

# **Pre-feasibility Study for Development of Intermodal Transit Hub, Yeshwanthpur on PPP Model**

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## **FINAL PRE-FEASIBILITY REPORT**

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**To**

**Infrastructure Development Department,  
Government of Karnataka**

**March 28, 2012**

**SUBMITTED BY:**



**KSIDC – IL&FS Project Development Company Limited**

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## I. Introduction

### 1.1. Background

- a. 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 Karnataka.
- b. IDD has proposed to develop Intermodal Transit Hubs (ITH) at locations across Bengaluru on PPP format.
- c. In this regard, pre-feasibility studies for each of the five location across Bengaluru has been proposed at a meeting held on 6th January 2010, in the office of Principal Secretary-IDD, attended by all the concerned public transportation agencies of Bengaluru.
- d. The five locations eligible for the Pre-feasibility study includes Yeshwanthpur, Yelahanka, Peenya, Baiyyappanahalli & Mysore Road Junction.
- e. **IDD has appointed KSIIDC-IL&FS Project Development Company Limited (KIPDC), to undertake the Pre feasibility study for the Development of Intermodal Transit Hub at Yeshwanthpur.**
- f. IDD, vide its letter no.: **IDD 107 ITS 2009 dated 5<sup>th</sup>April, 2010**, appointed KIPDC to entrust the preparation of Pre-Feasibility Report for the Development of Intermodal Transit Hubs (ITH) at Yeshwanthpur location on PPP format (hereinafter referred to as the "Project").
- g. In order to assess if the above project would be prima facie feasible for development on PPP basis and its financial self-sustainability or otherwise, KIPDC will conduct a comprehensive Pre-feasibility study for the same as per the appointment of IDD.
- h. The objective of the Pre-feasibility Study would be to assess the broad project viability for development on PPP basis and to segregate the project that would require VGF or other State / Central support. On completion of the Pre-feasibility study of the said project identified for development of Intermodal Transit hub at Yeshwanthpur, the IDD has agreed in principle to mandate the project development of the viable project identified, to the advisory agency doing the project pre-feasibility on single source basis.

- i. However, if this Project found to be viable for development only with financial assistance/VGF from GoI, then the project development and bid process management related work of this Project would be bid out by IDD as per GoI guidelines for PPP projects, in which KIPDC would also be eligible to participate.
- j. A Presentation has been made on 4<sup>th</sup>May, 2010 on this Pre-feasibility Report for the Intermodal Transit Hub - Yeshwanthpur, in the chamber of Principal Secretary, IDD. The presentation has also been made separately before the Project Stakeholders.

## 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 Public Private Partnership (PPP) basis;
- To assess the preliminary project viability for development on PPP basis and to segregate the project if it would require VGF or other State / Central support;
- To identify the project stakeholders including the project sponsoring department and advice them on taking up the projects;
- Mandate the viable project to the respective project advisors for project development;
- Assist in the development & time bound implementation of the aforesaid project of the government with private sector investment;
- Development, operations and maintenance of the projects 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 proposed site at Yeshwanthpur 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 or without State / Central Govt. support, segregation of projects / locations requiring VGF support and project development approach for projects proposed to be taken up for project development by KIPDC.
- The Pre-feasibility study has been carried out with location analysis and assessment of viability for development at multiple locations across the State.

#### 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;
- Interact with the head of respective Departments for data
- Co-ordination for correspondence by KSIIDC / IDD with respective Departments for additional information pertaining to information needed for the successful completion of the Pre-Feasibility report;
- Identification of critical issues
- Preliminary project structuring and viability assessment;
- Summarizing of the Pre-feasibility assessment in the form of a report along-with recommendation to KIPDC / IDD;
- Presentations to IDD.

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

- 1) Inception Report
- 2) Draft Pre-feasibility Report
- 3) Presentation on Draft Pre-feasibility Report
- 4) Final Pre-feasibility Report

## II. 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 unofficial high-tech capital.

The growth of Bengaluru from a town to a metropolis has been a result of following 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
- Development of Industries in Peenya and along Tumkur Road (NH-4)

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 favorable 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)	5.8
Projected Population (2008, million)	8.01
Literacy Rate (%)	83%
Per Capita Income (US\$) (2007-08)	1087
Software Exports (US\$ billion)	13.5
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

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%
<b>Total</b>	<b>585,000</b>	<b>100.00%</b>

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 include:

- North-west of Bengaluru (Peenya Industrial estate) – traditional small scale industries
- North-west of Bengaluru (Yeshwanthpur Railway Station) - Railway lines connecting North Karnataka and India and the surrounding area development including Jalahalli, Yeshwanthpur, etc.

However, 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 Bengalore'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 Bengaluru

Yeshwanthpur, one of the important area of Bengaluru, is one of the fastest growing areas in the city, since Yeshwanthpur has location advantage as it is adjacent to the Peenya, a well known Industrial estate of Bangalore and also has vast network of important roads.

Bengaluru has a formidable rail network system and 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 Peenya & its extensions.

Buses, operated by Bengaluru Metropolitan Transport Corporation (BMTTC), are the means of public transport in the city. BMTTC 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.

Yeshwanthpur is slowly but steadily developing into an transportation Hub with the development of Traffic & Transportation Management Centre (TTMC), an existing Railway station, a Metro rail line (under progress), and a Bus Stand with parking facilities (proposed).

### 2.3 Initiatives 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 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 urbanisation;
- 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. The following is the list of few projects:

- Bangalore Metro Rail Project is under construction and a Yeshwanthpur will house a Metro station just opposite to the existing Yeshwanthpur Railway Station.
- Railway over bridge at Mathikere and Marthahalli.
- Elevated expressway along NH-4

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.

## 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 millions in 1981 and 1991 respectively. While the current population of the city is more than 6.5 million. 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 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.

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 HMTVs. 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.

The traffic at Yeshwanthpur is heavily clogged as the existing roads are not wide enough and there are an increasing number of vehicles travelling to North Karnataka, Mumbai, Pune, etc. In order to reduce the heavy traffic, it is necessary to increase the ridership in Public transport vehicles for which more number of buses & trains along with the upcoming Metro Rail project.

### III. 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 lopsided 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.

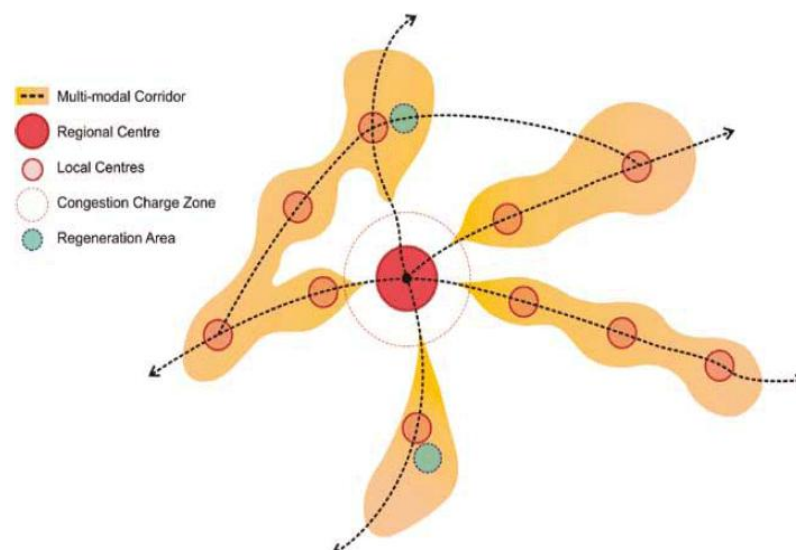
- Addressing the above issue of poor modal connectivity, Intermodal surface public transport stations represent a rapidly evolving and developing concept.
- In an Inter modal Transport system, the different modes of transport such as Buses, Trains, intermediate transport networks like auto rickshaws, 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 Hubs

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 Railways services along with the intermediate public transport network. The figure below depicts a Multi/inter modal corridor in an Urban regional centre



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 & Benefit of ITH

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.

## IV. Intermodal Transit Hub on PPP

### 4.1 PPP in Infrastructure Projects

The Governments encourage the implementation of Infrastructure Projects through a Public Private Partnership (PPP) model. The PPP approach allows an ideal combination of public interest with private sector efficiency and sensitivity to market requirements. Private Sector tends to be responsive to market requirements and with a motivation to optimize returns brings in efficiency and accountability. For Operation, Maintenance and Management, Private Sector efficiency can also be tapped through awarding Management contracts, Service contracts and other such arrangements.

In a PPP, while the private sector shall be responsible for financing, executing and operating the facility, Government shall facilitate the development by providing timely clearances and approvals. The Government shall define minimum development obligations for the private sector, yet leave adequate flexibility for the developer to build the project in response to market demand and hence optimize collective returns.

In order to optimize on the utilization of Government Funds for priority projects, timely implementation of Infrastructure Projects and to offload the operational and market risks, the Government has been promoting the involvement of the private sector on Public Private Partnership (PPP) format in the infrastructure projects. The following are a few advantages of involvement of the private sector in Infrastructure Projects:

- Development & time bound implementation of all priority projects of the government with private sector investment
- Development, operations and maintenance of the projects in a planned manner with modern amenities and requisite supporting infrastructure by reputed developers without utilizing Government resources of manpower, funds, etc
- Focused project development and time bound implementation
- Optimization of commercial benefits to the Government, which could be utilized for funding other unviable projects
- Project funding through Private Sector Developer

### 4.2 Intermodal Transit Hubs 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 pre-determined period of time. 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 busses, taxis, Autos etc
- Levy of Parking fee vehicles using the proposed parking facilities
- 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 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.

## V. Proposed Project

### 5.1 Project Location: Yeshwanthpur

Yeshwanthpur is an industrial-cum-residential area located in Bangalore City in the Indian state of Karnataka, situated in the north of Bangalore, a well-planned township. This place homes dozens of industrial units and residential colonies like HMT Layout, Devanarapalya, LIC colony and these residential colonies mainly homes the employees of this region. It is close to areas like Malleswaram and Mathikere and the famous MS Ramaiah college and hospitals.



*Pic: Tumkur Road in Yeshwanthpur*

Yeshwanthpur has location advantage as it is adjacent to the Peenya, a well known Industrial estate of Bangalore as well as the largest industrial areas in south-east Asia. It has well network of roads, CV Raman Road, BEL Road and Tumkur Road are the major roads connecting Yeshwanthpur and making this place easy for transportation to other part of city. Yeshwanthpur is the main junction of the Inner Ring road and Tumkur Road. Its just 6 kms from the City Railway Station.

Transportation in Yeshwanthpur is equally robust,

- It has a central bus stand providing connectivity to various parts of the city.
- A major railway terminal is located in Yeshwanthpur.

A new railway terminal was built in 2001 besides the existing Krishnarajpuram terminal, to cater for the growing population of Bangalore.

In Yeshwanthpur, railway line stands as a divider between industrial area and residential colonies, with industries on one end while residential colonies at the other side of line and the nearest railway station to this place is Yeshwanthpur Railway Station.

Many long distance trains to Delhi, Mumbai, Hyderabad, and Howrah originate from here. Its also an important station for all trains going on the Bangalore-Hubli track.

Yeshwanthpur is also linked to the Bangalore Metro Project and the metro station just opposite to the Yeshwanthpur Railway Station.

Talking of utility establishments in Yeshwanthpur area, the biggest wholesale market of agricultural produce in the region, the Yeshwanthpur APMC Yard is situated in Yeshwanthpur.

This well planned township has concentrated on every detail to make this place a mix of residential, commercial, institutional, and industrial suburb.

The list of major Industries established here in Yeshwanthpur / Peenya are:

- Bharat Heavy Electronics Limited (BHEL),
- Mysore Lamps, Chandan Chemical Corporation,
- Govt Soap Factory,
- Mafatlal Plywood,
- Suryodaya Industries and
- Kirlosker Batteries.
- HMT Limited

Apart from the above, Yeshwanthpur is also an industrial suburb home to Mackson's industrial Estate, RMC YARD, National Horticulture Board department.

There are several prestigious educational institutions situated in and around this place, to name few Society of Indian Institute of Sciences' (IISc), Biological Chemists Research, Tata Institute Of Fundamental Research Centre, National Institute of Advance Studies. Ashwini Medical Relief Trust, KLE Dental College & Hospital are some of the hospitals providing medical service to the residents of this locality.

Yeshwanthpur area constitutes of Gokula Extension, Mattikere, Sundara Nagar and the area is covered with rich green. The famous water reservoir of this area Matti kere is an excellent place for evening stroll in a scenic beauty. To add credit to Yeshwanthpur, the famous ISKCON temple is located in close proximity. Gopalan Theater and Ullas Theater are the two theaters located here for the purpose of recreation activity to the residents of this area.

## 5.2 Location Assessment:

### 5.2.1 Project Site

The site identified for the development of Intermodal Transit Hub (ITH) presently owned by the Karnataka Food & Civil Supplies Corporation (KFCSC). The site is opposite to the Yeshwanthpur Railway station along the service road on NH-4 (Tumkur Highway).



*Top Left:* Identified site presently holding KFCSC offices and godowns.

*Top Right:* Service Road of Tumkur Road abutting the identified site.

*Bottom Left:* Govardhan Theatre on east of the site.

*Bottom Right:* Yeshwanthpur Railway Station opposite to the identified site.

The identified site as mentioned above is currently the Northern Office of Karnataka Food & Civil Supplies Corporation (KFCSC) in Bengaluru. The site has the advantage of roads on all four sides. Towards the north is the service road. Towards the west of the site are APMC and a fire station. Finally towards east is Govardhan cinema hall and the southern side of the site is dotted by shops.

A portion of the identified site around 10000 sqft, has been acquired by BMRCL for the construction of the Yeshwanthpur Station for Bangalore Metro. The Proposed Project is being proposed on the balance portion of the land.



### 5.2.2 Surrounding Area:

The northern part of the city is already seeing an accelerated development with the commencement of operations of the International airport and the same has also influenced the developments in Yeshwanthpur region. The major developments envisage that would augment travel convenience and catalyzes the growth and developments in the region are:

- Satellite Railway Station of Yeshwanthpur
- Proposed Metro Rail Corridor
- Peripheral Ring Road

The classification of parts of the Yeshwanthpur as commercial /Hi tech corridor as per CDP 2015 has resulted in the advanced commercial activity in the corridor including IT sector developments. Taj Hotel, Resorts and Palaces is already constructing a 200-room business hotel in the near vicinity of the site to take advantage of the future possibilities of the area.

### 5.2.3 Land Use Pattern:

The site is classified as Commercial (Central) Zone. Therefore, from a prima facie the land use pattern change has to be initiated. Steps have to be taken to change the land use of the site from commercial/Hi-Tech to Traffic & Transportation type. The following table mentions about the basic aesthetics:

S. No	Particulars	Description
1.	Plot Area	Approx. 7981.95 sq.m (excluding land acquired by BMRCL)
2.	Land Use as per CDP	Commercial/ Hi-Tech Corridor
3.	Major establishments near the site	Railway Station opposite the site Upcoming Metro Station adjacent to the site APMC on the western side, Govardhan Theatre on the eastern side.

#### 5.2.4 Transport Environment:

- The entire Yeshwanthpur area comes under Bruhat Bengaluru Mahanagara Palike (BBMP) jurisdiction.
- Bengaluru Metropolitan Transport Corporation (BMTCL), which is the agency that operates the public transport bus service in Bengaluru, has a vast network of buses within the Yeshwanthpur area.
- BMTCL has also constructed a Traffic & Transit Management Centre (TTMC) just adjacent to the Yeshwanthpur Circle flyover.
- Yeshwanthpur Circle Flyover ends just ahead of the TTMC and little ahead a Road Over Bridge (ROB) starts.
- Tumkur Highway is the most important gateway towards the northern Karnataka and for other important destinations like Mumbai, Pune, Goa, etc.
- KSRTC and NEWRTC both provides interstate bus service towards the northern Karnataka and Mumbai, Pune, Goa, etc.
- Many private buses also ply in the area providing the connectivity towards Mumbai, Pune, Goa, North Karnataka, etc.
- All these buses from Bengaluru take the Tumkur Road gateway towards the above mentioned destinations.
- Thus, making the proposed ITH site at Yeshwanthpur a very important & strategic location to set up an ITH.
- Intermodal Transport hub gets a huge boost in terms of need and demand with such an extensive network of buses in the area.
- The site area is also close to International airport.
- A new railway terminal was built in 2001 at Yeshwanthpur, to cater for the growing population of Bangalore.
- Many long distance trains to Delhi, Mumbai, Hyderabad, and Howrah originate from here. Its also an important station for all trains going on the Bangalore-Hubli track
- The junction is an important junction from the perspective of the passenger trains going towards Andhra Pradesh, Orissa,
- Phase I of Bangalore Metro project covers Yeshwanthpur in its route.



- The Metro Station at Yeshwanthpur is opposite to the Railway station & adjacent to the proposed site.

The following list mentions in detail about the existing and upcoming transport infrastructure in the nearby area to the identified site.

### 5.2.5 Traffic & Transit Management Centre (TTMC), Yeshwanthpur:

BMTC serves the citizens of Bengaluru with quality bus services and is the only Bus Corporation within the city of Bengaluru to ferry more than 4 million commuters. The organization comprises a fleet of over 5593 buses covering an area encompassed with a radius of 36 kilometers from the city centre. In a day, BMTC operates on 583 city and 1785 sub urban routes, running 13 lakhs kilometers and making 76266 trips. BMTC has a 28000 strong labour force to carry out different aspects of BMTC bus operations.

The major bus stations of BMTC in the city are:

- Kempegowda Bus Station
- K. R. Market
- Shivajinagar
- Shantinagar
- MCTC, located on Mysore road

BMTC is exploring and evolving in great pace and thus taking substantial steps to provide better connectivity, comfort to passengers and ease the ever increasing traffic of Bengaluru.

In the process, the BMTC proposed Traffic & Transit Management Centre (TTMC) at various location which includes Kengeri, Shanthinagar, Kormangala, Vijayanagar, Banashankari, ITPL and Yeshwanthpur.

Many of these TTMC are constructed while rest are in construction process. TTMC at Yeshwanthpur is already constructed and operational.

The basic details of the TTMC at Yeshwanthpur are as follows:

S.No	Particulars	Description
1	Site Area	14,940 sqm.
2	Total Builtup Area	43,173 sqm.
3	Passenger Amenities	4,020 sqm.
4	BMTC Offices	7,110 sqm.
5	Bus Terminal	11,140 sqm.
6	Covered private vehicle parking	20,150 sqm.

The amenities/service provisioned for in the Traffic & Transit Management Centre under JNNURM by BMTC at Yeshwanthpur are:

- PHC, 24 Hour Chemist Shop, Health Club
- Public utilities services such as Bangalore One counters, bus & rail reservation counter, post office counter, etc
- Banks, ATMs.
- Bus station, KSRTC bus counters, Karnataka State tourism counters, etc.
- Food court, departmental stores, crèche for children, etc.

BMTC also services the transport needs of the urban and sub-urban population in and around Yeshwanthpur 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 Yeshwanthpur area from Neelamangal Road towards Tumkur Road are as following:

Sl. No.	Route No.	From	To	Route Length	No.of Sch.	Total No. Trips
1	249	Peenya 2nd Stage	R.P.C.Layout	18.7	2	28
2	249-A	Peenya 2nd Stage	R.P.C.Layout	19.8	1	12
3	250	K R Market	Chikka Banavara	20.5	4	52
4	250-A	K R Market	Bagalagunte	17.8	2	48
5	250-AA	K.R.Market	Chikkabanavara Rly. Stn.	22.5	5	12
6	250-AB	Kempegowda Bus Stn	Chikkabanavara Rly. Stn.	17.4	3	30
7	250-B	Kempegowda Bus Stn	Thammenahalli	18.9	3	28
8	250-BA	Kempegowda Bus Stn	Sheshadri Nagara	17.0	1	6
9	250-C	Kempegowda Bus Stn	Bagalagunte	14.9	2	30
10	250-CA	Kempegowda Bus Stn	Kirloskar Badavane	16.7	1	10
11	250-CB	Kempegowda Bus Stn	Mallasandra	17.6	1	10
12	250-CC	K.R.Market	Munikondappa Badavane	18.1	1	12
13	250-D	K R Market	Ganigarahalli	19.3	1	12
14	250-E	K R Market	Thammenahalli	21.7	1	12
15	250-F	K R Market	Soma Shettahalli	22.3	1	14
16	250-G	K R Market	Ravindranagar	18.7	1	30
17	250-H	Kempegowda Bus Stn	IAF Chimani Hills	16.9	1	12

18	250-J	Kempegowda Bus Stn	Thotadaguddadahalli	16.7	1	10
19	250-K	K R Market	Ganigarahalli	21.7	1	10
20	250-M	Kempegowda Bus Stn	MEI Layout	16.3	1	16
21	250-N	Shivajinagar	MEI Layout	17.6	1	14
22	250-P	Kempegowda Bus Stn	Chikka Banavara	16.9	7	98
23	250-R	K R Market	Chimani Hills	19.2	1	14
24	250-S	Kempegowda Bus Stn	Geleyarabalaga	16.8	1	16
25	250-SA	Kempegowda Bus Stn	Kuduregere	20.1	2	18
26	250T	K R Market	Kuduregere	16.8	1	10
27	250-V	Shivajinagar	Thammenahalli	20.2	1	14
28	250-W	Shivajinagara Bus Station	Chikka Banavara	20.0	2	28
29	250-X	Shivajinagara Bus Station	Thammenahalli	24.2	1	7
30	250-Y	Kempegowda Bus Stn	Kuduregere	20.3	2	26
31	250-YA	Kempegowda Bus Stn	Meenakshi Badavane	15.8	1	13
32	250-Z	Kempegowda Bus Stn	Achitha Nagara	19.9	1	14
33	251	K R Market	Shivakote	31.0	1	10
34	251-A	K R Market	Kakolu	37.4	1	10
35	251-B	Kempegowda Bus Stn	Rajanukunte	38.2	1	8
36	251-C	Shivajinagar	Laggere	16.7	5	76
37	251-D	K R Market	Rajiv Gandhi Nagar	18.2	1	14
38	251-E	K R Market	Laggere (via Mahalxmi Layout)	14.9	4	64
39	251-F	K R Market	Rajiv Gandhi Nagar	19.7	1	12
40	251-G	K.R.Market	Muthkur	31.0	1	8
41	251K	K R Market	Dasarahalli	18.4	2	30
42	251-M	K R Market	Karlapura	38.3	1	10
43	252	Kempegowda Bus Stn	Peenya 2nd Stage	16.2	15	236
44	252-A	Shivajinagar	Peenya 2nd Stage	18.1	14	160
45	252-B	Peenya 2nd Stage	Banasawadi	29.2	2	30
46	252-C	Kempegowda Bus Stn	Machohalli	25.5	1	10
47	252-D	Kempegowda Bus Stn	Rajani Farm	15.5	1	18
48	252-E	Kempegowda Bus Stn	Laggere	15.2	10	144

49	252-F	Kempegowda Bus Stn	Peenya 2nd Stage	13.8	11	140
50	252-FA	Kempegowda Bus Stn	Thigalarapalya	18.4	2	24
51	252-G	Kempegowda Bus Stn	Byadarahalli	23.6	2	22
52	252-GA	Yeshwanthapura Bus Station	Andrahalli	13.0	1	15
53	252-H	Kempegowda Bus Stn	Rajiv Gandhi Nagar	12.3	3	50
54	252-J	Peenya 2nd Stage	Bhoopasandra	17.5	1	12
55	252-K	Shivajinagar	Kareemsab Palya	20.0	1	14
56	252-L	Peenya 2nd Stage	Bandireddy circle	15.8	1	14
57	252-M	Peenya 2nd Stage	Boopasandra	16.0	1	12
58	252-N	Peenya 2nd Stage	Jeevanahalli	23.8	1	14
59	252-P	Kaval Byrasandra	Peenya 2nd Stage	17.5	1	16
60	252-R	Kempegowda Bus Stn	Indira Priyadarshni Nagar	18.0	1	10
61	252-RA	Kempegowda Bus Stn	Annapoorneshwari Nagar	18.5	1	10
62	252-U	Kempegowda Bus Stn	Thigalarapalya	19.4	1	18
63	253	K R Market	Indo Danish Farm	32.1	3	34
64	253-A	K R Market	Byatha	36.5	1	10
65	253-B	Kempegowda Bus Stn	Kanaswadi	37.4	1	12
66	253-C	Shivajinagar	Indo Danish Farm	31.5	1	8
67	253-D	K R Market	Thore Nagasandra	31.8	1	10
68	253-E	K R Market	Railway Gollahalli	36.1	2	24
69	253-F	K R Market	Kallodu	39.8	1	12
70	253-G	K R Market	Madurai	37.4	1	6
71	253-H	K.R.Market	Mallohalli	41.2	1	8
72	253-J	Kempegowda Bus Stn	Hesaraghatta	26.4	3	52
73	253-K	K R Market	Kodihalli	35.8	2	16
74	253-L	K R Market	Hesaraghatta Indo Danish Farm	31.7	1	6
75	253-M/1	Kempegowda Bus Stn	Totagere Basavanna Temple	29.4	1	10
76	253-N	K R Market	Kodihalli	36.4	1	8
77	253-P	K R Market	Hosahalli palya	35.4	1	10
78	253-Q	Kempegowda Bus Stn	Chikka Kukkanahalli	32.1	1	8
79	253-R	Kempegowda Bus Stn	Gopalapura	30.4	1	8
80	253-T	Shivajinagar Bus	Kanaswadi (S.M.Temple)	40.0	1	5

		Station				
81	253-V	Kempegowda Bus Stn	Totagere Village	31.0	1	6
82	254	K R Market	Bylakere	29.4	1	10
83	254-A	K R Market	Siluvepura	24.2	2	26
84	254-B	K.R.Market	Kumbarahalli	24.3	1	8
85	254-C	K R Market	Kala Thammana Halli	27.1	2	22
86	254-D	K R Market	Kempapura	22.3	1	12
87	254-E	K R Market	Kempapura	22.5	1	12
88	255	K R Market	Mattahalli	29.4	1	12
89	255-A	K R Market	Huskur Village	31.3	2	18
90	255-B	K R Market	Nagaroor	26.8	1	8
91	255-C	K R Market	Pillahalli	27.4	1	12
92	255-D	Kempegowda Bus Stn	Huskur Village	28.6	1	10
93	255-E	K R Market	Narasipura	30.4	3	30
94	255-F	K R Market	Bailanjaneya Temple(Byrasettahalli)	32.9	1	10
95	255-G	K R Market	Bettanagere	31.8	1	8
96	255-H	K R Market	Govinda Pura	31.5	1	10
97	255J	K R Market	Hosnnasandra	28.0	1	10
98	255-K	Shivajinagar Bus Station	Pillahalli	29.2	1	12
99	255-M	K.R.Market	Bommashetty Halli	32.2	1	10
100	256	K R Market	Shivanapura	29.6	1	10
101	256-A	Hampinagara	Nelamangala	20.0	2	20
102	256-B	K R Market	Gejjagadahalli	28.4	1	24
103	256-C	Kempegowda Bus Stn	Thippenahalli Anjaneya Temple	18.6	1	12
104	256-D	K R Market	Ravauthanahalli	28.0	1	12
105	256-F	Laggere	Nelamangala	17.8	2	22
106	256-J	M.C.T.C. Bus Stand	Nelamangala	27.7	1	10
107	256-K	Kempegowda Bus Stn	Adarshanagara	26.4	1	7
108	256-M	K R Market	Motaganahalli	51.1	1	10
109	257	K R Market	Alur	25.1	2	24
110	257-A	K R Market	Harokyatana Halli	24.5	1	12
111	257-B	K R Market	M.Kodi Palya	20.5	1	12
112	257-C	Kempegowda Bus Stn	Anchepalya	18.2	1	8
113	257-D	K R Market	Kuduregere	24.5	1	14
114	257E	K R Market	Alurpalya	26.3	1	14
115	257-G	Kempegowda Bus Stn	Adakamaranahalli	22.5	2	22

116	257-H	Shivajinagara Bus Station	Alur	24.2	1	10
117	257-K	Shivajinagar	Kuduregere	22.5	1	10
118	SAC 257-M/1	Kempegowda Bus Stn	Bangalore International Exhibition	16.4	2	24
119	258	K R Market	Nelamangala	30.4	9	150
120	258-A	K R Market	Papabhovi Palya	36.1	1	10
121	258-B	Kempegowda Bus Stn	Nelamangala	27.3	3	50
122	258-C	Kempegowda Bus Stn	Nelamangala	26.7	22	144
123	258-CB	Govardhan	Nelamangala	21.0	8	60
124	258-CC	Kempegowda Bus Stn	Nelamangala	26.7	4	24
125	258-CD	K.R.Market	Binnamangala	25.3	1	10
126	258-E	K R Market	Mailanahalli	34.2	2	20
127	258-F	K R Market	Shivanapura	38.2	1	10
128	258-G	K R Market	Guruvanahalli	38.3	1	8
129	258-GA	K R Market	Bommashetty Halli	36.3	1	7
130	258-K	K R Market	Yantaganahalli	37.3	2	30
131	258-KA	K.R.Market	Mahadevapura	40.2	1	8
132	258-L	K R Market	Guruvanahalli	38.3	1	8
133	258-M	K R Market	Tyamagondlu	47.4	3	26
134	258-MA	K R Market	Jakkanahalli	43.9	1	4
135	258-N	Shivajinagar	Nelamangala	27.9	2	24
136	258-P	K R Market	Islampura	32.8	1	10
137	258-Q	K R Market	Hunnigere	38.5	1	10
138	258-QA	Kempegowda Bus Stn	Mantanakurchi	35.4	1	6
139	258-R	K R Market	Honnasandra	40.3	1	8
140	258-S	K R Market	Ramadevanahalli	45.8	1	6
141	258-SA	K.R.Market	Vajrakattepalya	41.1	1	6
142	258-SB	K.R.Market	Isvanahalli	49.0	1	8
143	258-T	Kempegowda Bus Stn	Kannamangala	40.5	1	12
144	258-TA	K.R.Market	Kannamangala	43.5	1	8
145	258-TB	K.R.Market	Arjunbettahalli	39.1	1	6
146	258-U	K R Market	Kulume Kempalinganahalli	35.3	1	7
147	258-V	K R Market	Soladevanahalli	42.8	2	10
148	258-VA	Kempegowda Bus Stn	Thore Kempanahalli	35.8	1	6
149	258-VB	Kempegowda Bus Stn	Chkkamaranahalli	33.8	1	7
150	258-VC	K.R.Market	Yelachagere	36.5	1	8

151	258-VD	K.R.Market	Hemapura	41.0	1	7
152	258-VE	K.R.Market(Curtail Tr.No.61))	Chowdsandra	43.5	1	10
153	258-VF	K.R.Market	Yennegee	38.4	1	8
154	258-W	Kempegowda Bus Stn	Jodi Ragithimmasandra	41.0	1	12
155	258-WA	Kempegowda Bus Stn	Jodi Ragithimmasandra	41.0	1	8
156	258-X	Nelamangal	Mutyalanagar Temple	24.7	1	10
157	258-Y	K.R.Market	Mallarabanawadi	36.0	1	6
158	258-YA	K R Market	Anchipura	37.1	1	10
159	259-B	Shivajinagar	Suvarna Nagar(Doddabidarakallu)	19.6	1	10
160	261	Kempegowda Bus Stn	Peenya 2nd Stage	15.3	1	16
161	262-A	Peenya 2nd Stage	J.P.Nagar 3rd Phase	29.5	1	14
162	263	K R Market	Kammasandra	32.4	2	20
163	263-A	K R Market	Thippenahalli	22.5	2	24
164	263-B	K R Market	Gangondanahalli	22.5	2	26
165	263-C	K R Market	Kadirenahalli	30.0	1	12
166	263-D	K R Market	K.R.S.Gowda Layout	14.1	1	30
167	263-E	K R Market	Channa Nayakana Halli	20.5	2	30
168	263-F	Kempegowda Bus Stn	Andrahalli	17.7	1	36
169	263-G	Kempegowda Bus Stn	Gangondanahalli	18.5	1	14
170	263-H	Kempegowda Bus Stn	Dodda Bidarakallu	18.2	1	14
171	263-J	K.R.Market	Nagasandra	17.5	1	12
172	263-K	Kempegowda Bus Stn	Kammasandra Palya	28.0	1	8
173	263-M	Kempegowda Bus Stn	Thippenahalli	19.0	1	9
174	263-N	K.R.Market	Dodda Bidarakallu	21.7	1	10
175	265	Kempegowda Bus Stn	Kempegowda Bus Stn (Ring Route)	29.2	11	100
176	265-A	Kempegowda Bus Stn	Kempegowda Bus Stn (Ring Route)	28.7	12	100
177	G -8	B.R.V. Parade Ground	Nelamangala	29.4	14	120

### 5.2.6 Yeshwanthpur Railway Station:

- A new railway terminal was built in 2001 at Yeshwanthpur besides the existing Krishnarajapuram terminal popularly known as KR Purma Terminal, to cater for the growing population of Bangalore.
- Now after the Bangalore City Railway station popularly known as majestic railway station, Yeshwanthpur is the busiest Railway junction in the city.
- Many long distance trains to Delhi, Mumbai, Hyderabad, and Howrah originate from here. It is also an important station for all trains going on the Bangalore-Hubli track.
- The junction is an important junction from the perspective of the passenger trains going towards Andhra Pradesh, Orissa, etc. The list of the trains stopping at Yeshwanthpur is as following list:

Train No.	Train Name	From	To
2079	Bangalore-Hubli Janshatabdi Express	Bangalore	Hubli
1018	Chalukya Express	Bangalore	Mumbai Dadar
6515	Bangalore Mangalore Express	Bangalore	Mangalore
2890	Yeshwanthpur Tata Express	Bangalore	Tatanagar
7304	Yeshwanthpur Mysore Express	Bangalore	Mysore
2725	Siddhaganga Intercity Express	Bangalore	Dharwar
7604	Prasanthi Nilayam Express	Bangalore	Hyderabad
7307	Basava Express	Bangalore	Bagalkot
2864	Howrah Express	Bangalore	Kolkata Howrah
6527	Yeshwanthpur Cannanore Express	Bangalore	Kannur Main
6517	Yeshwanthpur Kannur Express	Bangalore	Kannur Main
2736	Garib Rath Express	Bangalore	Secunderabad
6535	Yeshwanthpur Solapur Golgumbaz Express	Bangalore	Solapur
6589	Rani Chennamma Express	Bangalore	C Shahu Maharaj Terminus
2649	Karnataka Sampark Kranti Express	Bangalore	Delhi Hazrat Nizamuddin
6508	Jodhpur Express	Bangalore	Jodhpur



6592-Slip	Hampi Express Slip	Bangalore	Huzur Sahib Naned
6592	Hampi Express	Bangalore	Hubli
6227	Shimoga Express	Bangalore	Shimoga Town
5901	Yeshwanthpur Dibrugarh Express	Bangalore	Dibrugarh
583	Hubli Passenger	Bangalore	Hubli
433	Vijayawada Passenger	Bangalore	Vijayawada
595SW	Bangalore Chik Ballapur Passenger	Bangalore	Chik Ballapur
222SW	Tumkur Yeshwanthpur Passenger	Bangalore	Tumkur
582SW	Hubli Bangalore Passenger	Bangalore	Hubli
576SW	Shimoga Town Bangalore Passenger	Bangalore	Shimoga
588SW	Hubli Bangalore Passenger	Bangalore	Hubli
226SW	Tumkur Bangalore Passenger	Bangalore	Bangalore ...
228SW	Shimoga Town Bangalore Passenger	Bangalore	Shimoga
596SW	Chik Ballapur Bangalore Passenger	Bangalore	Chik Ballapur
594SW	Hindupur Bangalore Passenger	Bangalore	Hindupur
224SW	Arsikere Bangalore Passenger	Bangalore	Arsikere
583-Slip	Hubli Passenger Slip	Bangalore	Hospet
593SW	Bangalore Hindupur Passenger	Bangalore	Hindupur
223SW	Bangalore Arsikere Passenger	Bangalore	Arsikere
201	Yeshwanthpur Guwahati Express	Bangalore	Guwahati
592SW	Chitradurg Bangalore Passenger	Bangalore	Chitradurg
227SW	Bangalore Shimoga Town fast Passenger	Bangalore	Shimoga Town
221SW	Bangalore Tumkur Passenger	Bangalore	Tumkur
591SW	Bangalore Chitradurg Passenger	Bangalore	Chitradurg
587SW	Bangalore Hubli Fast Passenger	Bangalore	Hubli
574SW	Yeshwanthpur Salem Passenger	Bangalore	Salem

575SW	Bangalore Shimoga Town fast Passenger	Bangalore	Shimoga Town
581SW	Bangalore Dharwar Passenger	Bangalore	Hubli
225SW	Yeshwanthpur Tumkur Passenger	Bangalore	Tumkur
2291	Chennai Express	Bangalore	Chennai Central
7314	Chennai Express	Bangalore	Chennai Central
6532	Garib Nawaz Express	Bangalore	Ajmer
5016	Gorakhpur Express	Bangalore	Gorakhpur
691	Bangalore Nagercoil Express	Bangalore	Nagercoil
7309	Yeshwanthpur Vasco da Express	Bangalore	Vasco Da Gama
2251	Wainganga Express	Bangalore	Korba
7212	Machilipatnam Express	Bangalore	Machilipattanam
7312	Chennai Express	Bangalore	Chennai Central
7313	Hubli Express	Bangalore	Hubli
685	Yeshwanthpur Shirdi Garib rath	Bangalore	Sainagar Shirdi
681	Yeshwanthpur Korba Special Express	Bangalore	Korba
6506	Gandhidham Express	Bangalore	Gandhidham
926	Yeshwanthpur Ahmedabad Express	Bangalore	Ahmedabad
2253	Anga Express	Bangalore	Bhagalpur
2836	Hatia Express	Bangalore	Hatia
7311	Chennai Vasco Express	Bangalore	Vasco Da Gama
6534	Yeshwanthpur Jodhpur Express	Bangalore	Jodhpur
2629	Karnataka Sampark Kranti Express	Bangalore	Delhi Hazrat Nizamuddin
2846	Bhubaneswar Express	Bangalore	Bhubaneswar
6210	Mysore Ajmer Express	Bangalore	Ajmer
5227	Muzaffarpur Express	Bangalore	Muzaffarpur
2255	Yeshwanthpur Puducherry Express	Bangalore	Puducherry

6502	Ahmedabad Express	Bangalore	Ahmedabad
6209	Ajmer Mysore Express	Bangalore	Mysore
2257	Kochuveli Garib Rath	Bangalore	Trivandrum
6535A	Yeshwanthpur Bijapur Special	Bangalore	Bijapur
2777	Yeshwanthpur Kochuveli Express	Bangalore	Trivandrum
2778A	Yeshwanthpur Hubli Weekly Express	Bangalore	Hubli
2246	Yeshwanthpur Howrah Duronto	Bangalore	Kolkata Howrah
6503	Yeshwanthpur Lucknow Express	Bangalore	Lucknow

More than 40 express trains pass through the station almost daily and around 20 passenger trains pass the Yeshwanthpur station. The station code for Yeshwanthpur railway Junction is YPR.

### 5.3 Project Concept & Project Mix:

Considering the limitations/constraints related to the extent of the available site for the ITH - Yeshwanthpur and an another Intermodal transit hub proposed in Peenya Industrial area, the Inter modal Transit Hub (ITH) of Yeshwanthpur is proposed at a smaller magnitude in comparison to the ITH proposed in Peenya which is much larger in comparison of size and amenities.

Yeshwanthpur is a suitable and desirable location for an ITH due to it being strategically situated, i.e. adjacent to a rail terminal (only next to Bangalore City Rail station in terms of rail traffic), and the BMRCL station. Such strategic placement of ITH at Yeshwanthpur gives it an edge inspite of the presence of a similar facility in Peenya.

#### 5.3.1 Components of Intermodal Transit Hub:

In line with the advantages of intermodal coordination in general, discussed above, intermodal passenger hubs appear to offer important particular benefits. For example, public transportation providers can benefit from the efficiencies of shared costs and operational infrastructure, and public transportation services benefit from smoother intermodal interfaces and travel route connection opportunities that tend to promote higher ridership. Likewise, passengers benefit from improved system wide connectivity and the greater convenience this affords in making connections among local, regional, or intercity travel.

The conception of Intermodal Transit Hub at the subject site would involve:

**A) Pick up point for:**

- Govt. owned inter-state & intra state buses - KSRTC, NEKRTC & NWKRTC
- Govt. owned intra-city & inter-city busses - BMTC & KSRTC
- Private Bus operators (Inter-State / Inter-city)
- Proposed Amenities complementing the proposed facility:
  - Platforms
  - Ticket Counters

**B) Railway Station & Metro Rail Station:**

The southern railways have an important junction at Yeshwanthpur and interestingly the railway station is just opposite to the proposed site for the ITH. More specifically Tumkur Road lies between the site and the railway station.

An important development near the proposed site is the upcoming metro station adjacent to the site and opposite to the railway station. The entire combination makes an ideal combination to include all the transport in the hub.

Thus the only effort is to be done to connect all these transport establishments through proper structures/ Travellator or through other viable connection technology.

Well the ITH at Yeshwanthpur will also provide the following infrastructure in process of providing connectivity:

- Metro Station
- Yeshwanthpur Railway Junction
- Mechanized Foot over Bridges
- Platform seating for passengers
- Barrier free access for differently abled passengers.

**C) Passenger Utility Zone:**

To provide basic amenities under one floor, easing the hectic lifestyle of passengers/citizens, these components are also added.

- Ticket Reservation Counters by private operators

- Bengaluru One counters
- Tourism Counters
- ATMs
- Skywalk / Inter-Connectivity to Railway Station and Bus Terminus.

#### **D) Commercial Zone:**

Over the last two decades, the common tactic to develop single-purpose facilities with the intent to serve the one possible cross section of a local community, today's facilities are often developed with the intent to offer the different facilities at one spot which in turn enhance the ability to generate greater economic activity. As this has occurred, society has also become more mobile and time constraints for families much greater, which has resulted in the number of hypermarkets which generally offer every item at one place. Thus adopting the same policy in order to provide all the regular necessary activities in the form of commuter lifestyle space where restaurants, office, hypermarkets, etc are also provided. Thus, facilities would be offered in the ITH are as follows:

- Food & Beverages Outlet
- Coffee Counters/Kiosks
- Commercial spaces
- Ramp Based Multilevel Parking Facility only for visitors of commercial zone

Thus, with the intent to lower the overall transportation costs by allowing each mode to be used for the portion of the trip to which it is best suited. Reducing congestion and the burden on overstressed infrastructure components. Improving mobility for the elderly, disabled, isolated, and economically disadvantaged. Reducing energy consumption and contributing to improved air quality and environmental conditions.

Which in turn increasing economic productivity and efficiency in a developing country like India 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 centre will be complemented with a commuter lifestyle space where utilities like restaurants, commercial & retail sales and public utility services are also offered to the passengers.

*Thus, an Intermodal Transit Hub at Yeshwanthpur will be of small magnitude and connect or network the closely located different modes of transport which includes Rail, Metro and Bus transport. The ITH will also provide utility services like Bangalore-One counters, ATM, commercial & ramp based multi level parking.*

## VI. Infrastructure Planning

### 6.1.1 Criteria for the Selection of Proposed Location at Yeshwanthpur:



On the basis of above location assessment and Transport environment in the area, Yeshwanthpur becomes one of the most ideal and strategic site for the establishment of an Intermodal Transit Hub.

As mentioned above the identified site at Yeshwanthpur that has been selected for the establishment of Intermodal Transit hub in Yeshwanthpur, Bengaluru is based on the following parameters.

- Proximity of the site, with an important & second busiest terminal of Bengaluru, Yeshwanthpur Railway Station.
- Tumkur is developing as a major industrial hub, thus increasing the need for connectivity by all modes of transport including the requirement for more number of trains connecting Tumkur and Yeshwanthpur railway station.
- Strategically located on NH 4 and can act as terminus for Tumkur, Mumbai, Pune and broadly North Karnataka passengers from Bengaluru.
- Location proposed can be developed as an integrated facility, with state of the art connectivity facilities to the nearby existing Yeshwanthpur Railway station, nearby TTMC upcoming BMRCL's Yeshwanthpur Metro station and which is directly connected with the NH-4 i.e Tumkur Road.
- The integrated facility at the proposed location can also improve the connectivity to new International airport at Devanahalli from the Yeshwanthpur area.

### 6.1.2 On-Site:

The proposed ITH at Yeshwanthpur is in sense very strategically located. Establishing an Intermodal Transit Hub becomes a very complex exercise when all the facilities in terms of infrastructure and amenities have to be set up from scratch. Even though the identified site is too small to set up an ideal Intermodal Transit Hub (ITH) but the good and encouraging part regarding the proposed ITH at Yeshwanthpur is that all the major transport infrastructure establishments such as Railway Station, upcoming Metro Station and Bus station are in very close proximity. A proper and state of art connection & circulation network will automatically develop the intermodal transit hub.

The idea is to create an Inter-city and Intra-city Bus pick station at the identified site, which will be connected with the existing railway station and upcoming Yeshwanthpur Metro station with a combination of traveller and escalators/elevators.

#### 6.1.2.1 Area Requirement for various components within ITH

The following are the area details of components proposed for Intermodal Transit Hub at Yeshwanthpur.

##### Bus Terminal

To be provided in Bus Pick-Up Station	Units	Area in sq. ft.
Enquiry Offices & Ticketing counters	1	4304
Security Guard Cabin	2	200
Yard Control Room & Enquiry Office	1	300
Passenger concourse area		21120
Gents Waiting hall	1	1500
Ladies Waiting hall	1	1200
Toilet Areas	1	750
Cloak Room	1	600
Office area		
Generator Room with Electric Panel	1	250
Common Areas		1000
Buffer Area		5000
Total Bus Terminal area		36224.00 sq. ft
Boarding bays area (Part of Open Area)		32710

### 6.1.2.2 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 that service on the routes in and around Yeshwanthpur region. The routes and the bus schedules have been highlighted in the previously submitted Inception report. BMTC, KSRTC, NEKSRTC, NWKSRTC, etc.

BMTC have a strong network in the area runs around 360 buses from Neelamangala Road towards Tumkur Road.

The assumptions considered are:

- The Bus Schedule growth rate assumed is 2% since the saturation point in terms of no. of buses has been reached. Already BMTC is running more than 360 buses which is a huge no. in terms of city buses. While the KSRTC, NEKRTC, NWKRTC, etc also have an equally strong and extensive network passing through the Tumkur Road
- The time to Board a Bus – 5 minutes
- The time to Alight a Bus – 3 minutes
- Bus Pick Up Station shall operate for approx. 18 hrs.
- The number of Boarding buses, a Bus Bay can handle more than 550 buses daily.
- The total Estimated of bus trips are 10956,
- From the above, the total number of Bus-Bays to be developed is 40 for the outbound buses going towards Tumkur. Out of which the 26 bus Bays will serve the BMTC buses while remaining bays will serve the KSRTC, NEKRTC, NWKRTC and Private buses.
- Five Bus Bays will be developed for the inbound buses near thye parking area of back gate of Yeshwanthpur railway Station.

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 40 Bus Bays is 32710 sq.ft..

### 6.1.2.3 Parking Facility:

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

As per the guidelines, the norms for parking requirements in a Traffic & Transport Land use area is one ECS per 100 sq.mt of built up area. The total parking facility is bifurcated in two sections:



- Basement (Area consumed for 93 car parking slots);
- Ramp based Multi level parking (Area consumed for 86 car parking slots)

The parking facility will be connected to the Bus Pick Up station, Railway Station & Metro Stations via Skywalks or Foot over bridges so that passenger circulation does not conflict with vehicle circulation.

#### 6.1.2.4 Passenger Utility Zone:

To provide basic amenities under one floor, easing the hectic lifestyle of passengers/citizens, this component is provided.

#### 6.1.2.5 Commercial Zone:

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

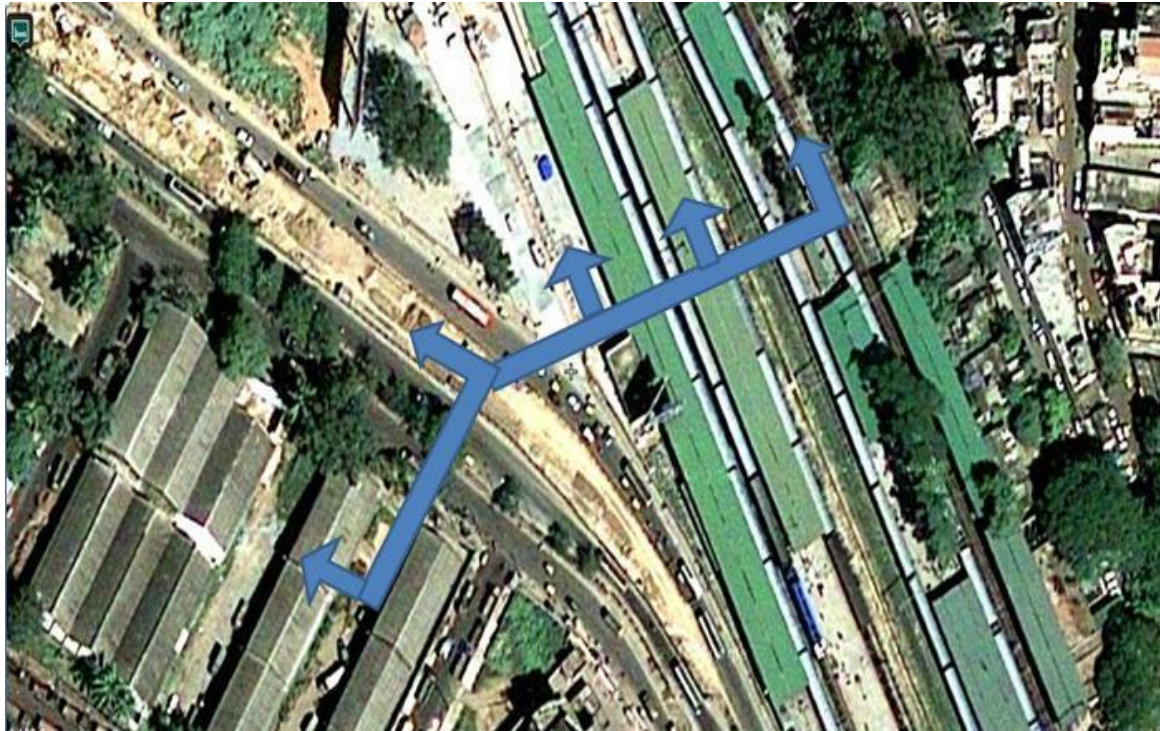
S. No.	Sub- component
1	Commercial complex area – <i>Restaurants, Food Courts, Kiosks etc</i>

#### 6.1.3 Off-Site:

As mentioned the proposed Inter Modal Transit Hub shall be planned with contemporary innovative design and state of art connectivity between the proposed Integrated Bus Pick-Up station, Railway Station and Upcoming Metro Station in consideration with the applicable norms/ laws/ rules such as setbacks, distance between buildings, etc.

The Bus Pick-Up is proposed in the identified site shall present Yeshwanthpur as a Gateway for Tumkur, North Karnataka, etc. It shall also serve as pick up station for buses plying on longer routes i.e. to destination in North Karnataka, Mumbai, Pune, Shirdi, etc.

As mentioned, metro alignment is coming in between the inbound flow of NH-4 and outbound flow of NH-4 near our site. And BMRCL has also acquired 10,000 sq.mt from the identified site for its Yeshwanthpur Metro Station. This will provide hurdle in connecting the inbound buses with the identified site location. Thus, separate bus-bays are proposed in the railway land for the inbound buses towards Bangalore city.



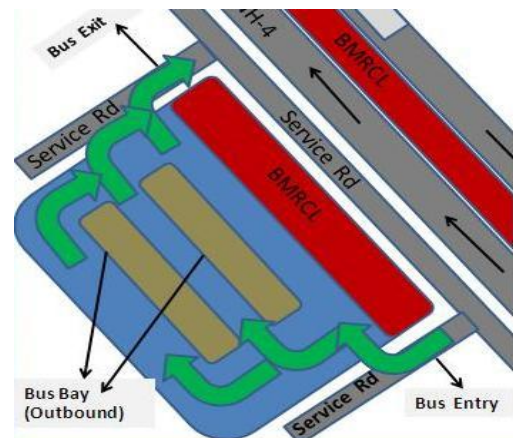
Pic I- MFOB Integrating the nearby Transport Modes

A combination of escalators, travellers and elevators are proposed to connect the railway station, metro station bus pick-up station for outbound buses and separate bus-bay pick up points for inbound buses.

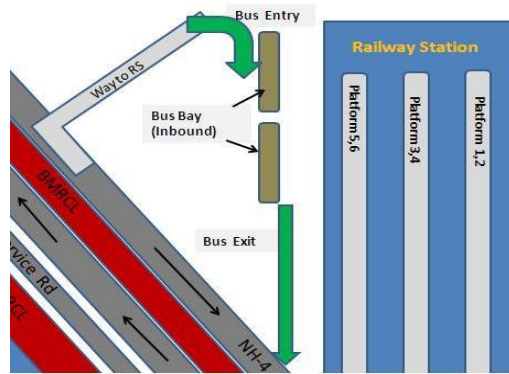
#### 6.1.4 Entry & Exit:

As mentioned the issues of joining the inbound buses with the identified site, separate bus bays are provided for the inbound and outbound buses. For the outbound buses entry for buses is suggested from the service road and again the exit is suggested from the parallel service road.

Pic II- Entry-Exit flow for Outbound buses going towards Tumkur



While in case of inbound buses the entry will be from the way to the railway station, then in the large parking area of railway station the bus bays for the inbound buses is proposed.



The entry/exit for passenger vehicle movement is proposed to be separate from that of Buses. The BMTC is promoting “Park & Ride” which is a concept where passengers come to nearest TTMC by their vehicles and then they park the vehicles in the parking area and take the bus to their destination. Similar concept is proposed to be adopted for ITH also

**Pic III-Entry-Exit Flow of Inbound Buses**

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.

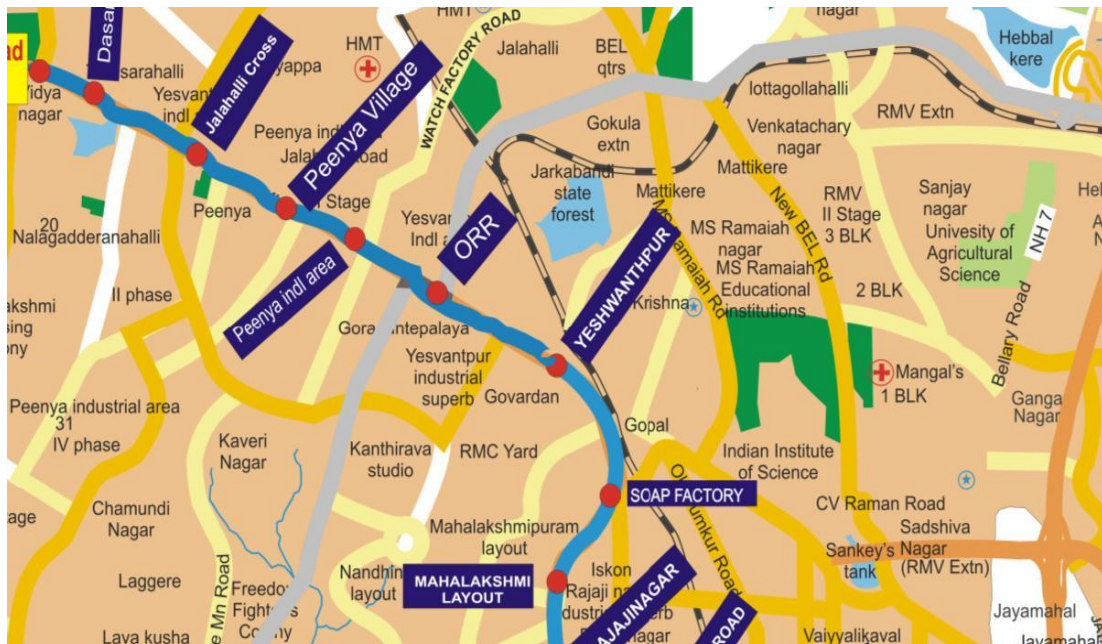
A Mechanised foot over bridge or Skywalk may be provided at the parking facility also to ease the passenger circulation which does not conflicts with the Bus and vehicle movement.

### 6.1.5 Traffic Circulation:

The intermodal Transit Hub proposed for the region will connect the three modes of transport, which includes Railways, Metro Rail and Bus at the identified site. The ground floor will be developed as a bus pick up station for both govt. & private inter-city and intra-city buses passing through the area. Above the bus station on higher floors, the space would be provided for the passenger amenities and commercial developments.

As mentioned the proposed Inter Modal Transit Hub shall be planned with contemporary innovative design and state of art connectivity between the proposed Integrated Bus Pick-Up station, Railway Station and Upcoming Metro Station in consideration with the applicable norms/ laws/ rules such as setbacks, distance between buildings, etc.

The Bus Pick-Up is proposed in the identified site shall present Yeshwanthpur as a Gateway for Tumkur, North Karnataka, etc. It shall also serve as pick up station for buses plying on longer routes i.e. to destination in North Karnataka, Mumbai, Pune, Shirdi, etc.



**Pic IV- Metro route is indicated in Blue alignment**

As mentioned, metro alignment is coming in between the inbound flow of NH-4 and outbound flow of NH-4 near our site. And BMRCL has also acquired 10,000 sq.mt from the identified site for its Yeshwanthpur Metro Station.

This entire set up induces one critical issue in joining the inbound buses (coming from Tumkur side towards Bangalore) with the identified site. To mitigate the critical issue few options were explored:

**Option I:** Connect the inbound buses with the site through underpasses.

**Challenge:** BMRCL would surely have critical apprehensions over the underpasses options.

Since the metro alignment is passing in between the inbound flow of traffic and outbound flow of traffic on NH-4 near Railway Station, constructing underpasses under the metro line would need very sophisticated technology to implement such an option. Apart from this BMRCL would always present its apprehension over the underpasses referring about the compatibility threats posed by the underpasses to the metro line and station.

**Option II:** Connect the inbound buses with the site via flyovers.

**Challenge:** **Seems financially and economically very expensive and complex.**

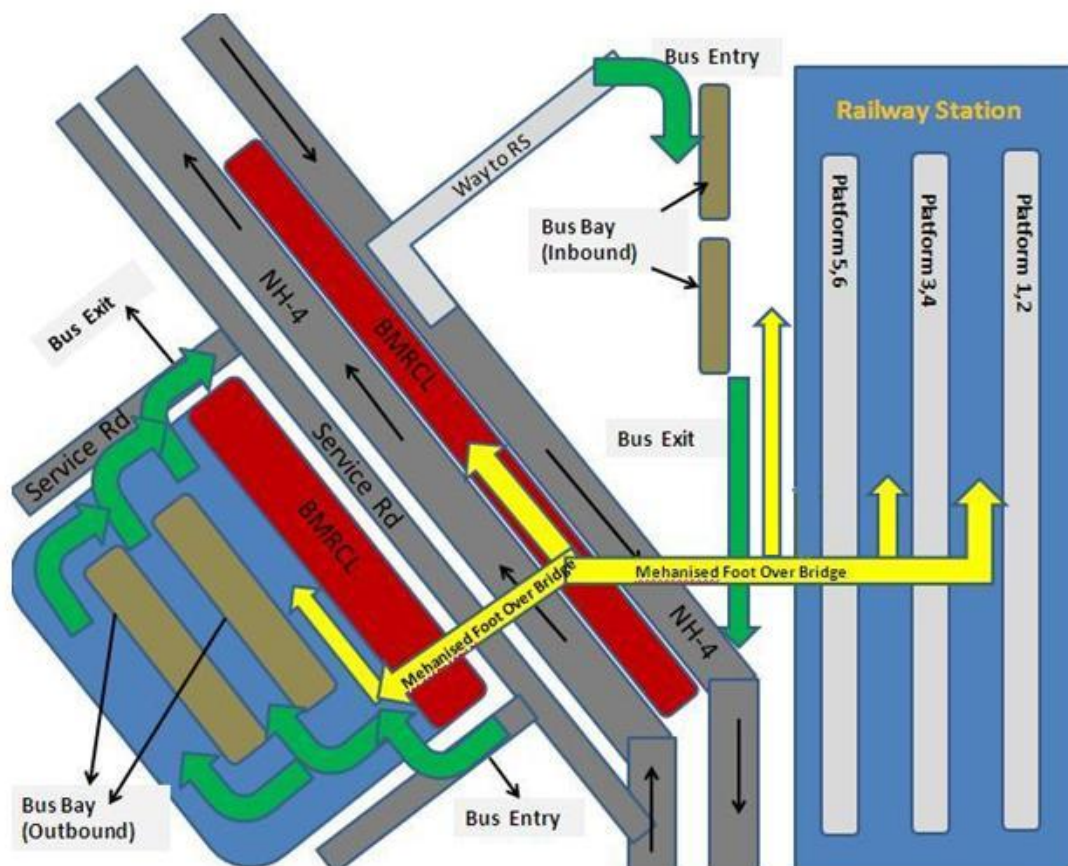
This option will be again needs very sophisticated road circulation planning and would definitely be highly expensive. The high cost would surely affect the viability of the proposed project.

**Option III:** Connection through two U-turns.

**Challenge:** Already the entire stretch of NH4 near RS is very messy in terms of traffic, U-turn will increase the mess and traffic chaos on both sides inbound and outbound flow of traffic.

After the exploration of many options the following option is proposed.

**Proposed Option:** Creation of few Bus-Bays in the parking area of Railway Station for inbound buses and Integrated Bus Pick-Up Station should be developed in the identified site for outbound buses.



Pic V- Networking of different modes of transport in the Proposed ITH, Yeshwanthpur

**Legends:**

1. Green Arrows indicate the bus entry and exit.
2. Yellow Arrows indicate the location of Mechanized Foot over Bridges
3. Brown Slabs indicate the Bus bays.

## VII. Critical Issues

The following critical issues have been identified which should be mitigated in order to implement the project. These issues raised would be required to be addressed by the stakeholders prior to commencement of Project Development.

Critical issues would be identified as a part of the project pre-feasibility which would be required to be addressed by the stakeholders prior to commencement of Project Development. Some of the critical factors for development of Intermodal Transit Hub are:

- The identified site presently belongs to Karnataka Food & Civil Supplies (KFCS). In order to undertake the envisaged development, land acquisition/transfer from the Karnataka Food & Civil Supplies (KFCS) is necessary.
- The size of the proposed site is not large enough to accommodate all the components of an ITH.
- Proposed site come under commercial /Hi tech corridor as per CDP 2015. Thus, process of change in Land use pattern from commercial /Hi tech corridor to Traffic & Transportation has to be initiated.
- Thus, again the issue of interlinking the site with the nearby existing facilities like Railway station, upcoming Metro Station & TTMC should be addresses very meticulously.
- Proposed site for ITH at Yeshwanthpur is in close proximity to another Intermodal Transit Hub proposed at Peenya. However, the positioning of both the ITH is different.
- The sizing and quantum again gets effected by a TTMC proposed by BMTC at a location very close to the proposed site for ITH at Yeshwanthpur.
- The Tumkur Highway just adjacent to the site is designed at different levels or elevation in terms of inflow and outflow of the traffic. This again should be addressed while proposing the connecting point for the ITH with the road and other components of the ITH including Railway station & Metro Station.

## VIII. Project Financials

### 8.1 General

The preliminary financial analysis for a standardised ITH has been carried out based on the assumptions arrived from preliminary market assessment carried out Yeshwanthpur location.

The Intermodal Transit Hub is proposed to be developed connecting the existing Railway Station, Upcoming Metro Station with the proposed Bus Pick-Up Station facilities with linkages and connectivity to the National Highways/Major roads/Ring Roads.

The locations where there is an existing Railway Station only the Bus Station facilities and amenities need to be included. However for the preliminary calculation capital cost and operation costs the entire development is considered. This includes:

- State of art Bus Pick-Up Station
- Passenger Amenities within the Bus station
- Connectivity between both the modes of transport by Sky Walks/ Mechanised Foot Over Bridge.
- Approach Roads to the ITH
- Adequate circulation areas and parking facilities
- Passenger Utility Zone which includes tourism counter, etc
- Commercial Development, which includes Food Court, Kiosks, etc.

The broad Financial Viability of the Project is assessed with respect to the key parameters such as Project IRR and Equity Internal Rate of Returns (IRR).

The viability analysis includes the identification of revenue and expenditure streams. Revenues will be from parking fees, commercial activities and advertisement, while the expenditure would be primarily on account of Capital and O&M costs.

### 8.2 Assumptions in Capital Cost & Operations & Maintenance

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

### 8.2.1 Preliminary Cost Estimation

The preliminary cost estimates are based on the preliminary market surveys carried out for Yeshwanthpur location. The landed project cost is estimated considering the cost involved in Construction, Project Development Fees, Interest during construction, Cost of Approvals & Sanctions and Pre-operative cost & contingencies etc. Following Tables shows the break-up of the Cost for an integrated Intermodal Transit Hub.

#### SUMMARY OF PROJECT COSTS

Description	Capital Cost (in Rs. lakhs)
Land Development Cost	85.89
Cost of Construction of Bus Pick-Up Station (Includes Cost of Bus-Bays for inbound buses near Railway Station)	362.24
Cost of MFOB (Total Length of MFOB is 160 mt)	1806.40
Cost of Passenger Utility Zone at First Floor	425.13
Cost of Commercial Development within the proposed facilities	1379.75
Parking (Basement + Multi Level)	977.47
<b>Base Construction Cost</b>	<b>4059.40</b>
Preemptive & Pre Operative expenses	202.97
Project Development Expenses	40.59
Escalations & Contingencies	162.38
<b>TOTAL PROJECT COST OF INTER-MODAL TRANSPORT HUB</b>	<b>4465.34</b>



### 8.3 Revenue Streams

The proposed ITH to be structured on Development and Management Rights

Model with parking fees, advertisement and commercial rental rights. Revenue from Commercial development, parking fees shall be major revenue stream for the operator to recover the investment.

The lease rentals and parking fees are considered as per market conditions prevailing at the Yeshwanthpur locations considering the development potential of the location.

#### 8.3.1 Revenue from lease of commercials within the Passenger Utility:

The developer shall have the right to lease the shops at the Passenger Utility Zone for specific end uses. The end uses of the shops/ kiosks/ stalls shall be subservient to the requirements of the Bus Terminal, Railway & Metro passenger traffic. Sufficient enhancement in scale and scope of this commercial space 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.

#### 8.3.2 Revenue from Parking:

The parking fees to be charged from various categories of vehicles and its periodic increase should be fixed. For instance, Cars shall be charged Rs.10/- and Two wheelers shall be charged Rs 3/-.

#### 8.3.3 Revenue from Advertisement rights:

Income from advertising charges has massive potential considering the large footfall of commuters in the Bus Terminal, MFOB 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.

### 8.4 Key Financial Indicators

The returns of the ITH project at Yeshwanthpur 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 Yeshwanthpur is provided at Annexure I

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

<b>Financing</b>		
<b>Lease Period</b>	Years	<b>30</b>
<b>Debt : Equity ratio</b>	Ratio	<b>1.0</b>
<b>Loan Period</b> <i>(incl. 2 yrs Moratorium period)</i>	Years	<b>9</b>
<b>Interest Rate</b>	% p.a.	<b>11.5</b>
<b>Expected Returns</b>		
<b>Total Cost of Project (Excl Land)</b> <i>(Rs crs)</i>		<b>44.65</b>
<b>Project IRR (Post tax)</b>		<b>18.64%</b>
<b>Equity IRR</b>		<b>23.64%</b>
<b>NPV of the Project</b> <i>(Rs crs)</i>		<b>1263.52</b>

The assumptions considered for the model are Block Cost Estimates for capital Outlay and conservative returns, also taking into account the present market scenario. The Equity IRR and the Project IRR represent the projects broad financial viability on PPP format.

## 8.5 Commercial Viability

Viability of the project is based on the revenues from subleasing of Built-up space, revenues from parking, advertisement, etc and depends on the development and city infrastructure around the proposed area.

The developer can Operate, Maintain and sublease the built up space at market rates. The advertisement and parking revenues can also generate additional revenue streams for the developer.

The land to be provided to the developer for commercial development will thus be determined upon the proposed development works envisaged considering a win –win situation to all the stakeholders.

## 8.6 Recommendations

On the basis of the findings of the pre-feasibility study which includes the most important financial analysis of the project's estimated construction and O&M cost and projection of project revenue cash flows, it is recommended that the project is viable on a PPP basis maintaining land is provided at zero cost to the developer.

The demand analysis of the end users of the proposed facility also validates the claims of viability of the project but with certain issues and challenges which have to be addressed during the detailed project development study for the development of the Intermodal Transit Hub at Yeshwanthpur area.

## IX. Assessment of Risks

### 9.1 Risk Allocation and Mitigation

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

#### 9.1.1 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. The traffic revenues for the project would also depend on the following:

1. Enforcement by the local bodies for directing the private / Government operated busses to the ITH.

#### 9.1.2 Project Development Risk:

The project development stage is a very important stage from the perspective of the success of project. The

- Transfer of land from KSFCs to the Project Sponsoring agency/Nodal Agency.
- Permission from Railways to allow the bus bays, to provide feeder services, for inbound buses in its parking area.
- Approvals and involvement of Railways and BMRCL in the integration of the proposed project ITH at Yeshwanthpur.

#### 9.1.3 Demand Risk:

These risks arise from the project if there is no established demand for the Project. However in this case, a Pre-feasibility has been carried out to assess the viability of the project 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.

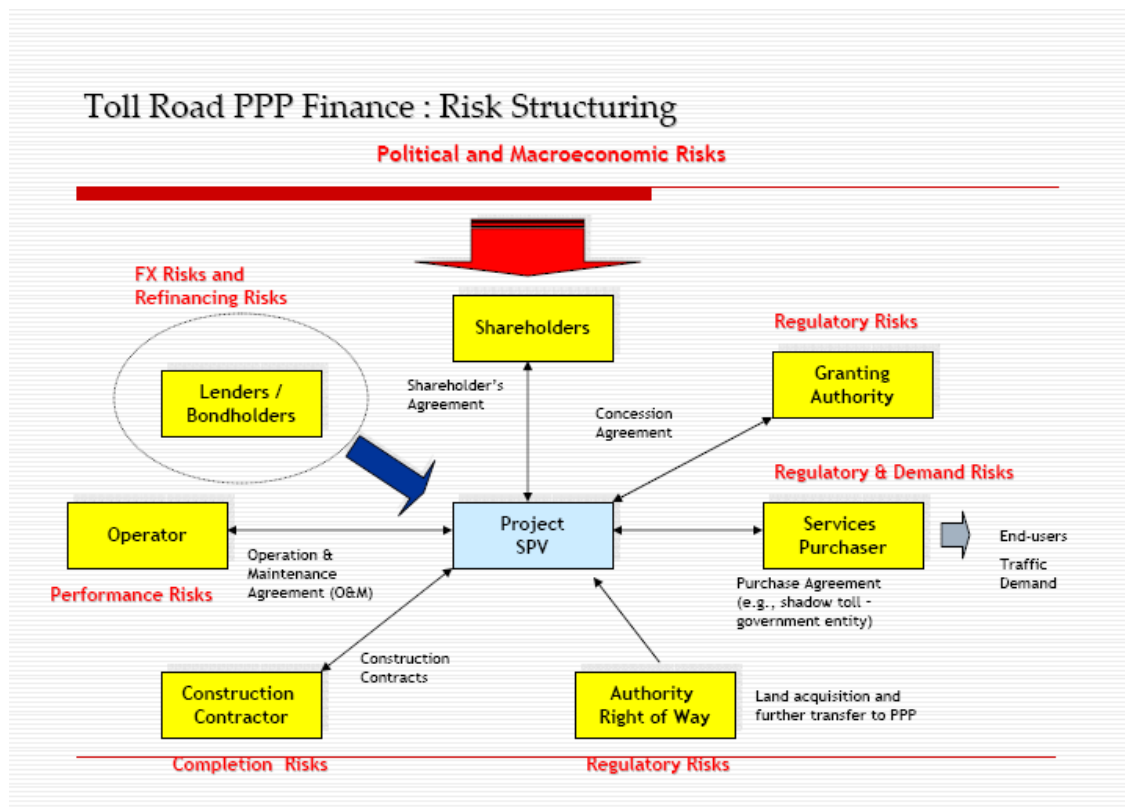
#### 9.1.4 Commercial Risk/ Revenue Risk:

These risks arise 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. 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.

### 9.1.5 Debt servicing Risks

The Risk Mitigants are appropriate debt–equity mix and proactive managerial strategies in financial restructuring



## X. Legal & Regulatory Framework

### 10.1 Requirement of Legal & Regulatory Framework

One of the important aspects for governments developing a sector based on private investments is the necessity of devising systems of regulation and support that provide the encouragement and room for maneuver that the private sector needs while at the same time minimizing govt. exposure to the host of commercial and financial risks surrounding the project.

When the regulatory bodies have become more stringent and cautious, the long-term nature of most infrastructure investment makes credible commitments difficult and vague in the absence of regulatory bodies. Any design of a regulatory framework is thus a complex undertaking that involves the balancing of many influences/elements which include regulatory goals and resources, social institutions and sector characteristics. These elements influence the form, function and scope of regulatory policy

The proposed ITH necessitates a robust legal and regulatory framework which includes:

- Land Acquisition from Karnataka Food and Civil Supplies.
- 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.
- Responsibility of preparation of the master plan, infrastructure planning, financing, implementation, integration, management, operations, licensing and overall administration of the project
- The success of the ITH would depend on the Implementation of Traffic regulations levied by the local administration towards restricted entry of busses to the CBD 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 boarding and alighting of busses, etc

## XI. Project Structuring & Implementing Frame Work

### 11.1 Background

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

When properly structured and made bankable, PPP projects balance between the requirements of the government and the public for service provision with high quality of standards and attract private investments. Public Private Partnerships, particularly those that focus on innovative ways to help public and private interest meet, carry the promise of a development that is inclusive and sustainable at the same time. The project involves components of diverse nature viz: Rail, Metro 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.

There are many options that can be considered for implementing the proposed ITH on a PPP framework. The table below shows some of the different options that may be adopted:

**Possible Options for PPP**

Option	Ownership	Financing	Management
Lease	Public	Private	Private
Concession	Public	Private	Private
BOOT	Private , then Public	Private	Private
Outright Sale	Private	Private	Private

### 11.2 Implementation through Public-Private-Partnership (PPP)

Successful development and implementation of the ITH 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 any infrastructure project has unique and distinctive requirements, not comparable to similar ventures in production and service sectors. It is also pertinent to say the 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, which will help in:

- Leveraging limited public resources
- Expediting implementation
- Improve quality of services and bring in value for money

For successful private sector participation in such capital-intensive projects with associated risks involved, commercial viability, amenability to private sector participation and bankability of the project assume significant importance, which can be addressed only through proper and comprehensive project development. The benefits to project development include:

- ✓ Basic Feasibility
  - Technical
  - Financial
- ✓ Risks Mitigation
  - Technical
  - Financial
  - Regulatory
- ✓ Viability Enhancement
  - By optimizing implementation time
  - Appropriate implementation structure
  - Financial engineering
  - Accessing government support/grants, wherever possible
- ✓ Enhance Market Response
  - Developing reliable technical & financial information
  - Direct marketing with potential investors
  - Dry financial closure to ensure bankability
  - Statistically Accurate valuation
- ✓ Provide Clarity to
  - Government - basis of support to make the project bankable
  - Private Sector - to bid at nominal bid costs and risk premia
  - Financing Agencies - the bankability of the project



For such PPP Projects to be able to attract private capital, substantial project preparation and development work will need to be undertaken. This will include

- Techno-Commercial Feasibility Studies,
- Financial Modeling and Engineering,
- Risk Management Plans,
- Marketing of the Projects,
- Management of the Procurement Process,
- Design of appropriate Contractual and Regulatory Structures,
- Management of the Government approval process at the State and the Central Government levels

The PPP approach will enable the GoK to raise resources and implement Projects expeditiously on the strength of future accruals with minimum recourse to budget financing. Hence implementing a complex project, involving multiple stakeholders makes “**Project Development**” a necessary pre-requisite. The success of developing such a project is largely based on understanding the risks, allocating them among various stakeholders, developing structural frameworks and following transparent procurement processes to induct private sector efficiencies and resources.

### 11.3 Project Structuring

Project may be proposed to be implemented on Public-Private-Partnership (PPP) format under Design, Build, Finance Operate and Transfer (DBFOT) basis. Under this basis, the Build-Own-Operate- Transfer (BOOT) structure has been identified as the most suitable model for implementing the identified project.

In this model Private Developer / Private Sector Player (PSP) shall finance, design, engineer, construct, market, operate, maintain and manage the facility during the Authorization period and transfer the 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 GoK/IDD.
- Scope of Work for the PSP/ Developer:
  - Selected private sector player for Designing including Planning,
  - Detailing and placement of the Project components
  - Detailed designing and Engineering of facilities based on Concept
  - Achieving Financial closure and making the necessary capital investment
  - Construction, Marketing and Promotion

- 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 Government/ Project Sponsoring agency will receive 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,

- Role of Government:
  - GoK/ Project Sponsoring Agency shall lease the land to the Developer for Authorization period.
  - Signing a 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 Proposals from the Qualified Potential Bidders.
- The bid parameter for the project may be the maximum Upfront Fee payable by the Developer to the GoK/ Project Sponsoring Agency or the Annual Fee or both, keeping the Authorization Period fixed for 30 yrs.

## XII. Operating Framework

### 12.1 Implementation Structure

The development of ITH at Yeshwanthpur would need to be assessed for their technical & financial viability. In the proposed PPP structure for implementation, the roles to be performed by the respective parties i.e. the ULBs / Project Sponsor and Selected Developers have been identified as below:

#### 12.1.1 Role of Project Sponsor:

The role of the Project Sponsor would include:

- a. Identification & Acquisition of location
- b. Grant of lease hold rights of the project site to the developer
- c. Co-ordination with Railways and seeking requisite clearances
- d. Standardization of performance standards
- e. Providing collection of parking fees rights to developers

#### 12.1.2 Role of Developer:

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

- a. Design, finance, construct, operate, maintain and manage the facilities including supporting ancillary infrastructure
- b. Meet the requirements laid down by the Competent Authority
- c. Operate & Maintain the commercial facility in order to recoup the investment incurred

#### 12.1.3 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)

#### 12.1.4 Fire Fighting Facilities

The developer shall provide the required fire fighting 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.

## 12.2 Maintenance and Performance Standard

### 12.2.1 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 Parking Facility, 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

## XIII. Keys to Success

### 13.1 Key Stakeholders

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

- **Project Sponsor** – Infrastructure Development Department/Railways
- **Nodal Department** - Urban Development Department / Transport Department / Infrastructure Development Department
- **Facilitating Department** - Infrastructure Development Department
- Railways
- Bangalore Metropolitan Transport Corporation (BMTC)
- Karnataka State Road Transport Corporation (KSRTC)
- Bangalore Metro Rail Corporation Ltd. (BMRCL)
- Private Bus Operators Associations
- National Highway Authority of India
- State Public Works Department- (Roads Division)
- City Town Planning Department
- Revenue Department
- City Corporations
- Traffic Police Department
- Other agency as deemed necessary

For the successful implementation of the projects, the Infrastructure Development Department along with the Project Advisors, the Urban Development Department, 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 alongwith the Project Advisors will be required to take the lead in co-ordinating with the individual agencies involved throughout the various stages of the project.

### 13.2 Essential issues to be addressed

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

- Coordination with the Railway Authorities for providing the land (in its parking area) needed for constructing Bus-bays for inbound buses
- Coordination with National & State Highway Authorities to sort out connectivity issues for intermodal
- Coordination with State Road Transport Corporations & Private Bus Operators Associations for the entry of busses to the ITH
- Traffic Authorities to be roped for Traffic Management for ingress & egress routes to the ITH
- A graded parking/entry fee structure should be evolved as a measure of demand management at the ITH for Busses, Omni Busses, Taxis, Autos etc
- Joint inspections of locations and reviews with key stakeholders

### 13.3 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 busses to the ITH

### 13.4 Clearances and Sanctions

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

- Department of Railways for the approval for constructing the bus-bays for inbound buses in railway area.
- 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

## XIV. Way Ahead

### 14.1 Implementation Plan

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

1. BMRCL informed that the matter pertaining to handing over of the subject site was taken before the High Power Committee for the Metro Project. The Committee decided not to take over the subject site from the Karnataka Food & Civil Supplies Corporation.
2. BMRCL further informed that if the land was being made available, the proposed facilities would be implemented by BMRCL.



## XV. Case Studies

### 15.1 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



### 15.2 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.

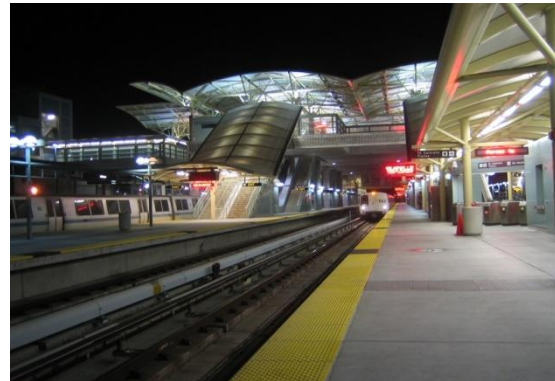


- The total Cost of the facility is expected to be \$ 1.7 billion.
- Expected to serve 1,50,000 commuters and travelers each day.

### 15.3 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.



### 15.4 Salt Lake City Intermodal Transit 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

### Financial Appraisal & Financial Analysis Work Sheets

#### A) Area Requirement for Bus Pick-Up Station & Passenger Utility Zone

Ground Floor	Bus Pick-Up Station & Related Amenities
1st Floor	Passenger Utility Zone
2 <sup>nd</sup> Floor & 3 <sup>rd</sup> Floor	Commercial Zone

Area		1.9723	acres
		85885.22356	in sq.ft.
Ground Coverage		45%	
Allowable Building Foot print		38648.35	in sq.ft.
Open Area		47236.87	in sq.ft.
FAR		4	
Total Covered area		343540.89	in sq.ft.
Basement		70425.88	
Total Construction required for Bus Terminal area		36224.00	in sq.ft.
Use of Foot print area		38648.35	
<b>Bus Pick-UP Station Area (Ground floor)</b>		<b>36224.00</b>	in sq.ft.
<b>Passenger Utility Zone (First Floor)</b>		<b>38648.35</b>	in sq.ft.

*B) Project Cost*

Particulars		Cost/unit	Total cost	
Land Development Cost		100	85.89	Rs lakhs
Cost of Construction of Bus Pick-Up Station (Includes Cost of Bus-Bays for inbound buses near Railway Station)		1000	362.24	Rs lakhs
Cost of MFOB (Total Length of MFOB is 160 mt )			1806.40	Rs lakhs
Cost of Passenger Utility Zone at First Floor		1100	425.13	Rs lakhs
Cost of Commercial Development within the proposed facilities		1600	1379.75	Rs lakhs
Parking		1400	977.47	Rs lakhs
<b>Base Construction Cost</b>			<b>4059.40</b>	<b>Rs lakhs</b>
Premptive & Pre Operative expenses	5.0%	of Const cost	202.97	Rs lakhs
Project Development Expenses	1.0%	of Const cost	40.59	Rs lakhs
Escalations & Contingencies	4.0%	of Const cost	162.38	Rs lakhs
<b>Total - Project Cost</b>			<b>4465.34</b>	<b>Rs lakhs</b>

*C) Project Financing and Project Phasing*

Construction Phasing			
	1s year	2nd year	3rd year
	45%	30%	25%
Funds Requirements (in lakhs)	2009.40	1339.60	1116.34

Financing	Participation	1s year	2nd year	3rd year
Debt (in lakhs)	50%	1221.71	1221.71	-
Equity (in lakhs)	50%	-	-	2443.42

<b>Cost of Capital</b>	<b>14.75%</b>
<b>Interest During Construction</b>	<b>421.49 lakhs</b>

*D) Revenue Details*

		Escalations		15% every three years														
				10%	25%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Passenger Utility Zone		sq.ft	Rs/ sq.ft./ month	1	2	3	4	5	6	7	8	9	10	15	20	30		
		First Floor	38648.35	60		278.27	278.27	278.27	320.01	320.01	320.01	368.01	368.01	368.01	486.69	643.65	978.91	
<b>Total income from Utility Zone</b>					27.83	69.57	278.27	320.01	320.01	320.01	368.01	368.01	368.01	486.69	643.65	978.91		

		0% 15% 60% 80% 100% 100% 100% 100% 100% 100% 100%																
Commercial Zone		sq.ft	Rs/ sq.ft./ month	1	2	3	4	5	6	7	8	9	10	15	20	30		



				5	5	5	5	8	8	8				
<b>Total Revenue</b>		18.81	39.95	174.16	1168.95	1468.95	1592.15	1592.15	1830.98	1830.98	1830.98	2421.47	3202.39	4870.43

### A) Cash Flows & IRR Calculations

Year	1	2	3	4	5	6	7	8	9	10	15	20	30
Revenues	0.00	18.81	39.95	174.16	1168.95	1468.95	1592.15	1592.15	1830.98	1830.98	1830.98	2421.47	3202.39
O&M Expenses	0.00	26.58	62.81	169.97	242.11	293.06	294.08	334.60	335.73	336.92	441.33	579.08	880.12
Annual Concession fee -	30.00	30.00	30.00	33.60	33.60	33.60	37.63	37.63	37.63	42.15	47.21	59.21	83.19
Capital expenses	-1221.71	-1221.71	-2443.42										
PBIDT			-79.60	860.34	1126.63	1235.26	1230.49	1443.25	1442.46	1437.11	1958.37	2647.42	4127.62
Interest	140.50	280.99	268.54	239.29	206.49	169.71	128.47	82.23	30.38	0.00	0.00	0.00	0.00
PBDT			-348.14	621.05	920.14	1065.55	1102.02	1361.02	1412.07	1437.11	1958.37	2647.42	4127.62
Depreciation			584.55	462.97	370.25	299.29	244.75	202.60	169.84	144.19	61.37	45.38	23.32
Income Tax (33.66%) or MAT (11.33%)	0.00	0.00	0.00	53.21	185.09	257.92	288.56	389.93	418.14	435.20	638.53	875.84	1381.57
<b>PAT</b>	0.00	0.00	-932.69	104.87	364.79	508.34	568.72	768.50	824.10	857.72	1258.47	1726.19	2722.93

### Cash Flows

	1	2	3	4	5	6	7	8	9	10	15	20	30
Cash Flow From Operations less tax			-79.60	807.13	941.53	977.34	941.93	1053.33	1024.32	1001.91	1319.84	1771.57	2746.05
Interest on Loan			268.54	239.29	206.49	169.71	128.47	82.23	30.38	0.00	0.00	0.00	0.00
Tax			0.00	53.21	185.09	257.92	288.56	389.93	418.14	435.20	638.53	875.84	1381.57

Cash flow after tax & Interest			-348.14	567.84	735.05	807.63	813.46	971.10	993.94	1001.91	1319.84	1771.57	2746.05
Capital repayments			241.25	270.50	303.30	340.08	381.32	427.56	479.40	0.00	0.00	0.00	0.00
(Project Cash Flows)	-1251.71	-1251.71	-2523.02	807.13	941.53	977.34	941.93	1053.33	1024.32	1001.91	1319.84	1771.57	2746.05
Equity Cash Flows			-2791.56	297.34	431.75	467.55	432.14	543.54	514.53	1001.91	1319.84	1771.57	2746.05
Cumulative	-1251.71	-2503.42	-5026.43	-4219.31	-3277.77	-2300.43	-1358.50	-305.17	719.15	1721.06	7781.43	15447.59	37752.12

### IRR Details

Project IRR (Post Tax)	18.56%	
Equity IRR	23.64 %	
NPV of the Project	1263.52	Rs lacs