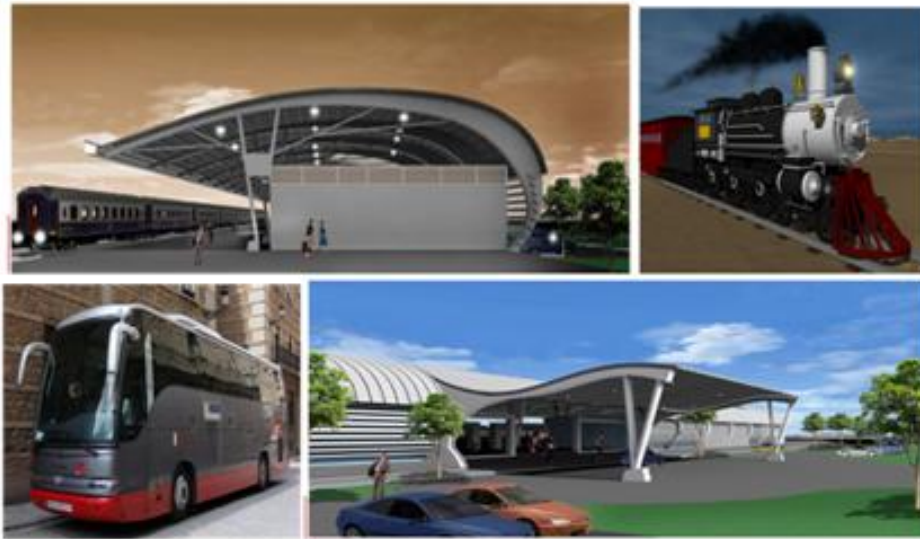


PRE FEASIBILITY REPORT
FOR
DEVELOPMENT OF INTERMODAL TRANSIT HUB
ON PPP FORMAT AT YELAHANKA, BANGALORE
TO



INFRASTRUCTURE DEVELOPMENT DEPARTMENT

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SUBMITTED BY:



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1. Introduction

1.1. Background

Infrastructure Development Department (IDD), Government of Karnataka (GoK) is the Infrastructure arm of GoK with the primary objective of facilitating development of infrastructure projects across the Karnataka state.

IDD on discussions with project advisors empanelled with the department, including KSIIDC-IL&FS Project Development Company (KIPDC) has identified a pipeline of infrastructure projects to be taken up across the State. Having realized the significance of developing infrastructure in the State and special emphasis to the Urban infrastructure, IDD has proposed to develop Intermodal Transit Hubs (ITH) at various locations across Bengaluru, to be developed on Public Private Partnership format.

In this regard, pre-feasibility studies for each of the locations across Bengaluru has been proposed at a meeting held on 6th January 2010, under the Chairmanship of the Principal Secretary-IDD, attended by all the concerned public transportation agencies of Bengaluru. The five locations selected for the Pre-feasibility study includes Yelahanka, Yeshwanthpur, Peenya, Baiyyappanahalli, Hebbal & Mysore Road, Bangalore.

IDD has appointed KSIIDC-IL&FS Project Development Company Limited (KIPDC), vide its letter no.: IDD 107 ITS 2009 dated 12-04-2010, to undertake the Pre-feasibility study for the **Development of Intermodal Transit Hub (ITH) at Yelahanka on PPP format** (hereinafter referred to as the "Project"). The objective of this prefeasibility study shall be to assess the broad project viability for development on PPP basis and to identify the key issues in developing the Project as well as the extent of property development that would be required to be leverages to address the viability of the project.

The Inception report submitted earlier for Yelahanka location focused on the conceptual framework and methodology which has been used in preparation of this Pre-feasibility study. This pre-feasibility report lays emphasis on the feasibility and financial sustainability of the project to be implemented on PPP format.

1.2. IDD's Objective

IDD's objective towards preparation of the Project pre-feasibility is:

- To explore the possibilities of development of the project identified on PPP basis
- To assess the preliminary project viability for development on PPP basis and the extent of property development to be leveraged for addressing the commercial viability of the Project on PPP format.
- To identify the project stakeholders including the project sponsoring department and advice them on taking up the project
- Development & time bound implementation of the project of the government with private sector investment
- Development, operations and maintenance of the project in a planned manner with modern amenities and requisite supporting infrastructure by reputed developers without utilizing government resources of manpower, funds, etc
- To structure a viable and bankable project amenable for PPP and explore project funding through private sector developer
- To expedite project implementation by leveraging private sector efficiency

1.3. Role of KSIIDC-IL&FS Project Development Company (KIPDC)

The role of KIPDC while carrying out the Pre-feasibility studies has been to:

- Conduct project pre-feasibility study for development of the proposed project on PPP at the identified locations and include the project concept, need for the project at the location, preliminary market / demand assessment, broad financial feasibility / viability, implementation framework, recommendation of nodal agency for the project at individual locations, role of nodal agency & IDD and way-ahead
- The Pre-feasibility essentially focuses on the viability of the project on PPP with / without State / Central Govt. support, segregation of project components

1.4. Approach & Methodology

Activities required to be carried out by KIPDC would include:

- Development of project concept
- Desk study for location(s) analysis, review of statistic / data already available
- Interaction with the head of respective Departments
- Preliminary project structuring and viability assessment
- Summarizing of the Pre-feasibility assessment in the form of a report along with recommendation to KIPDC / IDD
- Preparation of requisite presentations to IDD

As a part of the project documentation, KIPDC would submit the following to IDD:

1. Inception Report (*submitted on April 23, 2010*)
2. Draft Pre-feasibility Report
3. Presentation on Draft Pre-feasibility Report
4. Final Pre-feasibility Report

2. Infrastructure in Bengaluru

2.1. Overview

Bengaluru, the capital of the Indian State of Karnataka, is located on the Deccan plateau in the south-eastern part of Karnataka. Bengaluru is India's third most populous City and the fifth-most populous urban agglomeration. It is positioned at 12.97°N & 77.56°E and covers an area of 741 sq. km. The majority of the city of Bengaluru lies in the Bengaluru urban district of Karnataka and the surrounding rural areas are a part of the Bengaluru rural district.

Today as a large growing City, Bengaluru is home to many of the most well-recognized colleges and research institutions in India. Bengaluru, known as the Silicon Valley of India for being the nation's leading IT exporter, is also the playground of many Indian as well as multinational Information Technological (I.T.) and Bio-Technological (B.T.) companies. Numerous public sector heavy industries, aerospace, telecommunications, and defense organizations are located in the City. A demographically diverse City, Bengaluru is a major economic and cultural hub and the fastest growing major metropolis in India.

Bengaluru has made a niche for itself in the international arena in terms of this growth, and with major players in the IT industry gaining foothold here, Bengaluru has come to be best known within India for being the country's un-official high-tech capital.

The growth of Bengaluru from a town to a metropolis has been a result of five growth events:

- Shifting of state capital from Mysore
- Establishment of the Cantonment
- Setting up Public Sector Undertakings / Academic Institutions
- Development of Textile Industry, and
- Development of Information Technology/ITES/Biotech based industries

With an economic growth of 10.3%, Bengaluru is the fastest growing major metropolis in India. Additionally, this city is India's fourth largest fast moving consumer goods (FMCG) market. The city is the third largest hub for high net worth individuals and is home to over 10,000 dollar millionaires and about 60,000 super-rich people who

have an investable surplus of Rs. 4.5 crore (US\$ 1 million) and Rs. 50 lakh (US\$ 111,500) respectively. As of 2001, Bengaluru's share of Rs. 1,660 crore (US\$ 400 million) in Foreign Direct Investment was the fourth highest for an Indian city. With its encouraging policies and favourable environment, the city has attracted investors and has seen a steady increase in FDI inflow in recent years.

Economic Snapshots

Area (sq km)	741 sq. km.
Population (Census 2001, million)	5.80
Projected Population (2008, million)	8.01
Literacy Rate (%)	83%
Per Capita Income (US\$) (2007-08)	1087
Software Exports (US\$ billion)	13.50
Workforce (Techies) (in lakhs)	5.55
National Highways Length (km)	
International cum Domestic Airport	Bengaluru International Airport, Devanahalli
116 IT companies have been added to a total of 2000 IT companies 248 Business Process Outsourcing and 183 Bio Technology companies	

Bengaluru has emerged as one of India's fastest growing cities with respect to per capita income and exports as well. The per capita income for the city stood at US\$ 1087 for 2007-08 as against US\$ 942 for Karnataka State. The city has been a frontrunner in the IT/ITES space owing to an appropriate ecosystem for knowledge driven industries including proactive government, sector-friendly policies and a large pool of skilled manpower.

The headquarters of several public sector undertakings such as Bharat Electronics Limited (BEL), Hindustan Aeronautics Limited (HAL), National Aerospace Laboratories (NAL), Bharat Heavy Electricals Limited (BHEL), Bharat Earth Movers Limited (BEML) and Hindustan Machine Tools (HMT) are located in Bengaluru. In June 1972 the Indian Space Research Organization (ISRO) was established under the Department of Space and headquartered in the city.

The large number of information technology companies located in the city has contributed to about 33% of India's Rs. 144,214 crore (US\$ 32 billion) IT exports in 2006-

07. Bengaluru's IT industry is divided into three main clusters – Software Technology Parks of India (STPI); International Tech Park, Bengaluru (ITPB); and Electronics City. UB City, the headquarters of the United Breweries Group, is a high-end commercial zone. Infosys and Wipro, India's second and third largest software companies are headquartered in Bengaluru, as are many of the global SEI-CMM Level 5 Companies. Bengaluru is considered to be amongst the five largest technology hubs in the world.

In addition to the prominent industry names and fortune 500 companies operating in the city, there are a large number of small and medium size industries that contribute significantly to the economic base of Bengaluru.

The industry turnover and the employment base in various categories of industry are illustrated:

Size	Number	Investment (Rs million)	Job Opportunities
Small Scale	55,162	16,820	578,000
Medium & Large Scale	546	47,250	224,287
Mega	17	38,080	33,830

Source: JnNURM CDP

Given the above scenario, industrial/commercial employment is obviously the highest, at over 90%, while employment avenues in the rest of the sectors are relatively minor.

Further substantiation is illustrated in the table below:

Sector	No. of Workers	% of Total
Primary sector	5,000	0.80%
Manufacturing	254,000	43.36%
Electricity, Gas and Water supply	8,000	1.40%
Construction	6,000	0.99%
Transport, Storage and Communication	43,000	7.29%
Banking & Insurance	65,000	11.07%
Trade & Business	21,000	3.59%
Services	184,000	31.50%
Total	585,000	100.00%

Source: JnNURM CDP

The distribution of economic activities in the city reflects its history, its different stages of development as well as the underlying socio-spatial contexts. Several distinct areas or spatial groups emerge from the geographical distribution of activities of Bengaluru. These spatial groups are:

- The “Old Petta”, the historical heart of the city – Centre of trade (wholesale & retail activities)
 - Core area include Chickpet, Cubbonpet and other areas focus on silk, garments & jewellery
 - North west of Old Petta include Binnypet, Cottonpet and Srirampuram focus on activities related to transport services and agarbathi manufacturing
 - North of Old Petta include Cubbon park which houses the State’s administrative centre, and other large public facilities and universities.
- North- east of Bengaluru (Shivaji nagar & Russell Market) – 2nd Commercial hub of Cantonment area
 - East part of MG road have banks, head offices of companies and hotels
- North-west of Bengaluru (Peenya Industrial estate) – traditional small scale industries
- East of Bengaluru (Chennai railway line and Whitefield road) – International Technology Park Ltd. (ITPL) and logistic infrastructure facilities like CONCOR & Oil terminal.
- South-east of Bengaluru (Hosur road and Bommasandra) – Electronic City and industries oriented towards traditional activities.

The city’s software exports growth rate (11%) has dipped and is trailing way behind the rival cities of Tamil Nadu (37%) & Andhra Pradesh (41%). The main reason for Benagluru’s dismal performance may be the poor quality infrastructure. Huge capital investment is required in order to address and improve the conditions of dilapidated roads, Urban Infrastructure, Sewerage & sanitation, plentiful water and power supply.

2.2. Transport Infrastructure in the Bengaluru

Bengaluru is served by the newly built Bengaluru International Airport (BIA) which started operations from May 24, 2008. It has become the fourth busiest airport in India in terms of passenger traffic and the number of air traffic movements with about 300-315 per day. Yelahanka has become one of the fastest growing areas in the city due to the proximity to BIA.

Bengaluru has a formidable rail network system and is being connected by rail to most cities in Karnataka, as well as Mumbai, Chennai, Kolkata, Hyderabad, Bhopal, Mysore and other major cities in India. A rapid transit system called Namma Metro is being developed now and is expected to be operational by 2012. Once completed, it will encompass a 42.3 km elevated and underground rail network comprising 41 stations. It is expected to connect central locations in Bengaluru to Devanahalli and Chikballapur regions. The sprawling Rail Wheel factory is Asia's second largest manufacturer of Wheel & Axle for Railways and headquartered in Yelahanka.

Apart from this, a High Speed Rail Link (HSRL) is expected to be constructed between Airport and the city centre.

Buses, operated by Bengaluru Metropolitan Transport Corporation (BMTC), are the means of public transport in the city. BMTC operates Vayu Vajra Airport services buses from city centre to the Airport, Big 10 which are AC buses, and Suvarna & Pushpak which are non AC buses, on city routes. The inter city and inter State buses are operated by Karnataka State Road Transport Corporation (KSRTC) which have 6600 buses on 5700 schedules, connecting Bengaluru with other parts of Karnataka as well as other states. Auto-rickshaws and taxis, which are the intermediate public transport (IPT), are another popular mode of transit in the city.

2.3. Initiative in Urban Infrastructure

The growth of urban population in India has been extremely rapid. While the total population in India has grown by about 3.5 times in the last century, its urban population has increased almost 9 times over the same period. According to the 2001 census, India has a population of 1027 million with approximately 28% or 285 million people living in urban areas. The liberalization policies adopted by the Government of

India, is expected to increase the share of the urban population to about 40% of total population by the year 2021. It is estimated that by the year 2011, urban areas would contribute about 65 per cent of gross domestic product (GDP). Urban economic activities and higher productivity is contingent upon the availability and quality of infrastructure services such as power, telecom, roads, water supply and mass transportation, coupled with civic infrastructure, such as sanitation and solid waste management.

To ensure sustainable growth, Government of India has initiated the development programs for the urban sector in selected cities through Jawaharlal Nehru Urban Renewal Mission (JNNURM). The aim is to encourage reforms and fast track planned development of identified cities with focus on efficiency in urban infrastructure and service delivery mechanisms, community participation, and accountability of ULBs/ Parastatal agencies towards citizens.

The objectives of the JNNURM are to ensure that the following are achieved in the urban sector:

- Focused attention to integrated development of infrastructure services in cities covered under the Mission
- Establishment of linkages between asset-creation and asset-management through a slew of reforms for long-term project sustainability
- Ensuring adequate funds to meet the deficiencies in urban infrastructural services;
- Planned development of identified cities including peri-urban areas, outgrowths and urban corridors leading to dispersed urbanization
- Scale-up delivery of civic amenities and provision of utilities with emphasis on universal access to the urban poor
- Special focus on urban renewal programme for the old city areas to reduce congestion
- Provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply and sanitation, and ensuring delivery of other existing universal services of the government for education, health and social security.

Bengaluru is one of the fastest growing cities in Asia and one of the most sought after cities in India by people, companies, multinationals and tourists. The massive growth that the city has witnessed in the last decade is a clear indication of this city being developed to be on par with the most modern cities.

A number of infrastructure projects have come up in the city such as roads, highways flyovers etc easing the traffic and making travel a lot easier. While there is still a lot to be done with regard to the projected traffic demand, the Government has indeed been working at a great speed to bring Bengaluru on par with the great cities of the world.

Some of the infrastructure initiatives are:

- Railway under bridges at Cantonment, Frazer town, Yeshwantpur and Wheeler towns
- Railway over bridge at Mathikere and Marthahalli
- Flyover at Gali Anjaneya temple in Mysore road.
- Flyovers along Outer Ring Road
- Peripheral Ring Road
- NICE Corridor

2.4. Traffic Scenario

Bengaluru city has a population of 5.8 million according to the census statistics for the year 2001, as against the city's earlier population of 2.92 and 4.13 million in 1981 and 1991 respectively. This shows that the population is growing at a rapid pace and has nearly doubled in the last twenty years, and presently the growth rate is around 3.8% annually. The geographical boundaries of the city also are expanding fast, as evident from the census data, which showed the city areas as 386, 446 and 531 sq. km. during the years 1981, 1991 and 2001 respectively. With increasing population and reduced available land area the city's population density stood at 7983, 9260 and 10,710 persons/sq. km for the above corresponding period. It is further projected that the population size of Bengaluru Urban Agglomeration (BUA) will be around 7.8 million in 2011 and 11.0 million in 2021. A large city of this size and a rapidly rising population of the above magnitude, demands a whole range of civic services, including in the vital transportation sector.

The present public transport infrastructure of Bengaluru city is largely dependent upon the BMTC operated bus network facility, which is the mainstay for a population size of nearly six million. In Bengaluru, there is a preponderance of private transportation – mainly consisting of two wheelers and three wheelers, besides a good number of four wheelers and light vehicle population. Given this scenario, Bengaluru city is also being promoted as a high profile investment destination by Government, Private industries and Multi-Nationals and the good response thus received, has resulted in a chaotic situation as far as Urban Transport Sector is concerned.

A traffic density survey conducted for evaluating the traffic pattern scenario helps in determining the congestion status of the road network. The present vehicular fleet on Bengaluru roads is around 1.8 million vehicles traversing in the city area which would be difficult to survey and hence at chosen key locations along the corridors, field survey teams carried out traffic census during peak and off peak hours of the day for different categories of vehicular flow in the area. The collected field statistics were analyzed and compared with the congestion index available for the city. The derived Congestion Index (CI) indicated far above the limiting value of 1.0. This is evident from some of important road links in the city network which are given in the table below.

Name of the road	Peak Hour service volume	Practical Capacity	Congestion Index
Platform Road	14,375	2,486	5.78
Seshadri Road	10,105	3,813	2.65
Race Course Road	7,375	1,371	5.38
Subedar Chatram Road	5,934	2,057	2.88
J.C. Road	11,813	4,971	2.30
Dickenson Road	5,511	1,971	2.80
Airport Road	7,767	2,900	2.68

The traffic pattern surveys along the proposed corridors brought out clearly the composition of vehicle population plying on the city roads. From the survey data, it was evident that the two wheeler population almost always exceeded 50% at most survey points, while the three wheelers were typically around 20%, which together accounted for over 70% of the total vehicle population and the rest accounted for by cars and

HMV. These findings have helped to confirm the total inadequacy of the present public transport system operating in the city.

As a sequel to this and to meet the genuine needs of a rapid, efficient and convenient mode of city transport, there is a growing trend to use personalized vehicles in Bengaluru with attendant problems of high road congestions, large fuel consumption, heavy air pollution levels, besides growing number of accidents on the road. To address these problems singularly and collectively in order to bring in considerable relief to the travelling public, the Government of Karnataka has desired to introduce a Metro rail system for the benefit of the city's commuting population on the lines of the Metro rail at Delhi and a High Speed Rail link (HSRL) connecting the city centre with the Bengaluru International Airport.

3. The Concept: Intermodal Transit Hubs

3.1. Background

The government of Karnataka (GoK) has been very proactive and has brought in a number of new initiatives for growth and development of the State. The efforts being taken up for the city of Bengaluru is particularly commendable. Bengaluru city was originally developed as a Garden City and has now transformed into an industrial and software hub. Most of the development has happened on the outskirts of the city and has caused an urban sprawl around, to some extent lop sided towards south and east.

However, rapid growth in the development, economic activity, and in turn population in Bengaluru, brought to the fore increasing traffic and transportation problems due to the gap between demand and supply of transport system. For Bengaluru, the modal shift in favour of mass transport system is not only poor but declining. As a result, there is tremendous increase in the use of personalized vehicles. To further aggravate the situation, the carrying capacity of the roads has not kept pace with the growth and hence leading to congestion, increased air pollution and accidents. The use of personalized vehicles should be regulated through Low cost Transportation systems and management techniques. An **Intermodal Transit system** is the need of the hour for a city like Bengaluru. It is a network that links all of the city's public transport services together.

In an Intermodal Transit system, the urban transport system should complement and not compete with the other services/ components of the systems. Mere introducing of new modes of public transport system will not do the trick, unless a good connectivity is not established between the various modes of transport. As per the opinion of experts in the Urban Transportation systems, poor modal connectivity is a significant barrier to intermodalism just as in freight transport, leading to commuters opting out of public transport system. Too often, the bus station is 1 km away from the commuter rail station, or the transit line stops at the airport, but too far away to walk to the terminals.

- Addressing the above issue of poor modal connectivity, Intermodal surface public transport stations represent a rapidly evolving and developing concept.
- In an Inter modal Transport system, the different modes of transport such as Buses, Trains, intermediate transport networks like auto rickshaws, private vehicles, etc. are linked to enable commuters to travel within the city in the least possible time and at lower costs.

- The Intermodal transit hub will be developed as a publicly owned and operated central transit passenger transfer facility which services rail, bus, shuttle, taxis, bicyclists and pedestrians. Apart from this complimentary land uses such as offices, restaurants, commercial & retail sales and service, bus line terminals, bus line yards and repair facilities and taxicab facilities may be provided to make the project viable.
- The development of the Transit centre becomes a destination by itself as the future Central Business District “CBD”.

Thus, on a whole Intermodalism is an important feature of today’s transportation systems worldwide. In recent years, there has been an increasing emphasis placed on the development of intermodal transport centres as tools with which to improve urban mobility. Specifically this activity is highly critical in the developing countries, where a majority of residents use transit and where an effective system of transfer centres could improve intra-urban mobility and give low-income residents better access to economic opportunities. The facility may be complemented with a commuter lifestyle space where utilities like offices, restaurants, commercial & retail sales and services are offered to the commuters.

3.2. Intermodal Transit hub – *the Concept*

An intermodal facility can be defined as a place where interface occurs between transportation systems. In a passenger terminal, people enter the facility by one mode of access (e.g. by car, by bus or rail, etc.) and leave by another. The term “**Intermodal Transit Hub (ITH)**” is generally applied to a terminal that serves multiple transit operators and/or modes, such as combined bus and rail systems such as Metro and HSRL services along with the intermediate public transport network. The figure below depicts a Multi/inter modal corridor in an Urban regional centre

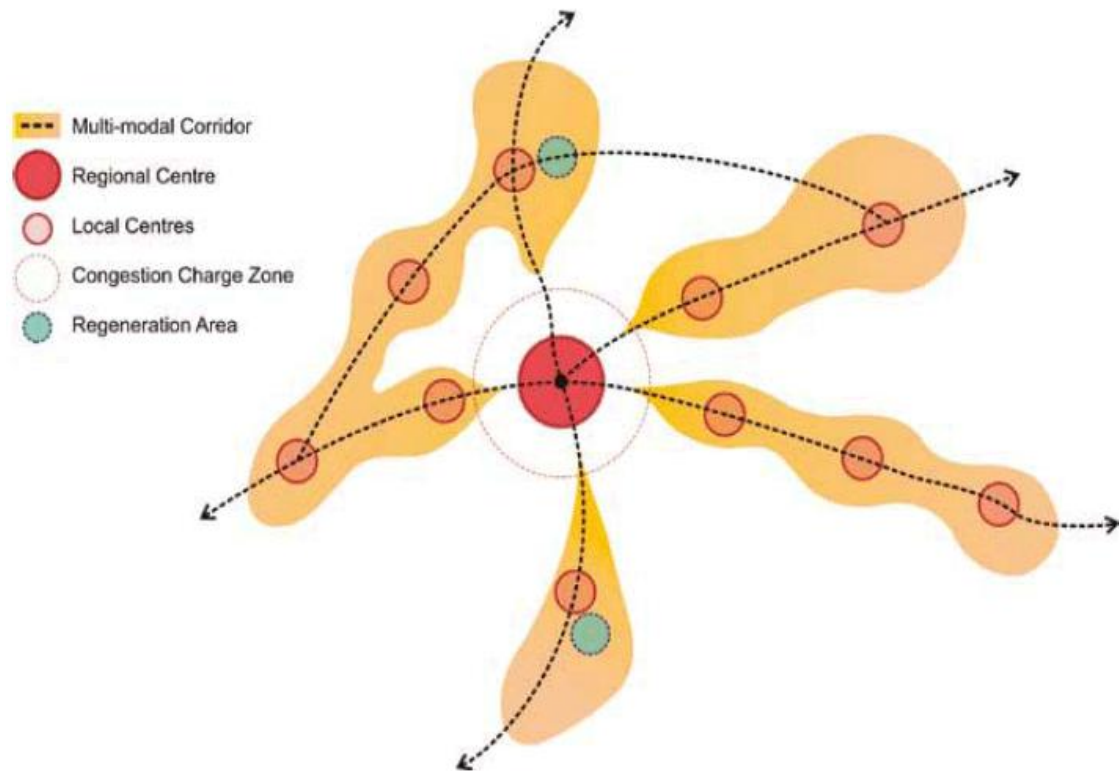


Figure 1: Multi / Intermodal corridor

Intermodal Transit hubs are a particularly strategic consideration in the present scenario of traffic growth and congestion in roads in Bengaluru. An Intermodal Transit Facility gathers many modes of transportation together and is strategically located so that the commuter has different transit alternatives to reach the destination. It describes an approach to planning, building and operating the transportation system, emphasizes optimal utilization of transportation resources and connections between modes. One of the objectives of an Intermodal transit hub is to minimize the cost and inconvenience of changing transit systems by a commuter.

The intermodal hub is a major transportation centre generally characterized by a large footprint, many thousands of users, multiple modes of transportation and serving large portion of the city area, regional center, park-and-ride activity, transfer between bus and possibly other modes and includes a building that functions as a transit centre. A well-designed ITH should fit within the fabric of the entire transport system of the region.

3.3. Need & benefits of Intermodal Transit Hub

An Intermodal Transit Facility gathers many modes of transportation together and is strategically located so that the commuter has different transit alternatives to reach the destination. It describes an approach to planning, building, and operating the transportation system, emphasizes optimal utilization of transportation resources and connections between modes. One of the objectives of an Intermodal transit hub is to minimize the cost and inconvenience of changing transit systems by a commuter.

The benefits derived from effective intermodal co-ordination:

- Lowering transportation costs by allowing each mode to be used for the portion of the trip for which it is best suited
- Increasing economic productivity and efficiency, thereby enhancing the Nation's global competitiveness;
- Reducing the burden on overstressed infrastructure components by shifting use to infrastructure with excess capacity
- Generating higher returns from public and private infrastructure investments
- Improving mobility for the elderly, disabled, isolated, and economically disadvantaged
- Reducing energy consumption and contributing to improved air quality and environmental conditions.
- It introduces Single ticket travel which in turn enables easy movement from one mode to another.
- Reducing Land take for road operations and common amenities & maximizing opportunities for shared facilities and synergies
- Minimizing potential phasing impacts by reducing the number of components that need to be accommodated and avoiding duplication of facilities.

3.4. Intermodal Transit Hubs (ITH) on PPP

ITH facilities are expensive and require massive mobilization of resources for investments that have long gestation periods. Urban transport also has an inherent imbalance as it involves carriage of high volume of traffic during peak hours whereas during rest of the day, it is underutilized. This affects the economic viability of the system adversely.

The development of the project can be envisaged on Public Private Partnership basis wherein the private sector player shall develop, operate and manage the facility for a

predetermined time period. Commercial viability being the key to the success of any PPP project, the viability of Intermodal Transit Hubs in the urban sector can be ascertained with the following as main streams of Revenue:

- Revenues from the commercial space and other facilities provided at the ITH
- Levy of user charges to transport service providers including Government inter and intra state services, private/ Omni buses, taxis, Autos etc
- Levy of Parking fee for buses and other vehicles using the proposed parking facilities
- User charges for other miscellaneous services like day/ night parking, vehicle repair/service facilities, etc for buses, cars etc
- Revenue from advertising (at the intermodal hub premises, on parking fee tickets, interior walls, parking spaces and subway etc)

The Project could be implemented on a PPP model by selecting a developer through a transparent open bidding process who would be responsible for the design, development, finance, construction, marketing, sub-lease and maintenance of the common area and facilities of the property.

The subject site for the construction of Intermodal Transit Hub can be leased out for a pre-agreed number of years to the successful bidder by Government for an agreed upfront lease premium, an annual license fee and /or on any other feasible option derived as per detailed studies.

4. Proposed Project

4.1. Project Area - Yelahanka

Yelahanka is one of the oldest towns in Karnataka and is believed to have a history of more than 500 years. It was ruled by a king called Kempegowda (under a provision given by Krishnadevaraya) who built Bengaluru City.

Yelahanka is a suburb of Bengaluru in the Indian state of Karnataka originally envisaged as a satellite town of Bengaluru city and is now part of the Bruhat Bengaluru Mahanagara Palike. It has several Churches and Temples, some of which are several centuries old.

As of 2001 India census, Yelahanka had a population of 93,263. Males constitute 54% of the population and Females 46%. Yelahanka has an average literacy rate of 75%, higher than the national average of 59.5%.

Yelahanka, covering an area of 38.71 Sq. Km, is situated on the northern periphery of the city of Bengaluru, India. It is chiefly bifurcated as Old Town & New Town. Yelahanka has

the Largest Milk Dairy in whole of Karnataka State. It also houses the Rail Wheel Factory (formerly Wheel & Axle Plant).

Attur Layout and Bommsandra Cross are major transit points in Yelahanka. Astra Zeneca Pharmaceuticals,

Gogo International, Federal-Mogul Goetze (India) Limited (formerly Escorts Mahle Goetze), Ranflex India Pvt. Ltd. and Hobel Flexibles Inc., a 100% Export Oriented Unit area domiciled here and it also houses many educational institutions.



Yelahanka is also the place with the most number of International Schools in Karnataka. Indian Air Force Station has a big establishment spread through the Yelahanka area, which caters to many activities of the IAF. Apart from this Border Security Force also has an important establishment in the area.

The predominant Land use of Yelahanka is agriculture, which covers 43.3% of the area. Residential use cover 11.1% and industrial use is 5%. The natural drainage system consisting of valleys running North-South between the Yelahanka and Puttenahalli lakes is mostly preserved except for an area south of the Yelahanka Kere which is encroached by residential development. Areas in the North-west, along Doddaballapur road are undergoing major transformations with the building of large apartments. Within the large plantations beyond the urbanized areas, several small residential layouts are cropping up. The satellite town is equipped with a treatment plant and has a good water supply. The main water supply to the Yelahanka town comes via the GKV Kendra system. National Highway Bellary road (NH-7) is the main North-South axis running through this area. A portion of the highway North of the railway line is widened to four lanes. It links to the state highway Doddaballapur road (SH-9), which leads to the North-west, to Hindupur. Two railway lines go through this area and there is a railway station located close to the junction of Bellary road and Doddaballapur road.

The main traffic is on Bellary road (NH-7) which carries 40,000 to 65,000 PCUs a day. The southern part of Yelahanka has the largest volume of traffic. A part of the traffic is transient in nature and has increased considerably after the development of the new International Airport.

4.2. Proposed Project - ITH

Intermodal Transit Hubs (ITH) is proposed to be implemented on PPP basis across many locations in Bengaluru and accordingly an ITH has been planned to be developed on a site in Yelahanka. The site identified adjoins the service road of Yelahanka bypass on the front side, a plot owned by Reliance on the left side of the plot and private farms on the other two sides.

The subject Site has been identified for acquisition for the Bangalore Airport Rail Link (BARL), for construction of a High Speed Rail Link (HSRL) Station. Now, considering the

interface of multiple modes at Yelahanka, an Inter Modal Transit Hub (ITH) with the other project components being Bus Terminal & repair shop, Metro Station, Multi level parking and property development is also being considered for development.

4.3. Location & Site Assessment

The site is about 100-200 mts away from an important junction on NH-7 - “Kogilu Cross”. A state highway SH-104 also adjoins the plot for the proposed project on the right side.



Figure 2: Areal view of site with major landmarks



Figure 3: Areal view of the proposed site

Approach to the site: The site does not have a regular shape and has an area of approx. 24 acres. The site is located close to the Yelahanka bypass and the plot has a complete frontage (on one side) from the NH-7. The NH-7 connects the site to the Bengaluru city center and the newly built International Airport.



Figure 4: NVM Kalyana Mantappa

On-site features: The site for the Project is plain terrain and is left vacant. It is flanked by private farms on two sides and a National Highway (NH-7) on the front.

Off-site features: Nehru nagar locality is on the southern side of the plot. The main junction on the NH-7 “Kogilu Cross” is adjacent to the plot. Adjacent to the site area is a Kalyana Mantappa and a Yelahanka Merchant Finance Company.



Figure 5: Yelahanka Merchant finance company

Applicable Development controls for the Project:

Area of the site	24 acres
Permitted Ground Coverage	45%
FAR	4 <i>(Since Metro station is also proposed for the project)</i>
Parking	

Height Restriction	The proposed facilities such as Bus Terminal, Metro and HSRL are proposed one on top of the other and require enough height separation.
Setbacks (all around setbacks)	As per applicable Zoning Regulations: Above 30 mts - 11 mts Above 40 mts - 13 mts Above 50 mts - 16 mts
When Multi Level Car Parking (MLCP) is proposed on a plot as independent activity, there shall not be any limitation of FAR or height of building subject to condition that it satisfies fire and airport authority restrictions where ever applicable.	

4.4. Transportation Environment in the area

- The entire Yelahanka area comes under Bruhat Bengaluru Mahanagara Palike (BBMP) jurisdiction.
- Thus, Bengaluru Metropolitan Transport Corporation (BMTc), which is the agency that operates the public transport bus service in Bengaluru, has a vast network of buses within the Yelahanka area
- Similarly, Karnataka State Road Transport Corporation (KSRTC) operates intra-state buses across the State.
- KSRTC and APSRTC both run inter-state bus services between the two states namely Karnataka and Andhra Pradesh. Buses pass through Rayadurga, Puttaparthi, Mantralaya via the Yelahanka bypass.
- Many of BMTc & KSRTC buses ply though the Yelahanka area via Yelahanka bypass (which is passing through one side of the site).
- Intermodal Transport hub gives a huge boost in terms of need and demand with such an extensive network of buses plying in the area.
- The area also lies en-route the newly built Bengaluru International airport.
- The Yelahanka Railway station is one of the oldest in South Asia. It was built in the years from 1913 to 1918 as part of the Kolar-Chintamani-Chickballapur-Bengaluru line.
- Yelahanka railway station is also very near to the identified site. The railway junction is an important landmark from the perspective of the passenger trains going towards Andhra Pradesh, Orissa etc.

Bengaluru Metropolitan Transport Corporation (BMTC) also services the transport needs of the urban and sub-urban population in and around Yelahanka area. Despite the differentiated base of the commuting population, BMTC reaches far and wide, in every nook and corner of the area making public transport an attractive travel choice for everyone.

Details of buses plying in the Yelahanka area via Bellary Road & Yelahanka Bypass have been provided in the Inception report.

The Yelahanka Railway station is very close to the identified site for ITH near Kogilu Cross and is not more than 1 km away. Many trains pass through the Yelahanka junction which includes important superfast & express trains.

Apart from this being busy station, Yelahanka Railways also have a factory of national pride, Rail Wheel & Axle factory. Rail Wheel Factory (RWF) at Yelahanka, Bengaluru is a premier manufacturing unit of Indian Railways, which is engaged in the production of wheels, axles and wheel sets of rail-road wagons, coaches and locomotives for the use of the Indian Railways and selects overseas customers. The factory employs more than 2000 personals.

A High Speed Rail Link (HSRL) is proposed from the International Airport to the Police Ground situated between M.G.Road and Cubbon road (city centre) at Bengaluru. This is expected to be operational by mid 2012. The expected route length for the proposed HSRL is approx. 33.65 km. With the HSRL becoming operational, the travel time from Police Grounds to International airport will be hardly 25 mins.

The HSRL stations are proposed to be located at:

Sl. No.	From	To	Time taken to travel
1	Police Grounds	Hebbal	4 minutes
2	Hebbal	Yelahanka	5 minutes
3	Yelahanka	Bengaluru International Airport	10.5 minutes
4	Total time from Police Grounds to Airport including halt at Hebbal & Yelahanka		25 minutes

According to the traffic forecast by Bengaluru International Airport Limited (BIAL), the air traffic will be 17.2 million passengers p.a. in 2010-11. As per ridership forecast, about 40%

of this figure will be using HSRL. The all day station loadings have been provided in the table below:

All Day Station loading	2011		2016		2021		2026	
	Police Ground to Airport - IN	Airport to Police Ground - OUT	Police Ground to Airport - IN	Airport to Police Ground - OUT	Police Ground to Airport - IN	Airport to Police Ground - OUT	Police Ground to Airport - IN	Airport to Police Ground - OUT
Police Grounds	18,925	17,187	28729	26343	44853	41745	71268	65083
Hebbal	1702	1,546	2580	2,366	4028	3749	6400	5844
Yelahanka	730	663	1101	1010	1720	1601	2734	2496

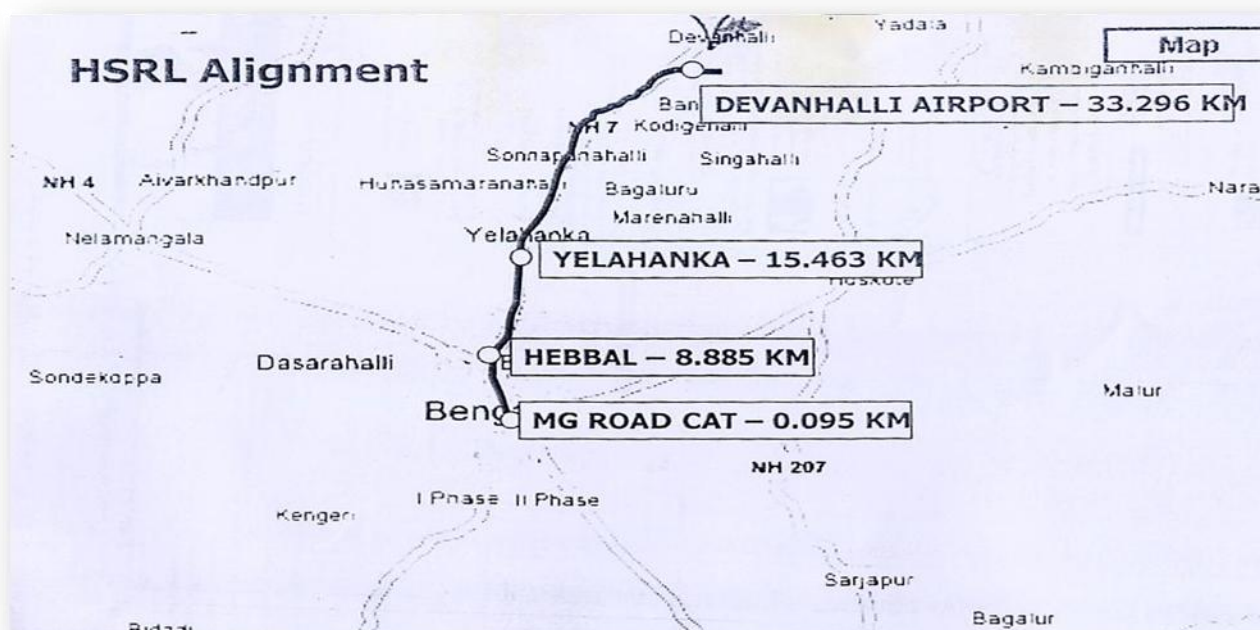
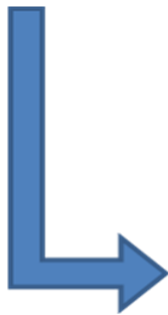


Figure 6: HSRL alignment from MG road to Devanahalli

4.5. Tentative Components of Intermodal Transit Hub at Yelahanka

The development of an Intermodal Transit Hub would include the following project components:

4.5.1. High Speed Rail Link

**The HSRL facilities include:**

- ✓ City Airport Terminal and rail offices
- ✓ Waiting Rooms (AC & Non AC) and also separately for ladies, Cloak rooms
- ✓ Ticket Counters (*inclusive of automatic fare collection system*) / Information Kiosks / Enquiry
- ✓ Counters / Office Spaces for Airlines
- ✓ Baggage Scanning / Check- in counters
- ✓ Duty paid shops, Shopping centres, Foreign Exchange centres
- ✓ Food & Beverage outlets
- ✓ Budget Hotels
- ✓ Luggage Trolleys, Foot over bridges (*if necessary*)
- ✓ Barrier free access for differently abled passengers i.e. escalators / elevators (*if necessary*)

4.5.2. Integrated Bus Terminal

An integrated Bus Terminal would serve as a common facility to:

- Govt. owned inter-state / inter-city buses, viz: KSRTC, NEKRTC, NWKRTC, other State transport buses, etc.
- Private Bus operators (inter-state / inter-city)
- Local city buses viz: BMTC etc.

The Bus Terminal shall be a transit terminal and there shall be a repair shop at the Ground Floor. The components of the Bus Terminal shall include:

**-Bus Station Facilities**

- ✓ Bus bays – Intercity and Intra-city Buses
- ✓ Bus Parking Area (for each operator)
- ✓ Mini repair shop for buses
- ✓ Driver Retiring rooms / Cafeteria
- ✓ Administrative Offices (for each operator), security cabins,

-Passenger Facilities

- ✓ Ticketing Counters / Information Kiosks / Enquiry
- ✓ Passenger Concourse area
- ✓ Retiring / Waiting Rooms / Cloak Rooms

-Other Facilities

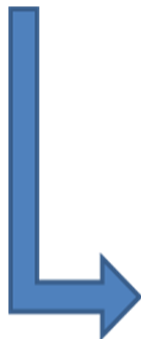
- ✓ Restaurants / Coffee Shops / Fast Food Outlets
- ✓ Commercial Outlets- Book Stores, Medical Shops, etc
- ✓ Bank & Finance companies / ATMs, Internet Cafes, / Business Centres, Stalls, etc

A mini repair shop can be included mainly for the buses plying on longer routes on user charge basis. This shall include:

- Small Workshop shed
- Washing platforms
- Crew rooms
- Office area for BMTC/KSRTC/NEKRTC/NWKRTC
- Diesel Fuel Station

4.5.3. State of the art Metro Station

A State of the art Metro Station, taking in to consideration the future development and expansion plans, is envisaged to be an integrated part of the project. The facilities in the Transit centre may also include specific areas allocated to cater to passengers commuting to the Airport. Parking facilities also need to be provided for the facilities mentioned above.



Metro station Facilities

- ✓ Ticket Counters/ Reservation counters (Bus & Rail) / Information Kiosks
- ✓ Waiting Lounge/ Cloak Rooms
- ✓ Pre-paid porter counters
- ✓ Restaurants/ Coffee Shops/ Fast Food Centres
- ✓ Commercial Outlets- Book Stores, Medical Shops, Souvenir Shops etc
- ✓ Luggage trolleys, Foot over bridges (if necessary)
- ✓ Access for disabled persons

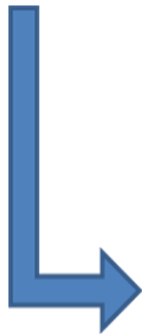
4.5.4. Intermediate Public Transport (IPT) system

Most of the passengers use intermediate public transport such as auto-rickshaws and taxis over short distances and on routes normally plied by a lesser no. of buses. Hence appropriate space need to be provided for this mode of transport within ITH facility.

4.5.5. Property Development – Commercial /Institutional /Office

The project being envisaged to be the centre of future development in the area, commercial development of the available FSI has been proposed, that would provide supplementary

services to the passengers traveling by Rail as well as Road. The following are possible developments that command a potential demand at the project.



The Property Development – Commercial / Institutional / Office

- ✓ Ticket Reservation Counters by private operators
- ✓ Tourism Counters
- ✓ Food & Beverage Outlets
- ✓ Shopping Centre
- ✓ Retail Hyper mart
- ✓ 3 Star Hotel
- ✓ Dormitory Accommodation
- ✓ ATMs / Bank Counters / Foreign exchange Counters
- ✓ Visitor Parking Facilities
- ✓ Skywalk / inter-Connectivity to Metro station, HSRL pick up station and Bus Terminal
- ✓ Office space/ area for IT, ITES, BPO, Institutions etc.

5. Infrastructure Planning

5.1. On Site

The proposed Intermodal Transit Hub (ITH) is proposed to be planned and designed as an iconic/ landmark building with contemporary innovative design subject to clearance from Air force authorities and fulfillment of other applicable norms/ laws/ rules such as set-backs, distance between buildings, etc. and such that the requirements of the HSRL route alignment are met.

The ITH shall be required to comprise of a State-of-the-art Bus Terminal, High Speed Rail and Metro Station. The Bus Terminal is expected to be in the Ground Floor and shall connect Yelahanka with various other nearby locations such Doddaballapur, Chikaballapur, etc. It shall also serve as pick up station for buses plying on longer routes i.e. to Hyderabad, Puttaparthi, etc. The Metro station is expected in the 1st floor which shall serve the requirements of commuters travelling to various localities within the Bengaluru city region. The High Speed Rail Link (HSRL), expected in the 2nd floor of the Project facility, shall connect the new International Airport with the Bengaluru city centre. This shall cater to passengers who would want to travel to the airport and the employees at the airport living in and around Yelahanka region.

The ITH is intended to facilitate transportation via the mode that enables travel in the least possible time and permitting easy shift to another mode when necessary. Hence, it is mandatory to provide easy connectivity among Bus Terminal, HSRL & Metro. All related internal and external services i.e. internal sanitary and plumbing, internal electrical services and installation along with electric substation; fire detection; fire alarm and fire fighting services; air-conditioning services wherever necessary; communication system and services; elevators/ escalators should be provided wherever necessary to enable easy access for disabled passengers.

Apart from the bus movement in the Ground floor, easy and separate circulation should also be provided for private vehicles, intermediate public transport such auto-rickshwas, taxis, etc. Adequate parking area shall also be provided for various components within the Project site. The parking norms as applicable for Traffic and Transport facilities shall be valid for the site.

Area Requirement for various components within ITH

Bus Terminal

The Bus Terminal facility shall include:

Sl. No.	Sub- component	Area required (in sq.ft.)
1	Enquiry Office & Ticketing counters	4,000
2	Tourist Information centers, Admin office, Security Cabins, office area for operators/ transport depts.	4,000
3	Passenger Concourse area	25,000
4	Waiting Halls (Gents & Ladies)	6,000
5	Repair shop area – <i>Shed, washing platform, crew rooms, generator room, tool & store room</i>	18,000
6	Fuel Station	6,500
7	Passenger Amenities – <i>Commercial area / space within Bus Terminal, Toilets, Cloak rooms – 1/3rd of the Bus Terminal area in a Mezzanine floor</i>	21,700
8	Total Area required for Bus Terminal along with repair area	86,700 (approx.)
9	Boarding Bays <i>(Demand Assessment provided below)</i>	37
10	Idle Bay parking	30

Demand Assessment for Boarding Bays in Bus terminal

The number of Boarding bays for Bus Terminal has been calculated based on the total bus schedules trips that service on the routes in and around Yelahanka region. The routes and the bus schedules have been highlighted in the previously submitted Inception report. BMTC, KSRTC, NEKSRTC, NWKSRTC, APSRTC are the agencies that operate public transport bus services on these routes. There are a total of 484 Bus schedules plying in the region now. Using the Bus schedules, the no. of trips has been derived assuming the total distance plied by a bus to be 280 kms. The total no. of trips are 1230.

The assumptions considered are:

- The Bus trips growth rate assumed is 5%.
The Bus trips in the region are expected to increase about 4 times to 4390 after 30 years. The growth rate has been taken, comparing the growth in Yelahanka region with the rest of Bengaluru. Another point that needs to be factored in is that, considering 5% growth rate for 30 years brings in the compounding effect which is a reasonable estimation for the 30 yr period.
- The time to Board a Bus – 9 minutes
- The time to Alight a Bus – 4.5 minutes
- Bus Terminal shall operate for approx. 16 hrs.
- The number of Boarding buses, a Bus Bay can handle is 107 and Alighting buses is 213.
- Of the total estimated no. of bus trips (5312), 50% i.e. 2656 is for Boarding and the remaining 50% for Alighting.
- From the above, the total number of Boarding bays is 25 and Alighting bays is 12. Hence total number of Bus Bays is $12+25 = 37$

The Area required per Bus bay is a minimum 76 sq.mt. as per Urban Development Plans Formulation & Implementation (UDPFI) guidelines. Hence the Area required for 30 Bus Bays is 30257.1 sq.ft..

The Area required per idle bus bay is 145 sq.mt. as per UDPFI guidelines. Hence the Area required for 30 Idle bus Bays is 46806 sq.ft..



High Speed Rail Link (HSRL)

The area requirement for various sub components within HSRL has been provided below:

Sl. No.	Sub- component	Area required (in sq.ft.)
1	Enquiry Office & Ticketing counters, Security Check in Counters,	25,000
2	Admin office, Security Cabins, office area for HSRL staff,	5,000
3	Waiting Halls (Gents & Ladies)	6,000
4	Platform Area (rationale for the same provided below)	1,13,000
5	Passenger Amenities – Commercial area / space within HSRL, Foreign Exchange counter, Air Booking, Pre paid Taxi counter, etc, – 20% of the total platform area	22,600
6	Total Area required for HSRL	1,75,000 (approx.)

Rationale for Platform area for HSRL

- The length of a coach for HSRL is 22 mts.
- The width of a coach for HSRL is 3.5 mts
- The total number of coaches expected is 4 which may increase to 6 later. Hence total length of a Train is 132 mts. (= 22 x 6)
- Passenger platform length considered is 150 mts and width considered is 35 mts
- Hence the total Platform area for a two way line is 1, 13, 000 sq.ft. (= 150 x 35 x 10.76 x 2).



Metro Station

The area requirement for various sub components within Metro station has been provided below:

Sl. No.	Sub- component	Area required (in sq.ft.)
1	Enquiry Office & Ticketing counters, Check in Counters	15,000
2	Tourist Information centers, Admin office, Security Cabins, office area for Metro dept..	5,000
3	Waiting Halls (Gents & Ladies)	6,000
4	Platform Area	1,13,000
5	Passenger Amenities - <i>Commercial area / space within Metro such as Shopping arcade, ATMs, Kiosks, refreshments stalls, Cloak rooms, Dormitories - 20% of the total platform area</i>	22,600
6	Total Area required for HSRL	1,60,000 (approx.)

The Metro Station may be envisaged at a later time after the setting up of above mentioned facilities.



Multi Level Parking

Passengers normally use transit modes other than Buses and trains, such as cars, two-wheelers and intermediate public transports like taxis and autos. So it is necessary to provide a facility that ensures easy circulation and parking of these vehicles.

The norms for parking requirements in a Traffic & Transport Land use area is 1 ECS per 100 sq.mt of built up area which requires a parking facility for approx. 1200 ECS. This parking facility should be connected to the Bus Terminal, HSRL & Metro Stations via Skywalks, Subways or Foot over bridges so that passenger circulation does not conflict with vehicle circulation.

Property Development - Commercial/ Institutional/Office area

It is necessary to optimize the level of property development to be allowed so as to ensure financial viability for the project. The various sub-components within this facility are:

Sl. No.	Sub- component
1	Commercial complex area – <i>Shops, Grocery stores, Restaurants, Food Courts, Super/Hyper markets,</i>
2	Other facilities – <i>Budget hotels, Banquet halls, Meeting rooms, Conference rooms, Hospitals, Nursing homes,</i>
3	Institutional area – <i>Educational Institutions, Colleges, Tutorials, R & D Labs and Test centers</i>
4	Office area – <i>IT, ITES, BPO, Consulting & Business offices, Financial Institutions</i>

The preliminary Concept Plan for the ITH project at Yelahanka has been shown below:

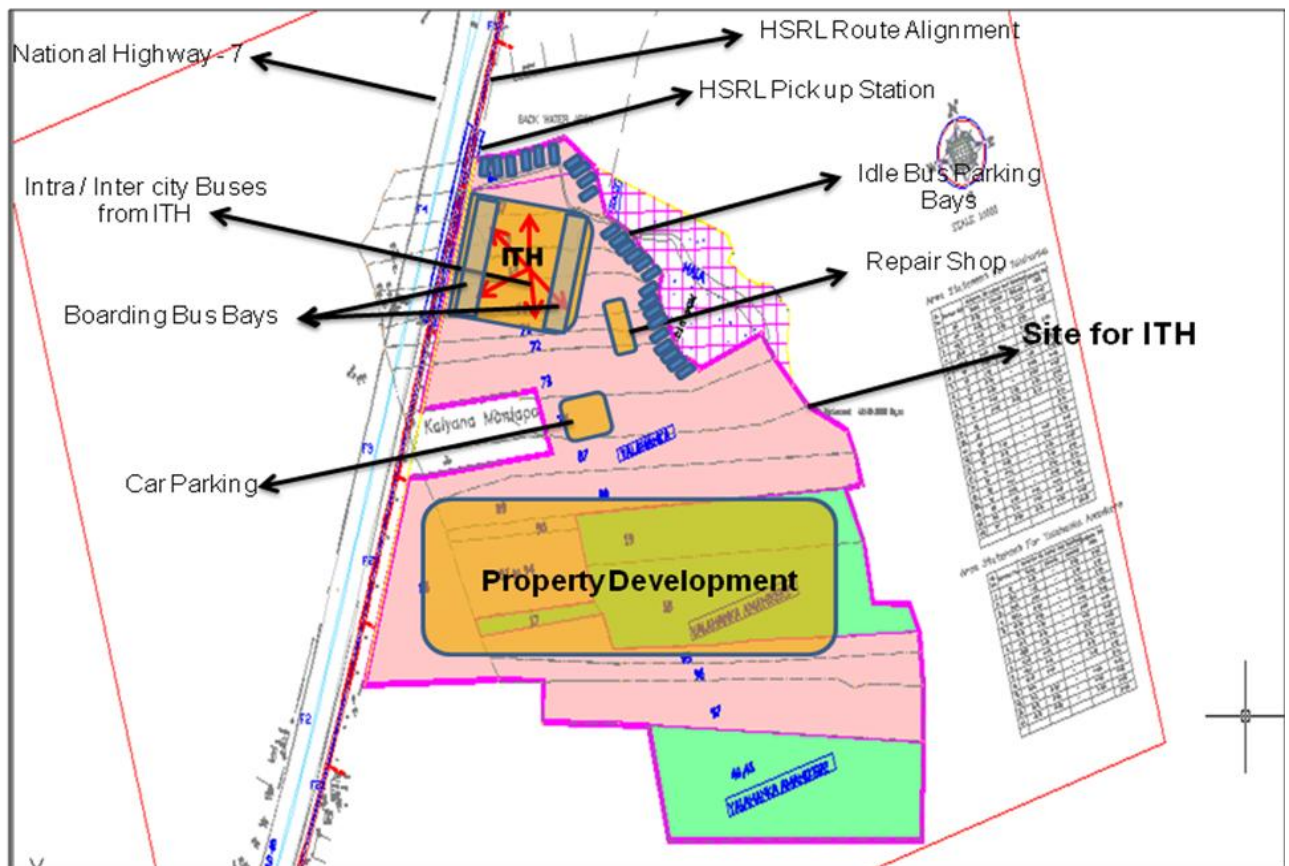


Figure 7: Project Site with major components

As, explained earlier, BARL to whom the site has been allotted, shall select a suitable private sector developer for the construction of HSRL pick up station along the route alignment as shown in figure. The developer shall also construct a Bus Terminal that includes all facilities for passengers, apart from Boarding Bays, Repair shop etc,. The developer shall also construct a Car parking facility and Property development just enough to make the project viable.

5.2. Off Site

A portion of the site is facing a service road to Yelahanka Bypass. The Entry/exit for users of the project facility shall be planned from this portion without causing any conflict to the traffic circulation of the region. Connectivity should be provided to the Yelahanka railway station from the site by Buses or IPT vehicles.

5.3. Entry & Exit Points

The entry/exit for private and intermediate public transport (IPT) vehicles movement shall be required to be separate from that for Buses. The 'Drive - way' concept shall be adopted wherein the private vehicle/ taxis carrying the passengers enters the Project site

through a drive way which leads to the passenger concourse of the Bus terminal, entrance to the Metro / HSRL pick up station. The private vehicles then move out of the drive way which is adjacent to the parking facility. The parking facility for the private vehicles and taxis shall be near to the entry/ exit of the drive ways. A foot over bridge / Subway may be provided at the parking facility so that passenger circulation does not conflict with the Bus and vehicle movement.

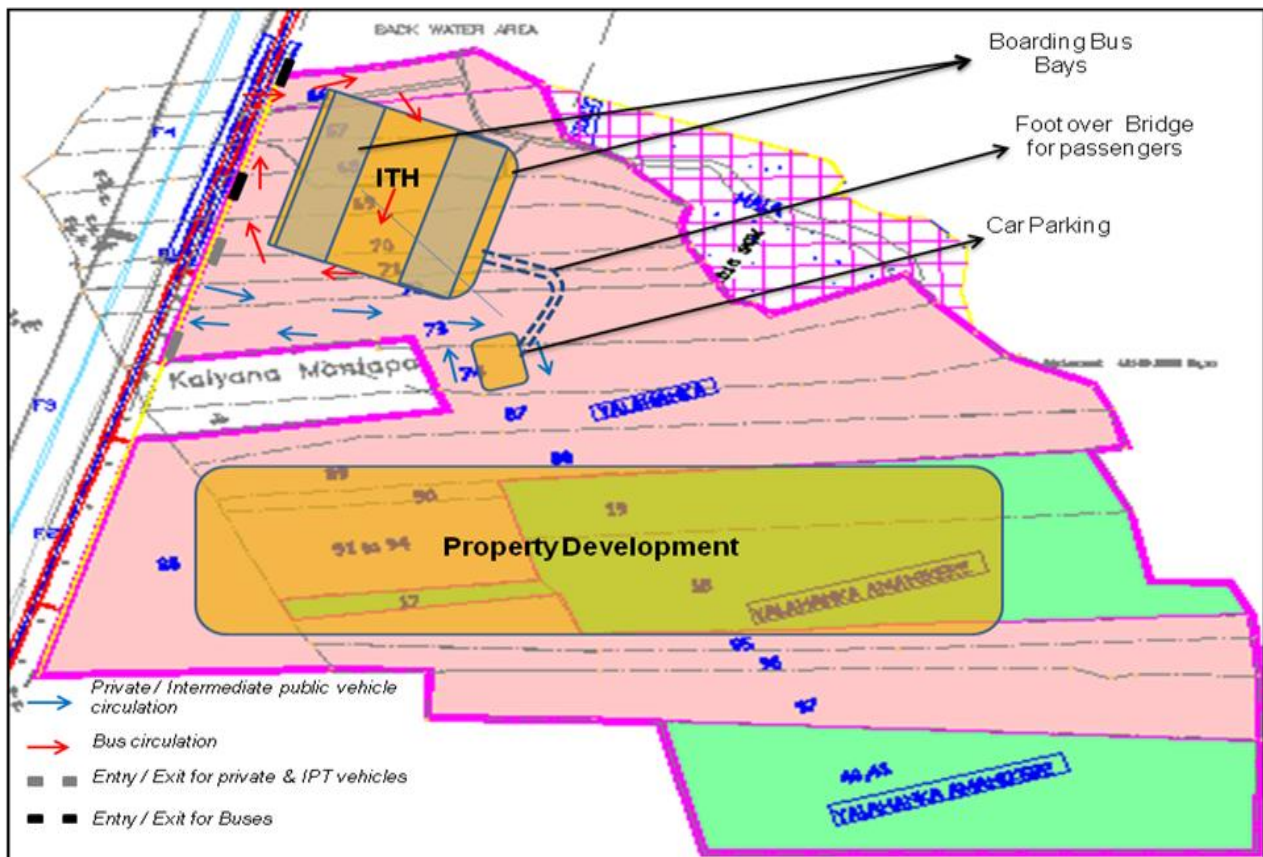


Figure 8: Entry / Exit and Internal circulation for the project

The Entry / Exit for both the Bus and private vehicles movement should be sufficiently wide so that vehicles clogging do not occur. The internal traffic circulation, depicted in the figure, is subject to change depending on the changes that may be required to be brought to external traffic flow mainly at the service road, Yelahanka Bypass and Kogilu Cross junction.

5.4. Traffic Circulation

Traffic circulation within the site has been illustrated in the figure in previous section. The external traffic circulation requires proper management considering the future growth prospects of the region. Vehicles entering the site from the direction of the new Airport and those leaving the site towards the Bengaluru city do not cause problems. However, for

vehicles entering the site coming from the city and vehicles leaving the site towards the new Airport require proper and easy access to the main road without causing any traffic disorder.

Accordingly, three options have been examined for proper administration of Traffic at the region.

External Traffic circulation - Option - 1

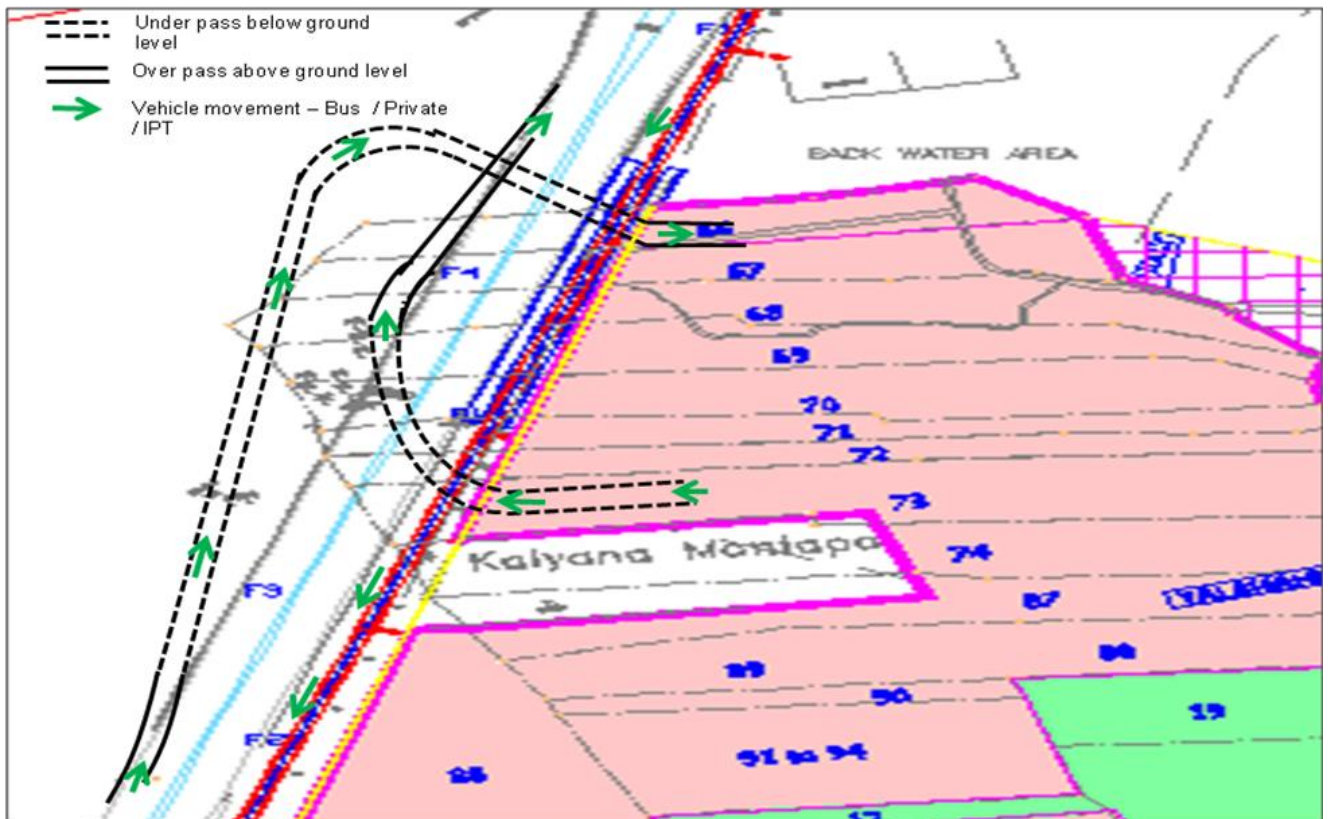


Figure 9: External Traffic circulation - Option 1

Option - 1 for the project, uses, the “Magic Box” or under passes for connectivity. All vehicles (Bus / private / IPT) shall service through the Under pass. Two Passes need to be constructed near the area of the Bypass having easy access to front of the site.

Advantages of this Option:

- Vehicle congestion may be avoided.
- Easy access for all vehicles to the Entry/ Exit
- No hindrance or obstruction to be caused to HSRL by construction of flyover.

Disadvantages of this Option:

- Construction of Underpass in this location is a costly affair as the Bypass as well as may not be technically feasible.
- Acquisition of extra land may be necessary for the project on the other side of the Yelahanka Bypass for vehicles to move easily.

External Traffic circulation - Option - 2

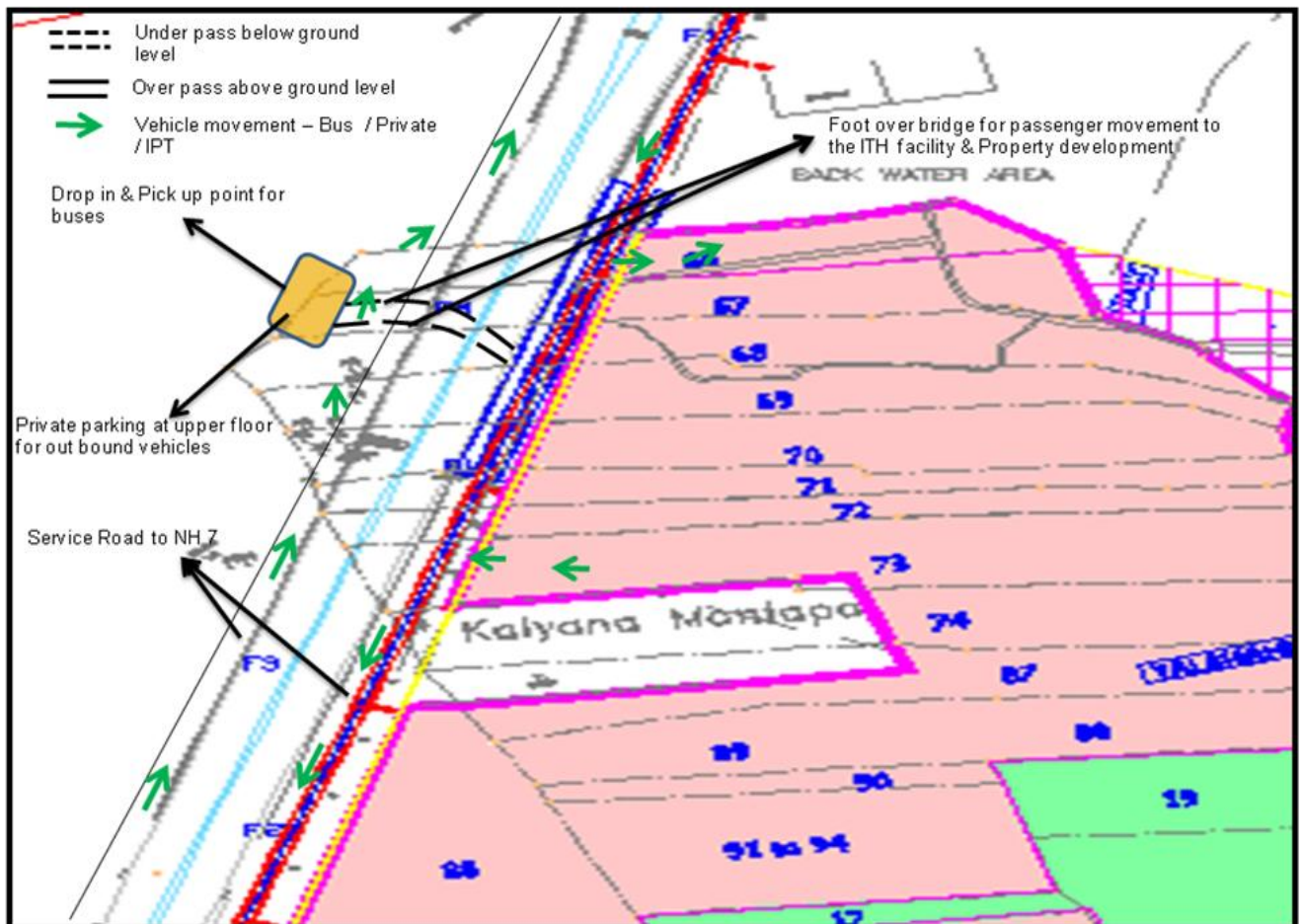


Figure 10: External Traffic circulation - Option 2

In this Option, a Drop-in cum Pick-up station and a Car parking facility is proposed on the other side of the Yelahanka Bypass for the buses and private vehicles respectively which are moving out bound from city. For the passengers alighting on the other side, to utilize the services of HSRL / Metro a skywalk or Over-bridge should be constructed over the Bypass. The service roads on both sides of the Bypass will be used by the vehicles for connectivity and hence widening of the same will be necessary.

Advantages of this Option:

- Vehicle congestion may be avoided.
- Easy access for all vehicles to the Entry/ Exit.
- No hindrance or obstruction to be caused to HSRL by construction of flyover.
- Less expensive than Option - 1

Disadvantages of this Option:

- Acquisition of extra land may be necessary for the project on the other side of the Yelahanka Bypass for vehicles to move easily.

External Traffic circulation - Option - 3

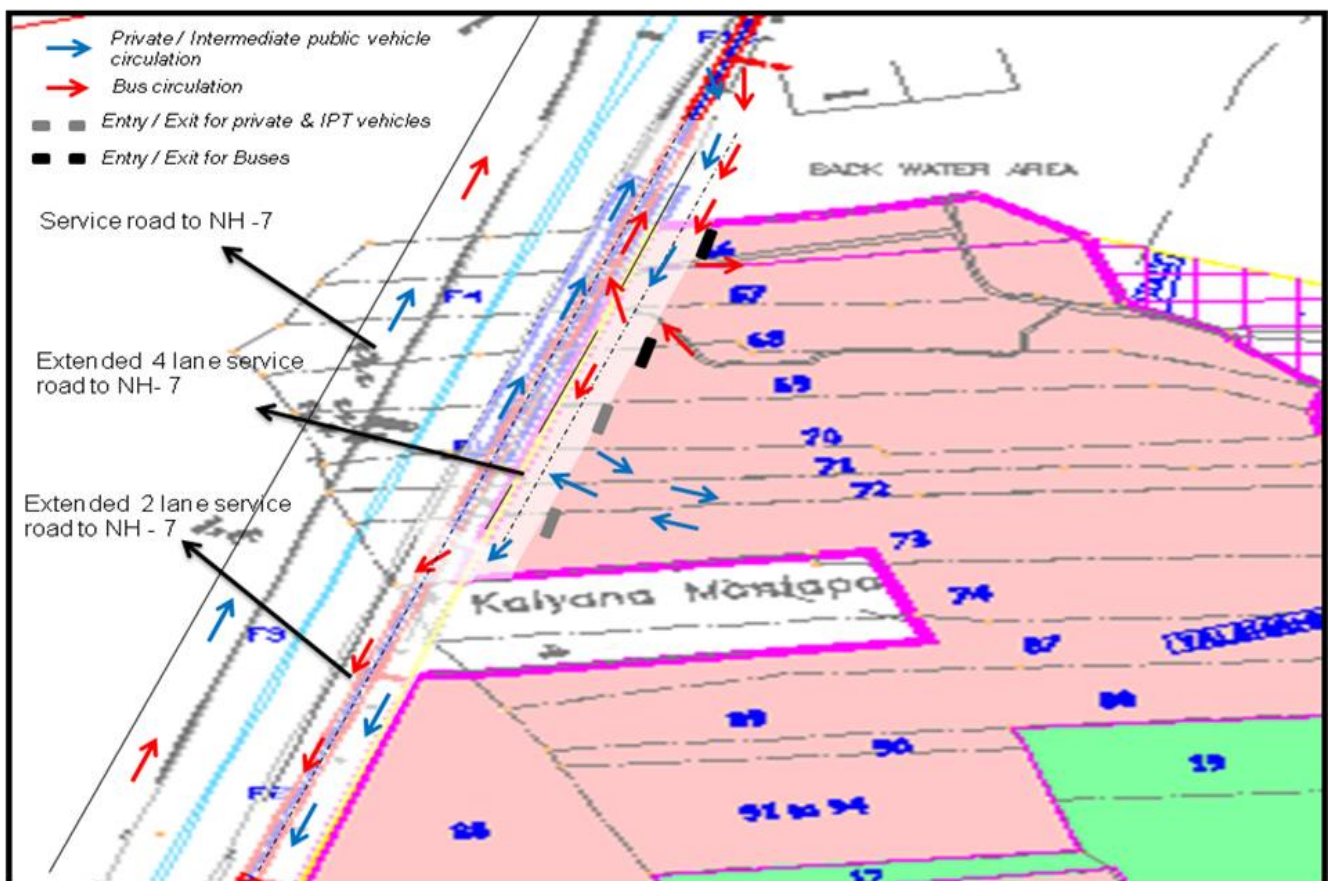


Figure 11: External Traffic circulation - Option 3

In this Option, the service road adjacent to the site need to be widened to a 4 way-lane enabling 2 lanes of road for each direction. With appropriate rotary systems being set up vehicle movement may be methodically arranged. The service may also require some widening, to a 2-way lane, from and beyond the Kalyana Mantappa towards the city region.

Advantages of this Option:

- Vehicle congestion may be avoided.
- Easy access for all vehicles to the Entry/ Exit
- No hindrance or obstruction to be caused to HSRL by construction of flyover.
- Less expensive than Option - 1 and Option - 2
- Acquisition of extra land not needed

Disadvantages of this Option:

- Heavy clogging of vehicles at the Kogilu Cross junction may ensue.
- Flyover may be necessary at Kogilu Junction in future leading to further increase in costs.

6. Critical Issues

Critical issues have been identified as part of the pre-feasibility study. These issues raised would be required to be addressed by the stakeholders prior to commencement of Project Development. The Critical issues are:

6.1. Land Acquisition

In order to undertake the envisaged development, land acquisition/ transfer from the private parties may be necessary. Apart from this, a portion of the land may come under the state forest land i.e. the **protected land** as per the guideline of City Development Master Plan (2007-2015) and needs to be confirmed. Hence, a Land Use change may be required. The land acquisition process will need to be expedited.

6.2. Location & Connectivity

The Entry/ Exit for the project site can only be provided at the Western side of the plot where access to all users i.e. Buses, private vehicles, intermediate public transport such as taxis, etc, need to be provided. This is the only side having a road adjacent to the plot and the other three sides are abutted by private lands. The road facing the side is a service road to the Yelahanka Bypass and has a narrow width.

The narrow width of the service road shall result in clogging of buses and other users of the facility once the proposed project is set up. In order to avoid congestion of vehicles at the entry/ exit, suitable traffic circulation measures have to be initiated.

To provide easy circulation and avoid clogging of vehicles at the site entrance, widening of the service roads might be a necessity.



Figure 12: Service road adjacent to the Yelahanka bypass

The coverage of ITH is restricted as the Railway station at Yelahanka is some distance away from the site and hence connectivity would have to be provided between the ITH and the station.

6.3. Capital Intensive

The envisaged project components for the project is expected to be capital intensive while the ITH & other ancillary facilities such as the car parking are not expected to be a major revenue generator for the Developer. It is only the property development that shall be a major revenue generator. However, it needs to be ensured that the risk - return tradeoff has been met.

7. Project Financials

7.1. General

The preliminary financial analysis for an Intermodal Transit Hub (ITH) has been carried out based on the assumptions arrived from preliminary market assessment carried out at Yelahanka.

The ITH is proposed to be developed with the state of art facility which integrates the High Speed Rail Link pick up station, Metro Station (proposed) and the Bus Terminal with linkages and connectivity to the National Highway / Major roads/ Ring roads.

The Railway Station at Yelahanka is hardly 1 km away from the site for the proposed facility and so may be connected via feeder buses. For the preliminary calculation of capital costs and operational costs, the development of the entire facility has been considered except the Metro Station. This includes:

- State of Art High Speed Rail Link (HSRL) pick up station and passenger amenities within this facility
- Bus terminal with Bus bays for transit operations and passenger amenities
- Repair shops for buses and Idle parking bays
- Adequate Parking for Intermediate public transport and Private vehicles
- Connectivity between various modes of transport if required, by Sky walks, subways etc.
- Service roads/ Approach road to ITH
- Adequate Circulation areas and Landscaping
- Property Development - Commercial / Institutional / Office area

The broad financial viability of the Project is assessed with respect to key parameters such as Project Internal rate of return (IRR), Net Present value (NPV) and Return on Investment (RoI). The discount rate considered for the project is 14.25% which is the Opportunity cost of capital.

The viability analysis includes the identification of revenue and expenditure streams. Revenues will be the user fees from private bus operators, parking fees, advertisement charges, rentals from Commercial activities, while the expenditure would be primarily on account of Capital and O & M costs.

7.2. Assumptions in Capital and Operation & Maintenance Cost

Following set of assumptions are considered for the Financial Assessment of the Intermodal Transit Hub at Yelahanka that includes general assumptions, area assumptions and specifications.

7.2.1. Preliminary Cost Estimation

The preliminary cost estimates are based on the preliminary market survey carried out for the identified cities. The Base Project Cost is calculated considering the cost of construction for each component - Bus Terminal, HSRL, Metro, , and the land development cost etc. The Total Project cost includes the Base Project cost, Preemptive & Preoperative expenses (4% of Base Project Cost), Project Development Expenses (1% of Base Project Cost), Escalations & Contingencies (4% of Base Project Cost) and Interest during construction (Interest @ 11.5%). The following table shows the break up of Cost for an Integrated Intermodal Transit Hub at Yelahanka. *(For details refer Annexure I)*

SUMMARY OF PROJECT COSTS

Description	Capital Cost (in Rs. crores)
Components	
Land Development Cost - for 10 hectares of Land	10.50
Bus Terminal Facilities	
No. of Boarding Bays - 37	
No. of Idle Bays - 30	
Construction cost of Bus Terminal & Repair Shop - <i>Rs 1200 per sq. ft.</i>	7.50
High Speed Rail Link (HSRL)	
Construction cost of High Speed Rail Link (HSRL) - <i>Rs 1300 pre sq.ft.</i>	19.37

Passenger Amenities – Commercials within Bus Terminal & HSRL	
Construction cost of Commercials	6.50
Multi Level Car Parking – 1200 cars based on Traffic & Transportation Land Use and total area of built up; Rs 1350 per sq.ft.	37.20
Construction Cost of Property Development – Rs 1650 per sq.ft.	151.00
Total Base Project Cost	232.07
Preemptive & Pre operation expenses (4% of Base Project cost)	9.30
Project Development Expenses (1% of Base Project Cost)	2.32
Escalations & Contingencies (4% of Base Project Cost)	9.30
Interest During Construction (Interest @ 11.5%)	21.87
Total Project Cost for Inter Modal transit Hub at Yelahanka	275.00 <i>(approx)</i>

7.3. Revenue Streams

Revenues will be generated from Bus Terminal, Multi level parking, Advertisement and Property development. The ITH is proposed to be structured on Development and Management rights Model with User fees, parking fees, advertising charges and commercial rental rights. The main source of revenue generation shall be from Property development. *(For details refer Annexure I)*

7.3.1. Revenue from Bus Terminal Operations – Income from User fees

The User fees or Adda fees is one of the major revenue sources for the Bus terminal. All buses except those of BMTC, KSRTC, NEKSRTC, and NWKSRTC shall pay User fees before leaving the Bus bays. This User Fees shall be revised at regular intervals. Apart from this, Buses parking during the day and night shall pay Idle parking charges.

7.3.2. Revenue from lease of Commercials within Bus Terminal & HSRL

The developer shall have the right to lease the shops at the Bus Terminal and HSRL for specific end uses. The end uses of the shops/ kiosks/ stalls shall be subservient to the requirements of the Bus Terminal and HSRL passenger traffic. Sufficient enhancement in scale and scope of this commercial space at the Bus terminal and HSRL would fetch higher rentals for the private sector party. Indicative acceptable end uses (or ancillary land uses) have been detailed in the Notification no. UDD 93 MNJ 2008 and the Zoning Regulations of Master Plan of Bangalore Development Authority.

7.3.3. Revenue from parking of Private & Intermediate transport vehicles

The parking fees to be charged from various categories of vehicles and its periodic increase should be fixed. For instance, Cars should be charged Rs.10/- and Two wheelers should be charged Rs 5/-.

7.3.4. Advertisement rights at the Bus terminal, HSRL & Property Development

Income from advertising charges has massive potential considering the large footfall of commuters in the Bus Terminal, HSRL and Property development, provided its is tapped properly. The private sector party has the right to locate hoardings as per applicable rules, regulations standards, etc.

7.3.5. Revenue from Property Development

The private sector party shall have the flexibility to charge any rentals from the commercial/institutional/office areas leased to third parties. The private sector party shall have no right to out-rightly sell the facility to the third party. The facilities that may be permissible under this category are been detailed in the Notification no. UDD 93 MNJ 2008 and the Zoning Regulations of Master Plan of Bangalore Development Authority.

7.4. Key Financial Indicators

The returns of the ITH project at Yelahanka have been calculated considering the typical investment and facilities at the location. The revenue streams are assumed as per the market conditions and the lease period considered for the project, for calculation of returns, is 30 years. A block financial Assessment for the development of ITH on PPP format at Yelahanka is provided at **Annexure I**.

The following table throws light on the financing pattern and expected returns for the Project:

Financing		
Lease Period	Years	30
Debt : Equity ratio	Ratio	1.0
Loan Period <i>(incl. 2 yrs Moratorium period)</i>	Years	9
Interest Rate	% p.a.	11.5
Expected Returns		
Total Cost of Project (Excl Land) <i>(Rs crs)</i>		275.00
Project IRR		17.33%
NPV of the Project <i>(Rs crs)</i>		56.67
Return on Investment (RoI) <i>(in %)</i>		22.34%

The assumptions considered for the model are block cost estimates for the capital outlay and returns have been worked out using a conservative approach taking into account the current market scenario. However, the viability of the project could be further enhanced by optimizing the product mix from a detailed project development study. Internal Rate of return (IRR) and Net Present value (NPV) represent the project's broad financial viability on PPP format. *(For details refer Annexure I)*

7.5. Commercial Viability as per location – Yelahanka

Viability for the project is based on the revenues from subleasing of property development area, user charges from buses, parking charges for private & public vehicles and advertising charges. The feasibility of this project also depends on the developments happening now and expected in the future, and infrastructure set up around the proposed area. The Investment criteria analysis (IRRs, NPVs) have been derived considering the prevailing lease rental rates, parking rates and advertising charges in Yelahanka region.

The private sector party developing the ITH project may operate or transfer operating rights of Bus Terminal, HSRL, etc, to respective departments after construction. The developer can operate, maintain, and sublease the property development built up area at prevailing market rates.

For viability of the project, approx. 9 lakhs sq.ft. of Property Development i.e. Commercial/Institutional/Office area should be allowed.

At Yelahanka, the railway station is 1 km away from the site for the proposed facility and connectivity to the site can be provided through the use of feeder buses and intermediate public transport like taxis. This avoids the need to provide a rail station at the facility, thus reducing the capital investment to be incurred by the developer. The internal connectivity for Bus Terminal and HSRL may be done via stairs, escalators and elevators at appropriate locations within ITH facility as these components are one above the other. The connectivity for ITH, Multi level parking and Property development can be provided through skywalks, subways or Foot over bridges so that passenger circulation does not conflict with vehicle circulation.

8. Assessment of Risks

8.1. Risk Allocation and Mitigation

Appropriate risk mitigation structures have to be evolved for the Project. Various risks associated with the Project and broad mitigation structure is explained below:

8.1.1. Traffic Revenue Risk

Traffic Revenue risks forms a major component in the risk matrix which can be mitigated only through diligent traffic studies and projections. Apart from this, it is essential from perspective, to ensure proper collection of user charges from private bus operators, to inculcate some discipline. The traffic revenues for the project would also depend on the following:

1. Enforcement by the local bodies for directing the private / Government operated buses, in and around the region of Yelahanka, to provide services to the ITH
2. Stoppage of High Speed Rail Link at the Yelahanka ITH
3. Provide intra city services by means of extension of Metro to Yelahanka.
4. Provide feeder bus services and appropriate parking and circulation for private and intermediate public transport vehicles (like taxis, auto-rickshaws)

8.1.2. Construction Risk

This risk may be a Design Risk, Cost Over run and/or Time Over run.

Design Risk:

The private sector developer shall be solely responsible for any defects and/or deficiency in the design and shall rectify the same at his/ her own cost. By transferring the design risk to private party there is scope for innovation leading to efficiency in cost and services.

Cost Over run:

Private Sector Developer to be responsible for this risk. Termination payments, specified in the Agreement, linked to Total Project Cost which shall be lowest of (i) Total Project Cost as per financing documents, (ii) actual capital cost as certified by auditor (iii) project cost defined by Client in the agreement.

Time Over run:

This leads to delay in completion. Construction period to remain fixed. Effective clauses to be provided in the Agreement to be signed between the Client and the Developer. Timely clearances and handing over of site for the project should be ensured.

8.1.3. Demand Risk

This risk arises from the project if there is no established demand for the Project. In this case, a Pre-feasibility has been carried out to assess the viability based on the demand for the revenue generating components for the project. It is however envisaged that the demand for revenue generating facilities at the proposed ITH would increment over years and on commencement of operations of the ITH. Apart from this, the Developer shall be given the freedom to design the facility in order to improve the optimum utilization, provided no obstruction is caused to development of minimum development obligations for the ITH.

8.1.4. Commercial Risk/ Revenue Risk

This risk arises from existing demand and future competition, effectiveness in utilizing space and management of facilities. With the involvement of Private Sector in marketing, O&M and management and attractive incentives structures linked with Project success, risk would be transferred to the Developer. The Developer also has the right to decide the lease rental tariff for the property development and other applicable charges / fees for the project components under the ITH facility. It is however envisaged that the demand for commercial facilities at the proposed ITH would increment over years and on commencement of operations of the ITH.

8.1.5. Operational Risk

The Developer should operate and maintain the facility for an agreed lease period. Effective clauses addressing the above should be incorporated in the Agreement. Increase in the O & M costs, except in cases due to change in Specification & Standards and Change in Law, shall be borne by Developer. The Developer may transfer operational rights to another party subject to approval from Client.

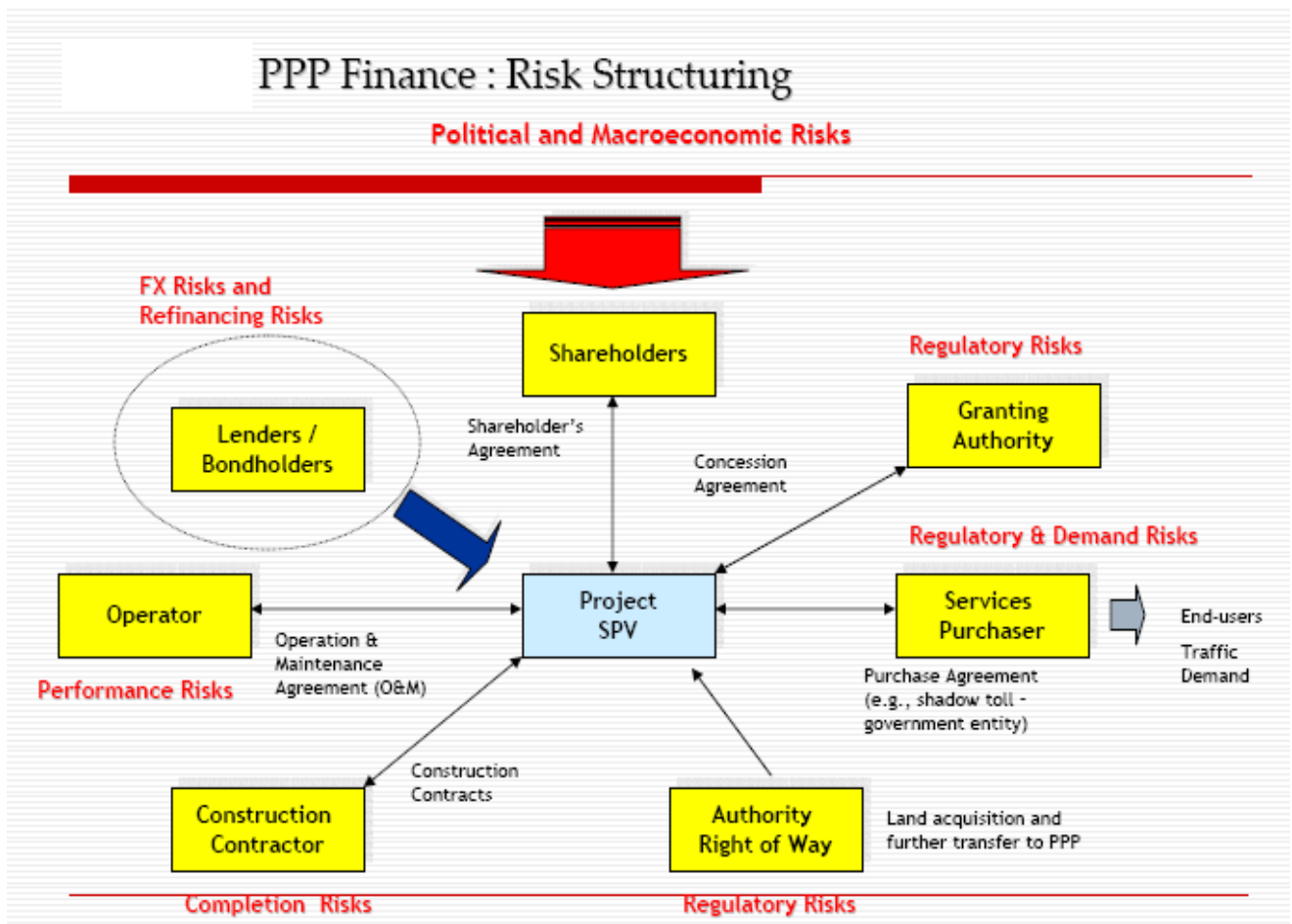
8.1.6. Debt servicing Risks

The risk mitigants are appropriate debt-equity mix and proactive managerial strategies in financial restructuring. Appropriate rights for lenders of debt, like project revenue security, may help in mitigating this risk. The lenders would also require assignment and

substitution rights so that the concession / lease can be transferred to another party in the event of failure of the Developer to operate the project successfully.

8.1.7. Political Risk

These can be mitigated by effective legal documentation & insurance and essential government involvement for successful implementation.



9. Requirement of Legal & Regulatory Framework

The government has to constantly reform the policies and regulations in sectors where development has been happening through private investment. Private sector parties require attractive incentives and policies in place in order for them to develop projects in an environment conducive to their needs and aspirations.

Regulatory agencies and issues pertaining to regulations have come to prominence after the privatization of Infrastructure sector. Thus, any design of a regulatory framework is a complex undertaking that involves the balancing of many influences/elements which include regulatory goals and resources, social institutions and sector characteristics.

The proposed ITH necessitates a robust legal and regulatory framework, the following are the requirements:

- Land Acquisition at Yelahanka

Bangalore Development Authority (BDA) plans, regulates, controls, monitors and facilitates urban development in Bangalore Metropolitan Area to ensure sustainable and orderly growth. All necessary land approvals need to be obtained from BDA. BDA prepares the Comprehensive Development Plan (CDP) which gets revised every ten years. The Town & Country planning department is responsible for preparation of layout plans & development plans for various lands and also for change of Land use.

The site for this project has been assigned to HSRL for construction station for the rail link. It has been proposed that the site should double up as an Intermodal Transit Hub (ITH) and hence the necessary approvals for Construction of facility, internal & external services like water supply etc, off-site Infrastructure planning (say, widening of roads for traffic circulation) may require concurrence from BDA / Bruhat Bangalore Mahanagara Palike (BBMP) / other concerned authorities. The developer should follow the Karnataka Town & Country Planning Act, 1961 and other applicable Acts in matters concerning the site and the project facility.

- Wide range of activities like those that are executed directly by government, activities that are executed under PPP mode and activities acquiescent to VGF and so on.

The Infrastructure Development Department (IDD) is the nodal agency for coordination, development and implementation of infrastructure projects mainly on PPP format. It also facilitates for obtaining clearances and approvals on PPP route.

The Infrastructure Policy of Government of Karnataka - 2007 puts in place a fair and transparent policy framework to facilitate the development of infrastructure projects in the State. Policy reformation has also been happening over the years; however a consistent approach in all infrastructure sectors to enable uniform and complimentary process of development is the need of the hour.

ITH facility (project under consideration) falls under the gambit of Transportation & Logistics sector, which would be governed by this policy. It is envisaged that incentives and financial support contemplated under this policy are applicable:

- For infrastructure projects where, in the opinion of the Government, the project is public project set up for common use, where such infrastructure would otherwise not be created;
 - Only for bridging the viability gap for infrastructure projects on a PPP basis.
- Responsibility of preparation of the master plan, infrastructure planning, financing, implementation, integration, management, operations, licensing and overall administration of the project.

For this, the Developer shall need to take the concurrence of the relevant development authorities of the state government such as BDA, BBMP, etc. For appropriate approvals and clearances. For assistance and necessary support appropriate and effective clauses in the Agreement may be incorporated.

- The success of the ITH would depend on the Implementation of Traffic regulations levied by the local administration towards restricted entry of buses to the region and directing the same to the proposed ITH. Implementation of No Parking zones,

Traffic Regulations, Entry / Exit limiting restrictions, Levy of penalty for off-street parking of buses, cars, intermediate public transport, etc are necessary as applicable.

- Have a suitable and unambiguous Agreement for selection of the Developer for ITH project at Yelahanka. One of the major tasks in infrastructure projects is to get all the provisions of the Contract right in order to implement the project successfully.
- The Liabilities of the Developer of the ITH project should be covered through an appropriate Insurance policy and this should be necessary and customary for the entire Authorization / Lease Period of the Project. The scope of the insurance policy shall not be reduced without the permission of the client.

10. Project Structuring & Implementation Framework

10.1. Background

The ITH is proposed to be developed on Public Private Partnership (PPP) format. Structuring infrastructure projects on a PPP platform has been seen as an avenue to optimize development and implementation in the long run. PPP provides an attractive alternative to bring private investments as well as efficiency gains in the provision of services.

Intermodal Transit Hub project at Yelahanka is highly capital intensive and the region is expected to develop greatly due to setting up of this facility. The major project components like Bus Terminal, Multi level parking, HSRL pick up station, etc, require huge investments but do not generate great revenues. The only major component for revenue generation is Property Development facility. However, this is greatly depended on the demand / market requirement for such facility in the region considering the fact that all the developments happening in and around Yelahanka is expected to make it a major hub in future only. This is a risk in itself for the Developer and may create difficulties for achieving Financial closure. Hence it is absolutely necessary to structure the project in order to make it financially viable.

When properly structured and made bankable, the project creates a balance between the requirements of the government and the public for service provision with high quality of standards and thus attract private investments. The project involves components of diverse nature viz: Rail & Road infrastructure, Real Estate Development to improve the feasibility of the project, etc. This results in various permutations and combinations of different options in PPP framework.

10.2. Implementation through Public-Private-Partnership (PPP)

Successful development and implementation of the ITH at Yelahanka would require diligent planning, extensive project development with proper implementation strategy. Technically, development and implementation of the project would draw expertise from transport sector.

It is pertinent to mention that implementation of this project has unique and distinctive requirements, not comparable to similar ventures in production and service sectors. It is also pertinent to say that due to limited resources of the local bodies and also in order to

achieve higher performance efficiency both in construction and operation, it is imperative that the project needs to be implemented through active private sector participation under an appropriate PPP model.

The ITH at Yelahanka can be implemented keeping in mind two options.

	Option 1	Option 2
Land	Subject site / Land for the project is segregated.	Subject site for the ITH project is the entire 24 acres.
Land for project components	<ul style="list-style-type: none"> One portion of land assigned for development of HSRL pick up station and, Other portion of land for Development of other ITH components - Bus Terminal, Multi parking and Property Development. 	<ul style="list-style-type: none"> All components envisaged for the ITH project (including HSRL station) to be developed in the subject site.
Land assigned to; & Project Development to be carried out by;	<ul style="list-style-type: none"> Land for HSRL station to be assigned to BARL. <i>BARL to select the Developer for the HSRL station through a transparent bidding process.</i> Land for the remaining components to be assigned to another authority, say IDD. <i>KIPDC/IDD to carry on with project development for selection of Developer</i> 	<ul style="list-style-type: none"> Subject site to be allotted to BARL who shall select a developer for the implementation of the project through a transparent bidding process. KIPDC / IDD shall suggest BARL for adoption of other project components in order for successful implementation of ITH.

10.3. Project Structuring

Project may be proposed to be implemented on Public-Private-Partnership (PPP) format under Design, Finance, Build, Operate and Transfer (DFBOT) basis.

Option 1:

In this option, Private Developer / Private Sector Player (PSP) shall finance, design, engineer, construct, market, operate, maintain and manage the project excluding the HSRL station during the Authorization/ Lease period and transfer the project facility to the client at the end of the Authorization / lease period. The project is proposed to be structured as under:

- The project is structured for capital investment to be brought in by the selected private sector player and land is provided by Infrastructure Development Department (IDD).
 - Scope of Work for the PSP/ Developer:
 - Selected private sector player does Designing including Planning,
 - Detailing and placement of the Project components in facilitation with HSRL station (to be developed by a Developer selected by BARL)
 - Detailed designing and Engineering of facilities based on Concept
 - Achieving Financial closure and making the necessary capital investment
 - Construction, Marketing, Operating, Maintaining and Managing (Utilities, Facilities, Equipments etc) the Project during the Authorization Period
 - Obtaining all clearances/approvals from the concerned Govt. Department, handling legal issues etc
 - The IDD receives a payment for concession / lease of the site for the project.
 - The private sector player recovers its investments over a period of time from revenues from property development created under the project and other applicable sources.
- The extent of property development permitted shall be determined based on the Authorization Period, sizing of other project components, etc.
- Role of Government:
 - IDD shall lease the land to the Developer for Authorization period.
 - Signing an Authorization Agreement with Developer for performing the obligations of agreement for a Authorization period.
 - Bidding Process: Two-stage bidding process may be adopted for selection of the Private Sector developer for implementation of the project
 - 1st Stage: Inviting Expression of Interest
 - 2nd Stage: Inviting Financial proposal from the Qualified potential Bidders.
 - The bid parameter for the project may be the maximum Upfront Fee payable by the Developer to IDD or Annual Fee or both, keeping the Lease Period fixed for 30 yrs.

The Project is proposed to be developed by:

- Dividing the total area in two : Non Commercial area and Commercial Area
- Developing the **Metro, the Bus terminal (Interstate/Local), Public amenities, basic infrastructure & utilities and Parking.**
- Developing Repair shops which includes a workshop shed, washing platform, Office, Staff Quarters, etc,
- Developing Property Development. The construction may be carried out in phases.

Option 2:

In this option, Private Developer / Private Sector Player (PSP) shall finance, design, engineer, construct, market, operate, maintain and manage the project during the Authorization/ Lease period and transfer the project facility to the client (BARL) at the end of the Authorization / lease period. The project is proposed to be structured as under:

- The project is structured for capital investment to be brought in by the selected private sector player and land is provided by Bangalore Airport Rail Link Authority (BARL).
- Scope of Work for the PSP/ Developer:
 - Selected private sector player does Designing including Planning,
 - Detailed designing and Engineering of facilities based on Concept
 - Construction, Marketing, Operating, Maintaining and Managing (Utilities, Facilities, Equipments etc) the Project during the Authorization Period
 - Obtaining all clearances/approvals from the concerned Govt. Department, handling legal issues etc

The Project is proposed to be developed by:

- Dividing the total area in two : Non Commercial area and Commercial Area
- Developing the **HSRL, the Bus terminal (Interstate/Local), Public amenities, basic infrastructure & utilities and Parking.**
- Developing Repair shops which includes a workshop shed, washing platform, Office, Staff Quarters, etc,
- Developing Property Development. The construction may be carried out in phases.

11. Operating Framework

11.1. Implementation Structure

The project at Yelahanka needs to be intensively assessed for its operational efficiency and technical & financial viability. The demand for the facility should be examined in keeping with the developments happening in and around the region. In the proposed PPP structure for implementation, the roles to be performed by the respective parties i.e. the Project Sponsor and selected Developer has been identified as below:

11.1.1. Role of Project Sponsor

The role of the Project Sponsor would include:

1. Identification and acquisition of land for the Project
2. Grant of lease hold rights of the project site to the developer
3. Co-ordination with Railways and seeking requisite clearances from the concerned departments regarding the site.
4. Providing collection of User charges (for Bus Terminal) rights to the developer
5. Providing collection of parking fees rights to developers
6. Permit collection of rentals from property development at tariff rates as decided by developer
7. Standardization of performance standards & specifications

11.1.2. Role of Developer

The role of the Developer would include but not limited to:

1. Design, finance, construct, operate, maintain and manage the facilities including supporting ancillary infrastructure conforming to the building by-laws and regulations
2. Meet the requirements laid down by the Competent Authorities and obtain all necessary clearances
3. Operate & Maintain the property development facility in order to recoup the investment incurred
4. Collect user charges/ fees / rentals from the components of the project facility.

11.1.3. Civil and Structural Requirements

The building shall be designed in accordance with the latest Indian Standard Codes and shall be designed to resist wind and seismic forces RCC Structures shall be designed as per IS 456: 2000. Steel Structures shall be designed in accordance with the provision of IS 800-1984. Structural steel shall conform to IS 2062. Tubular section shall conform to IS 4923

- Architectural design norms as per NBC (National Building Code - 2005)
- Structural Design norms as per NBC and BIS (Bureau of Indian Standards)

11.1.4. Fire Fighting Facilities

The developer shall provide the required firefighting equipment and facilities conforming to relevant standards and the applicable rules and regulations. Fire safety measures as recommended in applicable codes (Indian as well as international) shall be implemented. Specifically, the fire fighting system shall be adequate to control petroleum fires. Construct the Parking Facilities' structure with non-combustible material without a specified fire resistance. In addition, those portions of the facility used for the transport and / or storage shall have a finish of non-absorbent, non-combustible material.

11.2. Maintenance and Performance Standard

11.2.1. General

During the period of operation, the Developer would be required to maintain all the Facilities in accordance with performance standards and maintenance requirements, as mentioned below:

- Perform maintenance on a routine and periodic basis. Identify potential problems early within the context of the planned maintenance system so that corrective action may be planned and completed in a timely manner.
- Establish a maintenance list for planned operation and maintenance. Follow an orderly program so that maximum operational efficiency is attained.

The system shall be required to be designed such, that maintenance personnel has access to all facilities, machinery and electrical and electronic components in a safe manner.

The Developer shall perform routine and periodic maintenance activities for the project infrastructure viz, civil, mechanical and electrical works and equipment, furniture for meeting the specified performance standards.

12. Keys to Success

12.1. Key Stakeholders

The key stakeholders identified for the development of Intermodal Transit Hub in Yelahanka are:

- **Project Sponsor** - Bengaluru Airport Rail Link Ltd. (BARL)
- **Nodal Department** - Infrastructure Development Department (IDD)
- **Facilitating Department** - Infrastructure Development Department
- Bengaluru Metro Rail Corporation Ltd. (BMRCL)
- Bengaluru Metropolitan Transport Corporation (BMTCL)
- Karnataka State Road Transport Corporation (KSRTC)
- Bruhat Bengaluru Mahanagara Palike (BBMP)
- Traffic Police of Bengaluru
- Southern Railways
- National Highway Authority of India (NHAI)
- State Public Works Department- (Roads Division)
- City Town Planning Department
- Revenue Department
- City Corporations
- Other agencies as deemed necessary

For the successful implementation of the projects, the BARL, IDD along with the Project Advisors, the Urban Development Department and the Transport Department would require to convene a joint meeting of their respective heads where the project concept and structure is discussed and taken up for implementation.

The project sponsor along with the Project Advisors will be required to take the lead in co-ordinating with the individual agencies involved for identification of locations and for seeking the requisite clearances.

12.2. Essential issues to be addressed

The following have been identified to be key issues for the success in developing of ITH and effective utilization of the same

- Coordination with BARL and/ or IDD to decide on the Option (1 or 2) to be followed for the project.

- Coordination with the Railway Authorities for connectivity to the proposed ITH at Yelahanka
- Coordination with BMRCL for provision of Metro station at the proposed site
- Coordination with National & State Highway Authorities to sort out connectivity issues for intermodal transfer and provide for improvement roads if necessary
- Coordination with the concerned depts. and others concerned for land acquisition to provide for widening of the Service road to Yelahanka Bypass.
- Coordination with State Road Transport Corporations & Private Bus Operators Associations for the entry of buses to the ITH
- Traffic Authorities to be roped for Traffic Management for ingress & egress routes to the ITH
- Stringent provisions by way of fine and other penal actions need to be provided to restrict entry to the cities.
- A graded parking/entry fee / User fee structure should be evolved as a measure of demand management at the ITH for Buses, Mini Buses, Taxis, Autos, Cars etc
- Joint inspections of locations and reviews with key stakeholders

12.3. Role of Project Sponsor

The Project Sponsor shall be responsible to give right to use land free of encumbrance to the Developer for developing the Project components. The land required for creating the Project Facilities would be required to be given on Development and Management Rights to the Developer over the Authorization Period in terms of the Authorization Agreement supported by Development and Management Agreement (DMA).

The Project Sponsor will also require facilitating availability of infrastructural support / services and ensuring effective coordination between all government departments to provide timely approval and clearances. Government support/ facilitation would be required in the following:

- Ensuring availability of requisite land & infrastructural support/ services, viz. power supply, improving existing roads, development of connectivity
- Providing all clearances and approvals for execution of commercial centre at ITH, installing supportive facilities and other commercial components for development and operation

- Issue of necessary regulations for re-directing buses to the ITH

12.4. Clearances and Sanctions

The following clearances and sanctions for the proposed project from various agencies would be required

- Bengaluru Metro for the approval of location of the Metro Station facilities
- National and State Highway Authorities for efficient connectivity to the location and seamless integration for Intermodal transfer
- Concerned Municipal Authority /City Corporations
- Urban Development Authority
- Revenue Department in case of acquisition required in the location
- Traffic Police Department
- State Electricity Board
- Water Supply & Sewerage Board
- Other agency as deemed necessary

13. Way Ahead

13.1. Implementation Plan

A presentation on the Draft Pre-feasibility Study was made before the stakeholders, wherein the following decisions were taken:

1. The need of the proposed ITH would be established only if the proposed High Speed Rail Link (HSRL) Project is implemented.
2. It is important to program the implementation of the Project to coincide with the HSRL Projects
3. It would be most appropriate to include the development of the proposed ITH in the scope of the HSRL Project.

Based on the above and this pre-feasibility study carried out, it was decided that BARL through its consultants would prepare a Detailed Project Report which would become part of the HSRL Project.

The implementation of the proposed ITH would thus be the role and responsibility of the selected developer for the proposed HSRL Project.

Case Studies

Gateway Multi modal Transportation Centre

The Gateway Multi modal Transportation center is a rail and bus station in downtown St. Louis, Missouri. It was inaugurated in 2008 and is operational 24 hours a day.



- The station serves Amtrak, St. Louis MetroLink, MetroBus regional buses, Greyhound cross-country buses and taxis.
- The station was built at a cost of \$31.4 million.
- The Station has ancillary facilities such as sundry stores and food court which was opened in December 2008
- The Gateway Station serves as a terminal hub for the following:
 - Amtrak Rail – Trains to and from Chicago, Kansas City, Missouri, San Antonio, Los Angeles
 - MetroLink – Metro train from Lambert – St. Louis International Airport
 - MetroBus, MegaBus, – Serves many routes within and around the region of Gateway Station.
 - Taxis, Rental Cars

Miami Central Station

The Miami Central Station (MCS) is an Inter modal facility located on a 27 acre plot. This facility is designed to accommodate various transportation connections.



- This is built around the existing tri-rail tracks at its Airport Station.
- The MCS will offer centralized transfer between Tri -rail, Metrorail and Amtrak rail service.

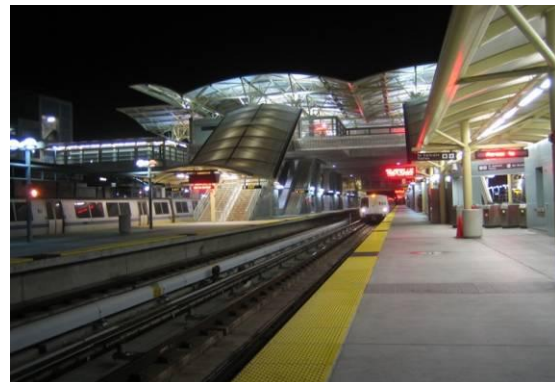
- Intra city bus services area also being provided here and space for private vehicle parking.
- There is an elevated pedestrian walkway spanning across the rail tracks from the public esplanade into the Miami International Airport.
- This would be also a Station on the proposed Florida High Speed Rail.
- The total Cost of the facility is expected to be \$ 1.7 billion.
- Expected to serve 1,50,000 commuters and travelers each day.



Millbrae Station

Millbrae Station (also known as Millbrae Intermodal Terminal) is an at-grade Bay Area Rapid Transit (BART) and Caltrain station located in suburban Millbrae, California, in northern San Mateo County

- Millbrae Station is the largest Intermodal terminal in the United States west in terms of station facilities and acreage
- Consists of three at-grade main tracks for BART and two for Caltrain.
- A regional bus transit hub with multiple bus bays served by several SamTrans lines.
- Approx. 3,000 parking spaces, including a five-story parking garage and surrounding surface parking.



Salt Lake City Inter modal Hub

This is a multi modal transportation hub located in Salt Lake City, Utah. Amtrak, the national regional rail system provides one train daily in each direction on the California

Zephyr line, with service to Emeryville, California, to the west and Chicago, Illinois, to the east.

- Hub through a TRAX, light rail system, on the University Line serves the University of Utah campus to the east.
- Have Access to the Sandy/Salt Lake Line, with service to Sandy to the south.
- Greyhound Lines, a national bus company, also services the station with several departures to points all across the United States, Canada and Mexico.
- Providing services of Amtrak, Greyhound lines, U Car Share.
- The Passenger traffic for the year 2009 was 31,319



Annexure I

Total Area requirements for various components

Ground Floor	Bus Terminal area (including Workshop) + Commercial	
<i>Mezzanine floor</i>	<i>Commercial (within Bus Terminal)</i>	
1st Floor	HSRL + Commercial (within HSRL)	
2nd Floor	Metro + Commercial (within Metro)	
Area	5	acres
	217728.6	in sq.ft.
Ground Coverage	45%	
Allowable Building Foot print	97977.87	in sq.ft.
Open Area	119750.73	in sq.ft.
FAR	4	
Total Covered area	870914.4	in sq.ft.
Basement	174182.88	
Total Construction required for Bus Terminal area	62794.00	in sq.ft.
Total Construction required for HSRL Station	149018.31	in sq.ft.
Total Construction required for Metro Station	139018.31	in sq.ft.
Commercial Area	43535.00	in sq.ft.
Commercial within BT has been assumed as per Norms i.e. 1/3rd of BT area; Commercials within Metro & HSRL have been assumed as 20% of the respective facilities		
Use of Foot print area	97977.87	
Bus Terminal area (Ground floor) + Repair shop for buses	62794.00	in sq.ft.
Use of Open area	119750.73	
Roads, pavement, Drive ways, circulation - % of Open area	35%	41912.76 in sq.ft.
Service road for Entry / Exit of Buses at the front of the site	10%	11975.07 in sq.ft.
Boarding Bays	24532.80	in sq.ft.
Idle Parking	26	No.s
Parking facilities for private vehicles (Picking & Alighting)	326	ECSs

Parking facilities for private vehicles (Picking & Alighting) - area reqd.	87694.00	in sq.ft.
Use of Total Covered area	870914.40	
Bus Terminal Station + Work Shop + Metro Station +HSRL Pick up station	394365.62	in sq.ft.
Unused area	433013.79	in sq.ft.

Total Area requirements for Property Development (PD)

Area	12	acres		
	522548.64	in sq.ft.		
Ground Coverage	45%			
Allowable Building Foot print	235146.89	in sq.ft.		
Open Area	287401.75	in sq.ft.		
FAR	4			
Total Covered area	2090194.56	in sq.ft.	But allowable PD shall be only 45% of the 24 acres i.e.	1837640.11 sq.ft.
			=	
Basement	418038.91	in sq.ft.	Reqd. PD for Financial Viability	918820.05 sq.ft.
			=	
			Percentage of total allowable PD	50.0%
			=	
Use of Foot print area	235146.89			
Commercial	235146.89	in sq.ft.		
Use of Open area	287401.75			
Roads, pavement, Drive ways, circulation - % of Open area	30%	86220.53	in sq.ft.	
Service road for Entry / Exit of Vehicles at the front of the site	8%	22992.14	in sq.ft.	
Parking facilities for private vehicles (Picking & Alighting)	854	ECS		
Parking facilities for private vehicles (Picking & Alighting) - area reqd.	275671.20	in sq.ft.		
Multi level parking - ground floor area available	178189.09	in sq.ft.		
no. of Floors of the MLP	1.55	No.		

Use of Total Covered area	918820.05	
Commercial area in the above floors	683673.17	in sq.ft.

Costing

	Cost/unit	Total cost	
Land Development Cost	100	1045.10	Rs lakhs
Cost of Construction of Bus Terminal + Work shop	1200	753.53	Rs lakhs
Cost of Construction of HSRL station	1200	0.00	Rs lakhs
Cost of Commercial Development within the proposed facilities	1300	1937.24	Rs lakhs
Construction of Multi level parking	1500	653.02	Rs lakhs
Cost of Property Development	1350	3721.56	Rs lakhs
Total - Base Cost		23270.98	Rs lakhs

Premptive & Pre Operative expenses	5.0%	of Const cost	930.84	Rs lakhs
Project Development Expenses	1.0%	of Const cost	232.71	Rs lakhs
Escalations & Contingencies	4.0%	of Const cost	930.84	Rs lakhs
Total - Project Cost			25365.37	Rs lakhs

Financing

Interest During Construction 2187.76 lakhs

Total Landed Project Cost 25365.37 lakhs

Construction Phasing

	1s year	2nd year	3rd year
	45%	30%	25%
Total cost phasing	11414.42	7609.61	6341.34

Financed By		1s year	2nd year	3rd year
Debt	60%	6341.34	6341.34	-
Equity	40%	-	-	12682.68

Revenue

Escalations 15% every three years

				60%	60%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Commercials within Bus Terminal		sq.ft	Rs/sq.ft./month		1	2	3	4	5	6	7	8	9	10	15	20	30
	GF	20931.33	60	150.71		150.71	150.71	150.71	150.71	173.31	173.31	173.31	199.31	199.31	199.31	263.59	348.59
Total income from commercial within BT					0.00	90.42	150.71	150.71	173.31	173.31	173.31	199.31	199.31	199.31	263.59	348.59	530.16

				65%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Commercials within HSRL & Metro		sq.ft	Rs/sq.ft./month		1	2	3	4	5	6	7	8	9	10	15	20	30
	1st floor & 2nd floor	22603.66	55	149.18		149.18	149.18	149.18	149.18	171.56	171.56	171.56	197.30	197.30	197.30	260.92	345.07
Total income from commercial within BT					0.00	89.51	119.35	149.18	171.56	171.56	171.56	197.30	197.30	197.30	260.92	345.07	524.81

				55%	60%	80%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Commercials within Property Development (PD)		sq.ft	Rs/sq.ft./month		1	2	3	4	5	6	7	8	9	10	15	20	30
	All floors	918820.05	55	6064.21		6064.21	6064.21	6064.21	6064.21	6973.84	6973.84	6973.84	8019.92	8019.92	8019.92	10606.35	14026.89
Total income from commercial within PD					0.00	3335.32	3941.74	4851.37	6973.84	6973.84	6973.84	8019.92	8019.92	8019.92	10606.35	14026.89	21333.15

				60%	80%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Car Parking					1	2	3	4	5	6	7	8	9	10	15	20	30
Average Parking rate per vehicle	7.22																
Covers per parkin lot per day	3.5																
No. of Days	365																
Total parking lots	1466																

Annual Revision of rates	15.00%																
				135.16	135.16	135.16	155.43	155.43	155.43	178.75	178.75	178.75	236.39	312.63	475.47		
Total Income from Parking				81.10	108.13	135.16	155.43	155.43	155.43	178.75	178.75	178.75	236.39	312.63	475.47		

Rate per vehicle	No.s	Vehicle type
10	650	Car (ECS)
5	816	Two wheeler

7.22

				No. of Hoardings	Sq.ft. / Hoarding	Total sq.ft.	40%	50%	80%	100%	100%	100%	100%	100%	100%	100%	100%
Advertising				1	2	3	4	5	6	7	8	9	10	15	20	30	
Rate per Sq. ft.				350													
Total Number of Hoardings - Category 1				20	500	10000											
Total Number of Hoardings - Category 2				25	200	5000											
				52.50	0.00	52.50	52.50	52.50	60.38	60.38	60.38	69.43	69.43	69.43	91.82	121.44	
Income from Hoardings						21.00	26.25	42.00	60.38	60.38	60.38	69.43	69.43	69.43	91.82	121.44	184.69

Total Revenue						3617.35	4346.17	5328.42	7534.53	7534.53	7534.53	8664.70	8664.70	8664.70	11459.07	15154.62	23048.29
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Escalation 4% every yr

			1	2	3	4	5	6	7	8	9	10	15	20	30
Manpower		50	No.s.												
Average Salary per month		7500													
Total Salary per yr		45		45.00	46.80	48.67	50.62	52.64	54.75	56.94	59.22	61.59	74.93	91.16	134.94
Power & Fuel per year		6600		66.00	68.64	71.39	74.24	77.21	80.30	83.51	86.85	90.33	109.89	133.70	197.91
Total Opex for ITH			0	111.00	115.44	120.06	124.86	129.85	135.05	140.45	146.07	151.91	184.82	224.87	332.86

Escalation		4.00%													
		1	2	3	4	5	6	7	8	9	10	15	20	30	
Staff	105	No.s													
Average Salary per month	8000		Construction Period												
Total Salary per yr	100.8		100.8	100.8	104.83	109.03	113.39	117.92	122.64	127.54	132.65	161.38	196.35	290.64	
Electricity per year	5.00%		166.77	197.09	242.57	348.69	348.69	348.69	401.00	401.00	401.00	530.32	701.34	1066.66	
Telephone per year	2.50%		83.38	98.54	121.28	174.35	174.35	174.35	200.50	200.50	200.50	265.16	350.67	533.33	
General Admin per yr	1.50%		50.03	59.13	72.77	104.61	104.61	104.61	120.30	120.30	120.30	159.10	210.40	320.00	
Maintenance exp per yr	2.00%		66.71	78.83	97.03	139.48	139.48	139.48	160.40	160.40	160.40	212.13	280.54	426.66	
Miscell. exp per yr	0.75%		25.01	29.56	36.39	52.30	52.30	52.30	60.15	60.15	60.15	79.55	105.20	160.00	
Total Opex for PD			492.70	563.95	674.87	928.45	932.81	937.35	1064.98	1069.88	1074.99	1407.63	1844.51	2797.29	

Total Opex		603.70	679.39	794.93	1053.31	1062.67	1072.40	1205.43	1215.95	1226.90	1592.45	2069.37	3130.14
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P & L Statement

	1	2	3	4	5	6	7	8	9	10	15	20	30
Revenues	0.00	3617.35	4346.17	5328.42	7534.53	7534.53	7534.53	8664.70	8664.70	8664.70	11459.07	15154.62	23048.29
O&M Expenses	0.00	603.70	679.39	794.93	1053.31	1062.67	1072.40	1205.43	1215.95	1226.90	1592.45	2069.37	3130.14
Annual Concession fee -	40.00	40.00	40.00	44.80	44.80	44.80	50.18	50.18	50.18	56.20	62.94	78.95	110.92
Capital expenses	-6341.34	-6341.34	-12682.68										
PBIDT			3626.77	4488.69	6436.41	6427.06	6411.95	7409.10	7398.58	7381.61	9803.68	13006.30	19807.22
Interest	729.25	1458.51	1393.87	1242.03	1071.77	880.87	666.82	426.82	157.71	0.00	0.00	0.00	0.00
PBDT			2232.90	3246.67	5364.64	5546.19	5745.13	6982.28	7240.86	7381.61	9803.68	13006.30	19807.22
Depreciation			2676.16	2181.65	1800.30	1504.51	1273.54	1091.79	947.49	831.81	442.97	330.71	174.77
PBT/Operating Profit	0.00	0.00	-443.26	1065.01	3564.34	4041.67	4471.59	5890.49	6293.37	6549.80	9360.71	12675.58	19632.45
Loss brought forward			-443.26	-	-	-	-	-	-				
Income Tax (33.66%) or MAT (11.33%)	0.00	0.00	0.00	0.00	1199.76	1360.43	1505.14	1982.74	2118.35	2204.66	3150.82	4266.60	6608.28
PAT	0.00	0.00	-443.26	1065.01	2364.58	2681.25	2966.45	3907.75	4175.02	4345.14	6209.90	8408.98	13024.17

Cash Flow Statement

	1	2	3	4	5	6	7	8	9	10	15	20	30
Cash Flow From Operations less tax			3626.77	4488.69	5236.66	5066.63	4906.82	5426.36	5280.23	5176.95	6652.86	8739.69	13198.94
Interest on Loan			1393.87	1242.03	1071.77	880.87	666.82	426.82	157.71	0.00	0.00	0.00	0.00
Tax			0.00	0.00	1199.76	1360.43	1505.14	1982.74	2118.35	2204.66	3150.82	4266.60	6608.28
Cash flow after tax & Interest			2232.90	3246.67	4164.88	4185.76	4239.99	4999.54	5122.51	5176.95	6652.86	8739.69	13198.94
Capital repayments			1252.21	1404.06	1574.31	1765.21	1979.26	2219.26	2488.37	0.00	0.00	0.00	0.00

(Project Cash Flows)	-7110.60	-7839.85	-10449.78	3246.67	4164.88	4185.76	4239.99	4999.54	5122.51	5176.95	6652.86	8739.69	13198.94
Equity Cash Flows			-10449.78	1842.61	2590.57	2420.55	2260.73	2780.28	2634.14	5176.95	6652.86	8739.69	13198.94
Cumulative	-7110.60	-14950.45	-25400.23	-22153.56	-17988.68	-13802.92	-9562.93	-4563.39	559.13	5736.07	36541.35	74739.64	183029.85

Project IRR (Pre Tax & Post Tax)	17.33%	
NPV of the Project	5,666.41	Rs lacs
PV of payments	350.22	Rs Lacs
Gross Revenue for Govt. during the 30 yr period	21.06	crores
Gross Cash Flows for the Project during the 30 yr period	1830.30	crores

12% escalations