

RESEARCH



INDIA WAREHOUSING MARKET REPORT 2016

THE TOTAL WAREHOUSING SPACE REQUIREMENT IN THE COUNTRY'S TOP 7 MARKETS IS EXPECTED TO GROW FROM **621 MN** SQ FT IN 2016 TO **839 MN** SQ FT BY 2020

A MASSIVE **218 MN** SQ FT NEEDS TO BE ADDED WITHIN THE NEXT 4 YEARS IN THE TOP 7 WAREHOUSING MARKETS OF INDIA

THE WAREHOUSING REQUIREMENTS OF THE E-TAIL SEGMENT WILL MORE THAN DOUBLE FROM **14 MN** SQ FT IN 2016 TO **29 MN** SQ FT IN 2020

CURRENTLY, **17 MN** SQ FT OF SPACE IS TRANSACTED ANNUALLY IN THE TOP 7 WAREHOUSING MARKETS OF THE COUNTRY

WITH INVESTMENT RETURNS OF **22-24%** PER ANNUM, PUNE OFFERS THE BEST INVESTMENT OPPORTUNITY IN INDIA TODAY

THE **AUTO & AUTO ANCILLARY** AND **CHEMICAL & PHARMACEUTICAL** SECTORS ARE THE LARGEST DEMAND DRIVERS OF WAREHOUSING SPACE



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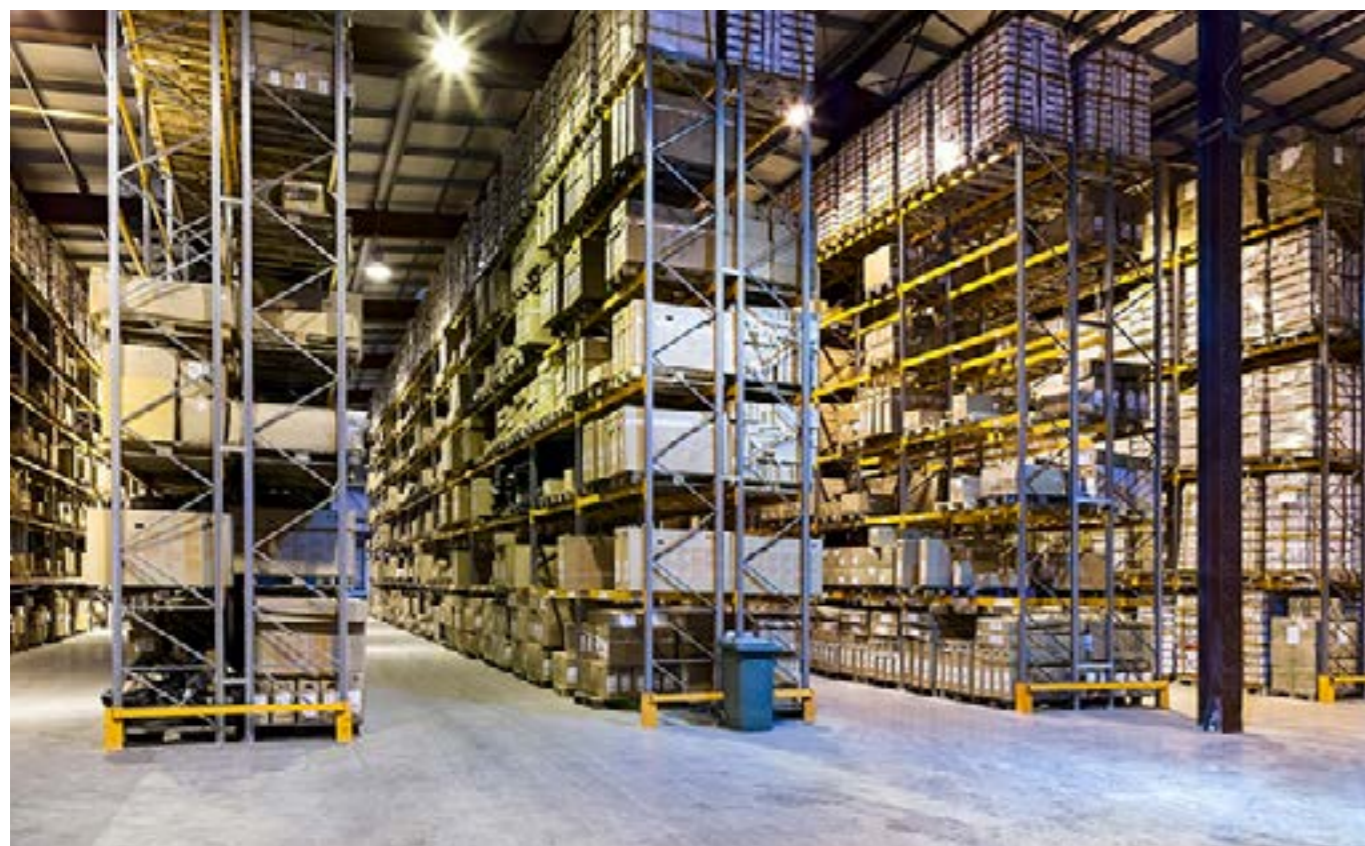
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EXECUTIVE SUMMARY

The report is primarily targeted towards institutional investors, real estate developers, high net-worth individuals (HNIs) and private equity funds that are planning to participate in the investment opportunities provided by the warehousing sector but have limited understanding of the various nuances of this sector. Additionally, the report also serves as a detailed handbook for industry stakeholders such as warehouse developers, logistic players and government agencies. It delves into the key warehousing markets of India, such as Mumbai, National Capital Region (NCR), Bengaluru, Chennai, Pune, Hyderabad and Ahmedabad, with an exhaustive analysis on the existing warehouse locations, land cost feasibility, investor returns and emerging areas.

The demand drivers considered for the warehousing market are the manufacturing and consumption sectors. The manufacturing sector-led demand comprises the requirements arising from the need for the storage of raw materials

and finished products from industries such as automobiles, cement and food processing, among others. In terms of consumption-led demand, all product categories, ranging from apparel and footwear to home and lifestyle, have been considered.

For the purpose of this report, agriculture-led demand has not been considered for analysis as it is a largely unorganised market with godown-type structures spread across a vast geography of the country. Additionally, the government contracted agriculture warehouses have caps on rentals and construction cost, thereby distorting free market economics. Similarly, export-import (EXIM) based warehousing requirement, which is serviced via container freight stations (CFS) and inland container depots (ICD) has been excluded from the study, as the market dynamics for this segment is entirely different from the remaining segments of the warehousing industry.

The need to quantify the size of the

warehousing market in these key hubs has led us to estimate the total requirement for warehousing space from the period 2016 to 2020. The total warehousing space requirement in these markets is expected to grow at a compounded annual growth rate (CAGR) of 8% from 621 mn sq ft in 2016 to 839 mn sq ft by 2020. Hence, over the next four-year period, an incremental 218 mn sq ft or 54 mn sq ft per annum of warehousing space will be required in the top seven markets of India.

While factors such as Goods and Services Tax (GST) and 'Make in India' initiatives will push the requirement from the manufacturing sector, it is the E-tail sector that will lead in terms of growth for warehousing space. While the requirement from traditional brick-and-mortar retail will continue to grow at a steady pace, requirement from the E-tail segment will more than double from 14 mn sq ft in 2016 to 29 mn sq ft by 2020, resulting in an annual growth rate of 19%.

WAREHOUSING SPACE REQUIREMENT IN INDIA'S TOP SEVEN MARKETS (MN SQ FT)

	Warehousing space requirement		CAGR*	Total additional space required from 2016–2020	Annual additional space required from 2016–2020
	2016	2020E			
Manufacturing	487	656	8%	169	42
Brick-and-mortar retail	120	154	6%	34	8
E-tail	14	29	19%	14.4	3.6
Total	621	839	8%	218	54

* Compounded Annual Growth Rate

Note: The top seven markets include Mumbai, NCR, Bengaluru, Chennai, Pune, Hyderabad and Ahmedabad

Source: Knight Frank Research

The biggest challenge that India's warehousing market currently faces is the acquisition of a feasible land parcel. Land cost constitutes the largest component of a warehousing project. Although rental values that a warehouse owner can charge are primarily driven by the demand and supply factors, it is the land price that is dependent up on multiple factors like development control regulations, infrastructure development and the best alternate usage of land. This

creates a mismatch between the return expectation of a warehouse developer and the ongoing market value of land. Since rental value in a market is beyond the control of a warehouse developer, acquiring land at feasible cost takes the centre stage when it comes to warehouse investment.

The below table depicts the current land rates and rentals in each of the major warehousing hubs of India. The table also

illustrates the feasible investor returns that can be achieved at the prevailing land rates and rentals. Even though an investor can avail returns up to a maximum of 24% per annum in markets such as the Wagholi-Ranjangaon belt in Pune, there are certain markets like the Jeedimetla-Medchal warehousing cluster in Hyderabad, where achieving returns upwards of 12% per annum is also not feasible.

FEASIBLE INVESTOR RETURN IN INDIA'S MAJOR WAREHOUSING MARKETS

Warehousing market	City	Quoted rentals (₹/sq ft/month)	Quoted land rate (₹ mn/acre)	Feasible investor return per annum
NH-8 warehousing cluster	NCR	11 – 21	25 – 40	10% – 16%
Ghaziabad warehousing cluster	NCR	14 – 20	20 – 40	12% – 18%
Bhiwandi	Mumbai	10 – 16	10 – 50	12% – 18%
Panvel	Mumbai	17 – 25	25 – 50	12% – 18%
Nelamangala-Dabaspete belt	Bengaluru	10 – 16	10 – 35	12% – 16%
Sriperumbudur-Oragadam warehousing cluster	Chennai	15 – 28	15 – 60	12% – 16%
Periyapalayam	Chennai	14 – 22	12 – 100	14% – 16%
Chakan-Talegaon belt	Pune	16 – 30	10 – 34	14% – 22%
Wagholi-Ranjangaon belt	Pune	14 – 22	8 – 45	18% – 24%
Jeedimetla-Medchal warehousing cluster	Hyderabad	10 – 14	15 – 40	Upto 12%
Aslali-Kheda belt	Ahmedabad	10 – 20	4.5 – 32	14% – 18%
Changodar-Bagodara belt	Ahmedabad	11 – 20	4 – 40	14% – 16%

Source: Knight Frank Research

Investment in warehousing can provide an opportunity of realising returns in the range of 10%–24% per annum to investors willing to explore this sector. Currently, one of the biggest

challenges facing an investor is the lack of understanding of the various nuances of this sector. Hence, the goal of this report is not only to familiarise the reader with the various aspects of the Indian

warehousing industry but also to provide an actionable advice on the investment opportunities available in the current scenario.



INTRODUCTION- GST IMPACT ON SUPPLY CHAIN

While logistics undertakes the critical role of connecting production centres to consumption markets, inefficiencies in managing it could lead to a severe disruption in the entire supply chain network. In India, the experience pertaining to this sector has not been very encouraging, leading to colossal losses during the transportation, distribution and storage of goods. Thus, any effort towards addressing this problem will meet with much appreciation.

The current environment is likely to accelerate progress in the logistics sector in India, considering the interest from government as well as private enterprises. The Government of India brought out the National Manufacturing Policy with the objective of increasing the share of manufacturing in the GDP to 25%. 'Make in India', the government's national initiative, places great importance on building best-in-class manufacturing infrastructure. The Goods and Services Tax (GST) will amalgamate several central and state taxes into a single tax, thereby mitigating double taxation and facilitating a unified national market. Further, inter-state industrial corridors, such as the ambitious Delhi

Mumbai Industrial Corridor (DMIC), and freight corridors, such as the Western and Eastern Dedicated Freight Corridors, are gaining renewed focus.

Since GST is at a critical legislative juncture and expected to be implemented next year, it will be the first significant catalyst in recent times to impact the warehousing market. Therefore, it needs special attention.

**TABLE:
TAXES SUBSUMED UNDER GST**

Subsumed under Central GST	Subsumed under State GST
Central Excise Duty	VAT / Sales Tax
Service Tax	Entertainment Tax
Additional Customs Duty	Luxury Tax
Surcharges	State Cesses and Surcharges
Cesses	Taxes on lottery, betting and gambling.

Source: Knight Frank Research

Inter-state sale of goods involves Central Sales Tax (CST) levied by the central government and Value Added Tax (VAT) of the respective state. Since, CST and other state taxes cannot be set off; inter-state sale becomes a costlier affair on account of duplication of taxation. Clearly distributors will avoid buying directly from the manufacturer in another state and prefer buying from a warehouse in the same state to remain cost competitive by saving on taxes. Such a tax structure in India has forced companies to locate warehouses in all the states where they operate, resulting in an inefficient supply chain. Hence, instead of creating an effective supply chain by strategically locating warehouses, the focus remains on tax saving. This has shaped the need for bringing in an efficient tax structure that eliminates the state boundaries by creating a common market place for India. The concept of Goods and Services Tax (GST) is a move in this direction. By providing input tax credit on all such inter-state sale of goods and services, GST will create a single, unified market for the country.

CHART: WAREHOUSING STRATEGY BEFORE GST IMPLEMENTATION

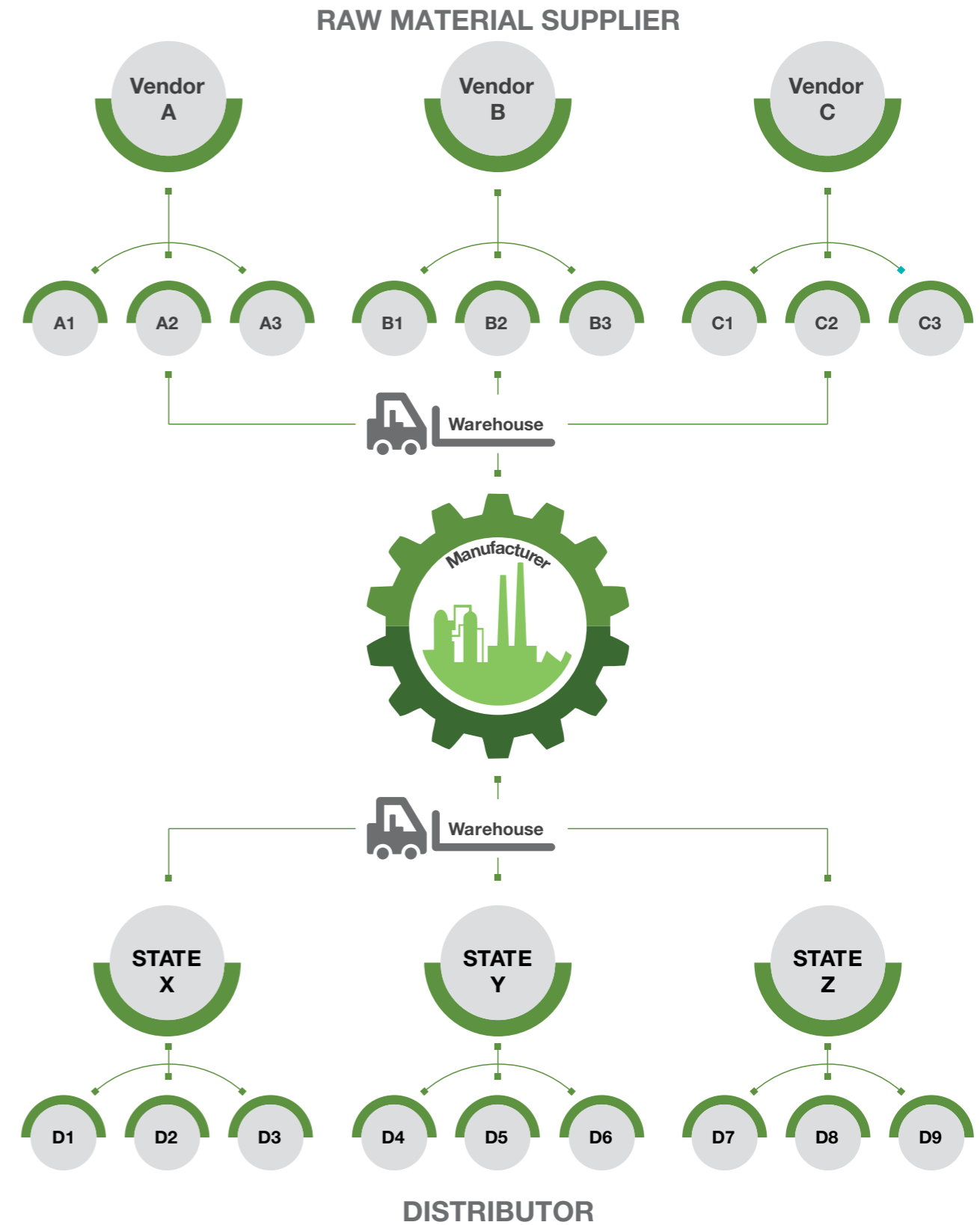
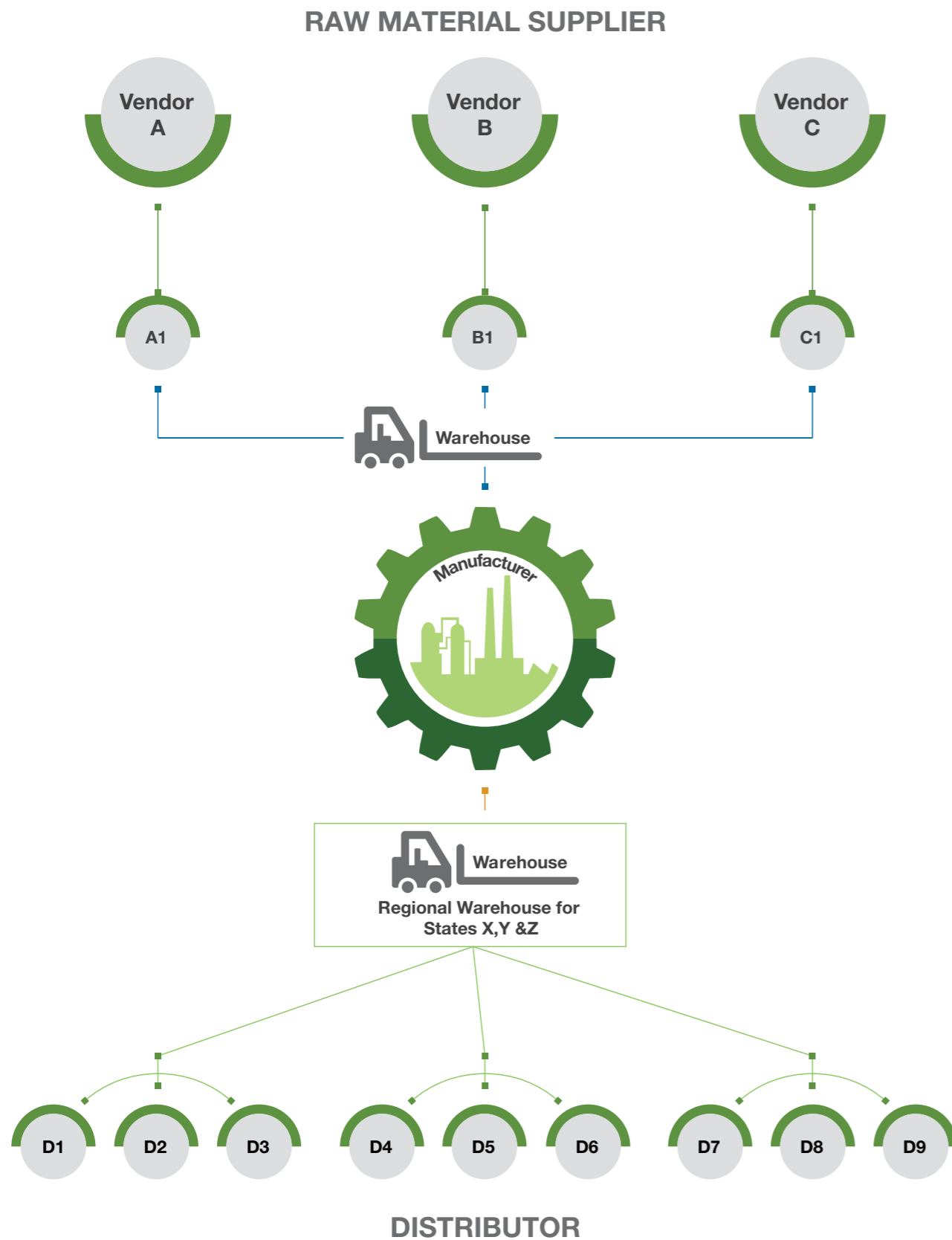


CHART: WAREHOUSING STRATEGY POST GST IMPLEMENTATION



GST will ensure the abolition of CST, thereby making the country a single market that will no longer be divided by state boundaries. This will eliminate the need to have warehouses in each state to avoid CST, thereby ensuring the removal of a redundant level of warehousing in the supply chain. This will enable a reduction in the number of warehouses and allow companies to focus on building fewer, larger and more strategically located warehouses. Larger warehouses can benefit from sophisticated information technology (IT) systems like Warehousing Management Systems (WMS) that are not feasible in smaller, scattered warehouses. This will help in bringing down the cost and improve service levels through economies of scale. Supply chains will become leaner and efficient in terms of warehousing, transport routes, distribution and sourcing, wherein the decisions taken will be based on operational efficiency rather than a tax avoidance mechanism.

The logistics sector can be broadly classified into three areas – transportation, distribution and storage. In India, the transportation and distribution sectors have traditionally been a part of many studies, with numerous reports and findings affiliated to them. However, it is the storage and warehousing sectors that have mainly remained under-researched. Although the warehousing segment constitutes only 15–35% of the total logistics costs, its importance is significant with respect to the role it plays in the smooth functioning of supply chain networks. With this thought process, we embarked upon the much-needed but uncharted territory of warehouse sector research in India. Our first report in the series—India Logistics & Warehousing Report 2014—was a detailed handbook introducing warehousing sector dynamics, such as demand drivers, policies and regulations, business models, and enabling infrastructure and emerging trends, among others. It set the ball rolling with regards to the exploration of the India warehousing market through a research on the key warehousing markets of Mumbai and Pune.

In this latest edition, we present our warehouse market study of seven top warehousing markets in the country, namely NCR, Mumbai, Pune, Ahmedabad, Bengaluru, Hyderabad and Chennai. The report provides an exhaustive analysis on parameters such as the spread of warehousing clusters, demand drivers, warehouse space requirement (estimated warehouse stock) and investment feasibility. Extensive field surveys across the hinterlands of the subject markets coupled with interviews with warehouse occupiers, logistics players, developers and land aggregators have been conducted for the study. Third party databases like Annual Survey of Industries (ASI) and Indicus were used for estimation of subject market’s manufacturing output and consumption spending respectively.

The demand drivers considered for the warehousing market are the manufacturing and consumption sectors. The manufacturing sector-led demand comprises the requirements arising from the need for the storage of raw materials and finished products from industries such as automobiles, cement and food processing, among others. In terms of consumption-led demand, all product categories, ranging from apparel and footwear to home and lifestyle, have been considered.

The estimated warehousing space requirement is the total space requirement (estimated warehouse stock). The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer’s plant or company-owned warehouses. Our estimate of this requirement considers all the manufacturing clusters within a transit time of four hours from the city’s warehouse hubs. In some cases like Mumbai and Pune this leads to overlap of manufacturing clusters that could be serviced from both Mumbai as well as Pune. Accordingly, we have made the adjustment to address such overlap while calculating the consolidated potential for the country.

In case of the consumption-led

requirement, the warehousing requirement is estimated at the city level because warehousing clusters are in a position to service almost all parts of the city within a transit time of two hours. In case of NCR, which is a large geography, the consumption-led requirement has also been estimated at the warehouse cluster level, namely NH-8 and Ghaziabad. At the NCR level, we have addressed any overlap of consumption markets that could be serviced from any of these warehouse clusters.

On account of the export-import (EXIM) activity, warehousing demand is serviced via container freight stations (CFSs) and Inland Container Depots (ICDs). Further, agriculture warehouse demand is predominantly catered to by government enterprises and the unorganised market, with godown-type structures. Thus, EXIM and agriculture-led warehousing has not been covered in this version of the report.

The renewed focus on infrastructure development and the manufacturing sector offers opportunities across the logistics value chain. With regards to the warehousing sector, which is the subject matter of this report, we are witnessing the heightened interest of international financial and development institutions and global institutional investors and developers to participate in this accelerating opportunity. The Indian developer community, which has long been fixated on the traditional real estate asset classes, viz. residential, office, hotel and retail, has now opened its mind and wallet to enter into this segment. The improving regulatory environment for the Indian Real Estate Investment Trust (REIT), which also covers the warehousing segment, has added to this inclination. E-tail is already proving to be a juggernaut, expanding the market in terms of space and service standards. In light of such a promising environment, we believe that this report will serve as an actionable knowledge piece for your pursuit in the warehousing sector.

AHMEDABAD



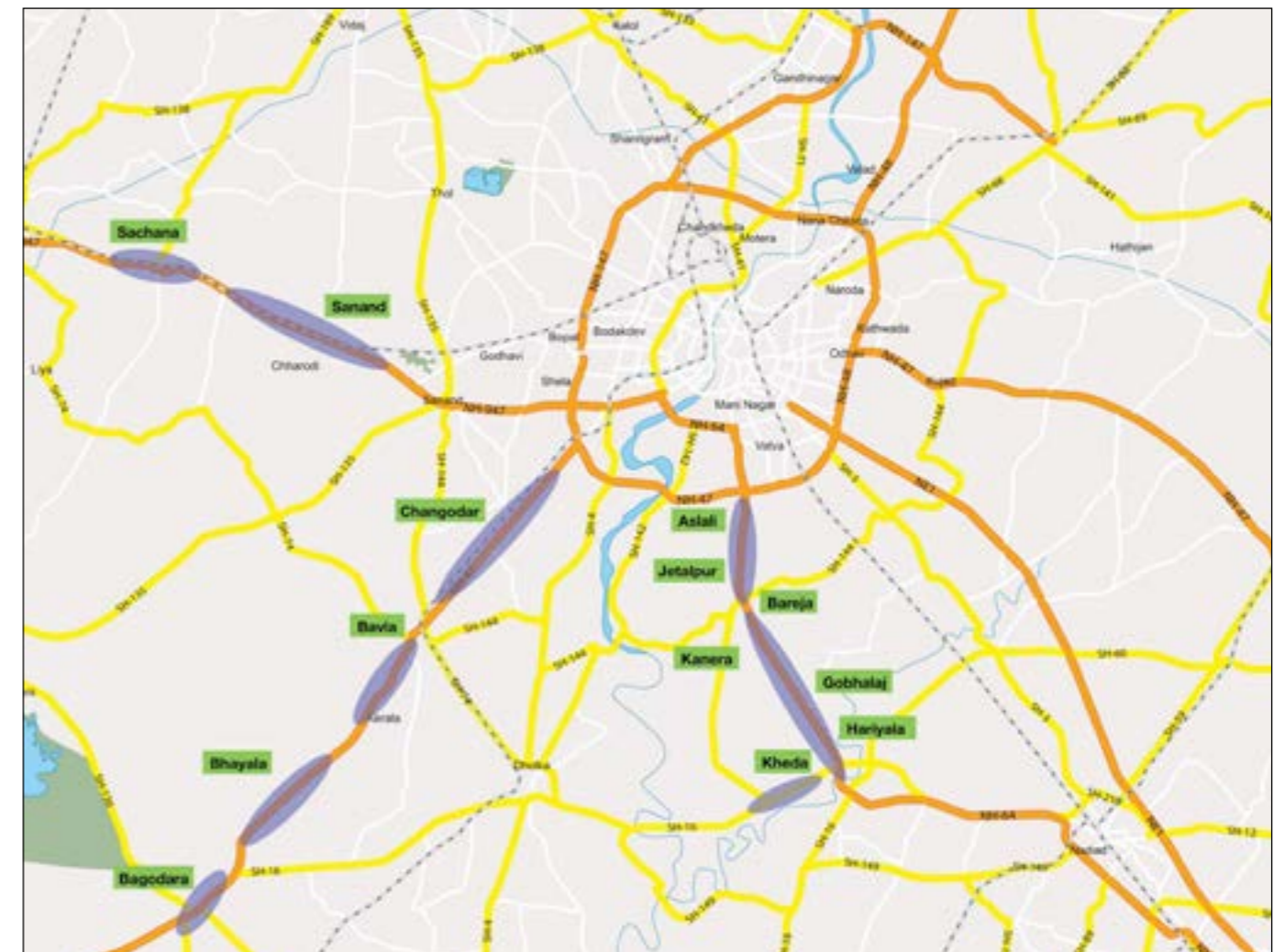
1. MAJOR WAREHOUSING CLUSTERS IN AHMEDABAD

Historically, warehousing activities in Ahmedabad have been concentrated in the peripheral areas of the city, such as Aslali, Changodar and Naroda, with godown-type structures dominating the landscape. As land prices became infeasible for such activities, they slowly started shifting further away from the city. With manufacturing units gradually shifting from Naroda and Vatva towards Changodar and Sanand, the need for warehousing also witnessed a steady shift towards these locations.

Currently, most of the warehousing activity is concentrated on the Ahmedabad-Kheda highway and Ahmedabad-Rajkot highway. Additionally, Sanand has also been attracting interest from warehouse developers over the last few years, but is still a relatively smaller market compared to the other two locations. For the purpose of this report, we have classified the various warehousing locations into two major belts: Aslali-Kheda belt and Changodar-Bagodara belt, based on factors such

as geographical location, proximity to the national highway, access to the city centre and distance from the major manufacturing hubs. Since these two clusters collectively account for the majority of the warehousing space demand in the Ahmedabad market, the rest of the locations have been classified into the 'Others' category.

MAJOR WAREHOUSING LOCATIONS IN AHMEDABAD



CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

Warehousing cluster	Major warehousing locations
Aslali-Kheda belt	Aslali, Jetalpur, Bareja, Kanera, Gobhalaj, Hariyala, Kheda
Changodar-Bagodara belt	Changodar, Bavla, Bhayala, Bagodara
Others	Sanand-Viramgam belt, Adalaj

2. TOTAL REQUIREMENT FOR WAREHOUSING SPACE

Currently, Ahmedabad's total requirement for warehousing space is estimated to be 40 mn sq ft, of which more than 85%, or 34 mn sq ft, is attributable to the manufacturing sector. However, the majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses. Although the trend of leasing a warehouse rather than owning it is steadily picking up with the emergence of third-party logistics (3PL) players, it is still at a nascent stage compared to developed markets such as Europe and the US. These 3PL players, such as Safexpress, Blue Dart, TCI and Future Supply Chain, among others, provide end-to-end logistics services, including a common warehousing facility, to multiple manufacturers, thereby reducing the need

to have a separate warehouse.

With the Goods and Services Tax (GST) set to become operational, the need for captive warehouses will reduce further. We believe that a large number of manufacturers will outsource their logistics and warehousing requirements and focus on their core operations. This will create an additional demand for leasable warehousing space in Ahmedabad in the coming years.

In contrast to the manufacturing-led requirement for warehousing space, consumption-led requirement is mostly for leasable space, with very few operators fulfilling their needs through a captive warehouse. This is primarily due to the need to have a fulfilment centre as close to the urban area as possible in order to ensure quick delivery. Over

the last ten years, this segment has witnessed a renewed traction, especially in the E-tail sector. As the time between placing an order and delivery has shrunk drastically with the advent of the E-tail sector, the need for warehousing space has also increased significantly. With the share of E-tail expected to rise steadily in the coming years, we estimate the demand for warehouses from this segment to increase proportionately as well.

Currently, the leasable market in Ahmedabad is estimated to be in the range of 6-8 mn sq ft. However, the share of annual transacted volume is approximately 0.6-0.8 mn sq ft. This includes transaction volume from manufacturing-led and consumption-led demand.

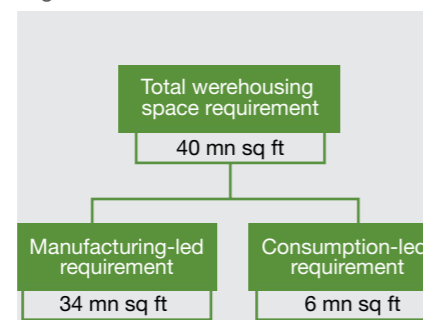
3. DEMAND DRIVERS OF WAREHOUSING SPACE IN AHMEDABAD

The primary demand drivers of warehousing space in Ahmedabad can be broadly classified into two categories: manufacturing-led demand and consumption-led demand. The demand from the manufacturing sector arises predominantly due to the distance between the manufacturer's factories, raw material suppliers and the consumption markets of the final goods. The need to store the raw materials or final goods due to this distance, determines the amount of space required by each manufacturer. The quantum of space required is also dependent on the type of product that is manufactured. Hence, each manufacturer will have a different requirement for space, depending on these factors.

Consumption-led demand, which is an equally important demand driver for warehousing space, is largely dependent on population, income level and the propensity to spend. The changing dynamics of the retail industry has resulted in the business model of a retailer becoming heavily dependent on a smooth and efficient supply chain network. In addition to this, the advent of E-tail in recent years has necessitated the need for huge warehouses close to urban

centres in order to deliver in the shortest possible time. Such factors have brought the warehousing industry to the forefront of the retail business and compelled retailers to focus on this segment.

In the following sections, we have identified the key manufacturing industries in Ahmedabad, their current warehousing requirement, the major manufacturing hubs and the various regions within Ahmedabad from where the requirements originate. Similarly, in terms of consumption, we have identified the current warehousing requirement of brick-and-mortar stores and E-tail segment.



Source: Knight Frank Research

3.1 MANUFACTURING-LED DEMAND

Ahmedabad is one of the largest manufacturing hubs in Gujarat and accounts for the majority of the production activity in west India. Currently, the pharmaceutical sector accounts for a lion's share in the total production output within the region. Intas, Claris Lifesciences, Cadila Pharmaceuticals and Dishman Pharmaceuticals and Chemicals are some of the pharmaceutical majors that have their manufacturing units located in this region. Food processing, which includes dairies, rice mills, sugar mills, confectionaries, and beverages, among others, has the second largest share in the output in Ahmedabad. This is followed by the metals, textile and engineering industries.

In terms of the requirement for warehousing space, the pharmaceuticals sector leads with more than 12 mn sq ft. This is followed by the remaining industries, with each requiring warehousing space of around 2-6 mn sq ft. The auto and auto ancillary sector, which has gained a lot of traction in the recent years with the commencement of

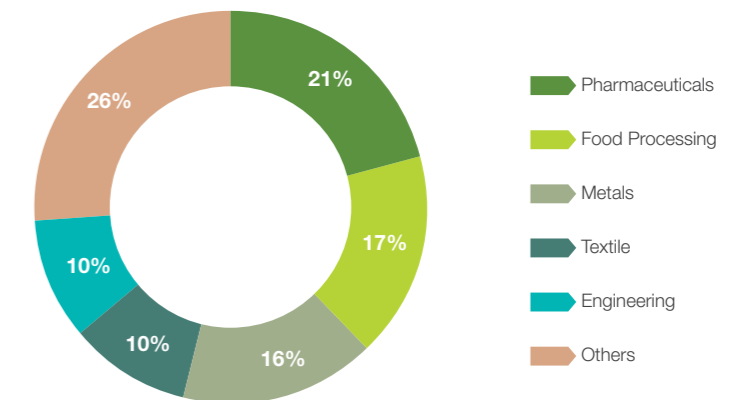
production facilities of Tata Motors and Ford India near Sanand, still account for less than 5% of the total output of the region. However, with demand in the auto sector gaining momentum with each passing year, we expect its share in Ahmedabad's total output to rise steadily in the coming years. This could lead to a dramatic rise in demand for warehousing space from the auto ancillary companies that will be supplying auto components to these two auto majors.

Manufacturing activities in Ahmedabad are spread across multiple locations. While Naroda and Vatva used to be the largest industrial areas in the city, high land prices and various restrictions from the pollution control board have compelled most of the large manufacturers to shift their production activity outside the city area. The Ahmedabad-Rajkot highway, from Changodar to Bagodara, has emerged as the largest industrial belt in this region with numerous pharmaceutical, chemical, textile and engineering companies located here. Sanand is another area that has picked up significant interest from various corporates in the last few years, as the state government's push to develop it as an automobile and engineering hub has attracted several manufacturing plants here.

The above factors clearly indicate that the demand for manufacturing-led warehousing space in Ahmedabad will be concentrated primarily on the Ahmedabad-Rajkot highway and Sanand highway, with sectors such as pharmaceuticals, automobile, food processing, metals and textiles leading in terms of this demand.

FIGURE 1

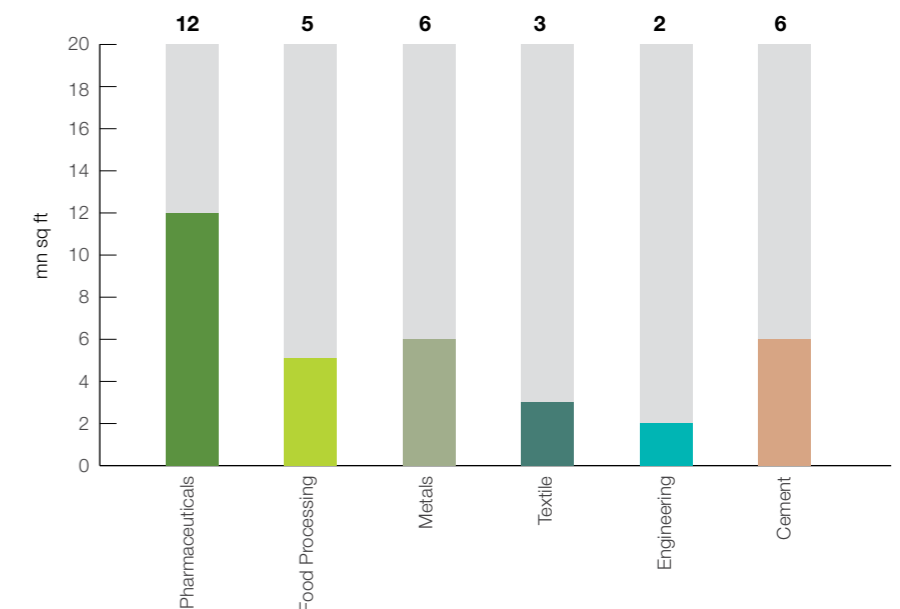
SHARE IN OUTPUT OF THE VARIOUS MANUFACTURING INDUSTRIES IN AHMEDABAD



Source: Annual Survey of Industries (ASI) and Knight Frank Research

FIGURE 2

WAREHOUSING SPACE REQUIREMENTS OF MAJOR MANUFACTURING INDUSTRIES IN AHMEDABAD



Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from ASI. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses.

MANUFACTURING CLUSTERS WITHIN AHMEDABAD



3.2 CONSUMPTION-LED DEMAND

In terms of retail spending, Ahmedabad is the largest market in Gujarat with a consumer base of more than 6.3 mn. This retail spending not only includes traditional brick-and-mortar stores, malls, shopping streets and mom-and-pop stores but also accounts for the spending by consumers through the e-commerce medium. Hence, any type of consumer goods consumed within Ahmedabad, whether offline or online, is categorised in the retail spending.

Among the various product categories, apparel, sportswear and footwear together have the highest share in demand. Other prominent product categories include food and beverages, department stores and daily needs. The

daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis. Just the top four categories account for majority of the total warehousing space requirement in Ahmedabad.

The E-tail sector has emerged as a major driver for the incremental warehousing space requirement in recent years and currently accounts for 12% of the total space requirement of the consumption-led demand. While brick-and-mortar stores still lead in terms of space requirement, at 5 mn sq ft, the E-tail segment contributes up to 0.7 mn sq ft. This is significant, considering that until just a few years ago, this entire segment was non-existent.

While the boom in the E-tail sector may have eaten into the market share of the brick-and-mortar retail stores to a great extent, our analysis indicates that the advent of this segment has expanded the overall consumption pie and led to a substantial increase in the urban consumers' propensity to spend. Hence, the warehousing space requirement by the E-tail segment is largely the incremental demand for space and not just a replacement of the demand for space by brick-and-mortar stores. Going forward, we believe that the share of the E-tail sector will increase further in the total retail spending of consumers. This will invariably lead to a higher demand for warehousing space from this segment in the coming years.

4. ASLALI-KHEDA WAREHOUSING BELT

Aslali was one of the first warehousing markets to be developed in Ahmedabad due to the various advantages that this location commands. Before the National Expressway-1 (NE-1) was constructed, the Ahmedabad-Vadodara highway used to be the primary access road between Ahmedabad and cities like Vadodara, Surat and Mumbai. Aslali, which is located on this highway just before entering Ahmedabad city from south, was a major transit point for all the transporters and logistics players. With increased urbanisation and rising land prices, warehousing development started shifting southwards on this highway towards Jetalpur and Bareja. Over the last ten years, this shift has continued further south on the highway with warehousing development stretching all the way till Kheda.

Since the demand drivers for all the warehouse locations along the Ahmedabad-Vadodara highway are similar, we have clubbed these locations into a single warehousing cluster for the purpose of this report and named it as the 'Aslali-Kheda warehousing belt'. In the following sections, we have explained the types of warehouses, major players, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook for this belt.

4.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

Warehouses in locations such as Bareja, Kanera, Ghobalaj, Hariyala and Kheda are relatively recent constructions. Most of the development on this road comprises pre-engineered building (PEB) type structures with 24-foot clear height and basic infrastructure such as security, ample parking space, fire-fighting equipment and insulation, among others. Some of the prominent occupiers are Panasonic, Ceat, Schenker and Reckitt Benckiser. However, bulk of the warehouses in Aslali and Jetalpur are old godown-type structures with minimal amenities and poor infrastructure.

Currently, most of the incremental demand comes from the E-tail and FMCG sector companies that not only require adequate clear height within the warehouse for multi-level stacking of products, but also seek added amenities such as fire-fighting equipment and enhanced security. This has resulted in majority of the new warehouses being constructed to adhere to such standards and move away from the traditional godown-type structure. Over the last five years, a large number of FMCG and 3PL companies have shifted their warehousing space from old godown-type structures in Aslali towards the recently constructed good quality warehouses in Bareja, Kanera and Ghobalaj.

Select warehouse operators

- Rudrapratap Indian Logistics
- Sumar Logistics and Industrial Park
- Sara Warehouse & Logistics

4.2 LOCATION AND INFRASTRUCTURE

The Aslali-Kheda warehousing belt is located in the southern part of the city on the old Ahmedabad-Vadodara highway and starts after crossing the Sardar Patel Ring Road and stretches till the town of Kheda. This highway is a six-lane national highway connecting Ahmedabad with Mumbai via Vadodara and Surat. With the construction of the National Expressway-1, the road attracts very few passenger vehicles and is mostly used by transporters and logistics players. This makes it less prone to traffic congestion and is easily accessible from the city centre within 30-60 minutes of travel time.

The Sardar Patel Ring Road, a four-lane road around the periphery of the city, provides a smooth access to all the major industrial and retail destinations in the city from the Aslali-Kheda warehousing belt. Major industrial areas such as Vatva, Naroda and Changodar can be reached within 70 minutes. Additionally, most of the industrial areas of Vadodara can be accessed within a commutable time of two hours.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM THE ASLALI-KHEDA WAREHOUSING BELT

Distance from:	Km	Travel time in mins
Ahmedabad city centre	15 - 36	30 - 60
Vatva industrial area	10 - 32	20 - 40
Kheda industrial area	2 - 20	5 - 18
Naroda industrial area	26 - 47	45 - 70
Changodar industrial belt	24 - 45	30 - 50
Sanand industrial area	40 - 60	60 - 80
Kalol industrial area	55 - 75	70 - 90

Source: Knight Frank Research



4.3 RENT AND LAND COST OF WAREHOUSES

Warehouses that are closer to Ahmedabad in locations such as Aslali and Jetalpur are currently quoting the highest rental values. The rents in these locations start from ₹14/sq ft/month and in certain cases go as high as ₹20/sq ft/month, depending on the quality of the warehouse and access from the highway. However, there are numerous reinforced cement concrete (RCC) structures located in Aslali that offer warehousing space for as low as ₹11/sq ft/month. These are very old godown-type structures with poor amenities and hence are offered at a significant discount compared to the pre-engineered building (PEB) type structures. Currently, a large number of the occupiers are relocating from these RCC structures towards modern PEB structures due to the various inherent advantages such as higher floor strength, fire safety equipment, security, common amenities and good quality of approach road.

The rental value reduces as we move further away from Ahmedabad towards Kheda on the highway and touches as low as ₹10/sq ft/month in Kheda. Similarly, land rates are the highest in Aslali and reduce as we move towards Kheda on the highway.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/month)	Land rate (₹ mn/acre)
Aslali	14 - 20	18 - 32
Bareja	12 - 14	9 - 14
Kanera	12 - 14	7 - 12
Gobhalaj	10 - 12	6 - 9
Kheda	10 - 12	4.5 - 6

Source: Knight Frank Research

4.4 COMPETITIVE ADVANTAGES

Aslali has historically been the dominant warehousing market in Ahmedabad and over the years has become the transportation and logistics hub of the city. This has resulted in the

development of a robust logistic ecosystem with transporters, freight operators, warehouse operators and all the other allied service operators located within this area. Hence, despite the steep escalation in rental values for warehouses, a large number of occupiers still prefer to operate from locations that are in close proximity to Aslali. This logistics ecosystem that has developed in this cluster provides it with a distinctive competitive advantage over the other warehousing clusters within the Ahmedabad region.

Another advantage of this warehousing belt is its accessibility to all the major retail hubs of the city. The excellent quality of road infrastructure and minimal traffic congestion enables a warehouse occupier to supply products from the warehouse to anywhere in the city within 60 minutes.

Lack of residential development is another advantage that this cluster scores over other areas. Unlike west, north and east Ahmedabad, demand for housing in South Ahmedabad is relatively weak due to the presence of various industrial estates in this region. This has limited the scope for residential development and hence restricted the growth in land prices compared to the other regions of the city. Such a scenario inherently works in favour of warehousing development as the limited potential of alternate land-use not only keeps the land prices in check but also feasible for such activities.

4.5 CHALLENGES

While the Ahmedabad city centre and Vatva industrial areas are quickly accessible from the Aslali-Kheda warehousing belt, accessing emerging industrial locations such as Changodar and Sanand takes relatively longer time. Since most of the new industries are being set-up in either Changodar or Sanand, it becomes imperative for the vendors of these units to be located as close to them as possible. Supplying materials from a warehousing location such as Gobhalaj on the Aslali-Kheda belt to Sanand could take anywhere between 60 – 80 minutes. This could be

a challenge for warehouse occupiers that service time-sensitive industries such as auto and auto ancillary, where they follow just-in-time inventory concepts.

4.6 OUTLOOK

The Aslali-Kheda warehousing belt will continue to remain as the preferred warehousing destination in Ahmedabad due to the various inherent advantages that it offers compared to the other locations. The sharp appreciation in land prices in Aslali and Jetalpur have led to the development of locations such as Bareja, Kanera, Gobhalaj and Kheda over the past ten years. Since land prices in these emerging locations are still below the ₹15 mn/acre mark, there are sufficient feasible options for warehouse development even at the prevailing rentals.

Since land cost is the most critical component of warehousing development, it influences the realisable returns to a great extent. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay on this belt in order to achieve the expected return in the range of 14%-18% per annum, subject to the achievable rents. For example, with a returns expectation of 16% per annum and an achievable rental value of ₹16/sq ft/month, the feasible land cost amounts to ₹17 mn/acre. In other words, investors can fetch a 16% per annum return only if they are able to purchase land at or below ₹17 mn/acre at present and lease it at ₹16/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

FEASIBLE LAND COST MATRIX ON THE ASLALI-KHEDA WAREHOUSING BELT (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum		
	14%	16%	18%
10	6	4	2
12	11	8	5
14	16	12	10
16	21	17	13
18	26	21	18
20	31	26	21

Note: The table presents 18 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 13 options that are possible to source on this warehousing belt and are upwards of the minimum prevailing land rate, which is ₹6 mn/acre on this belt, have been highlighted in colour.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

Currently, most of the locations on this belt are feasible for warehousing activities at the prevailing land rates, subject to a minimum achievable rental value of ₹10/sq ft/month. However, rental values below this level may not even fetch returns of 14% per annum to the investors at the current land prices.

For investors to achieve returns upwards of 18% per annum, it is imperative that the land acquisition cost does not exceed ₹21 mn/acre and that it can be leased out at a minimum rental value of ₹20/sq ft/month. Considering the current market scenario, only Aslali is able to command a rental value upwards of ₹18/sq ft/month. Since the prevailing market price of land in this location ranges from ₹18-32 mn/acre, a warehouse developer can fetch annual returns upwards of

18%, if he is able to source land at the lower range. However, such land parcels are not available with direct access from the highway, rendering them unsuitable for warehouse operations. While an access road can be constructed by the warehouse developer, this could push the cost of development significantly high and make it unviable at the existing rental value.

The Aslali-Kheda belt has ample feasible options for investors looking to earn returns in the range of 14%-16% per annum. Locations such as Bareja, Kanera, Gobhalaj and Kheda have sufficient land parcels available in the range of ₹6-14 mn/acre. At the prevailing rental range of ₹10-14/sq ft/month, these locations offer numerous opportunities to investors to fetch returns

The Aslali-Kheda warehousing belt will continue to remain as the preferred warehousing destination in Ahmedabad due to the various inherent advantages that it offers compared to the other locations.

up to 16% per annum. Going forward, we believe this belt will continue to attract both warehouse developers as well as occupiers on the back of affordable land prices and competitive rental values.

5. CHANGODAR-BAGODARA WAREHOUSING BELT

The saturation of vacant land parcels in the erstwhile industrial hubs of Naroda and Vatva resulted in a large number of manufacturers setting up their greenfield plants in Changodar on the Ahmedabad-Rajkot highway. The development of this area as an industrial hub shaped the demand for warehouses, especially industrial warehouses. With increased urbanisation and rising land prices, warehousing development started shifting southwards on this highway towards Bavla and Bhayala. Over the last few years, this shift has continued further south on the highway, with warehousing development stretching all the way till Bagodara.

Since the demand drivers for all the warehouse locations along Ahmedabad-Rajkot highway are similar, we have clubbed these locations into a single warehousing cluster for the purpose of this report and called it as the 'Changodar-Bagodara warehousing belt'. In the following sections, we have explained the types of warehouses, major players, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook for this belt.

5.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

Warehouses in locations such as Bavla, Bhayala and Bagodara are relatively recent constructions. Most of the development on these roads comprises pre-engineered building (PEB) type structures with 24-foot clear height and basic infrastructure such as security, ample parking space, fire-fighting equipment and insulation, among others. Some of the prominent occupiers on this belt are LG, TCI, FedEx and Yazaki. While Changodar still houses some of the old godown-type structures, majority of the warehouses on this belt are of PEB structure.

Currently, most of the incremental demand for warehousing space in this belt comes from manufacturing companies and 3PL players. However, over the last few years, demand from

e-commerce and FMCG players has been building up.

Select warehouse operators

SNK Logistics Park

Crystal Indus & Logistic Park

Shree Rajlaxmi Logistics

5.2 LOCATION AND INFRASTRUCTURE

The Changodar-Bagodara warehousing belt is located in the south-western part of the city on the Ahmedabad-Rajkot highway and starts from Sarkhej and stretches till the town of Bagodara. This highway is currently a four-lane national highway and connects Ahmedabad with Rajkot and Kutch. Due to the immense traffic that this highway attracts, the government has already initiated the process of converting it from a four-lane road to a six-lane one. This will provide a major fillip to the already thriving warehousing market as newer land parcels towards Bagodara will become feasible for warehousing development in the coming years due to reduced travel time.



ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM CHANGODAR-BAGODARA WAREHOUSING BELT

Distance from:	Km	Travel time in mins
Ahmedabad city centre	20 - 60	40 - 75
Vatva industrial area	28 - 65	40 - 75
Kheda industrial area	45 - 55	50 - 60
Naroda industrial area	48 - 86	65 - 100
Changodar industrial belt	0 - 40	0 - 45
Sanand industrial area	30 - 60	40 - 70
Kalol industrial area	45 - 85	60 - 90

Source: Knight Frank Research

5.3 RENT AND LAND COST OF WAREHOUSES

Warehouses that are closer to Changodar are quoting the highest rental values. The rents in these locations start from ₹16/sq ft/month and in certain cases go as high as ₹20/sq ft/month, depending on the quality of the warehouse and access from the highway. However, there are a few RCC structures located here that offer warehousing space for as low as ₹12/sq ft/month. These are very old godown-type structures with poor amenities and hence are offered at a significant discount compared to the PEB type structures.

The rental value reduces as we move further away from Changodar towards Bhayala on the highway and touches as low as ₹11/sq ft/month near Bagodara. Similarly, land rates are highest in Changodar and reduce as we move towards Bagodara on the highway.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/month)	Land rate (₹ mn/acre)
Changodar	16 - 20	18 - 40
Bavla	14 - 16	13 - 24
Bhayala	12 - 15	7 - 12
Bagodara	11 - 14	4 - 6

Source: Knight Frank Research

5.4 COMPETITIVE ADVANTAGES

The biggest competitive advantage of the Changodar-Bagodara warehousing belt is its proximity to the largest industrial hub of Ahmedabad - the Changodar industrial area. Over the last twenty years, Changodar has emerged as the most preferred industrial area in Ahmedabad, with all the major pharmaceutical and engineering companies setting up their production units here. The demand for warehousing space from the suppliers and vendors of these manufacturing units has helped in establishing a vibrant warehousing market on this belt. Additionally, the emergence of Sanand as the automobile and engineering hub over the past five years has provided further impetus to this belt. The industrial

hub of Sanand can be accessed within a travel time of 40-60 minutes from here, thereby negating the need to have a separate warehouse in order to service the industries located near Sanand. With ample availability of land near Bavla and Sanand for industrial development, demand for warehousing space will continue to remain strong in this belt going forward.

5.5 CHALLENGES

The biggest challenge that the warehousing sector faces in this belt is the availability of viable land parcels. The strong preference of manufacturing units to be located in this belt creates unwarranted competition for warehouse operators in terms of purchasing land. Since most manufacturers purchase land for captive use with a time horizon of more than 30 years, their feasibility for higher cost land increases. This is in contrast to a warehouse developer whose viability to purchase a land parcel is determined by the maximum rent that can be fetched from it. This restricts the ability of a warehouse operator to purchase land at high cost as it could jeopardise his entire business model. Hence, on the one hand the presence of manufacturing units helps in sustaining demand for warehouses in this belt; it also pushes up the price of land for warehouse developers.

5.6 OUTLOOK

The Changodar-Bagodara warehousing belt is slowly emerging as an alternate to the existing warehousing belt of Aslali-Kheda due to the inherent advantage of being located in close proximity to the major industrial clusters of Changodar and Sanand. However, the sharp appreciation in land prices over the previous five years due to strong demand for industrial land is rendering certain locations unviable for warehouse development. Changodar, where land prices in certain pockets have already crossed the ₹40 mn/acre mark, has limited scope for further warehousing development. Nonetheless, the opportunities for investors lay beyond Changodar on the Ahmedabad-Rajkot highway in locations such as Bavla,

Bhayala and Bagodara.

Since land cost is the most critical component of warehousing development, it influences the realisable returns to a great extent. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay in this belt in order to achieve the expected return in the range of 14%-16% per annum, subject to the achievable rents. For example, with a returns expectation of 16% per annum and an achievable rental value of ₹16/sq ft/month, the feasible land cost amounts to ₹17 mn/acre. In other words, investors can fetch a 16% per annum return only if they are able to purchase land at or below ₹17 mn/acre at present and lease it at ₹16/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

Warehouses that are closer to Changodar are quoting the highest rental values. The rents in these locations start from ₹16/sq ft/month and in certain cases go as high as ₹20/sq ft/month, depending on the quality of the warehouse and access from the highway. However, there are a few RCC structures located here that offer warehousing space for as low as ₹12/sq ft/month

**FEASIBLE LAND COST MATRIX ON THE CHANGODAR-BAGODARA
WAREHOUSING BELT (₹ MN/ACRE)**

Rental value (₹/sq ft/month)	Investor return per annum		
	14%	16%	18%
10	6	4	2
12	11	8	5
14	16	12	10
16	21	17	13
18	26	21	18
20	31	26	21

Note: The table presents 18 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 11 options that are possible to source in this warehousing belt and are upwards of the minimum prevailing land rate, which is ₹6 mn/acre in this belt, have been highlighted in colour.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

The Changodar-Bagodara belt has ample feasible options for investors looking to earn returns in the range of 14%-16% per annum. Locations such as Bavla, Bhayala and Bagodara have sufficient land parcels available in the range of ₹6-24 mn/acre. At the prevailing rental range of ₹11-16/sq ft/month, these locations offer numerous opportunities to investors to fetch returns up to 16% per annum

Currently, most of the locations in this belt are feasible for warehousing activities at the prevailing land rates, subject to a minimum achievable rental value of ₹10/sq ft/month. However, rental values below this level may not even fetch returns of 14% per annum to the investors at the current land prices.

Investors with a return expectation of 18% per annum and above will not be able to operate in this belt. In order to achieve returns upwards of 18% per annum, it is imperative that the land acquisition cost does not exceed ₹21 mn/acre and that it can be leased out at a minimum rental value of ₹20/sq ft/

month. Considering the current market scenario, only Changodar is able to command a rental value upwards of ₹18/sq ft/month. Since the prevailing market price of land in this location ranges from ₹18-40 mn/acre, a warehouse developer can fetch annual returns upwards of 18% if he is able to source land at the lower range. However, such land parcels are not available with direct access from the highway, rendering them unsuitable for warehouse operations. While an access road can be constructed by the warehouse developer, this could push the cost of development significantly high and make it unviable at the existing rental value.

The Changodar-Bagodara belt has ample feasible options for investors looking to earn returns in the range of 14%-16% per annum. Locations such as Bavla, Bhayala and Bagodara have sufficient land parcels available in the range of ₹6-24 mn/acre. At the prevailing rental range of ₹11-16/sq ft/month, these locations offer numerous opportunities to investors to fetch returns up to 16% per annum. Going forward, we believe that this belt will continue to attract both warehouse developers as well as occupiers on the back of affordable land prices and competitive rental values.





1. MAJOR WAREHOUSING CLUSTERS IN BENGALURU

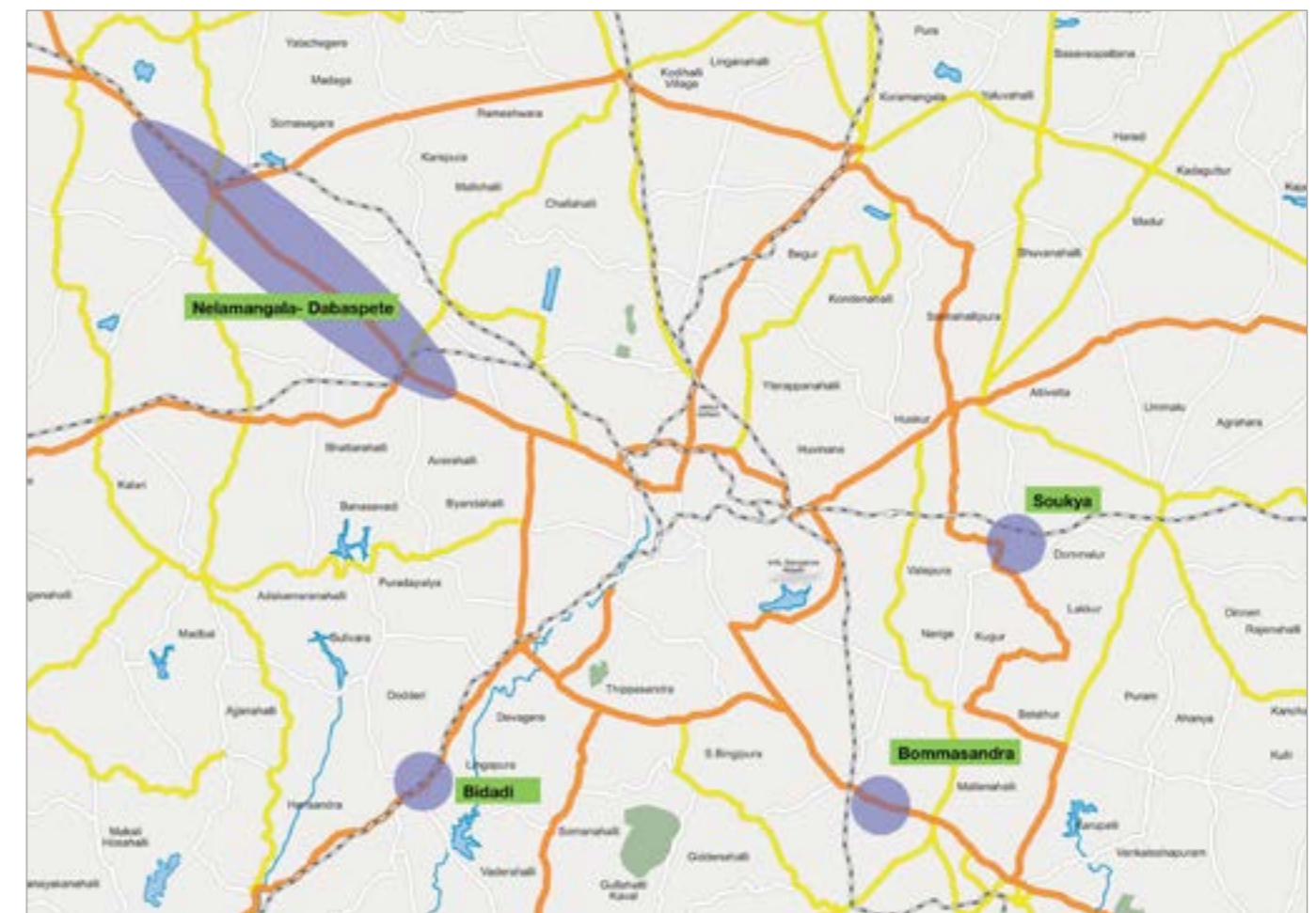
Bengaluru (formerly Bangalore), the capital city of the southern state of Karnataka, is recognised globally as the technology capital of India. While Bengaluru is the epicentre, the growth has spread to the larger geography identified as the Bengaluru Metropolitan Region (BMR). The BMR, which comprises Bengaluru urban district, Bengaluru rural district and Ramanagara district, is spread over an area of 8,005 sq km. The industrial and warehouse clusters and the new international airport are located across the larger geography, i.e. the BMR.

Certain factors have lent a characteristic

to the industrial and warehousing activities in Bengaluru. In terms of geography, the city is land locked and connectivity to Mumbai and Chennai for port is an important factor. Towards the north-west, the National Highway (NH)-4 connects the city to Mumbai at approximately 971 km, and the same NH-4 connects Bengaluru to Chennai towards the east at approx 340 km. With a population base of 9.52 million, coupled with serving as a gateway to southern India, the city is important from the consumption market perspective. Hence, the warehousing clusters have come up in light of such factors.

In terms of industrial activity, Bengaluru has precedents like Peenya industrial area – yesteryears biggest industrial hub in Asia. As a result, the biggest warehousing cluster has come up in the neighbouring Nelamangala-Dabaspete belt on the Bengaluru to Mumbai highway. Similarly, towards the east of the city is Soukya Road warehouse cluster that has come up in close vicinity of the Whitefield IT/ITeS cluster. The other small factions of warehouses have come up in Bidadi on Mysore Road and Bommasandra on Hosur Road, on account of the industrial areas in the southern part of the city.

MAJOR WAREHOUSING LOCATIONS IN BENGALURU



CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

Warehousing cluster	Major warehousing locations
Nelamangala-Dabaspete	Nelamangala, T Begur, Govenhalli, Dabaspete
Others	Soukya Road in East Bengaluru, Bidadi on Mysore Road, Bommasandra on Hosur Road

2. TOTAL REQUIREMENT FOR WAREHOUSING SPACE

We have estimated the warehousing space requirement for the Bengaluru market from two sub components, one being the manufacturing sector and another being the consumption/retail segment. The total warehousing space requirement in the Bengaluru market is thus estimated at 77 mn sq ft. At 71% or 55 mn sq ft, the manufacturing sector accounts for a lion's share, followed by the retail sector which accounts for 22 mn sq ft of the warehousing requirement.

A part of the warehousing requirement

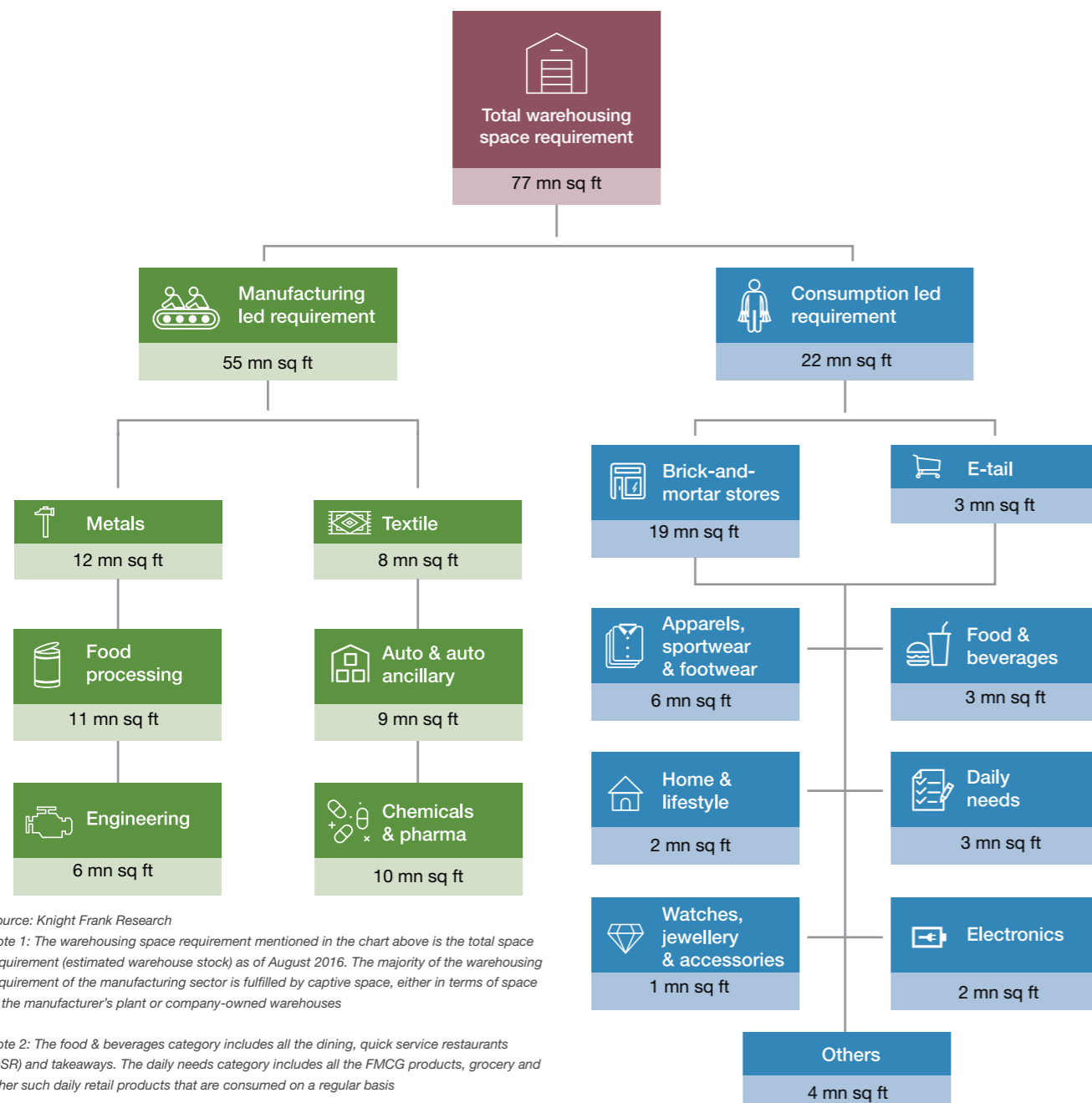
of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses. Although the trend of leasing a warehouse rather than owning it is steadily picking up with the emergence of third-party logistics players (3PL), it is still at a nascent stage compared to developed markets like the USA.

In contrast, the consumption-led warehouse requirement is close to urban agglomerations and thus in leased premises close to such urban centres. A

portion of this requirement is witnessing heightened activity on the emergence of the E-tail sector, which has created the need for sophisticated supply chain systems to ensure faster deliveries at controlled costs.

Of the total warehousing space requirement, the leasable warehousing market in Bengaluru is estimated at around 60 mn sq ft. The annual transaction volume for the market is approximately 4 mn sq ft.

TOTAL REQUIREMENT FOR WAREHOUSING SPACE IN BENGALURU



Source: Knight Frank Research

Note 1: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses

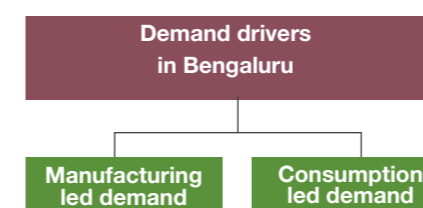
Note 2: The food & beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis

3. DEMAND DRIVERS OF WAREHOUSING SPACE IN BENGALURU

The drivers of demand have been classified by us as manufacturing-led demand and consumption-led demand. The demand from the manufacturing sector arises predominantly due to the distance between the manufacturer's factories, raw material suppliers and the consumption markets of the final goods. The need to store the raw materials or final goods due to this distance, determines the amount of space required by each manufacturer. The quantum of space required is also dependent on the type of product that is manufactured. Hence, each manufacturer will have a different requirement for space, depending on these factors.

Separately, the consumption-led demand for warehousing is dependent on population, income level and the propensity to spend. The changing dynamics of the retail industry has resulted in the business model of a retailer becoming heavily dependent on a smooth and efficient supply chain network. In addition to this, the advent of E-tail in recent years has necessitated the need for huge warehouses close to urban centres in order to deliver in the shortest possible time. Such factors have brought the warehousing industry to the forefront of the retail business and compelled retailers to focus on this segment.

In the following sections, we have identified the key manufacturing industries in Bengaluru, their current warehousing requirement, the major manufacturing hubs and the various regions in and around Bengaluru from where the requirements originate. Similarly, in terms of consumption, we have identified the current warehousing requirement of brick-and-mortar stores and the E-tail segment.



3.1 MANUFACTURING-LED DEMAND

Bengaluru has precedents like Peenya industrial area – yesteryears biggest industrial hub in Asia. This speaks about the early success of industrial activity in the region. To assess the scope of manufacturing-led demand for warehousing, we have captured the length and breadth of manufacturing activity across the city that can be covered at a motorable distance of around four hours.

As such, at 14% the metals sector leads the share in manufacturing output followed by textiles and auto and auto ancillary industries. The other important industries are food processing, engineering, petroleum and chemicals and pharmaceutical. In terms of the resultant warehousing demand, of the total manufacturing-led demand, metal contributes the largest at 12 mn sq ft, followed by auto and auto ancillary and chemicals and pharmaceutical sector at 11 mn sq ft and 10 mn sq ft respectively.

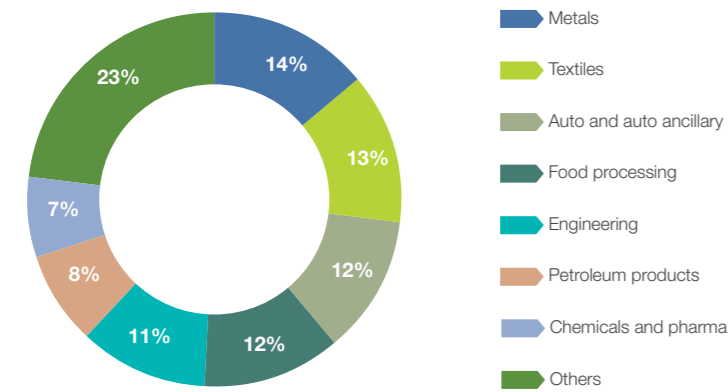
In terms of the geographical footprint, in the heart of Bengaluru city, Peenya industrial area along the Bengaluru-Tumkur Highway (NH-4), is amongst the larger industrial clusters in the city. Over the last four decades, the cluster has been home to a host of industries from engineering, electrical goods and textile sector. However, with the population growth of the city, and its neighbourhood development as residential market, the industrial growth is stunted.

In the western region, the Kumbalgodu-Bidadi belt on Mysore Road is another important industrial cluster in the BMR. The 15-km Kumbalgodu-Bidadi stretch is a good quality 2x2 lane highway with divider and is connected to the critical Nandi Infrastructure Corridor Enterprises (NICE) road. Bidadi is an auto cluster with manufacturing units of automobile and auto ancillary companies. Companies like Toyota Kirloskar, Bosch and Lumax have industrial units here. The cluster is an industrial belt with a non-descript warehousing footprint. There are a

handful of logistics players like Unity Logistics and Caravel Logistics.

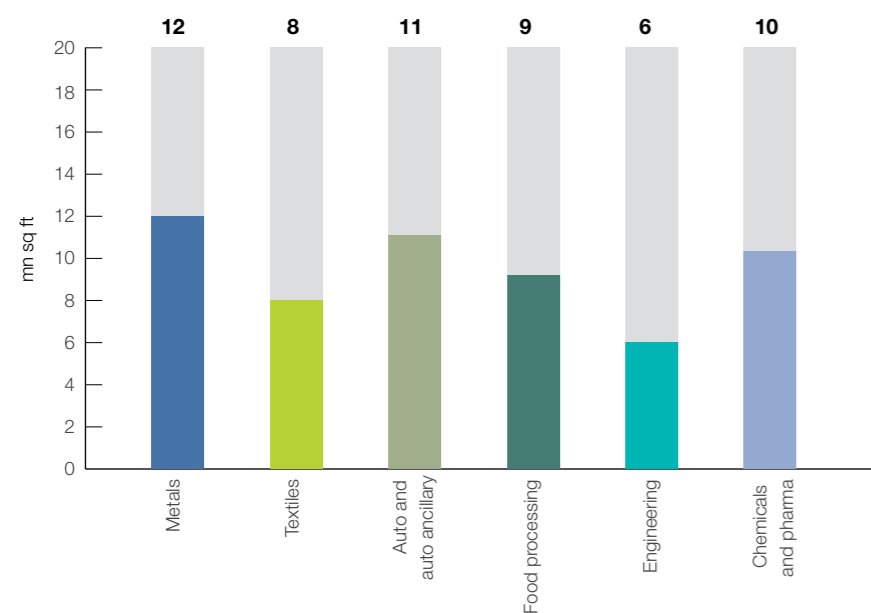
With the construction of the NICE Ring Road, Nelamangala-Dabaspete cluster witnesses the vehicular traffic flow between Mumbai and Chennai, thereby increasing the acceptance level for warehousing

FIGURE 1
SHARE IN OUTPUT OF THE VARIOUS MANUFACTURING INDUSTRIES IN BENGALURU



Source: Annual Survey of Industries (ASI) and Knight Frank Research

FIGURE 2
WAREHOUSING SPACE REQUIREMENTS OF MAJOR MANUFACTURING INDUSTRIES IN BENGALURU



Source: Knight Frank Research

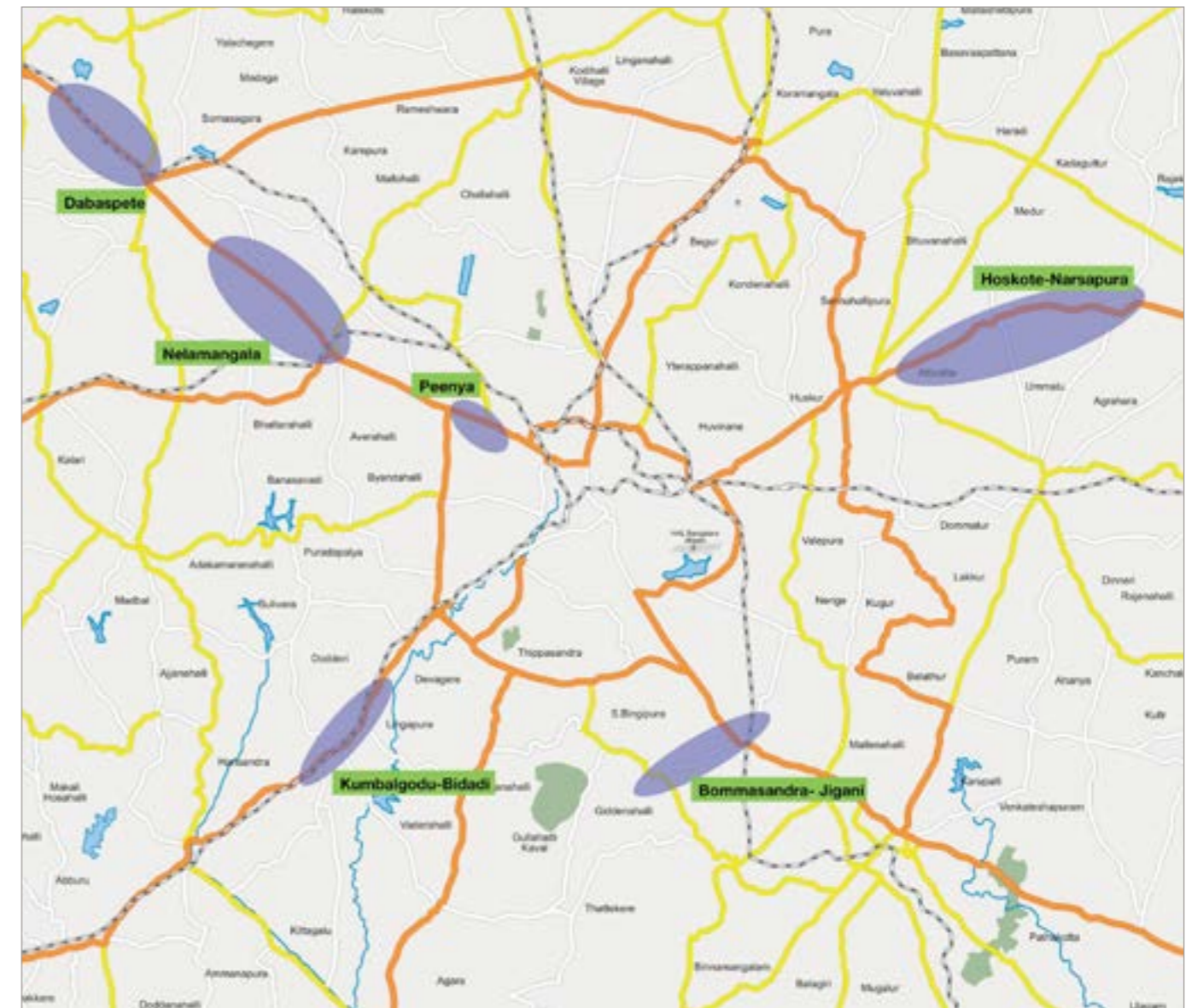
Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from ASI. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses

Towards Hosur Road, down south, is the old industrial area of Bommasandra. The cluster is an old industrial area with non-significant warehousing activity. The National Highway-7, a 3x3 well-maintained highway with a service road, provides it the primary connectivity. The NH-7 is a preferred route over the NH-4 (Old Madras Road) for cargo movement towards Chennai port. This makes it an important inter-state transport corridor too. The 10 km Jigani-Bommasandra Link Road, which is a 2x2 road, is an extension of this cluster. A host of pharmaceutical companies like Cipla, Biocon and Micro Labs have manufacturing facilities in this cluster. Over the last decade, the real estate development on account of the neighbouring IT/ITeS hub of Electronics City has pushed the land rates higher in this cluster and going forward new industrial development will be affected owing to the high land cost. Warehousing is not a feasible activity in this cluster and is non-descript as a result.

On the NH-4 (Old Madras Road) towards the east of Bengaluru city is the Hoskote-Narsapura industrial belt. This 25 km stretch has access through a 3x3 quality road with divider and connects Bengaluru to Chennai. The stretch has developed as an industrial cluster with dominance from the automobile and auto ancillary industry, on account of the proximity to the automobile manufacturing hub of Sriperumbudur in Tamil Nadu. Land prices in this cluster are influenced by the residential development until Hoskote, as well as the manufacturing plants of players from the automobile sector on the Hoskote-Narsapura belt. Hence, warehousing is kept at bay because of high land prices. From the perspective of warehousing, only a handful of old timers like Sairam Logistics are present here.

Towards the west of Bengaluru city on Tumkur Road, is the Nelamangala-Dabaspeta cluster. The 30 km stretch of this cluster is located on the NH-4, which connects Bengaluru city to the critical port city Mumbai. The region is host to warehouses from automobile, electronics, consumer durables and FMCG companies. Besides, the industrial

MANUFACTURING CLUSTERS WITHIN BENGALURU



area of Dabaspeta has manufacturing units from industries like automobile, pharmaceutical and food and beverage. Ample land availability and the connectivity to Mumbai have made it a significant warehouse cluster.

3.2 CONSUMPTION-LED DEMAND

Consumption-led demand for warehousing is driven by the demography of the catchment that it is expected to serve. As per our methodology, this is captured through retail spending not only through traditional brick-and-mortar stores, malls, shopping streets and mom-and-pop stores but also spending through the e-commerce medium. Hence, any type of consumer goods

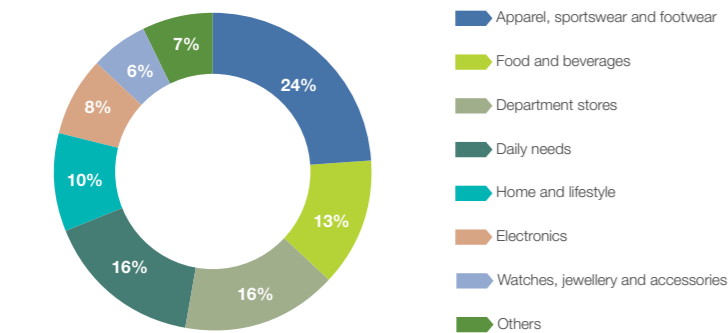
consumed within Bengaluru, whether offline or online, is categorised in the retail spending.

Bengaluru has emerged as a top IT/ITeS services exporter in the country and accordingly this services sector demography has resulted into a booming consumption market in the city. The city has a vibrant consumer culture on the back of a 9.52 mn strong population.

Apparel, sportswear and footwear is the biggest contributor of the retail spending followed by department stores and daily needs categories. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a

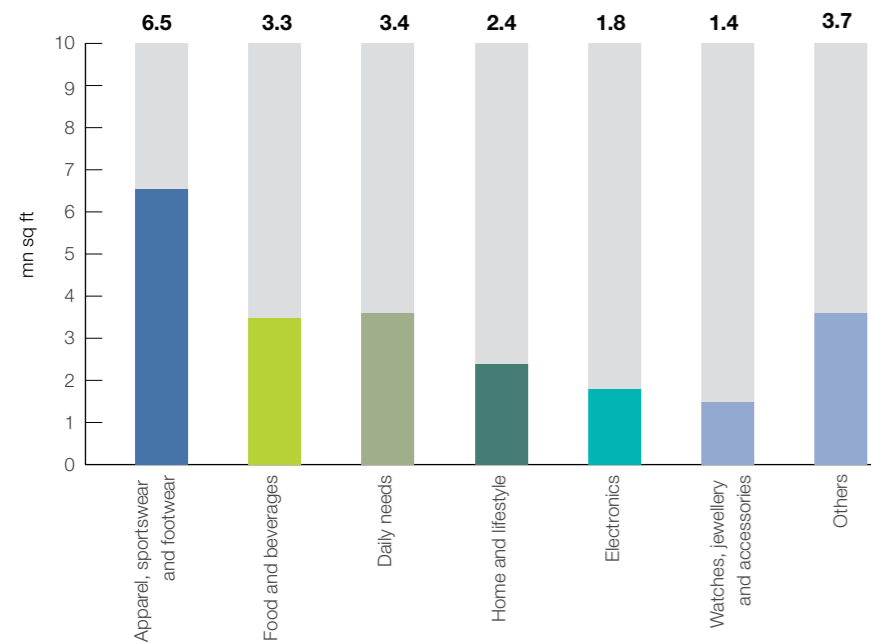


FIGURE 3
CATEGORY-WISE SPLIT OF RETAIL SPENDING IN BENGALURU



Source: Knight Frank Research

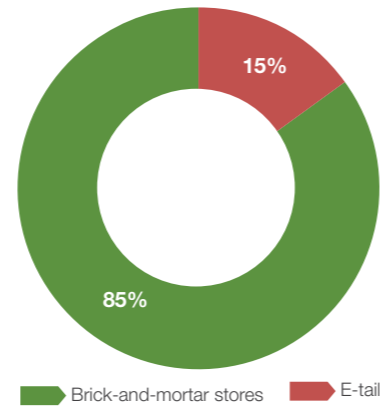
FIGURE 4
WAREHOUSING SPACE REQUIREMENTS FOR THE MAJOR RETAIL CATEGORIES IN BENGALURU



Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest consumption data. The food & beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

FIGURE 5
WAREHOUSING SPACE REQUIREMENTS BY E-TAIL AND BRICK-AND-MORTAR STORES



Source: Knight Frank Research

We have estimated the consumption-led warehousing requirement at 22 mn sq ft of which the apparel, sportswear and footwear category contributes 29%. The second largest contributor is the food and beverages and the daily needs categories with almost similar shares of 15% each. Further, with the emergence of the E-tail segment in the last few years, its share in the consumption-led warehousing requirement stands at 15%. Going forward, we believe that the share of the E-tail sector will increase further in the total retail spending of consumers.

In terms of the geographical footprint, the 6-km Soukya Road belt has emerged as the top warehousing cluster for the retail facing companies like Aditya Birla Nuvo, Madura Garments, Decathlon, Raymond and Max. Even the e-commerce firms like Amazon, Flipkart, Myntra and ABOF have taken up warehouses in this cluster. The proximity to the residential and office markets of Whitefield and Electronic City make it a preferred choice amongst these e-commerce firms, which are witnessing shrinking delivery timelines.

Similarly, Nelamangala-Dabaspete, the largest warehousing cluster in the city, is also a contender for the consumption-led demand with the presence of occupiers like Tata Global Beverages, Crown Electronics, Pantaloons and Shop CJ e-commerce.

4. NELAMANGALA-DABASPETE WAREHOUSING CLUSTER

Towards the west of Bengaluru city on Tumkur Road, is the Nelamangala-Dabaspete cluster. The 30 km stretch of this cluster is located on the NH-4, which connects Bengaluru city to the critical port city, Mumbai. This cluster predominantly comprises markets like Nelamangala, T Begur, Govenahalli, and Dabaspete. The region is a host to warehouses from automobile, electronics, consumer durables and FMCG companies. Besides, the industrial area of Dabaspete has manufacturing units from industries like automobile, pharmaceutical and food and beverage. Ample land availability and the connectivity to Mumbai have made it a significant warehouse cluster.

Since, the demand drivers for all these warehouse locations are similar, we have clubbed the locations into a single warehousing cluster for the purpose of this report and named it the 'Nelamangala-Dabaspete warehousing cluster'. In the sections below, we have explained the primary demand drivers of warehousing space in this cluster, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook.



4.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

The warehouses in this cluster are largely those with modern facilities with a few old warehouses by unorganised players. A large number of third party logistics players are present in the cluster with facilities upwards of 0.5 million sq ft.

The project size in the cluster ranges from 50,000–1,000,000 sq ft and are predominantly pre-engineered buildings (PEB). The nature of the cargo handled by the occupier determines the choice of the structure. Since PEB structures offer relatively more vertical storage space on account of their greater floor–ceiling height, such structures are preferred by occupiers that use pallets and electric-powered forklifts for the purpose of stacking cargo. PEB structures generally provide a side/clear height of 24–28 ft. In contrast, RCC structures provide just 12–14 ft of vertical space for storage. The load bearing capacity of the floor is trimix 5 metric tonne per sq m.

Select warehouse operators

Vijay Logistics
TVS Logistics
RCPC Supply Chain
TCI
VRL

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM NELAMANGALA-DABASPETE WAREHOUSING BELT

Distance from:	Km	Travel time in mins
Bengaluru city centre	30 - 50	60 - 90
Whitefield	45 - 70	105 - 120
Electronic City	50 - 75	60 - 90
Narsapura industrial area	75 - 95	105 - 120
Bidadi industrial area	45 - 65	60 - 75
Jigani industrial area	50 - 75	60 - 90

Source: Knight Frank Research

4.2 LOCATION AND INFRASTRUCTURE

The Nelamangala-Dabaspete cluster is on the important Bengaluru to Mumbai highway, which is a 3x3-lane excellent road with service lanes, ensuring seamless traffic movement. The road width does go down to a 2x2 lane at T Begur, but the quality remains upright. The NICE Ring Road further enhances its connectivity to the south and eastern parts of the city. With the construction of the NICE Ring Road, the road traffic movement from Mumbai to Chennai is handled first on the Bengaluru to Mumbai highway and further on the NICE Ring Road, thereby avoiding the Old Madras Road (Hoskote-Narsapura belt). This has increased the importance of the Nelamangala-Dabaspete warehouse cluster. Thus this cluster enjoys proximity to almost all the manufacturing and consumption hubs of Bengaluru within a driving time of two hours, as indicated in the adjoining table.

The roads are of excellent quality for movement of cargo traffic, and similarly, the ecosystem for warehousing has developed in terms of services for trucks and cranes, roofing and garages.

4.3 RENT AND LAND COST OF WAREHOUSES

The rent and land cost dynamics in this warehouse cluster are influenced by the alternative development options in the neighbouring markets. Moving from the Bengaluru city centre towards Nelamangala, there is no attraction for high-rise residential development beyond Yeshwantpur. The kind of residential development around Nelamangala and further west on the Mumbai highway is up to two storey residential developments in the village areas. Accordingly, the social infrastructure is also relatively of the lower-end segment compared to the city centre or even Whitefield and Electronic City.

As indicated in the adjoining table reasonable land rates and rents are prevailing in the cluster. The rates 1–2 km off the highway are further lower than indicated here. The rents displayed in the adjoining table reflect the facilities with standard construction and amenities. It would be higher if there are specific requirements for flooring, structure height, insulation and other capex within the facility.

Other terms of tenancy may also have a bearing on warehouse rents, specifically clauses related to the security deposit, rent escalation and lease tenure. The market practice for the security deposit is 4–6 months of rent. The rent escalation clause, which determines the quantum and frequency of rental increments, is usually 5% p.a. The market practice for lease tenure, i.e. the minimum period

for which the landlord and tenant are bound to honour the occupancy, varies largely on a case-to-case basis, usually in excess of five years. The characteristics of an industrial and warehousing market and ample land availability will ensure steady supply of warehouses in this cluster going forward also.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/month)	Land rate (₹ mn/acre)
Nelamangala	12 - 16	15 - 35
T. Begur	12 - 15	10 - 20
Dabaspete	10 - 14	10 - 30

Source: Knight Frank Research

4.4 COMPETITIVE ADVANTAGES

The biggest competitive advantage of the Nelamangala-Dabaspete warehouse hub is its proximity to the densely populated consumption hub of Bengaluru. This makes it a credible location for consumer-oriented (B2C) companies that can serve the Bengaluru consumption market from their warehouses in this cluster. The next advantage is its proximity to the manufacturing hubs of Dabaspete, Narsapura, Mysore Road and Hosur Road.

Warehouse occupiers are sensitive to rentals and thus, warehousing clusters that are in a position to offer affordable space would enjoy a competitive advantage over the others. With warehouse rentals in the range of ₹10–16

per sq ft per month, this cluster fares well. The ample land availability implies that the rentals will continue to remain affordable for a considerable amount of time.

With the construction of the NICE Ring Road, this cluster witnesses the vehicular traffic flow between Mumbai and Chennai, thereby increasing the acceptance level for warehousing. This ring road has also provided connectivity to almost all the manufacturing and consumption hubs of Bengaluru within a driving time of two hours.

The availability of manpower is another factor that lends competitive strength to this cluster. Bengaluru is a densely populated urban agglomeration, and the presence of old residential catchments in and around the cluster ensures an abundant supply of skilled, semi-skilled and unskilled workers.

4.5 CHALLENGES

The consumption-led warehousing requirement, mainly from the e-commerce segment, comes with a set of challenges for this cluster. With the e-commerce delivery timelines shrinking from a few days to same day and now a few hours, pockets that are closest to the most active consumer base of these e-commerce players score over the Nelamangala-Dabaspete cluster. For instance, Whitefield and Electronic City are the biggest office locations within the city and with consumers scheduling same day deliveries to office locations, some e-commerce firms have preferred

the warehousing hub of Soukya Road.

4.6 OUTLOOK

The Nelamangala-Dabaspete cluster with its inherent strengths scores over other smaller warehouse clusters in the city. The availability of land and excellent quality roads will ensure steady supply of warehouses going forward as well.

Geographically, we believe that in the cluster, the T Begur to Dabaspete region holds great potential on account of relatively lower land price within the cluster, even as good road quality compensates for the distance travelled further away from the city. Further, while the cluster itself is an approximately

30-km stretch, there is scope for enhancement of internal roads, which can further aid the growth of the warehousing market considering the existing land values are much lower 2–3 km off the highway.

From the pricing perspective, i.e. the achievable rent or on-going land rates, this hub offers a range of options. With land rate as the most important determinant of warehouse financial feasibility, it is crucial to get it right to achieve success in a warehouse development project. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an

investor should ideally pay in this cluster in order to achieve the expected returns in the range of 12–18% per annum, subject to the achievable rents. For example, with a return expectation of 14% per annum and an achievable rental value of ₹12/sq ft/month, the feasible land cost amounts to ₹11 mn/acre. In other words, investors can fetch a 14% per annum return only if they are able to purchase land at or below ₹11 mn/acre at present and lease it at ₹12/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

FEASIBLE LAND COST MATRIX ON THE NELAMANGALA-DABASPETE WAREHOUSING BELT (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum			
	12%	14%	16%	18%
10	10	6	4	2
12	14	11	8	5
14	20	16	12	10
16	25	21	17	13

Note: The table presents 16 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 9 options that are possible to source on this warehousing belt and are upwards of the minimum prevailing land rate, which is ₹10 mn/acre on this belt, have been highlighted in colour.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

T Begur to Dabaspete region holds great potential on account of relatively lower land price within the cluster, even as good road quality compensates for the distance travelled further away from the city





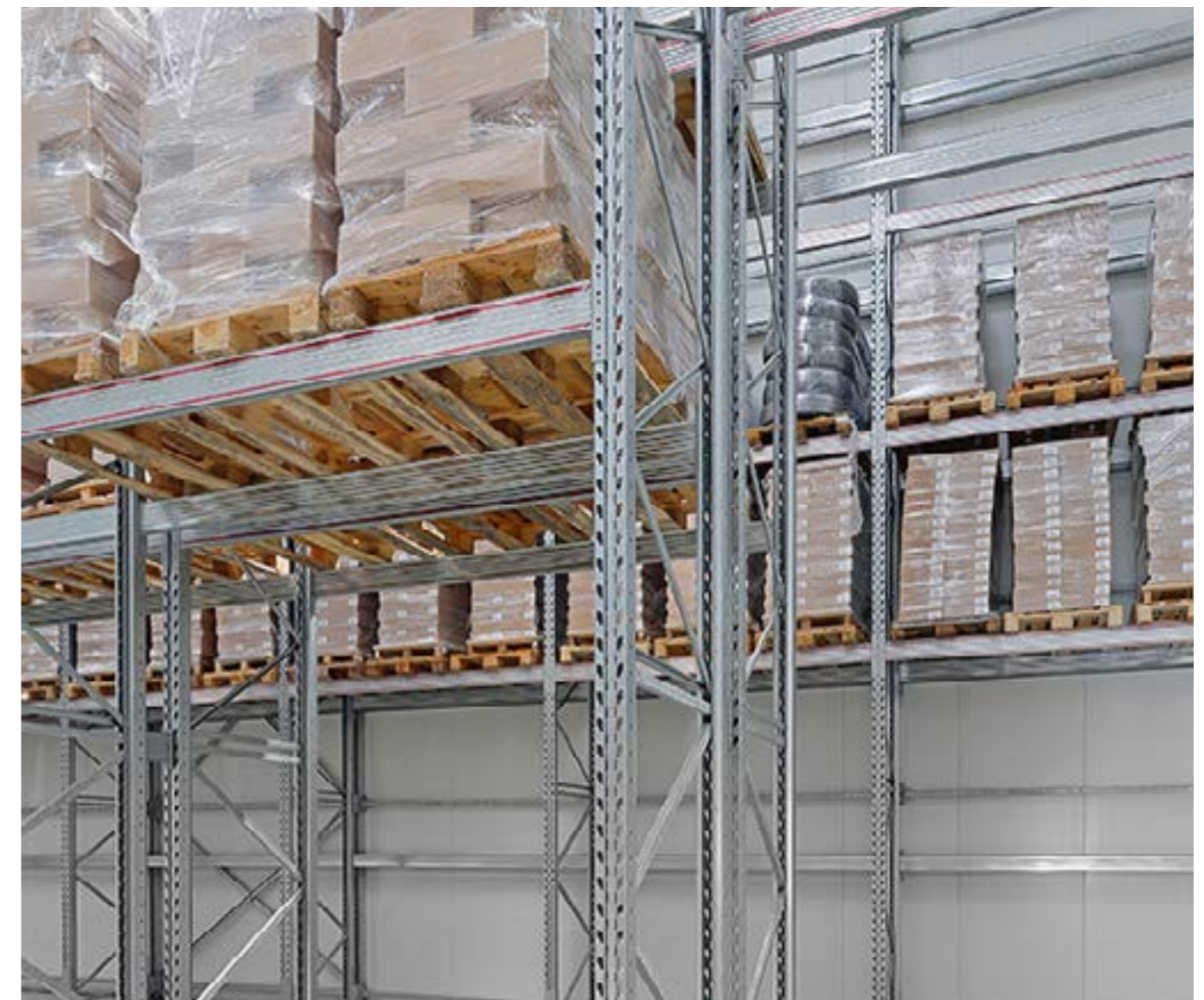
1. MAJOR WAREHOUSING CLUSTERS IN CHENNAI

Chennai has always been a centre for trade and commerce as is the case with most port cities. Over the years it has also evolved into a manufacturing hub with the automobile industry especially taking root and expanding in a big way. This in turn spurred the need for allied warehousing facilities that have evolved on and around the four arterial highways that branch out from the centre of Chennai towards the west such as the Grand Southern Trunk Road (GST Road/NH 32), Poonamallee High Road (Bengaluru highway), Chennai Thiruvallur Road (MTH Road) and the GNT Road (Kolkata highway, NH 16) toward the north.

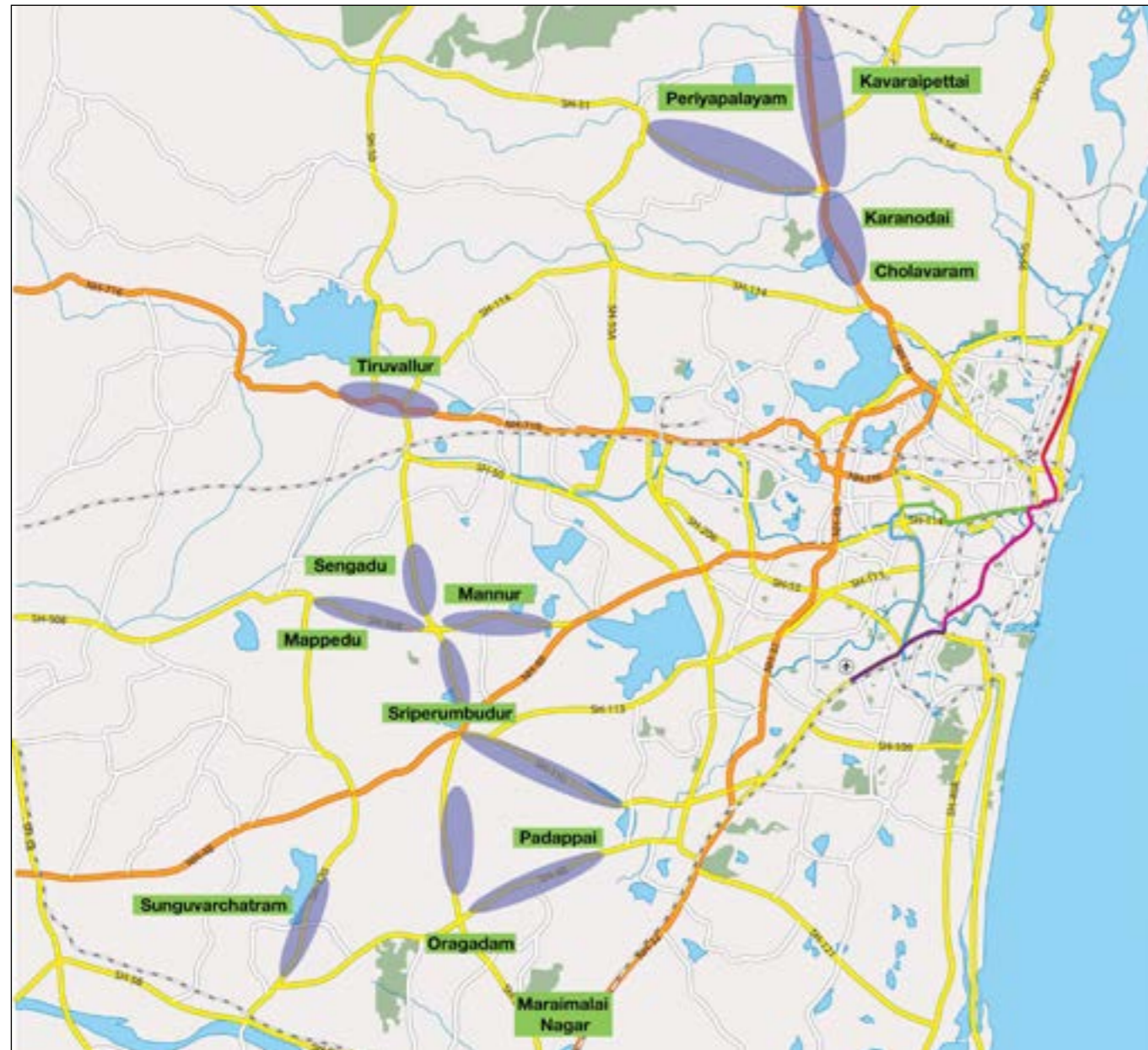
Warehousing activity in Chennai initially developed in locations such as Guindy and Ambattur that were promoted by the Small Industries Development Corporation (SIDCO). However, the turn of the century saw the demand for residential and commercial development spilling over to the suburbs of Chennai and subsequently pushing land prices higher, rendering warehouse development unviable in these locations. This gave impetus to warehouse development in peripheral locations where land prices were still viable, such as Oragadam, Sripurumbudur, Mappedu, Thiruvallur in the west and Periyapalayam in the north that are between 40 and 60 km away from the city centre. Recent

years have seen warehousing activity mushroom on internal roads branching out from Sripurumbudur toward Oragadam, Sunguvarchatram, Mappedu and Tiruvallur in the west and toward Periyapalayam and Gummidipoondi in the north, just off the GNT Road.

For the purpose of this report, we have classified the various warehousing markets into two major clusters: Sripurumbudur-Oragadam cluster and the Periyapalayam cluster, based on factors such as geographical location, access to the city centre and distance from the major manufacturing hubs.



MAJOR WAREHOUSING LOCATIONS IN CHENNAI



CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

Warehousing cluster	Major warehousing locations
Sriperumbudur-Oragadam cluster	Oragadam, Sriperumbudur, Walajabad, Mappedu, Mannur, Tiruvallur and other locations on the in-roads branching from Sriperumbudur
Periyapalayam cluster	Red Hills, Karanodai, Jagannathpuram, Thatchoor, Periyapalayam

2. TOTAL REQUIREMENT FOR WAREHOUSING SPACE

Chennai's total requirement for warehousing space is estimated to be 65mn sq ft, of which approximately 77%, or 51 mn sq ft, is from the manufacturing sector. However, the majority of the warehousing requirement of the manufacturing sector is fulfilled

by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses. Although the trend of leasing a warehouse rather than owning it is steadily picking up with the emergence of third-party logistics players (3PL), it is still at a nascent

stage compared to developed markets such as Europe and the US. These 3PL players, such as Redington, Safexpress, Indev Logistics, Nipon Express, DB Schenker, Timescan Logistics, Blue Dart and TCI among others, provide end-to-end logistics services, including a

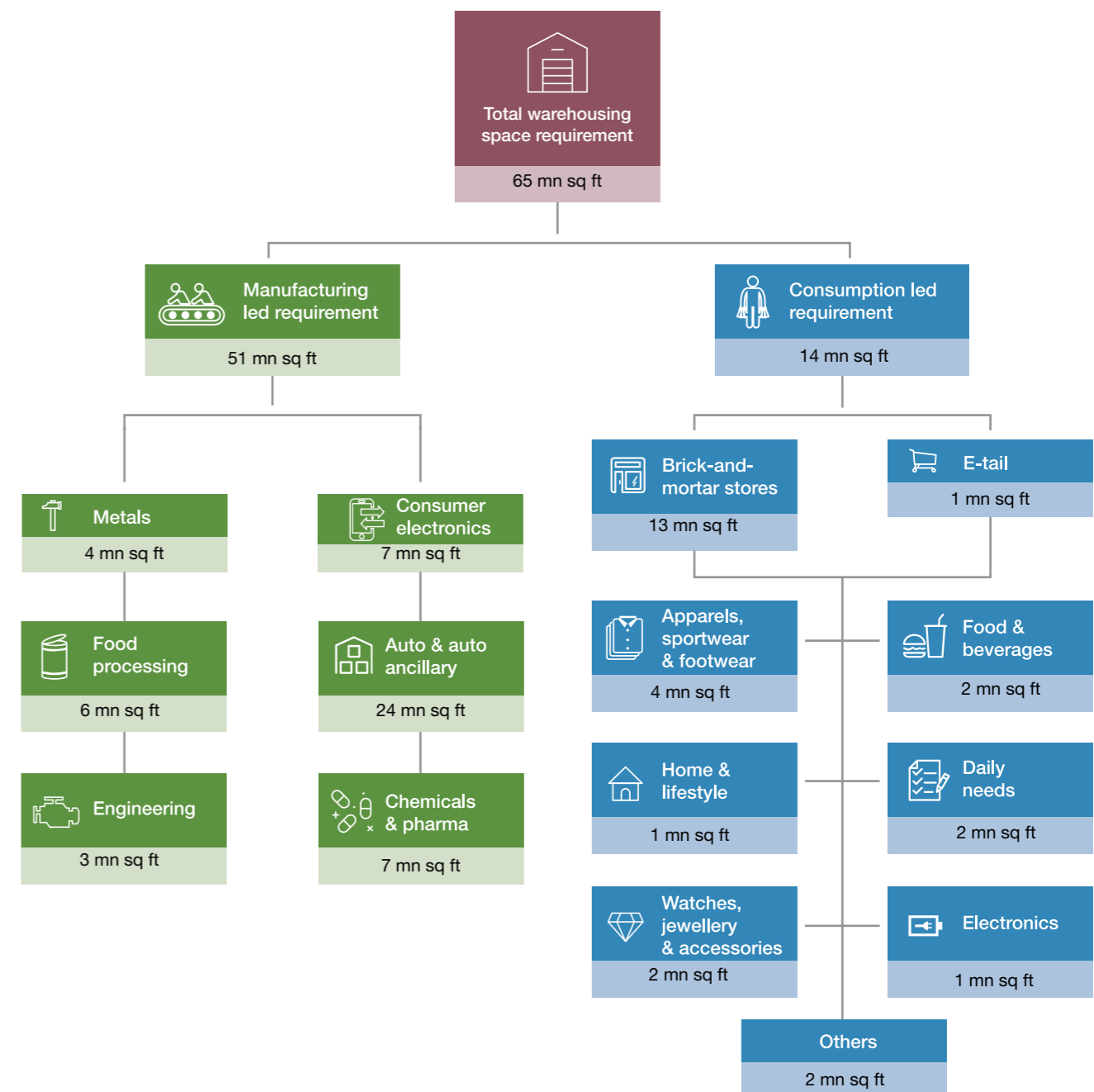
common warehousing facility, to multiple manufacturers, thereby reducing the need to have a separate warehouse.

The Goods and Services Tax (GST) will ensure the development of integrated big box warehousing facilities that will encourage a large number of manufacturers to outsource their logistics and warehousing requirements and focus on their core operations. This will create an additional demand for leasable warehousing space in Chennai in the coming years.

In contrast to the manufacturing-led requirement for warehousing space, consumption-led requirement is mostly for leasable space, with very few operators fulfilling their needs through a captive warehouse. This is primarily due to the need to have a fulfilment centre as close to the urban area as possible in order to ensure quick delivery. Over the last ten years, this segment has witnessed a renewed traction, especially in the online retail or E-tail sector. As the time between placing an order and delivery has shrunk drastically

with the advent of the E-tail sector, the need for warehousing space close to the consumption centres has also increased significantly. With the share of E-tail expected to rise steadily in the coming years, we estimate the demand for warehouses from this segment to increase proportionately as well. The total leasable market in Chennai is currently estimated to be in the range of 15-20 mn sq ft. However, the share of annual transacted volume is approximately 1-1.5 mn sq ft.

TOTAL REQUIREMENT FOR WAREHOUSING SPACE IN CHENNAI



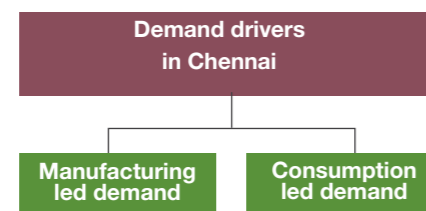
3. DEMAND DRIVERS OF WAREHOUSING SPACE IN CHENNAI

The primary demand drivers of warehousing space in Chennai can be broadly classified into two categories: manufacturing-led demand and consumption-led demand. The demand from the manufacturing sector arises predominantly due to the distance between the manufacturer's factories, raw material suppliers and the consumption markets of the final goods. The need to store the raw materials or final goods due to this distance, determines the amount of space required by each manufacturer. The quantum of space required is also dependent on the type of product that is manufactured. Hence, each manufacturer will have a different requirement for space, depending on these factors. For example, manufacturers in the automobile industry require their component suppliers to be able to supply their products at a much shorter time frame compared to those in the metals industry. Hence these component manufacturers need to be located within a one hour driving distance from their customer.

Consumption-led demand, which is an equally important demand driver for warehousing space, is largely dependent on population, income level and the propensity to spend. The changing dynamics of the retail industry has resulted in the business model of a retailer becoming heavily dependent

on a smooth and efficient supply chain network. In addition to this, the advent of E-tail in recent years has necessitated the need for huge warehouses close to urban centres in order to deliver in the shortest possible time. Such factors have brought the warehousing industry to the forefront of the retail business and compelled retailers to focus on this segment.

In the following sections, we have identified the key manufacturing industries in Chennai, their current warehousing requirement, the major manufacturing hubs and the various regions within Chennai from where their demand originates. Similarly, in terms of consumption, we have identified the current warehousing requirement of brick-and-mortar stores and the E-tail segment.



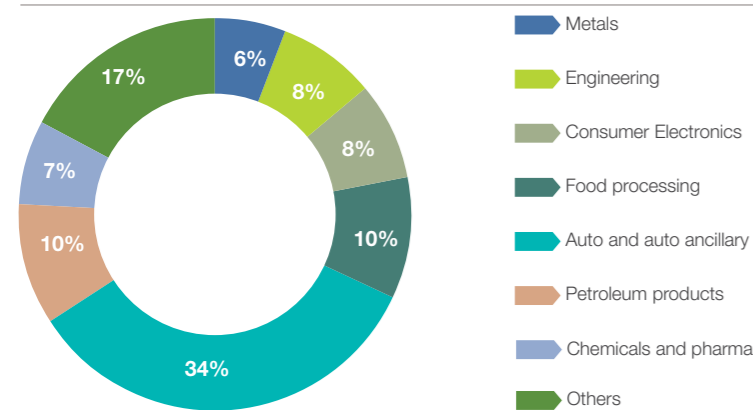
3.1 MANUFACTURING-LED DEMAND

Chennai is one of the largest manufacturing hubs in India and is a globally recognised hotbed for the automobile industry. Auto and auto ancillary companies together account for a massive 34% of the manufacturing

output of Chennai. Ashok Leyland, Royal Enfield, Hyundai, Ford Motors, Yamaha, Mitsubishi, Renault Nissan, Bharat Benz, TAFE, Caterpillar, Daimler and BMW are some of the automobile majors that have their manufacturing units located in this region. Food processing, which includes dairies, rice mills, sugar mills, confectionaries, and beverages, among others, has the second largest share in the output in Chennai. This is followed by the consumer electronics, engineering, metals and chemicals & pharmaceuticals industries.

In terms of the requirement for warehousing space, the auto and auto ancillary sector leads with approximately 24 mn sq ft. This is followed by the remaining industries, each requiring warehousing space of around 3–7 mn sq ft. The city has attracted global leaders in the consumer electronics space such as Samsung, Dell, Foxconn and Motorola that have invested in large manufacturing facilities in the city's periphery. This industry has a requirement of close to 7 mn sq ft and continues to show good traction in demand. With a steady rise in demand for consumer electronics, we expect its share in Chennai's total output to rise steadily in the coming years and cause a subsequent rise in this sector's demand for warehousing.

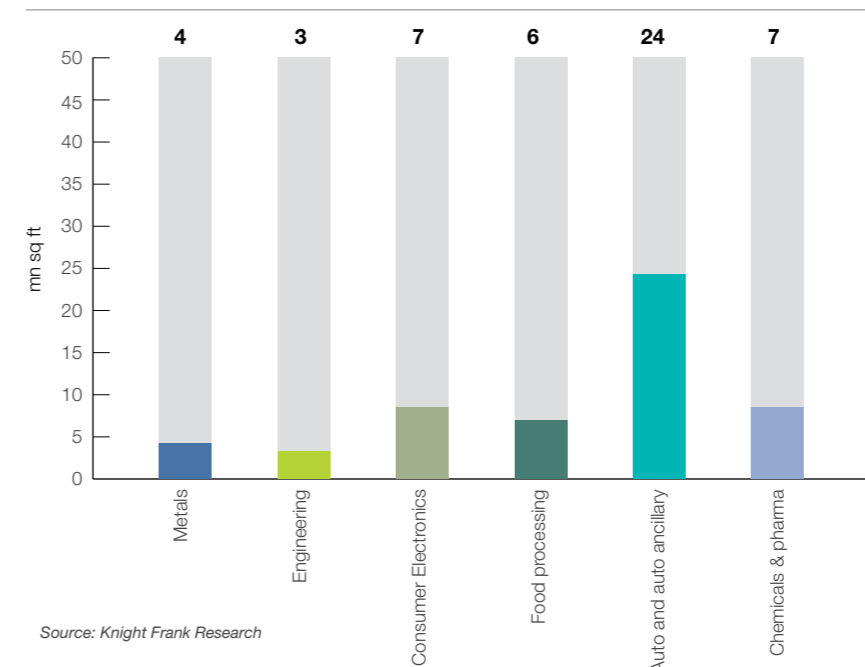
FIGURE 1
SHARE IN OUTPUT OF THE VARIOUS MANUFACTURING INDUSTRIES IN CHENNAI



Source: Annual Survey of Industries (ASI) and Knight Frank Research

FIGURE 2

WAREHOUSING SPACE REQUIREMENTS OF MAJOR MANUFACTURING INDUSTRIES IN CHENNAI



Source: Knight Frank Research

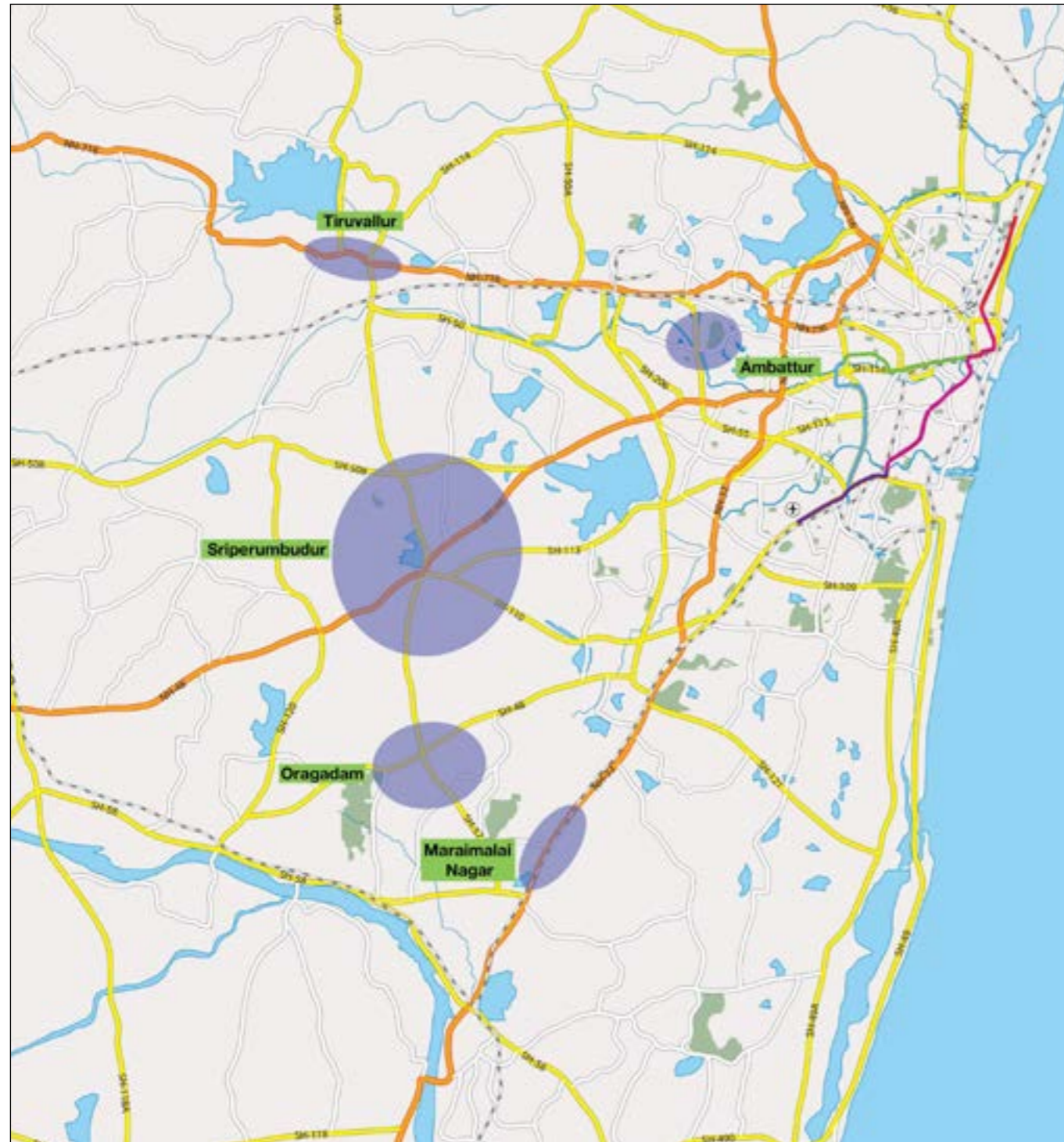
Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from the Annual Survey of Industries (ASI). The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses

Manufacturing activities in Chennai are spread across multiple locations. While locations such as Guindy and Perungudi used to be the established industrial areas in the city, high land prices resulting from the demand for commercial office spaces has compelled most of the large manufacturers to shift their production activity outside the city area. The GST Road, Bengaluru highway, MTH Road and the GNT Road have experienced prolific growth in industrial development with numerous automobile, consumer electronics, chemical and engineering companies located here. Bulk of the industrial activity has centred around locations such as Sriperumbudur, Oragadam, Maraimalai Nagar, Gummidipoondi and Periyapalayam on these roads. These locations have become established industrial locations today with very good roads and allied infrastructure. There is also considerable land available for potential development around the roads connecting these major highways.

The above factors clearly indicate that the demand for manufacturing-led warehousing space in Chennai will be concentrated primarily along these manufacturing clusters with sectors such as auto and pharmaceuticals, food processing, metals and textiles leading in terms of this demand.

The auto and auto ancillary companies account for a massive 34% of the manufacturing output of Chennai

MANUFACTURING CLUSTERS WITHIN CHENNAI



3.2 CONSUMPTION-LED DEMAND

The Chennai metropolitan area has the largest retail market in Tamil Nadu with a consumer base of nearly 9 mn people. This retail spending not only includes traditional brick-and-mortar stores, malls, shopping streets and mom-and-pop stores but also accounts for the spending

by consumers through the e-commerce medium. Hence, any type of consumer goods consumed within Chennai, whether offline or online, is categorised in the retail spending.

Among the various product categories, apparel, sportswear and footwear together have the highest share in

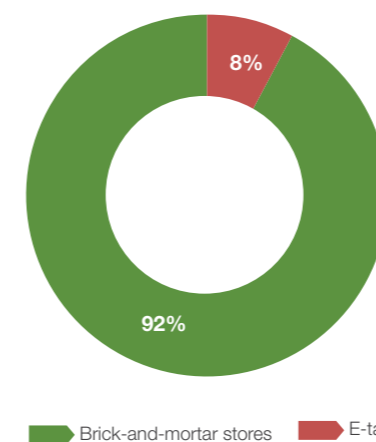
demand. Watches, jewellery and accessories, food and beverages and department stores are the other categories that claim a major share of the consumption basket. The share of the daily needs category that includes all the Fast moving consumer goods (FMCG) products, grocery and other such daily retail products that are consumed on

a regular basis exceeds only those of the electronics and home and lifestyle categories.

The E-tail sector has emerged as a major driver for the incremental warehousing space requirement in recent years and currently accounts for 8% of the total space requirement of the consumption-led demand. While brick-and-mortar stores still lead in terms of space requirement at 14 mn sq ft, the E-tail segment contributes a little over 1 mn sq ft. This is significant, considering that until just a few years ago, this entire segment barely existed.

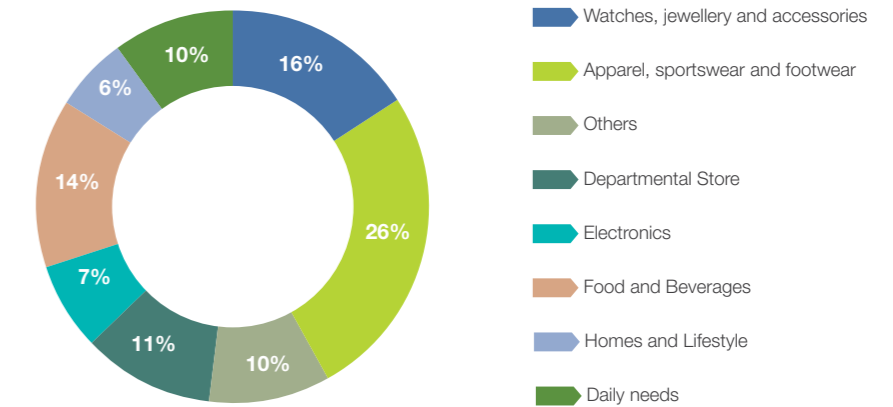
While the boom in the E-tail sector may have eaten into the market share of the brick-and-mortar stores to a great extent, our analysis indicates that the advent of this segment has expanded the overall consumption pie and led to a substantial increase in the urban consumers' propensity to spend. Hence, the warehousing space requirement by the E-tail segment is largely the incremental demand for space and not just a replacement of the demand for space by brick-and-mortar stores. Going forward, we believe that the share of the E-tail sector will increase further in the total retail spending of consumers. This will invariably lead to a higher demand for warehousing space from this segment in the coming years.

FIGURE 5 WAREHOUSING SPACE REQUIREMENTS BY E-TAIL AND BRICK-AND-MORTAR STORES



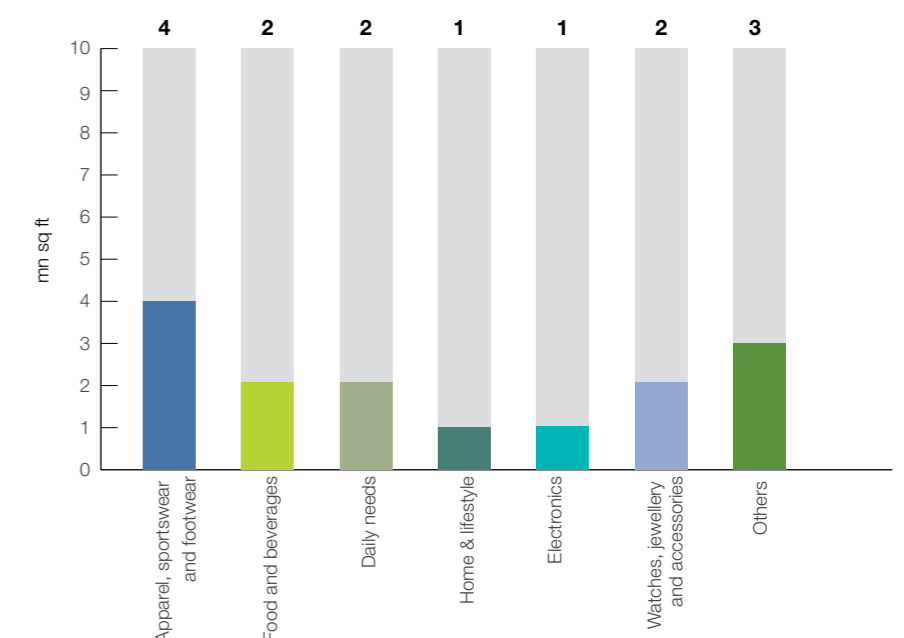
Source: Knight Frank Research

FIGURE 3 CATEGORY-WISE SPLIT OF RETAIL SPENDING IN CHENNAI



Source: Knight Frank Research

FIGURE 4 WAREHOUSING SPACE REQUIREMENTS FOR THE MAJOR RETAIL CATEGORIES IN CHENNAI



Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of April 2016. This is calculated on the basis of the latest consumption data. The food and beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

4. SRIPERUMBUDUR-ORAGADAM WAREHOUSING CLUSTER

The Sriperumbudur-Oragadam cluster was one of the largest warehousing markets to be developed in Chennai due to the various advantages that this location commands. It is centred on the Chennai-Bengaluru Highway and is a natural transit stop for goods being transported to and from Bengaluru which is arguably the largest consumption centre in South India. Also, the concentrated presence of the automobile industry manufacturing units on the GST and Bengaluru highway encouraged the development of supporting warehousing activity in this cluster. Ambattur is the other significant industrial hub in the west and also has a similarly large manufacturing sector presence.

Sriperumbudur, Irungattukotai and Oragadam started to develop as industrial and warehousing hubs at the turn of the 21st century as automobile majors such as Ford and Hyundai established large manufacturing facilities on the periphery of the GST Road and Bengaluru highway. Locations such as Maraimalai Nagar and Singaperumal Koil on the GST Road were among the first locations to benefit from the largesse of the automobile sector and the governments support to that industry in terms of transport and power infrastructure and single-window clearance for setting up a manufacturing unit.

Since the demand drivers for all the warehouse locations in western Chennai are similar, we have clubbed these locations into a single warehousing cluster for the purpose of this report and called it as the 'Sriperumbudur-Oragadam warehouse cluster'. In the following sections, we have explained the types of warehouses, major players, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook for this belt.

4.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

Most warehouses in locations such

as Mannur, Mappedu, Oragadam and Irungattukotai are relatively recent constructions. Most of the development on these roads comprises pre-engineered building (PEB) type structures with 24-foot clear height and basic infrastructure such as security, ample parking space, fire-fighting equipment and insulation, among others. While good quality warehouses pepper the landscape in most of these locations, recent years have seen the entry of integrated logistics parks operators such as Indospace that represent the next stage in the evolution of the Chennai warehousing market. These logistics parks are characterised by state-of-the-art warehouses and are fully equipped to handle multi-modal transportation, centralised storage and distribution and information transaction services. Some of the prominent occupiers in this cluster are Panasonic, Ceat, DB Schenker and Reckitt Benckiser.

While the auto and auto components sector forms the bulk of the warehousing demand, most of the incremental demand comes from E-tail and consumer electronics sector companies that not only require adequate clear height within the warehouse for multi-level stacking of products, but also look for added amenities such as fire-fighting equipment and enhanced security. This has resulted in the majority of the new warehouses being constructed to adhere to such standards and move away from the traditional godown-type structure. Over the last five years, a large number of companies have shifted their warehousing space from older warehouses in Oragadam and Sriperumbudur towards the recently constructed good quality warehouses on the Thandalam-Perambakkam-Thakkolam Road that connects Mannur and Mappedu to Bengaluru highway.

Select warehouse operators

Indospace

Casa Grande

Kailash Logistics

4.2 LOCATION AND INFRASTRUCTURE

The Sriperumbudur-Oragadam warehousing belt is located in the western part of the city along the GST Road, Bengaluru highway and the MTH Road. All these roads are good quality three-lane roads with dividers for the most part. The GST Road connects peripheral industrial hotbeds like Maraimalai Nagar and Singaperumal Koil to the city. The Chennai International Airport is also located on this road at Meenambakam. The road has a significant amount of residential development up until Vandalur, which is the southern end of the Chennai Outer Ring Road. Post that point, the population thins out and more industrial and warehouse development is visible on the 30 km stretch further south.

The Poonamallee High Road is part of the Bengaluru highway that connects Chennai to Bengaluru and the city's mainland to the industrialised locations in the vicinity of Sriperumbudur. It houses a dense residential catchment and numerous educational institutions till Chembarambakkam and hence tends to be congested until that point. Beyond there, the road attracts few passenger vehicles and is mostly used by the industrial and logistics players. This makes it less prone to traffic congestion and renders locations such as Sriperumbudur, Mannur and Mappedu accessible from the city centre within 50–75 minutes of travel time.

The various internal roads that branch out from Sriperumbudur towards Oragadam, Tiruvallur, Sunguvarchatram and the Thandalam-Perumbakkam-Thakkolam Road that connects Mappedu and Mannur to the GST Road are all of good quality and with two-lane width at the very least. These roads are well suited for truck traffic and can access all industrial destinations including Maraimalai Nagar, Ambattur and even Gummidipoondi within a commutable distance of two hours.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM SRIPERUMBUDUR-ORAGADAM WAREHOUSING BELT

Distance from:	Km	Travel time in mins
Chennai city centre	40–50	75–90
Gummidipoondi industrial area	65–85	90–120
Ambattur industrial area	27–40	40–60
Perungudi	35–47	55–75
Ennore Port	60–70	90–120
Maraimalai Nagar	15–30	20–30

Source: Knight Frank Research

4.3 RENT AND LAND COST OF WAREHOUSES

Warehouses that are closest to the GST Road and Bengaluru highway quote the highest rental values, purely by virtue of their access to the highways. For example, rents in Irungattukottai on the Bengaluru highway can go as high as ₹24/sq ft/month, while land is available here at a price of ₹40–50 mn/acre. However, there is limited stock available here and it does not really constitute a significant market. Similarly, land abutting the highway at Sriperumbudur is priced up to ₹60 mn/acre with warehouse rentals in the vicinity of ₹18–23/sq ft/month.

Bulk of the warehousing activity is concentrated on and around the internal roads that branch out from the GST Road and Bengaluru highway. Oragadam, which is located between these two arterial roads, is among the well-developed industrial and warehousing markets in this cluster where warehouse rentals quote as high as ₹26–28/sq ft/month. These high rentals have encouraged occupiers to look further west towards locations like Mappedu, Mannur and Thirukovilur, where most of the good quality warehouses can be made available at ₹15–18/sq ft/month, and land rates of land parcels not directly abutting the roads are in the range of ₹10–20 mn/acre. Currently, the market is experiencing a lot of resistance as warehouse rents approach ₹20/sq ft/month, as occupiers are aware that they will be able to avail of similar quality warehouses at 15–30% discounts, if they choose to shift operations from

Oragadam and Sriperumbudur to locations such as Mappedu and Mannur.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/month)	Land rate (₹ mn/acre)
Sriperumbudur	18 – 24	35 – 60
Oragadam	26 – 28	20 – 35
Mappedu	15 – 17	10 – 15
Mannur	16 – 18	17 – 25
Irungattukottai	20 – 24	40 – 50

Source: Knight Frank Research

4.4 COMPETITIVE ADVANTAGES

Western Chennai locations such as Sriperumbudur, Maraimalai Nagar, Oragadam and Irungattukotai are established industrial concentrations in Chennai that form regional bases for industry leaders in the auto and auto ancillary, and the consumer electronics industries. This has created a strong demand base for warehouses in the immediate vicinity as the automobile sector requires its vendors to be within a 1–2 hour driving radius from their base. This cluster has thus evolved as the dominant warehousing market in Chennai and over the years has become the transportation and logistics hub of the city. This has resulted in the development of a robust logistic ecosystem with transporters, freight operators, warehouse operators and all the other allied service operators located within this area. Hence, despite the

increase in rental values for warehouses, a large number of occupiers still prefer to operate from locations that are in close proximity to these industrial hotspots. Hence, this logistics ecosystem that has developed in this cluster provides it with a distinctive competitive advantage over the other warehousing clusters in Chennai.

Another advantage of this warehousing belt is its accessibility to all the major retail hubs of the city. The excellent quality of road infrastructure and minimal traffic congestion enables a warehouse occupier to supply products from the warehouse to anywhere in the city within 60 minutes.

4.5 CHALLENGES

Land prices have been spiralling up over the past decade as demand for residential and commercial development steadily moves west. Even Sriperumbudur that was purely an industrial destination has seen interest from residential developers such as Marg Group which caused a consequent rise in prices that have rendered warehouse development unviable. Although, there is enough land available in newer locations such as Mannur and Mappedu at more rational price levels, it does increase the time to transport goods and products required by industries that follow just-in-time inventory management and could pose a threat in times to come. Also, the new international airport being planned by the government at Sriperumbudur over the next decade will push land prices up further much the same way it

had in Navi Mumbai as well and force warehouse development even further away.

4.6 OUTLOOK

Since land cost is the most critical component of warehouse development, it influences the realisable returns to a great extent. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay in this cluster in order to achieve the expected return in the range of 10%–18% per annum, subject to the achievable rents. For example, with a return expectation of 14% per annum and an achievable rental value of ₹18/sq

ft/month, the feasible land cost amounts to ₹26 mn/acre. In other words, investors can fetch a 14% per annum return only if they are able to purchase land at or below ₹26 mn/acre at present and lease it at ₹18/sq ft/month. As the purchase price of land goes higher, the realisable return reduces for a particular rental rate. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

Currently, most of the locations within the Sriperumbudur-Oragadam cluster are feasible for warehousing activities at the prevailing land rates, subject to a minimum achievable rental value of ₹15/sq ft/month. However, rental values below this level may not even fetch returns of 10% per annum to the investors at the

current land prices.

For investors to achieve returns upwards of 14% per annum, it is imperative that the land acquisition cost does not exceed ₹40 mn/acre and that prevailing rental values do not go below ₹24/sq ft/month. Considering the current market scenario, only Sriperumbudur, Oragadam and Irungattukottai quote rental values approaching ₹24/sq ft/month and above. The prevailing market price of land in these locations starts at ₹20 mn/acre and provide reasonable options within ₹40 mn/acre if developers look for land parcels in the interiors. In order to achieve returns upwards of 14% per annum, investors will have to consider new locations within the Sriperumbudur-Oragadam warehousing cluster where

the land acquisition cost is minimal, and is well connected to the GST Road and Bengaluru highway.

We believe that locations such as Mannur and Mappedu that are located just west of the Bengaluru Highway and connected to the same by the 2x2 Thandalam-Perambakkam-Thakkolam Road can support investor returns of 16% with the prevailing land cost and rental dynamics of ₹10–25 mn/acre and ₹15–18/sq ft/month respectively. These locations are within a 30–60 minute driving radius from major manufacturing destinations such as Sriperumbudur, Irungattukottai and Maraimalai Nagar. Even the city centre and port can be reached within 90 minutes from these locations. Hence, based on these factors, we believe that locations such as Mannur and Mappedu on the Thandalam-Perambakkam-Thakkolam Road will witness considerable warehousing development in the coming years.

FEASIBLE LAND COST MATRIX IN THE SRIPERUMBUDUR-ORAGADAM WAREHOUSING BELT (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum			
	12%	14%	16%	18%
14	20	16	12	10
16	25	21	17	13
18	31	26	21	18
20	36	31	26	21
22	43	35	30	25
24	47	40	34	29
26	53	45	39	33

Note: The table presents 28 options of land cost in ₹mn/acre at different investor returns and rental value combinations. The 11 options that are possible to source in this warehousing cluster and are upward of the minimum prevailing land rate, which is ₹10 mn/acre in this cluster, have been highlighted in colour.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	50%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

5. PERIYAPALAYAM WAREHOUSING CLUSTER

North Chennai has traditionally been home to small-scale industrial activity, especially in the light engineering sector. The presence of the Ennore Port and the Gummidipoondi Industrial Estate in North Chennai encouraged industrial development along the GNT Road. The presence of the port has led to the development of a large number of container freight stations, container yards and allied warehousing infrastructure to support consolidation and distribution activities that take place outside ports.

Warehouse and industrial development has however, been pushed further north as demand for residential property pushed land prices up and forced the low-yielding warehouse development further north and off the GNT Road. The past decade has also seen the auto and auto components and FMCG sectors set up manufacturing units along the Periyapalayam Road and along the northern edges of the GST Road.

Since the demand drivers for all the warehouse locations along GNT Road are similar, we have clubbed these locations into a single warehousing cluster for the purpose of this report and called it as the 'Periyapalayam warehousing cluster'. In the following sections, we have explained the types of warehouses, major players, market characteristics, infrastructure

development, prevailing rentals and land rates, challenges and the future outlook for this belt.

5.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

Warehouses along the Tirupati Road and Cholavaram are relatively recent constructions. Most of the development on these roads comprises pre-engineered building (PEB) type structures with 24-foot clear height and basic infrastructure such as security, ample parking space, fire-fighting equipment and insulation, among others. Some of the prominent occupiers on this belt are Sony, Panasonic, LG, TAFE and Honda. Majority of the warehouses in this cluster are of PEB structure.

Currently, most of the incremental demand for warehousing space in this belt comes from manufacturing companies and 3PL players. However, over the last few years, demand from e-commerce and FMCG players has been building up.

Select warehouse operators

Sugal & Damani

NDR Logistics

Sunteck Logistics Park

5.2 LOCATION AND INFRASTRUCTURE

The Periyapalayam warehousing cluster is located in the northern part of the city on the GNT Road that is part of the Kolkata highway and starts from Red Hills and stretches till the industrial town of Gummidipoondi. This highway is currently a three-lane highway connecting Chennai with Kolkata and passes through important coastal cities such as Vishakhapatnam and Kakinada on the way. It is a good quality road but suffers from some congestion due to the Vijayanallur toll and the ongoing construction the ORR.

The Tirupathi Road that branches west from the GNT Road to Periyapalayam has attracted a lot of interest from warehouse developers as it is close to the port and has ample land available at prices that still make warehouse development feasible. This 15 km stretch is made up of a good quality two-lane road which is ideal for movement of trucks traffic as there is limited residential development around this road.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM PERIYAPALAYAM WAREHOUSING CLUSTER

Distance from:	Km	Travel time in mins
Chennai city centre	35 – 45	60 – 90
Gummidipoondi Industrial area	0 – 25	0 – 30
Ambattur industrial area	33 – 43	60 – 90
Perungudi	55 – 70	90 – 120
Ennore port	35 – 45	60 – 90
Maraimalai Nagar	60 – 75	75 – 105
Sriperumbudur	45 – 60	75 – 95

Source: Knight Frank Research

5.3 RENT AND LAND COST OF WAREHOUSES

Warehouses that are on the southern end of the GNT Road such as Madhavaram, Red Hills and Puzhal are quoting the highest rental values. The rents in these locations start from ₹14/sq ft/month and in certain cases go as high as ₹22/sq ft/month, depending on the quality of the warehouse and access from the highway. However, Madhavaram and Red Hills especially, that have quoted rentals at the higher end of the range, have developed into residential locations with land prices currently pushing more than ₹50 mn/acre and touching ₹100 mn/acre in some areas here.

Most warehousing development on the GNT Road starts after the Vijayanallur toll at Cholavaram where rentals are in the range of ₹15 - 18/sq ft/month and this same range continues till Karanodai and Janapanchatram junction post where, a drop is observed in warehouse rentals on the highway and on Periyapalayam road where it is possible to lease good quality warehouse space in the range of ₹14 - 16/sq ft/month.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/month)	Land rate (₹ mn/acre)
Cholavaram	15–18	20–30
Redhills	15–18	50–70
Madhavaram	20–22	90–100
Puzhal	18–20	30–60
Karanodai	15–18	20–25
Periyapalayam	14–16	12–15

Source: Knight Frank Research

5.4 COMPETITIVE ADVANTAGES

The biggest competitive advantage of the Periyapalayam cluster is its proximity to the large consumption markets in the city and the ample availability of large tracts of developable land. North Chennai has been relatively less impacted by the increasing demand for residential and commercial development compared to South and West Chennai and hence has

land available at comparatively rational prices that are suitable for warehouse development.

The concentrated and increasing presence of the FMCG and consumer electronics sector companies due to its proximity to the city centre has provided an adequate demand cushion that will ensure that warehousing requirement in this cluster will continue to increase with time. It is also well connected to the large manufacturing hubs of the west, such as Sriperumbudur and Maraimalai Nagar via the Chennai Bypass road and the upcoming Outer Ring Road that will reduce its travel time to Sriperumbudur by approximately 20 minutes.

North Chennai has traditionally been largely populated by a blue collar population and thus the availability of ample skilled and unskilled manpower also provides a competitive edge to this warehousing cluster.

5.5 CHALLENGES

The biggest challenge that the warehousing sector faces on this belt is the availability of legally viable land parcels. Even though ample land is available for development, the incidence of land titling issues is much higher in North Chennai compared to the southern and western periphery. Though residential and commercial development has still not been a factor beyond the Vijayanallur toll post, it is just a matter of time before alternative land uses push industrial and warehousing development further north.

The FMCG companies like Hindustan Unilever Ltd. and Procter and Gamble Ltd. among others, have large facilities set up in this cluster due to the proximity to the dense consumption markets in the city. However, the presence of the toll booth is a hindrance today due to toll costs and traffic congestion and this scenario will only exacerbate in future as land costs go up.

5.6 OUTLOOK

The Periyapalayam cluster has emerged as a promising warehousing corridor in Chennai with warehouse operators such as Indospace and large integrated

developers taking up space there. However, since land cost is the most critical component of warehousing development, it influences the realisable returns to a great extent. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay on this belt in order to achieve the expected return in the range of 10%–18% per annum, subject to the achievable rents. For example, with a returns expectation of 16% per annum and an achievable rental value of ₹16/sq ft/month, the feasible land cost amounts to ₹17 mn/acre. In other words, investors can fetch a 16% per annum return only if they are able to purchase land at or below ₹17 mn/acre at present and lease it at ₹16/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

FEASIBLE LAND COST MATRIX ON THE PERIYAPALAYAM WAREHOUSE CLUSTER (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum		
	14%	16%	18%
14	16	12	10
16	21	17	13
18	26	21	18
20	31	26	21
22	35	30	25

Note: The table presents 15 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 7 options that are possible to source on this warehousing belt and are upward of the minimum prevailing land rate, which is ₹ 12 mn/acre in this cluster, have been highlighted in colour.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	50%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

Currently, most of the locations on this belt are feasible for warehousing activities at the prevailing land rates, subject to a minimum achievable rental value of ₹14/sq ft/month. Locations such as Madhavaram, Red Hills and Puzhal will find it difficult to support warehouse development due to the higher land costs. While it is unfeasible to develop warehouses in Madhavaram and Redhills, developers in Puzhal will find it difficult to achieve return over 12% in the current scenario.

This cluster does have the potential to sustain warehouse development on locations along the 14 km long stretch of the Periyapalayam Road, where prevailing rentals at ₹14–16 can support returns of 16%, as land is available at a price range of ₹12–15 mn/acre. However, such land parcels might not have direct

access from the road and access roads might have to be constructed by the warehouse developer, which will have an impact on the eventual return. Similarly, Cholavaram that is located just before the beginning of the Periyapalayam road, can support returns of up to 14% with rentals at ₹15–18 and land available at a price range of ₹20–30 mn/acre.

We believe that the Periyapalayam Road does have the pricing dynamics today to support returns of over 16% for investors and that this belt will continue to attract both warehouse developers as well as occupiers on the back of rational land prices and competitive rental values.

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HYDERABAD

1. MAJOR WAREHOUSING CLUSTERS IN HYDERABAD

Hyderabad is the capital of the newly formed state of Telangana and till 2023, the joint capital of Andhra Pradesh. It is well connected with the major centres of economic activity in South India, such as Bengaluru and Chennai and because of its strategic location in South-central India, it is also known as the gateway to South India. The city has historically been a major trade centre and now possesses a more diversified technology-centric and service-oriented economic base.

The pharmaceutical and biotechnology sector has had a large impact on the city's economic landscape, and Hyderabad is today one of the largest pharmaceutical and biotechnology hubs in India. The constantly growing manufacturing operations of this industry have spawned the growth of warehouses in and around the industrial clusters occupied by pharmaceutical and biotechnology companies. With a population of approximately 7.3 mn people, Hyderabad is also a major consumption centre and has seen e-commerce companies increase their warehousing footprint in the city, especially since the formation of Telangana and the recent tax issues faced by the e-commerce players in Bengaluru.

Historically, manufacturing activity in Hyderabad had taken place around the main city but has been pushed out towards and beyond the Outer Ring Road (ORR), as residential and commercial office space development gained priority over manufacturing. The manufacturing sector in Hyderabad has grown primarily around the industrial parks established by the Telangana State Industrial Infrastructure Corporation Ltd. (TSIIC). Of the six parks that have been set up by the TSIIC; the parks at Jeedimetla, Karimnagar, Patancheru and Shamshabad have been more prominent, in terms of the growth of the manufacturing sector. This is mainly due to extensive measures taken up by the government, such as the establishment of the Genome Valley project across the northern periphery of the city. This has made Hyderabad arguably the largest pharmaceutical and biotechnology hub of India. Pharmaceutical/healthcare majors such as Novartis, Healthcare, Dr. Reddy's Labs, Shantha Biotechnics, GSK Consumer, Ashland India and Mylan Pharma, among others, have set up large production facilities here.

The development of these manufacturing hubs formed the genesis of the growth of the warehousing industry in Hyderabad. The Jeedimetla cluster emerged as the

preferred location among warehouse occupiers due to the concentrated presence of the pharmaceutical and healthcare sectors. Its proximity to the city centre, strategic access to the Nagpur (NH-44) and Karimnagar highways (SH-1) and availability of land with clear titles have contributed to the growth of this region as a warehousing cluster. However, increasing land prices within the ORR, due to rapid urbanisation, have caused a gradual exodus of warehouses beyond the ORR towards locations 20 km north of Jeedimetla, such as Medchal and Yellampet on the NH-44 and Turkapally on the SH-1.

Warehouses are also shifting beyond the ORR on the western and southern periphery of the city to locations such as Patancheru, Muthangi, Kothur, Shamshabad and on the Warangal highway towards the east. However, even as these locations are beginning to show some promise today, they still have some distance to go to match the relative scale of their northern counterparts. Hence, Hyderabad currently has only one established concentration of warehouses that is located towards the north of the city that we have named the Jeedimetla-Medchal warehousing hub for the purpose of this report.



MAJOR WAREHOUSING LOCATIONS IN HYDERABAD



CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

Warehousing cluster	Major warehousing locations
Jeedimetla-Medchal cluster	Jeedimetla, Gundlapochampally, Bowrampet, Gajularamaram, Bolarum, Bachupally, Medchal, Turkapally

Source: Knight Frank Research

2. TOTAL REQUIREMENT FOR WAREHOUSING SPACE

Hyderabad's total requirement for warehousing space is estimated to be 61 mn sq ft, of which approximately 69%, or 42 mn sq ft, is from the manufacturing sector. However, the majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses. As the government is the largest landlord in Hyderabad and is known for its pro-business stance, acquiring land to set up manufacturing and warehousing facilities is relatively easy in this city and

this has ensured that land costs as well as third party warehousing costs stay depressed. Although the trend of leasing a warehouse rather than owning it is gradually picking up with the emergence of third-party logistics players (3PL), it is still at a nascent stage compared to other Indian cities such as Mumbai, Pune and Bengaluru, primarily because warehouse rentals are among the lowest in the country. These 3PL players provide end-to-end logistics services, including a common warehousing facility, to multiple manufacturers, thereby reducing the need to have a separate warehouse.

The Goods and Services Tax (GST) is expected to have a positive impact on Hyderabad due to its unique location, which is equidistant from major cities in South and Central India such as Bengaluru, Chennai, Nagpur, Pune and Mumbai. This added impetus, due to the GST regime, will ensure the development of integrated big box warehousing facilities that will encourage a large number of manufacturers to outsource their logistics and warehousing requirements and focus on their core operations. This will create an additional demand for leasable warehousing space

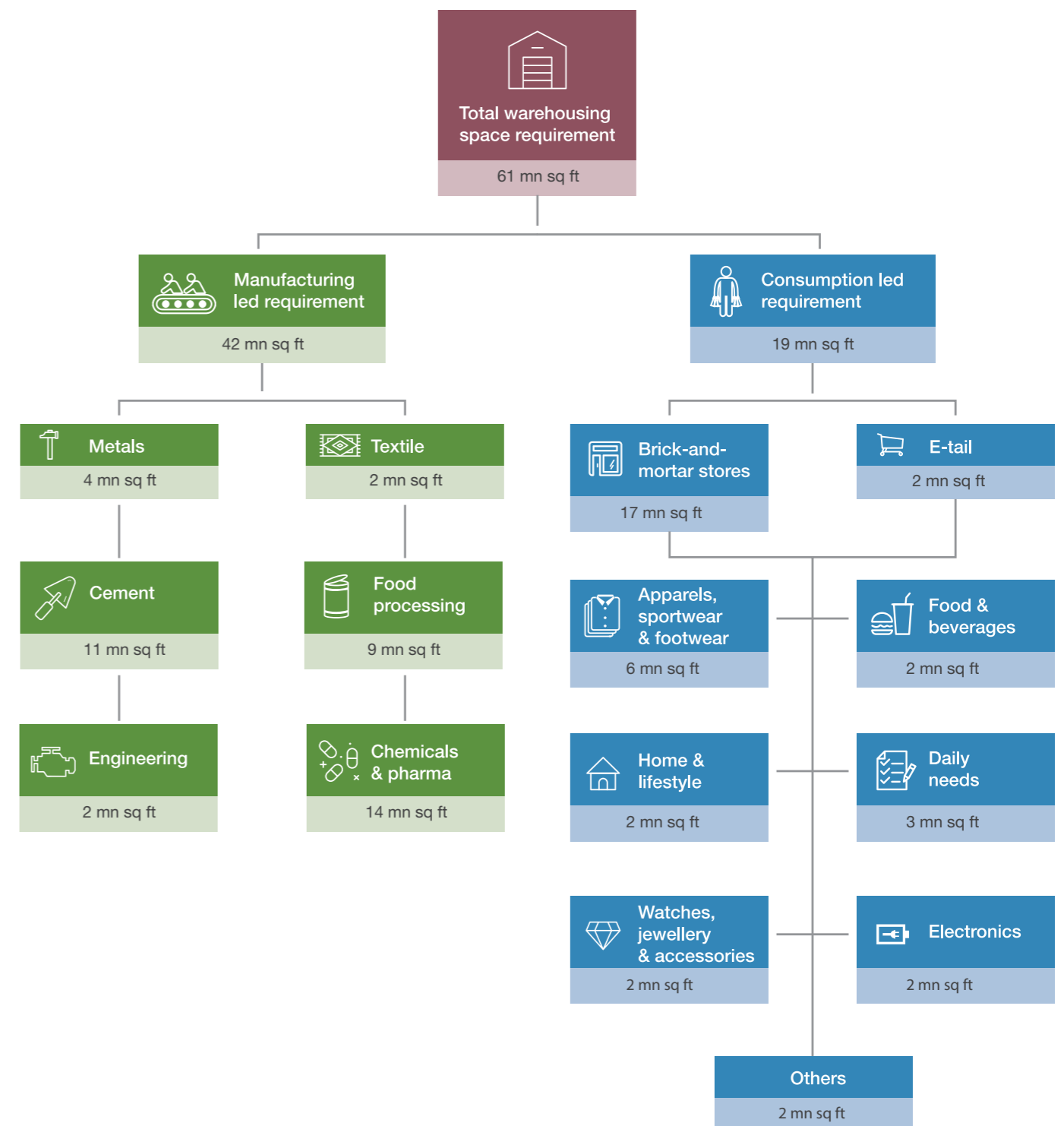
in Hyderabad in the coming years.

In contrast to the manufacturing-led requirement for warehousing space, consumption-led requirement is mostly for leasable space, with very few operators fulfilling their needs through a captive warehouse. This is primarily due to the need to have a fulfilment centre as close to the urban area as possible in order to ensure quick delivery. Over the last ten years, this segment

has witnessed a renewed traction, especially in the online retail or E-tail sector, with E-tail giants such as Flipkart and Amazon operating large fulfilment centres in Gundlapochampally and Kothur respectively. As the time between placing an order and delivery has shrunk drastically with the advent of the E-tail sector, the need for warehousing space close to the consumption centres has also increased significantly. With the

share of E-tail expected to rise steadily in the coming years, we estimate the demand for warehouses from this segment to increase proportionately as well. The total leasable market in Hyderabad is currently estimated to be in the range of 10–15 mn sq ft. However, the share of annual transacted volume is approximately 0.7–1.2 mn sq ft.

TOTAL REQUIREMENT FOR WAREHOUSING SPACE IN HYDERABAD



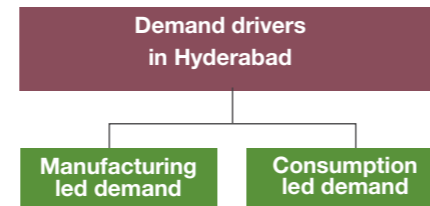
3. DEMAND DRIVERS OF WAREHOUSING SPACE IN HYDERABAD

The primary demand drivers of warehousing space in Hyderabad can be broadly classified into two categories: manufacturing-led demand and consumption-led demand. The demand from the manufacturing sector arises predominantly due to the distance between the manufacturer's factories, raw material suppliers and the consumption markets of the final goods. The need to store the raw materials or final goods due to this distance, determines the amount of space required by each manufacturer. The quantum of space required is also dependent on the type of product that is manufactured. Hence, each manufacturer will have a different requirement for space, depending on these factors. For example, manufacturers in the automobile industry require their component suppliers to be able to supply their products at a much shorter time frame compared to those in the metals industry. Hence these component manufacturers need to be located within a one hour driving distance from their customer.

Consumption-led demand, which is an equally important demand driver for warehousing space, is largely dependent on population, income level and the propensity to spend. The changing dynamics of the retail industry has resulted in the business model of a retailer becoming heavily dependent on a smooth and efficient supply chain network. In addition to this, the advent of E-tail in recent years has necessitated the need for huge warehouses close to urban centres in order to deliver in the shortest possible time. Such factors have brought the warehousing industry to the forefront of the retail business and compelled retailers to focus on this segment.

In the following sections, we have identified the key manufacturing industries in Hyderabad, their current warehousing requirement, the major manufacturing hubs and the various regions within Hyderabad from where their demand originates. Similarly, in terms of consumption, we have identified

the current warehousing requirement of brick-and-mortar stores and the E-tail segment.

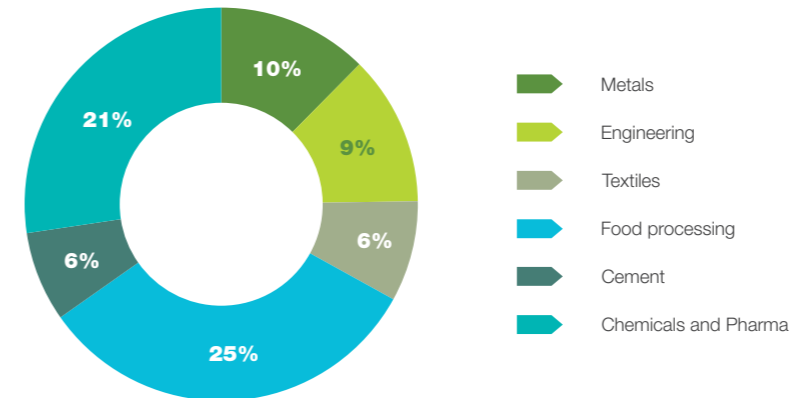


3.1 MANUFACTURING-LED DEMAND

Hyderabad is the largest pharmaceutical hub in India and accounts for the manufacturing of a third of India's bulk drugs and close to a fifth of the country's biotechnology output. Chemicals and pharmaceutical companies together account for 21% of the manufacturing output of Hyderabad. Dr. Reddy's Laboratories, Sanofi Aventis, Johnson & Johnson, Biocon, Bayer Biosciences and Aurobindo Pharma are some of the pharmaceutical majors that have their manufacturing facilities located in this city. However, food processing that includes dairies, rice mills, sugar mills, confectionaries, and beverages, among others, has the largest share in the output in Hyderabad at 25%. These are followed by the metals, engineering and textiles industries.

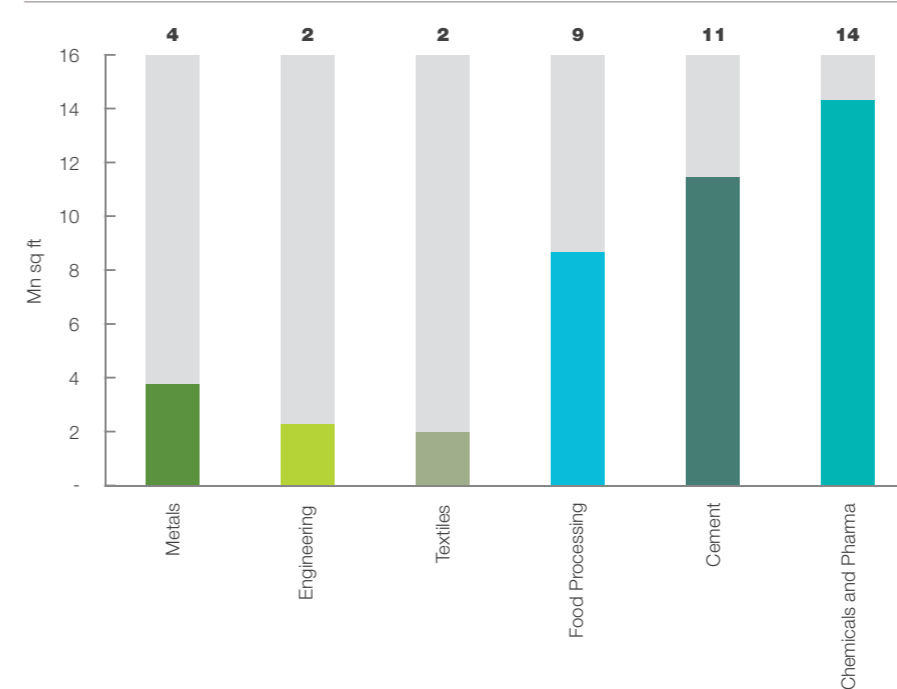
In terms of the requirement for warehousing space, the chemicals and pharmaceutical sector leads with approximately 14 mn sq ft. This is followed by the remaining industries, each requiring warehousing space of around 2-9 mn sq ft. As the city continues to grow as a pharmaceutical hub, we expect its share in Telangana's total output to rise steadily and cause a subsequent rise in this sector's demand for warehousing.

FIGURE 1
SHARE IN OUTPUT OF THE VARIOUS MANUFACTURING INDUSTRIES IN HYDERABAD



Source: Annual Survey of Industries (ASI) and Knight Frank Research

FIGURE 2
WAREHOUSING SPACE REQUIREMENTS OF MAJOR MANUFACTURING INDUSTRIES IN HYDERABAD



Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from ASI. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses.

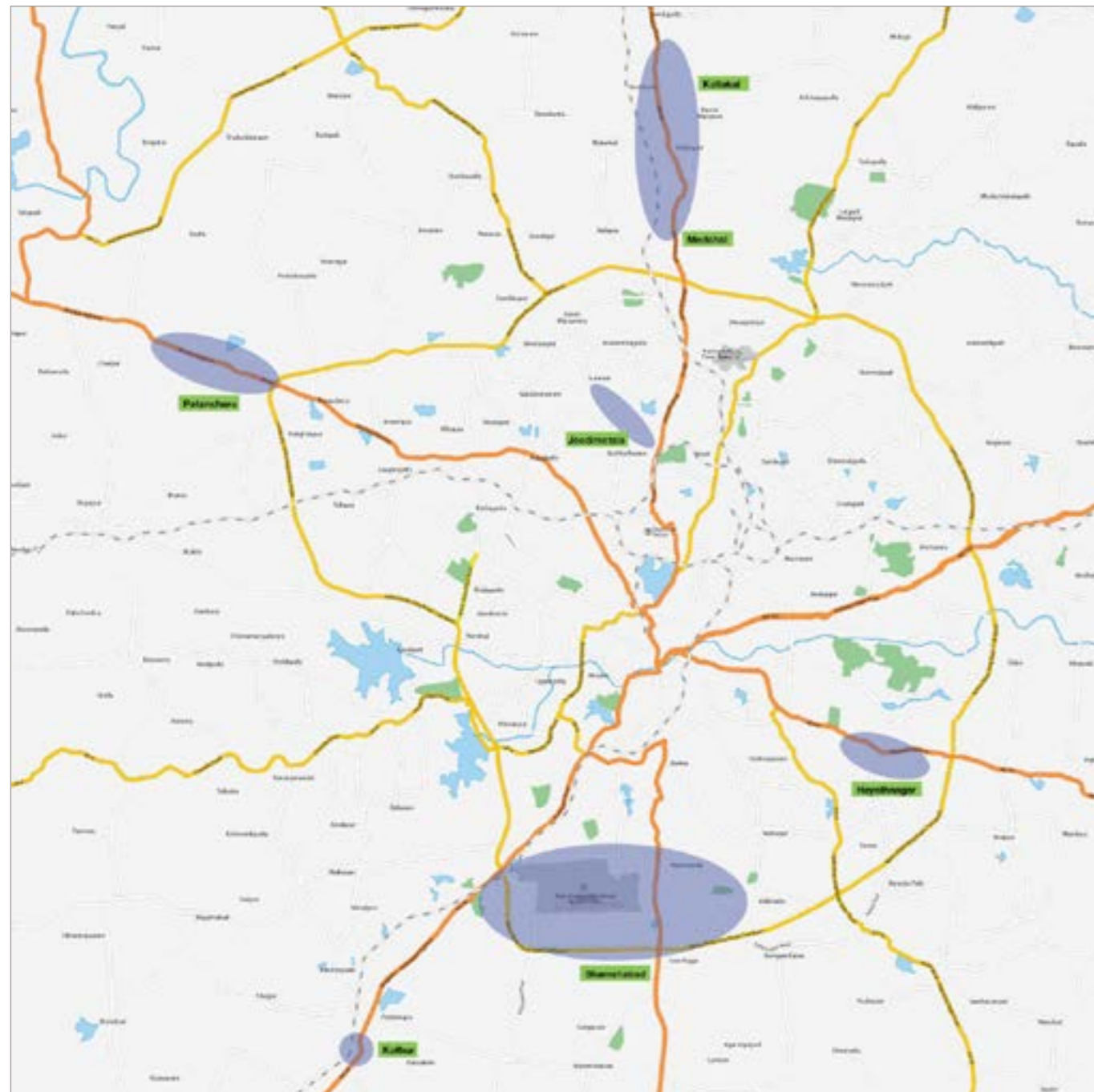
Source: Knight Frank Research

Manufacturing activities in Hyderabad are spread across multiple locations. While locations such as Jeedimetla used to be the established industrial areas in the city, high land prices resulting from the demand for commercial office spaces and the government's push to move most industrial activity beyond the ORR by the end of 2017 has compelled most of the large manufacturers to shift their production activity outside the city area. The Nagpur highway and the Karimnagar highway have experienced prolific growth in industrial development with numerous chemical and pharmaceutical, consumer electronics and engineering companies located here. Bulk of the industrial activity has centred around locations such as Jeedimetla, Medchal and Turkapally on these roads. These locations have become established industrial locations today with very good roads and allied infrastructure. There is also considerable land available for potential development around the roads connecting these major highways.

The above factors clearly indicate that the demand for manufacturing-led warehousing space in Hyderabad will be concentrated primarily along these manufacturing clusters with sectors such as chemicals and pharmaceuticals, food processing, metals and engineering leading in terms of this demand.

Hyderabad is the largest pharmaceutical hub in India and accounts for the manufacturing of a third of India's bulk drugs and close to a fifth of the country's biotechnology output. Chemicals and pharmaceutical companies together account for 21% of the manufacturing output of Hyderabad.

MANUFACTURING CLUSTERS WITHIN HYDERABAD



3.2 CONSUMPTION-LED DEMAND

The Hyderabad metropolitan area has the largest retail market in Telangana with a consumer base of 7.3 mn people. This retail spending not only includes traditional brick-and-mortar stores, malls, shopping streets and mom-and-pop stores but also accounts for the spending by consumers through the e-commerce medium. Hence, any type of consumer goods consumed within Hyderabad,

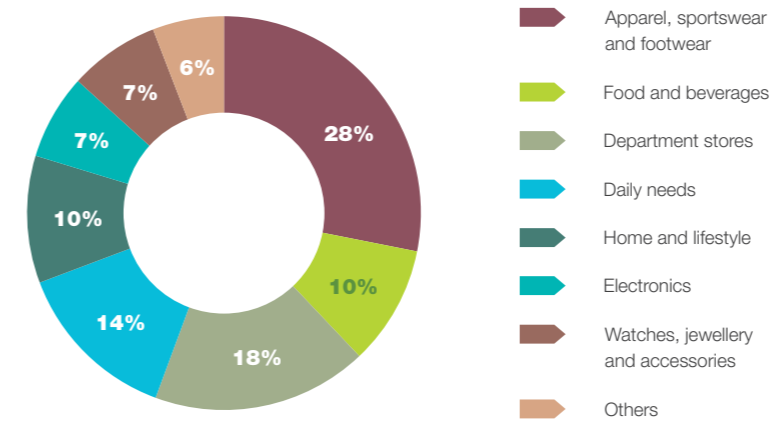
whether offline or online, is categorised in the retail spending.

Among the various product categories, apparel, sportswear and footwear together have the highest share in demand. Watches, jewellery and accessories, food and beverages and department stores are the other categories that claim a major share of the consumption basket. The share of the daily needs category that includes all

the fast moving consumer goods (FMCG) products, grocery and other such daily retail products that are consumed on a regular basis exceeds only those of the electronics and home and lifestyle categories.

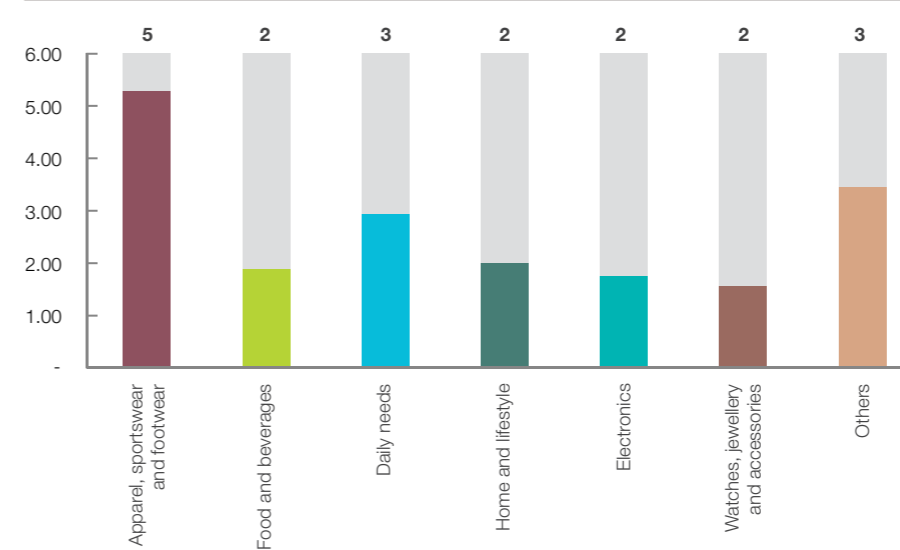
The E-tail sector has emerged as a major driver for the incremental warehousing space requirement in recent years and currently accounts for 8% of the total space requirement of the consumption-

FIGURE 3
CATEGORY-WISE SPLIT OF RETAIL SPENDING IN HYDERABAD



Source: Knight Frank Research

FIGURE 4
WAREHOUSING SPACE REQUIREMENTS FOR THE MAJOR RETAIL CATEGORIES IN HYDERABAD



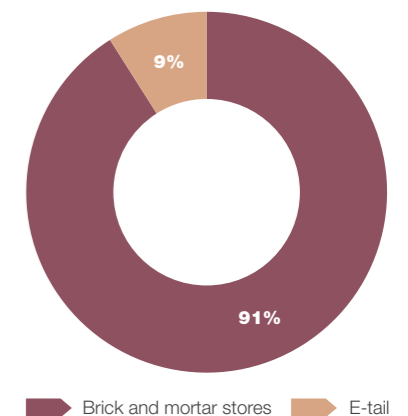
Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of April 2016. This is calculated on the basis of the latest consumption data. The food and beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

led demand. While brick-and-mortar stores still lead in terms of space requirement at 14 mn sq ft, the E-tail segment contributes a little over 1 mn sq ft. This is significant, considering that until just a few years ago, this entire segment barely existed.

While the boom in the E-tail sector may have eaten into the market share of the brick-and-mortar stores to a great extent, our analysis indicates that the advent of this segment has expanded the overall consumption pie and led to a substantial increase in the urban consumers' propensity to spend. Hence, the warehousing space requirement by the E-tail segment is largely the incremental demand for space and not just a replacement of the demand for space by brick-and-mortar stores. Going forward, we believe that the share of the E-tail sector will increase further in the total retail spending of consumers. This will invariably lead to a higher demand for warehousing space from this segment in the coming years.

FIGURE 5
WAREHOUSING SPACE REQUIREMENTS BY E-TAIL AND BRICK-AND-MORTAR STORES



Source: Knight Frank Research

4. JEEDIMETLA WAREHOUSING CLUSTER

Locations such as Balanagar and Sanath Nagar were places where industrial development originally took root but eventually gave way to residential and commercial development as the city grew. The existing industries located there then moved north of the Mumbai highway, in locations such as Jeedimetla, Bachupally, Bowrampet, and then further north to Medchal and Turkapally that form the Jeedimetla-Medchal warehousing hub today.

The Jeedimetla-Medchal warehouse cluster has a significant part of it located within the ORR, due to the presence of the Jeedimetla industrial area. It is well connected to the Nagpur and Karimnagar highways and its proximity to the city centre makes it a convenient warehousing location for the food processing industry that requires efficient access to the large consumption market.

4.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

The Jeedimetla-Medchal warehouse cluster is peppered with medium-sized warehousing facilities measuring up to 0.1 mn sq ft. These are reinforced concrete structures (RCC) and have a height ranging from 14–16 ft and pre-engineered buildings (PEB) with a height of 22–24 ft. The rental values vary from ₹10–14/sq ft/month, depending on the location and quality of the warehouse. While the warehouses located closer to the Nagpur highway or the city command higher rents, those located on internal roads or away from the city are available at a relatively lower cost. Additionally, the technical aspects such as floor strength, fire safety equipment and ventilation, security, amenities and approach road, among others, have a direct bearing on the rent of the property.

Since the occupier roster of leased warehouses Jeedimetla-Medchal cluster is largely made up of by small to medium-scale companies from the chemicals and pharmaceuticals and the food processing industries, their requirement regarding the quality of warehouse and

supporting infrastructure is not as high as that of a multinational. This keeps the cost of construction for warehouses low. Also, rental value of built-to-suit warehouses could go as high as ₹20/sq ft/month, depending on the requirement of the occupier. Large pharmaceutical industry players such as Dr. Reddy's and Aurobindo Pharma, among others, have multiple manufacturing facilities located in this cluster.

Select warehouse operators

Durgesh Godowns

Vittal Reddy Godowns

4.2 LOCATION AND INFRASTRUCTURE

The Jeedimetla warehouse cluster is located towards the north of the city and is aligned along the Nagpur and Karimnagar highways. The Karimnagar and Nagpur highways are both extremely good quality four-lane roads that connect the city to Nagpur, Bengaluru and Karimnagar. Both highways have seen dense residential development close to the city and this phenomenon tapers out as one moves towards and beyond the ORR. The southern end of this cluster is also reasonably well connected to the Mumbai highway.

There are several internal roads that connect the western extremities of this cluster, such as Gajularamam, Bachupally and Bowrampet, to the Jeedimetla Industrial Estate and the Nagpur highway, such as the Bachupally Road and the Pipeline Road. These are of reasonably good quality and 20–40 feet wide in most stretches, but are prone to congestion, as truck traffic tends to get stuck at the narrower parts of the roads. Also, there are significant residential catchments at Bachupally and Suraram locations that add to the congestion. Locations further north such as Medchal, Turkapally and Dandupally beyond the ORR are very well connected via the Nagpur and Karimnagar highways to the city and have experienced prolific growth in industrial and warehousing development over the years.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM JEEDIMETLA CLUSTER

Distance from:	Km	Travel time in mins
Hyderabad city centre (Begumpet)	10–35	35–60
Jeedimetla industrial area	0–20	0–25
Shamshabad industrial area	70–90	90–120
Patancheru	25–50	45–60
Uppal	25–55	45–90
Hyderabad International Airport	70–90	90–120

Source: Knight Frank Research

4.3 RENT AND LAND COST OF WAREHOUSES

Warehouses on land parcels directly connected to the Nagpur highway quote the highest rental values purely by virtue of their access to the highway. For example, rents in Kompally and Gundlapochampally on the Nagpur highway can reach as high as ₹12–14/sq ft/month, while land is available here at a price of ₹20–40 mn/acre. However, these rentals recede as one looks for warehousing spaces on the various roads that branch out from the Nagpur and Karimnagar highways.

Within the ORR limits, bulk of the warehousing activity is concentrated on and around the internal roads that branch out from the Nagpur and Mumbai highways towards the Jeedimetla industrial cluster. Locations along the Bachupally and Dullapally roads such as Bowrampet and Gajularamam provide a lot more warehousing options that are available in the range of ₹10–12/sq ft/month with land available at a price of ₹15–30 mn/acre.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/ sq ft/ month)	Land rate (₹ mn/ acre)
Jeedimetla	12–14	25–35
Gundla-pochampally	12–14	20–30
Kandlakoya	12–14	20–30
Kompally	12–14	30–40
Bowrampet	10–12	15–30
Gajularamaram	10–12	15–30
Medchal	12–14	35–40
Turkapally	12–14	30–35
Dandupally	10–12	25–30

Source: Knight Frank Research

4.4 COMPETITIVE ADVANTAGES

The Jeedimetla-Medchal industrial area is an established manufacturing and warehousing cluster with several food processing and pharmaceutical companies having committed huge capital and set up large-scale facilities here. It is not easy for these companies to shift operations to other parts of Hyderabad and this would ensure a captive demand for warehousing activity in this cluster as these companies grow over time. Further, the government is actively promoting the Genome Valley as a zone dedicated for pharmaceutical operations. This brings the industrial operations of these companies close to the northern extremities of the Jeedimetla-Medchal warehousing hub that has the capabilities to service their warehousing requirements.

This cluster is aligned along extremely good quality and uncongested highways with ample land available for industrial and warehouse development. Locations beyond the ORR have been relatively less affected by the increasing demand for residential and commercial development compared to the interior of the city.

Warehouse occupiers are sensitive to rentals and thus, warehousing markets that are in a position to offer affordable

space would enjoy a competitive advantage over the others. With warehouse rentals in the range of ₹10–14/sq ft/month, this cluster fares well. The ample land availability implies that the rentals will continue to remain affordable for the foreseeable future.

This cluster is also strategically located close to the heart of the city with easy access to the Nagpur and Mumbai highways. These locations are also well connected to almost all the manufacturing and consumption hubs of Hyderabad within a driving time of two hours via the ORR.

Warehousing rental levels in Hyderabad are among the lowest in the country and it is among the most centrally located cities in India having a strong infrastructure set up. This makes it a prime candidate for national players looking to set up regional big box warehouses or fulfilment centres along the Mumbai or Nagpur highway.

4.5 CHALLENGES

The biggest challenge that the warehousing sector faces along the three corridors of this cluster is the availability of legally viable land parcels. Even though the government is the largest landlord in the city, acquiring land that is free of encumbrances is still a significant issue.

Even though Hyderabad is an extremely good occupiers' market as warehousing rentals are among the lowest in the country, warehouse development is still largely unviable from an investor's return perspective due to high land rates. There is also little chance for rentals to increase, as there is potential for a lot of competing supply to hit the market at short notice due to the short construction period required to build a warehouse. This has effectively kept 3PL players from entering the market and will continue to be a major hurdle for them going forward.

Land prices have been spiralling up over the past decade as demand for residential and commercial development steadily pushes existing boundaries. Locations such as Balanagar and Sanath Nagar that were erstwhile industrial

zones had to make way for the city and push further north, and the Jeedimetla industrial cluster that forms a captive demand base for warehouses within the ORR could face the same scenario.

4.6 OUTLOOK

Since land cost is the most critical component of warehouse development, it influences the realisable returns to a great extent. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay in this cluster in order to achieve the expected return in the range of 10%–18% per annum, subject to the achievable rents. For example, with a return expectation of 14% per annum and an achievable rental value of ₹16/sq ft/month, the feasible land cost amounts to ₹16 mn/acre. In other words, investors can fetch a 14% per annum return only if they are able to purchase land at or below ₹16 mn/acre at present and lease it at ₹14/sq ft/month. As the purchase price of land goes higher, the realisable return reduces for a particular rental rate. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

FEASIBLE LAND COST MATRIX ON THE PERIYAPALAYAM WAREHOUSE CLUSTER (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum		
	10%	12%	14%
10	13	10	6
12	18	14	11
14	24	20	16

Note: The table presents nine options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The three options that are possible to source in this warehousing cluster and are upwards of the minimum prevailing land rate, which is ₹15 mn/acre in this cluster, have been highlighted in colour.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	50%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

While we do believe that Hyderabad holds immense potential as a warehousing destination, we consider it an ideal occupier's market where rentals will be prone to staying depressed due to the potential for enough and more supply that can come up as required in the market.

Most of the locations within the Jeedimetla-Medchal warehouse cluster are unfeasible for warehousing activities at the prevailing land rates due to low rentals. Current rental levels, even at the higher end of the range, do not make it feasible to underwrite fresh warehouse development along the Nagpur highway, as land costs are too high to achieve an annual return of even 12% comfortably.

For investors to achieve returns upwards of 14% per annum, which is an investor's expectation for this property type, it is imperative that the land acquisition cost does not exceed ₹16 mn/acre and that prevailing rental values do not go below ₹14/sq ft/month. Considering the current market scenario, none of the locations in this warehouse cluster qualify for a 14% return. A 12% return is the best case scenario in this cluster, given the current rent and land cost dynamics in a location such as Kandlakoya, if one is able to acquire land and construct a warehouse

within a cost of ₹20 mn/acre and lease it out at ₹14/sq ft/month. Fresh warehouse development is thus unfeasible in the Jeedimetla warehouse cluster at the current land cost and rental levels.

While we do believe that Hyderabad holds immense potential as a warehousing destination, particularly in the post GST era due to its strategic location and excellent infrastructure, we consider it an ideal occupier's market where rentals will be prone to staying depressed due to the potential for enough and more supply that can come up as required in the market. However, it remains to be seen how much the inevitable entry of large-scale 3PL players will affect the existing dynamics in the three corridors of the Peripheral cluster.





MUMBAI

1. MAJOR WAREHOUSING CLUSTERS IN MUMBAI

Mumbai has been the country's commercial capital for a long time. However, the structure of its economy has witnessed a rapid transformation during the last 2–3 decades. With rising population and increasing dominance of the service sector, industrial activity is moving outside the city.

While manufacturing faces a challenge, warehousing activities have flourished on account of large consumption base and port driven Export-Import (EXIM) cargo movement. As a result, two major warehousing clusters have developed namely Bhiwandi and Panvel. Bhiwandi has long been a prominent textile hub on

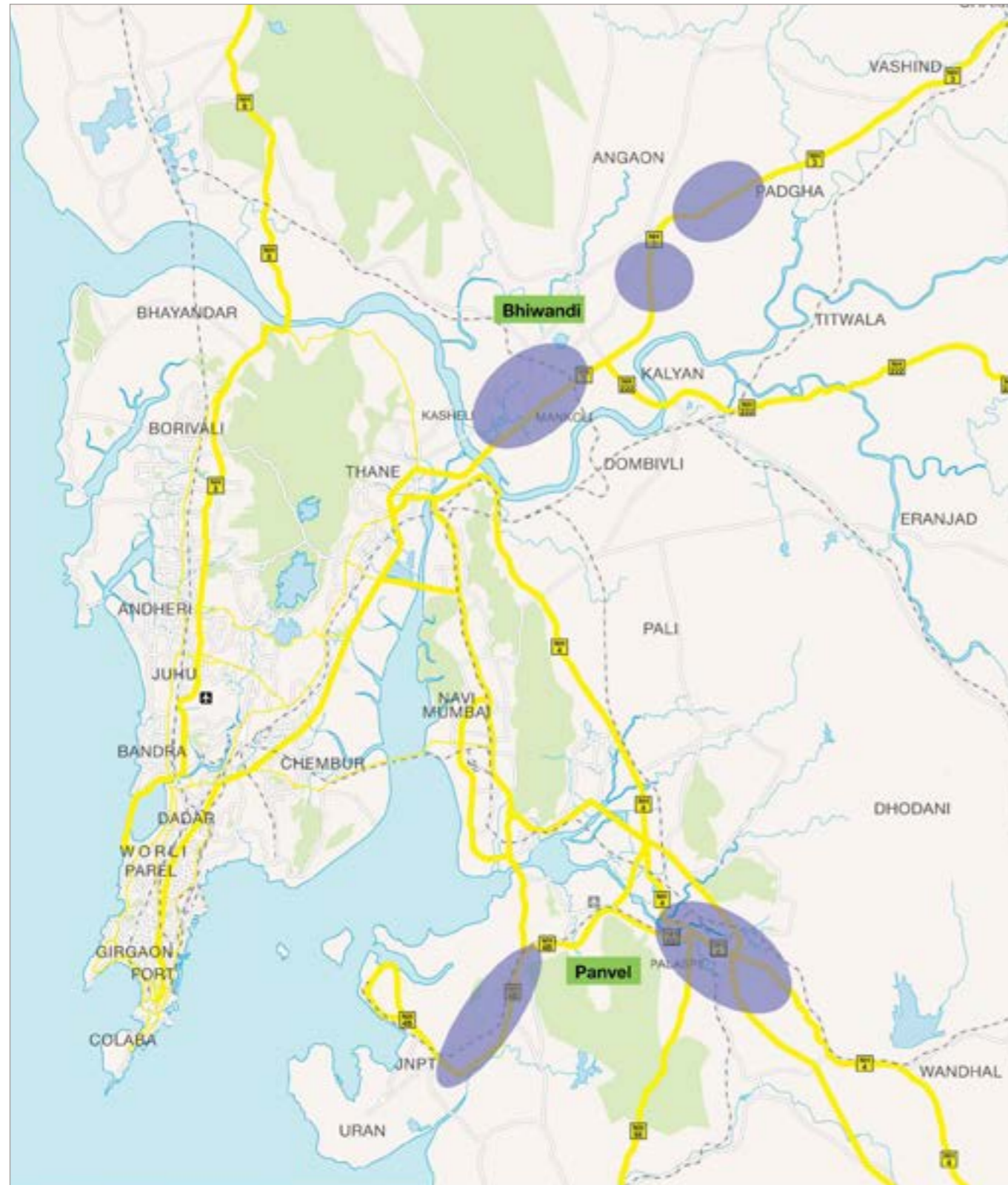
account of the largest number of power looms in the country. Being strategically located within the Mumbai Metropolitan Region (MMR), Bhiwandi is in close proximity to the large consumption markets of Mumbai, Thane city and Navi Mumbai. In addition, a thriving textile industry, availability of affordable land and labour were factors that contributed to the development of a warehousing ecosystem in Bhiwandi.

The other prominent warehouse cluster in the MMR is the EXIM-driven Panvel warehouse cluster. This cluster is dominated by industrial warehouses and container freight stations (CFS) on

account of its proximity to the country's largest sea port, the Jawaharlal Nehru Port Trust (JNPT). The port handles cargo traffic originating mostly from or destined for Maharashtra, Madhya Pradesh, Gujarat, Karnataka, as well as most of North India. The rising container freight traffic at JNPT over the last two decades fuelled the need for warehousing in its proximity. The Panvel warehouse cluster on account of its proximity to the JNPT emerged as a suitable warehouse hub for EXIM cargo that is mainly inbound. Besides, connectivity through the national highway network and availability of affordable land aided development of the CFS and warehouses in Panvel.



MAJOR WAREHOUSING LOCATIONS IN MUMBAI



CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

Warehousing cluster	Major warehousing locations
Bhiwandi	Mankoli, Kalher, Kasheli, Dapode, Padgha
Panvel	Palaspe, Uran road

2. TOTAL REQUIREMENT FOR WAREHOUSING SPACE

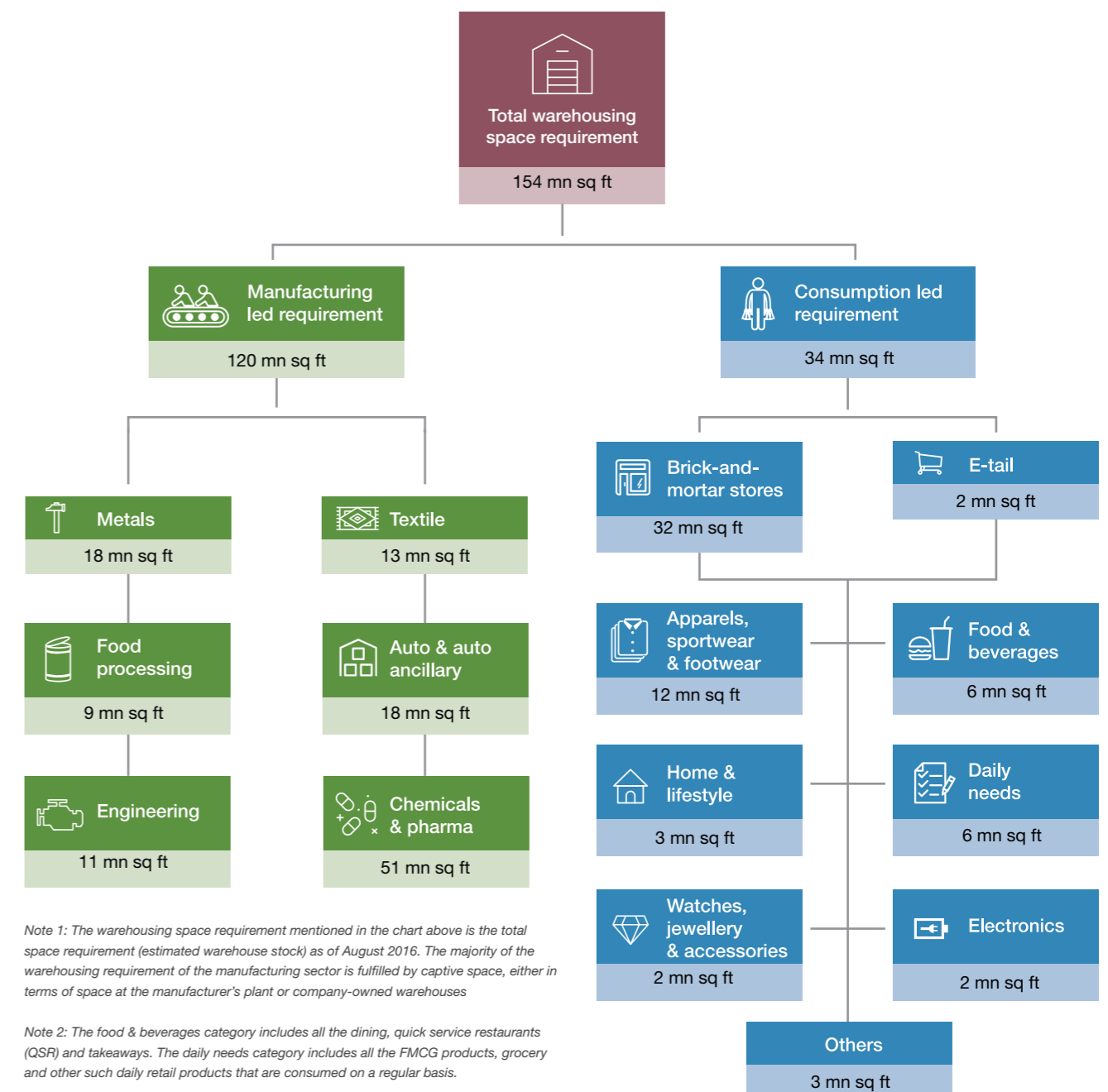
We have estimated the warehousing space requirement for the Mumbai market from two sub components, one being the manufacturing sector and another being the consumption/retail segment. The total warehousing space requirement in the Mumbai market is estimated at 155 mn sq ft. At 78% or 120 mn sq ft, the manufacturing sector accounts for a lion's share, followed by the retail sector which accounts for 34

mn sq ft of the warehousing requirement.

A majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses. In contrast, the consumption-led warehouse requirement is close to urban agglomerations and thus in leased premises close to such urban

centres. A portion of this requirement is witnessing heightened activity on the emergence of the E-tail sector, which has created the need for sophisticated supply chain systems to ensure faster deliveries at controlled costs. Of the total warehousing space requirement, the leasable warehousing market in Mumbai is estimated at around 60 mn sq ft. The annual transaction volume for the market is approximately 3 mn sq ft.

TOTAL REQUIREMENT FOR WAREHOUSING SPACE IN MUMBAI



Note 1: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses

Note 2: The food & beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

Source: Knight Frank Research

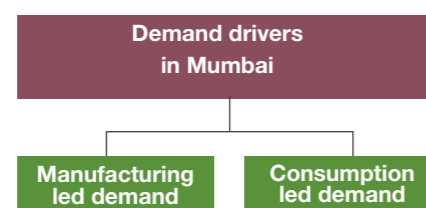
3. DEMAND DRIVERS OF WAREHOUSING SPACE IN MUMBAI

The biggest competitive advantage of the Bhiwandi warehouse hub is its proximity to the densely populated consumption hub of Mumbai, Thane and Navi Mumbai

The drivers of demand have been classified by us as manufacturing-led demand and consumption-led demand. The demand from the manufacturing sector arises predominantly due to the distance between the manufacturer's factories, raw material suppliers and the consumption markets of the final goods. The need to store the raw materials or final goods due to this distance, determines the amount of space required by each manufacturer. The quantum of space required is also dependent on the type of product that is manufactured. Hence, each manufacturer will have a different requirement for space, depending on these factors.

Separately, the consumption-led demand for warehousing is dependent on population, income level and the propensity to spend. The changing dynamics of the retail industry has resulted in the business model of a retailer becoming heavily dependent on a smooth and efficient supply chain network. In addition to this, the advent of E-tail in recent years has necessitated the need for huge warehouses close to urban centres in order to deliver in the shortest possible time. Such factors have brought the warehousing industry to the forefront of the retail business and compelled retailers to focus on this segment.

In the following sections, we have identified the key manufacturing industries in Mumbai, their current warehousing requirement, the major manufacturing hubs and the various regions in and around Mumbai from where the requirements originate. Similarly, in terms of consumption, we have identified the current warehousing requirement of brick-and-mortar stores and the E-tail segment.



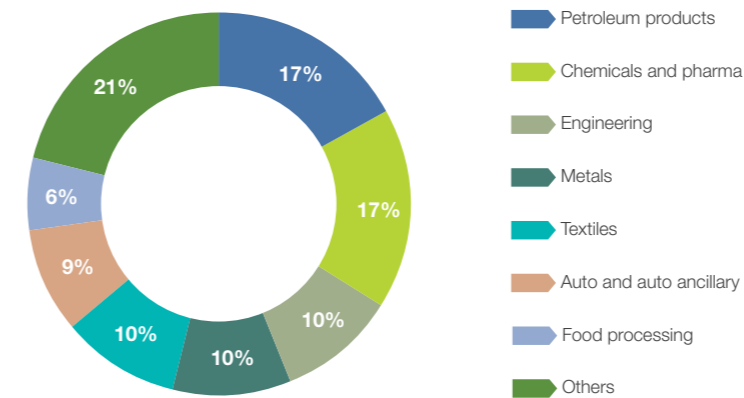
3.1 MANUFACTURING-LED DEMAND

The region is home to the first state government operated industrial estate namely Maharashtra Industrial Development Corporation (MIDC) Thane. This speaks clearly of the industrial progress in the Mumbai Metropolitan Region. In the recent period, however, the industrial activity in the city limits has given way to service sector activity. To assess the scope of manufacturing-led demand for warehousing, we have captured the length and breadth of manufacturing activity across the city that can be covered at a motorable distance of around four hours. This would mean manufacturing activity in important manufacturing clusters like Nashik, Pune, Valsad and Silvassa has also been taken in to account in our analysis.

At 17% each, chemicals and pharmaceutical and petroleum products contribute the biggest share of the manufacturing sector output in Mumbai. This is followed by the engineering, metals and textile sectors at 10% each. At 9% share in industrial output, the auto and auto ancillary industry follows closely.

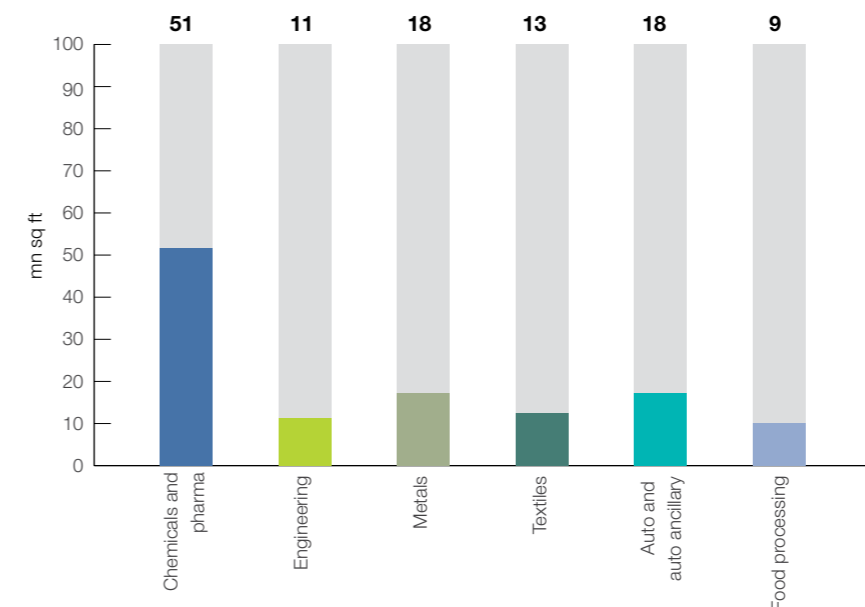
In terms of the resultant warehousing requirement, of the total manufacturing-led requirement, chemicals and pharmaceutical contributes the largest at 51 mn sq ft, followed by the auto and auto ancillary and metals sector at 18 mn sq ft each.

FIGURE 1
SHARE IN OUTPUT OF THE VARIOUS MANUFACTURING INDUSTRIES IN MUMBAI



Source: Annual Survey of Industries (ASI) and Knight Frank Research

FIGURE 2
WAREHOUSING SPACE REQUIREMENTS OF MAJOR MANUFACTURING INDUSTRIES IN MUMBAI



Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from ASI. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses

Source: Knight Frank Research

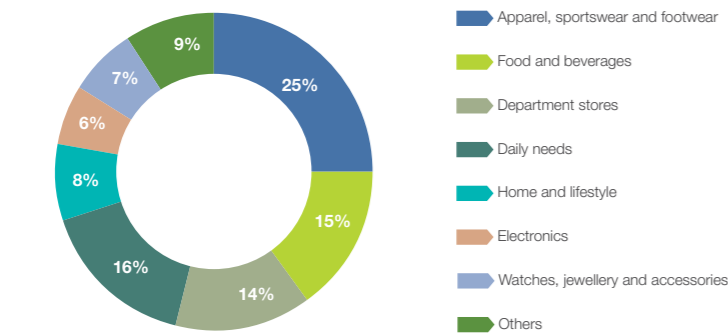
3.2 CONSUMPTION-LED DEMAND

Consumption-led demand for warehousing is driven by the demography of the catchment that it is expected to serve. As per our methodology, this is captured through retail spending not only through traditional brick-and-mortar stores, malls, shopping streets and mom-and-pop stores but also spending through the e-commerce medium. Hence, any type of consumer goods consumed within Mumbai, whether offline or online, is categorised in the retail spending.

Mumbai Metropolitan Region is amongst the most populated regions in the country and largely the demography is involved in the services sector occupation. Accordingly, this services sector demography has resulted into a booming consumption market in the city. The city has a vibrant consumer culture on the back of a large population and rapidly growing metropolitan area.

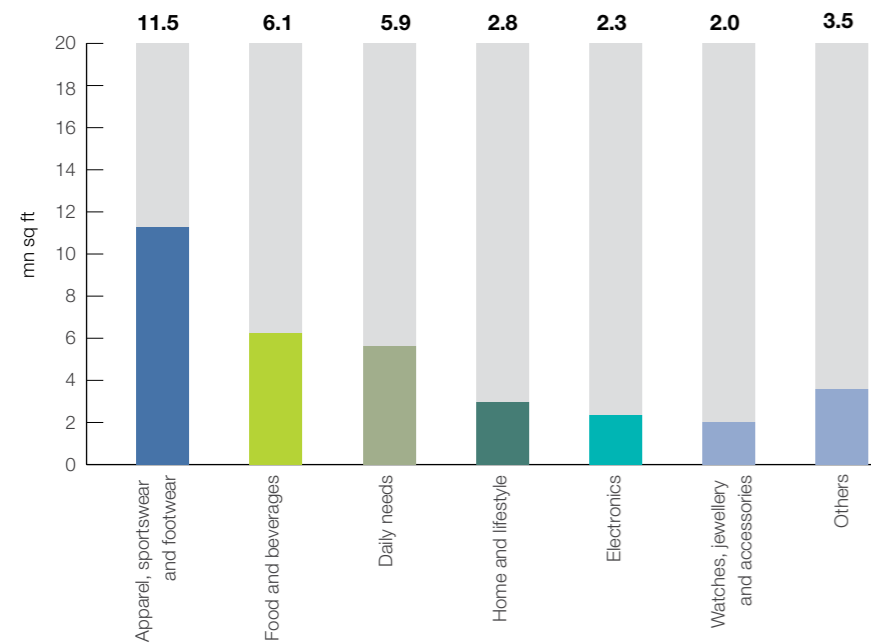
Apparel, sportswear and footwear is the biggest contributor of the retail spending followed by the daily needs category. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis. This is followed by the food and beverages and the department stores categories.

FIGURE 3
CATEGORY-WISE SPLIT OF RETAIL SPENDING IN MUMBAI



Source: Knight Frank Research

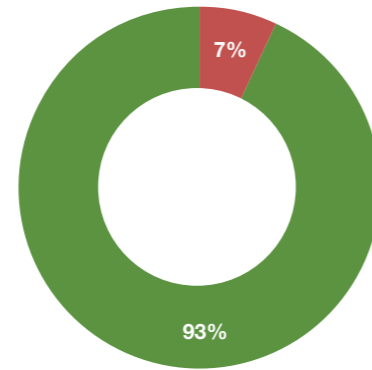
FIGURE 4
WAREHOUSING SPACE REQUIREMENTS FOR THE MAJOR RETAIL CATEGORIES IN MUMBAI



Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest consumption data. The food & beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

FIGURE 5
WAREHOUSING SPACE REQUIREMENTS BY E-TAIL AND BRICK-AND-MORTAR STORES



Brick-and-mortar stores E-tail

Source: Knight Frank Research

We have estimated the consumption-led warehousing requirement at 34 mn sq ft of which the apparel, sportswear and footwear category contributes 34%. The second largest contributor is the foods and beverages segment followed by the daily needs category. Further, with the emergence of the E-tail segment in the last few years, its share in the consumption led warehousing requirement stands at 7%. Going forward, we believe that the share of the E-tail sector will increase further in the total retail spending of consumers.

In terms of the geographical footprint, the Bhiwandi warehousing cluster has emerged as the top warehousing cluster for the retail facing companies like Raymond, Croma, Future Group, Shoppers Stop, and HyperCITY. Even the e-commerce firm, Flipkart, has taken up warehousing in this cluster. The proximity to the residential and office markets of Mumbai, Thane and Navi Mumbai make it a preferred choice amongst e-commerce firms, which are witnessing shrinking delivery timelines.

4. BHIWANDI WAREHOUSING CLUSTER

To the north-east of Mumbai is the Bhiwandi warehousing cluster. Encapsulating parts of Bhiwandi along the Old Agra Road and the National Highway-3 (Mumbai-Nashik Highway), the Bhiwandi warehousing hub is strategically located in the Mumbai Metropolitan Region (MMR).

The cluster is spread across locations like Kasheli, Kalher, Purna, Dapode, Mankoli, Vadape and Padgha. Since the demand drivers for all these warehouse locations are similar, we have clubbed the locations into a single warehousing cluster for the purpose of this report and named it the 'Bhiwandi warehousing cluster'. In the sections below, we have explained the primary demand drivers of warehousing space in this cluster, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook.

4.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

The warehouses in this cluster are a mix of new warehouses with modern facilities and old warehouses by unorganised players. Most warehouses on the Old Agra Road (Kalher, Kasheli, Purna) and Dapode Road are old developments with G+1 RCC structures that provide just 12-14 ft of vertical space for storage. These are primarily dominated by occupiers from textiles, pharmaceuticals and consumer durables. Occupiers from industries like consumer durables and electronics that carry high-value fragile cargo and do not require large

floor ceiling height prefer these RCC warehouses. Similarly, occupiers with a need for climate control through air coolers, for instance pharmaceuticals, prefer these structures.

Warehouses along the NH-3 can be categorised as modern warehouse complexes with sizes in excess of 1 mn sq ft. Mostly, warehouse parks of pre-engineered building (PEB) structures with supporting internal infrastructure can be found along this 20 km stretch from Mankoli to Padgha Toll Naka. Recent years have seen warehouse development with quality construction and support infrastructure comprising a sewage treatment plant, adequate internal roads for truck and trailer movement, fire-fighting equipment, parking and security.

This geographic advantage of proximity to the densely populated consumption markets of Mumbai, Thane and Navi Mumbai make the Bhiwandi warehousing hub a preferred choice of occupiers intending to serve the large consumption market of the MMR territory. As a result, a diversified set of consumer (B2C) oriented industries like retail, pharmaceutical, FMCG, textile and electronics have a presence in Bhiwandi. The need for reducing 'delivery time to consumer' makes it a preferred warehouse location in the MMR.

The other prominent use of this hub from the production/manufacturing side has been by the textile industry. With a significantly large number of power looms in the country, Bhiwandi has long been

the textile hub of the country. Locations like Kalher, Kasheli, Purna and Anjur have warehouses for textile companies.

Select warehouse operators

- Jai Bhagwan
- Renaissance Infra
- Indian Logistics Group
- Shree Sai Dhara
- Sumeet Logistics

4.2 LOCATION AND INFRASTRUCTURE

The Bhiwandi warehousing cluster is strategically located within the Mumbai Metropolitan Region (MMR). The warehouses are mainly concentrated on the Old Agra Road and the NH-3 (Mumbai-Nasik Highway). Kalher, Kasheli, Purna and Anjur on the Old Agra Road and the Mankoli to Padgha stretch of the NH-3 are the locations where warehouses are concentrated.

On account of Bhiwandi's good connectivity to a large part of the MMR, occupiers intending to serve the MMR consumption market prefer occupying a warehouse here. Bhiwandi is connected with Thane and Mumbai through the Old Agra Road and NH-3. It is connected with Navi Mumbai through NH-4 and the Thane-Belapur Road. JNPT, the country's largest container port, and Mumbai Port are at a maximum distance of 70 km from the Bhiwandi warehouse hub.

The Bhiwandi warehousing cluster has come up as an unplanned development

with a large number of projects being developed in village areas between the cities of Thane and Bhiwandi. Initially, the reason for these warehouse developments was that these locations were outside the Octroi Zone of both, the Thane Municipal Corporation and Bhiwandi Municipal Corporation. Warehouses that have come up in areas like Kalher, Kasheli, Purna, Anjur and Dapode are part of the villages on the Old

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM BHIWANDI WAREHOUSING CLUSTER

Distance from:	Km	Travel time in mins
Nariman Point	50 - 70	90 - 120
Bandra Kurla Complex	35 - 55	45 - 75
Andheri	35 - 55	70 - 90
Thane	10 - 35	20 - 45
Mumbai Port Trust	45 - 70	70 - 110
JNPT Port	50 - 70	60 - 120
Pune	150 - 170	180 - 210

Source: Knight Frank Research

Agra Road and hence regulated by gram panchayats of the respective village. As a result, the infrastructure development in terms of roads, water, sewerage and power was lagging. However, in recent years there has been an improvement in the quality of main roads like the Old Agra Road and Dapode Road. The Old Agra Road is a four-lane road and has got a divider that has improved traffic movement on the route. The supply of power, with a private enterprise Torrent Power, has witnessed a marked improvement in recent years.

The NH-3 (Mumbai-Nashik Highway) stretch has witnessed ample development of modern warehouse parks over the last five years. The 20 km stretch from Mankoli to Padgha Toll Naka is the most preferred stretch. The NH-3 is a well-built four-lane national highway. Besides, Bhiwandi has connectivity through the NH-4 (Mumbai-Pune Highway) and Mumbai-Ahmednagar Highway. Through the 23 km Chinchoti Anjur Phata Road, Bhiwandi is also connected with the NH-8 (Mumbai-Ahmedabad).

4.3 RENT AND LAND COST OF WAREHOUSES

As indicated in the adjoining table, the rent across the warehouse facilities in this cluster is in the range of ₹10–16/sq ft/month depending on the location within the cluster and quality of facility. Specifications beyond the generally prevalent terms in the market command rentals outside this range. The rent and land cost dynamics in this warehouse cluster are also influenced by the alternative development options.

Other terms of tenancy may also have a bearing on warehouse rents, specifically clauses related to the security deposit, rent escalation and lease tenure. The market practice for the security deposit is 4–6 months of rent. The rent escalation clause, which determines the quantum and frequency of rental increments, is usually 5% p.a. The market practice for lease tenure, i.e. the minimum period for which the landlord and tenant are bound to honour the occupancy, varies largely on a case-to-case basis, usually in

excess of five years.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/ month)	Land rate (₹ mn/ acre)
Mankoli	10 - 13	30 - 50
Vadpe	10 - 12	20 - 35
Padgha	12 - 16	10 - 20

Source: Knight Frank Research

4.4 COMPETITIVE ADVANTAGES

The biggest competitive advantage of the Bhiwandi warehouse hub is its proximity to the densely populated consumption hub of Mumbai, Thane and Navi Mumbai. This advantage makes it a preferred location for consumer oriented (B2C) companies that can serve the large MMR consumption market from their warehouse in Bhiwandi.

Warehouse occupiers are very sensitive to rentals and thus warehousing clusters that are in a position to offer affordable space would enjoy a competitive advantage over the others. With warehouse rentals in the range of ₹10–16/sq ft/month, Bhiwandi fares well. The rentals in Bhiwandi are significantly attractive in comparison to competing warehousing hubs like Panvel, that commands higher rentals of ₹17–25/sq ft/month. A significant size of the warehouse market, coupled with a large quantum of vacant space, implies that rentals will continue to remain affordable for a considerable time.

Availability of man power is another factor that lends competitive strength to the Bhiwandi warehouse hub. The MMR is a densely populated urban agglomeration and the presence of residential catchments, for all income groups in and around Bhiwandi, ensures an abundant supply of skilled, semi-skilled as well as unskilled workers.

The other advantage of this hub is its proximity to the country's largest container port, the Jawaharlal Nehru Port Trust (JNPT), as well as the Mumbai Port Trust. At a maximum distance of

70 km, transit time to the port is only two hours. Such proximity to the port attracts occupiers who import cargo from international production centres and set up a distribution centre in Bhiwandi. The imported container cargo is unloaded in Bhiwandi and then transported across the country.

4.5 CHALLENGES

The Bhiwandi warehouse market has its fair share of challenges that make it probably the most difficult market to comprehend. Being an unplanned warehousing cluster spread across several densely populated villages, the complexities of developing and operating a warehouse have also increased.

The first set of challenges arise on account of the land. Identifying warehouse projects with a clear land title is a big challenge in Bhiwandi. This challenge arises on account of improper land records, mainly in the hands of the local gram panchayat. The ideal size of a warehouse development is minimum 30 acres. On account of tiny and scattered land holdings in the hands of several villagers, identifying a contiguous land parcel of the relevant size for warehouse development is a challenge.

The other critical issue is that the land use is changing in favour of residential development. With rising population in the MMR, housing has received the top most priority for land development. While warehouse developments in this hub command ₹1,500–2,500/sq ft, residential prices are significantly higher in comparison to warehouse developments. In the neighbouring Thane city, the residential projects command ₹7,000–15,000/sq ft. Residential prices in the adjoining Kalyan hover at ₹5,000–7,000/sq ft. Even in dense warehousing locations on Old Agra Road, new residential projects fetch ₹3,000–4,000/sq ft. On account of such prices for the competing residential segment, land prices in this hub are being influenced and will stifle the growth of upcoming warehouse projects.

Another challenge in Bhiwandi arises on account of the warai charges that have to be borne by warehouse occupiers.

Warehousing activities like loading, unloading and stacking of cargo involve manual operations. An occupier may employ local labour/mathadi for this purpose or have its own employees to perform these activities. In either case, a warai charge has to be paid to the local labour union, wherein the charges are higher in case of not employing the locals. Most occupiers prefer employing their own staff to ensure uninterrupted and efficient performance of such activities.

Payable to the local labour union, warai or mathadi charges range between ₹0.50–2.00/sq ft/month calculated on the space leased by a warehouse occupier. It is an additional cost for occupiers and is payable over and above the rent and any other outgoings like maintenance, taxes and statutory levies. The warai charges in effect increase the cost of leasing a warehouse in Bhiwandi by 5–20% of the quoted rent thereby having an adverse impact on the cost competitiveness of

this hub.

Another set of challenges, applicable to organised/institutional players, is on account of the profile of a large number of warehouse developers operating in this hub. A large number of individuals and owners with small land holdings have built warehouses in Bhiwandi. Such unorganised players have return expectations as low as 8–12% for warehouse development projects. The reasons for underwriting projects at such a low internal rate of return (IRR) vary from lower opportunity cost of capital to non-compliance with statutory construction norms and poor construction quality. However, as a consequence, it becomes extremely difficult for institutional players to operate in this market at such sub-optimal return expectation given the associated risk.

4.6 OUTLOOK

From the pricing perspective, i.e. the

FEASIBLE LAND COST MATRIX IN THE BHIWANDI WAREHOUSING CLUSTER (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum			
	12%	14%	16%	18%
10	10	6	4	2
12	14	11	8	5
14	20	16	12	10
16	25	21	17	13

Note: The table presents 16 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 11 options which are possible to source in this warehousing cluster and are upward of the minimum prevailing land rate, which is ₹ 10 mn/acre in this cluster, have been highlighted in colour.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year 75%: Second year 100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

achievable rent or on-going land rates, this hub offers a range of options. With land rate as the most important determinant of warehouse financial feasibility, it is crucial to get it right to achieve success in a warehouse development project. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay in this cluster in order to achieve the expected returns in the range of 12–18% per annum, subject to the achievable rents. For example, with a return expectation of 14% per annum and an achievable rental value of ₹12/sq ft/month, the feasible land cost amounts to ₹11 mn/acre. In other words, investors can fetch a 14% per annum return only if they are able to purchase land at or below ₹11 mn/acre at present and lease it at ₹12/sq ft/month. As the purchase price of land goes higher, the realisable return

Being an unplanned warehousing cluster spread across several densely populated villages, the complexities of developing and operating a warehouse have also increased in Bhiwandi.

reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up. In terms of the characteristics, small standalone godowns will be shunned in favour of large warehouse parks with leasing area in excess of a million square feet bundled with support infrastructure and utilities. Occupiers prefer modern logistics and warehouse parks that provide support infrastructure to ensure hassle free and uninterrupted warehouse operations. This change in characteristic will gain momentum.

In terms of geography, currently the warehouses are mainly concentrated on the Old Agra Road and NH-3 locations falling between Thane city municipal

limit and Bhiwandi city municipal limit (locations like Kalher, Kasheli, Purna, Anjur, Dapode, Mankoli). However, the land use in these locations is now turning in favour of the residential segment. With residential development emerging as the most remunerative option for land development, new warehouse development will stifle on this stretch. Going forward the location that would emerge as a hub for new warehouse development would be the 15 km. stretch extending from Rajnoli (junction of NH-3 and Bhiwandi Kalyan Road) to Padgha until the toll point. The reasons for the emergence of this region as a promising alternative are varied. Besides land availability, through NH-3 (Mumbai-

Nashik) the region has good road connectivity with the MMR consumption centre. Further, being a region with poor suburban train connectivity will work in favour of warehouse developments. This is because residential markets flourish in locations with connectivity through mass rapid transport system (MRTS) which is the suburban train network in case of the MMR. With residential prices at a considerable premium to that of warehouses, land rates become unviable for warehouse developments. The relatively poor suburban train connectivity implies that warehouse developments will not be pitted against lucrative residential developments to secure land on this stretch.

plain vanilla storage structures. Such warehouses are concentrated around the Kalamboli Steel Market, Taloja MIDC and to a lesser extent along the Mumbai Goa Highway (NH-17) and the Mumbai Pune Highway (NH-4).

Select warehouse operators

- Singh & Chedda Logistics
- Jyoti Logistics
- CCI Logistics Park
- JWC Logistics
- Sumeet Logistics

5.2 LOCATION AND INFRASTRUCTURE

The Panvel warehouse cluster is located close to JNPT and a bulk of its logistics and warehousing facilities are geared to service container traffic and break bulk cargo. The container freight stations are concentrated primarily on JNPT Road, Mumbai Pune Highway and Mumbai Goa Highway that branch out from Palaspe Phata. CFS facilities have also seen growth along Chirner Road that is a part of the Virar-Alibaug corridor and in locations such as Kalambusare, Koproli and Kacherpada just south of the JNPT. The JNPT Road is a 25 km. stretch that begins at Palaspe Phata and ends at JNPT. It has the maximum number of CFS facilities among the three specified roads.

The port handles cargo traffic mostly originating from or destined for Maharashtra, Madhya Pradesh, Gujarat, Karnataka, as well as most of North India. This warehousing cluster lies at the confluence of Mumbai Goa Highway and Mumbai Pune Highway that directly connect it with major cities in Maharashtra, Goa, Karnataka, Kerala, Andhra Pradesh and Tamil Nadu. While these highways directly connect JNPT and the Panvel cluster with the southern states, the NH-8, NH-3 and the NH-222 connect them with Gujarat, Rajasthan, Uttar Pradesh, Madhya Pradesh and the National Capital Region through the northern ends of Mumbai.

The Panvel warehousing hub is very well served by the national highways around which logistics and warehousing

activity has evolved. Internal roads however do not meet the same quality, especially off the JNPT and Uran Road. These roads are in a poor condition and difficult to negotiate even by trucks in some cases. A significant number of internal roads are just two-lanes sans dividers, barely enough to let two trucks cross each other. This causes frequent traffic jams, delays and increases vehicle maintenance cost.

There is adequate power supply in this warehouse hub that has improved in recent years as the Maharashtra State Electricity Distribution Company (MSEDCL) now sources enough power to fulfil the needs of industries and warehouses in the Panvel hub. Water supply and sewerage are also significantly better compared to the Bhiwandi hub as ground water is extensively used.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM PANVEL WAREHOUSING CLUSTER

Distance from:	Km	Travel time in mins
Nariman Point	50 - 60	90 - 120
Bandra Kurla Complex	40 - 50	70 - 105
Andheri	50 - 60	105 - 140
Thane	50 - 55	100 - 120
Mumbai Port Trust	50 - 55	70 - 90
JNPT Port	5 - 25	15 - 30
Pune	110 - 140	140 - 180

Source: Knight Frank Research

5.3 RENT AND LAND COST OF WAREHOUSES

Rentals and land rates in the Panvel warehouse hub are governed primarily by the subject warehouses' proximity to the JNPT and Palaspe Phata. While the broad characteristics across the market stay the same, the proliferation of a residential market dictates land prices that see a declining trend going south of Palaspe Phata as this location forms the

fulcrum of all real estate activity in this market.

The Panvel warehouse hub caters to a broad range of warehousing facilities that service both ends of the quality spectrum. Fringe warehouses that are cost effective solutions for tenants are mostly located in Kalamboli and to a lesser extent in Taloja in the Taloja-Kalamboli cluster. These are characterised by G+1 RCC or PEB structures that might not have basic facilities like serviceable approach roads or security. Consequently these are used to house low value products for the metals and textile industry.

The highest priced warehouse products on offer in the Panvel cluster are located in the areas within a 5 km. radius of Palaspe Phata and locations on the JNPT, Uran and Chirner roads closer to the port. These are typically warehousing parks offering integrated logistics solutions that could include pick-up, packaging and delivery facilities. State-of-the-art construction quality with PEB structures having high ceilings (30-35 ft.), climate control, sewage treatment plants, adequate security and internal roads characterise these facilities and command a rental rate of INR.20-25/sq.ft.

Warehouses further away from the port command lower rentals. Also, on the Mumbai Pune Highway rentals progressively reduce as one moves further south on the highway in locations like Shedung, Bhokarpada and Khalapur. Similarly in case of Sawala Apta Road in locations towards Rasayani.

Warehousing facilities on the Mumbai Goa Highway are priced relatively higher than those on the Mumbai Pune Highway due to their proximity to the JNPT, the dearth of warehousing products on offer and the relative scarcity of land on this stretch of the highway. Any development can only take place on the Mumbai Goa Highway on a 7 km. stretch starting from Palaspe Phata due to the presence of the Karnala Bird Sanctuary beyond that boundary. Warehouse facilities are thus priced higher on the 4 km. stretch

5. PANVEL WAREHOUSING CLUSTER



To the east of Mumbai city is the Panvel warehousing cluster. Presence of the country's largest containerised traffic handling port JNPT adds to the identity of this warehouse cluster. The cluster comprises of locations branching out of Palaspe along the Mumbai Pune Highway, Mumbai Goa Highway, Chirner Road and Uran Road. Since the demand drivers for all these warehouse locations are similar, we have clubbed the locations into a single warehousing cluster for the purpose of this report and named it the 'Panvel warehousing cluster'. In the sections below, we have explained the primary demand drivers

of warehousing space in this cluster, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook.

5.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

The Panvel hub is dominated by industrial warehouses and container freight stations (CFS) due to its proximity to the Jawaharlal Nehru Port Trust (JNPT). Logistics and warehousing activity in the Panvel cluster gained prominence with the growth of container traffic passing through the JNPT that

was commissioned in 1989. The early nineties saw container freight stations and warehouses mushroom in the vicinity of JNPT as over half of India's container traffic was being handled by this port. Its dominance as the most viable port and Navi Mumbai's accessibility to major manufacturing destinations across India via the golden quadrilateral makes it one of the most preferred logistics and warehousing destinations.

Besides freight driven activity that demands logistics and warehousing facilities of a higher quality, the Panvel hub also contains warehouses that are

starting from Chirvat till the boundary of the Karnala Bird Sanctuary.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/ month)	Land rate (₹ mn/ acre)
Palaspe	20 - 25	30 - 50
Uran Road	17 - 22	25 - 40

Source: Knight Frank Research

5.4 COMPETITIVE ADVANTAGES

The single largest advantage that supports the Panvel warehouse hub's growth is its proximity to the JNPT. The fact that more than half of India's container traffic is routed through this port virtually cements its position as the one of the strongest warehousing hubs in India as nearly all containerised exim cargo requires CFS or warehouse facilities. This also enables it to command significantly higher rental and occupancy levels than Mumbai's only other major warehouse cluster of Bhiwandi. Efficient access to most container traffic destinations via the national highway network (Mumbai Pune Expressway, Old Mumbai Pune Highway, Mumbai Goa Highway) is also a critical factor aiding this market's growth.

A large portion of the Panvel warehousing hub has always been under the jurisdiction of CIDCO and has aided

in building sustainable infrastructure in terms of roads, power and water availability. The fact that the CIDCO's geographical boundaries have been extended to envelope the entire hub enhances its prospects further. The focus of the DMIC and DFC projects on the JNPT will only boost the attractiveness of this market. Abundant availability of skilled and unskilled labour in Navi Mumbai and the absence of specific local labour issues like the payment of a "Warai" charge that is commonplace in the Bhiwandi market also makes logistics and warehousing activity in Panvel more attractive.

5.5 CHALLENGES

In spite of the fundamental factors that support the growth of a thriving warehouse hub, the Panvel cluster has its fair share of challenges. The announcement of the Special Economic Zone in 2002 and the upcoming Navi Mumbai airport, led to Panvel and its surrounding locations being touted as the next big residential hub. Unavailability of viable land for warehousing and its spiralling prices due to a burgeoning residential market that has kept spreading its boundaries are by far the most pressing issues in this cluster.

Prices in residential projects within a 3 km. radius of Palaspe Phata have crossed INR. 5,000/ sq.ft. while nearby residential markets like Kharghar and Kamothe are priced even higher.

Residential projects have started coming up as far as Khalapur on the NH4. Land owners are more tempted to partner with residential developers who offer quicker returns compared to warehouse operators in which case the pay-out is more spread out over time. Over the years, the growing residential market has pushed land prices up especially in locations close to Palaspe Phata, while rentals have not gone up at the same pace due to a lull in the market. The relative paucity of contiguous land and fragmented land holdings also pose challenges in identifying viable land for development.

5.6 OUTLOOK

From the pricing perspective, i.e. the achievable rent or on-going land rates, this hub offers a range of options. With land rate as the most important determinant of warehouse financial feasibility, it is crucial to get it right to achieve success in a warehouse development project. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay in this cluster in order to achieve the expected returns in the range of 12-18% per annum, subject to the achievable rents. For example, with a return expectation of 14% per annum and an achievable rental value of ₹18/sq ft/month, the feasible land cost amounts to ₹26 mn/acre. In other words, investors can fetch a 14% per annum return only if they are able to purchase land at or below ₹26 mn/acre at present and lease it at ₹18/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

Assumptions

Construction cost (₹/sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year 75%: Second year 100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

The Panvel warehousing hub represents the higher end of logistics and warehousing facilities in the Mumbai market and is continuously evolving as a greater number of logistics parks bring about consolidation of warehousing activities. As occupiers increasingly prefer outsourcing their logistics and warehousing operations to third party experts and demand seamless operations, the market will continue to see growth in terms of sheer volume and improved operations. The anticipated rise in container traffic in the JNPT port will consequently result in an increase in demand for logistics and warehousing activities in the Panvel cluster.

The land-use is largely favourable for industrial and warehouse development in the Panvel hub. The 25 km. stretch on the JNPT Road between the JNPT and Palaspe Phata is peppered with CFS facilities and as land rates have gone up, there is comparatively less scope for further development there as commercial viability is an issue. The last 5-7 years have seen high quality warehouses come

up in a 5 km. radius from Palaspe Phata but it is unlikely that further warehouse development will come up in this area as land owners here will favour residential development due to the more lucrative proposition that it represents. The enhanced Sion Panvel Highway, planned introduction of fast trains on the harbour line and increasing the frequency of train services on the Diva-Panvel-Somatane route are among the infrastructure developments that will vastly reduce travel time to Mumbai's business districts and encourage residential developments here. The unviability of land prices closer to Palaspe Phata will push warehouse development further south towards the periphery of the Mumbai Goa Highway where land prices are still feasible enough to support a business case for this property type.

FEASIBLE LAND COST MATRIX IN THE PANVEL WAREHOUSING CLUSTER (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum			
	12%	14%	16%	18%
16	25	21	17	13
18	31	26	21	18
20	36	31	26	21
22	43	35	30	25
24	47	40	34	29

Note: The table presents 20 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 14 options which are possible to source in this warehousing cluster and are upward of the minimum prevailing land rate, which is ₹ 25 mn/acre in this cluster, have been highlighted in colour.

Source: Knight Frank Research

The unviability of land prices closer to Palaspe will push warehouse development further south towards the periphery of the Mumbai-Goa Highway, where land prices are still feasible to support a business case for this property type

**NATIONAL
CAPITAL
REGION (NCR)**



1. MAJOR WAREHOUSING CLUSTERS IN NCR

Historically, warehousing activities in NCR have been concentrated in the peripheral areas of New Delhi, such as Alipur, GT Road, Kapashera, Bamnoli, Dhulsiras and Okhla, with godown-type structures dominating the landscape. As land prices became unfeasible for such activities, they slowly started shifting outside the Delhi border. In the southern region, markets such as Kherki Daula and Manesar on NH-8 started attracting warehousing activities, while Kundli and Sonapat on NH-1 in the northern region developed as alternative markets. Similarly, NH-91, NH-24 and NH-58 near Ghaziabad became attractive for

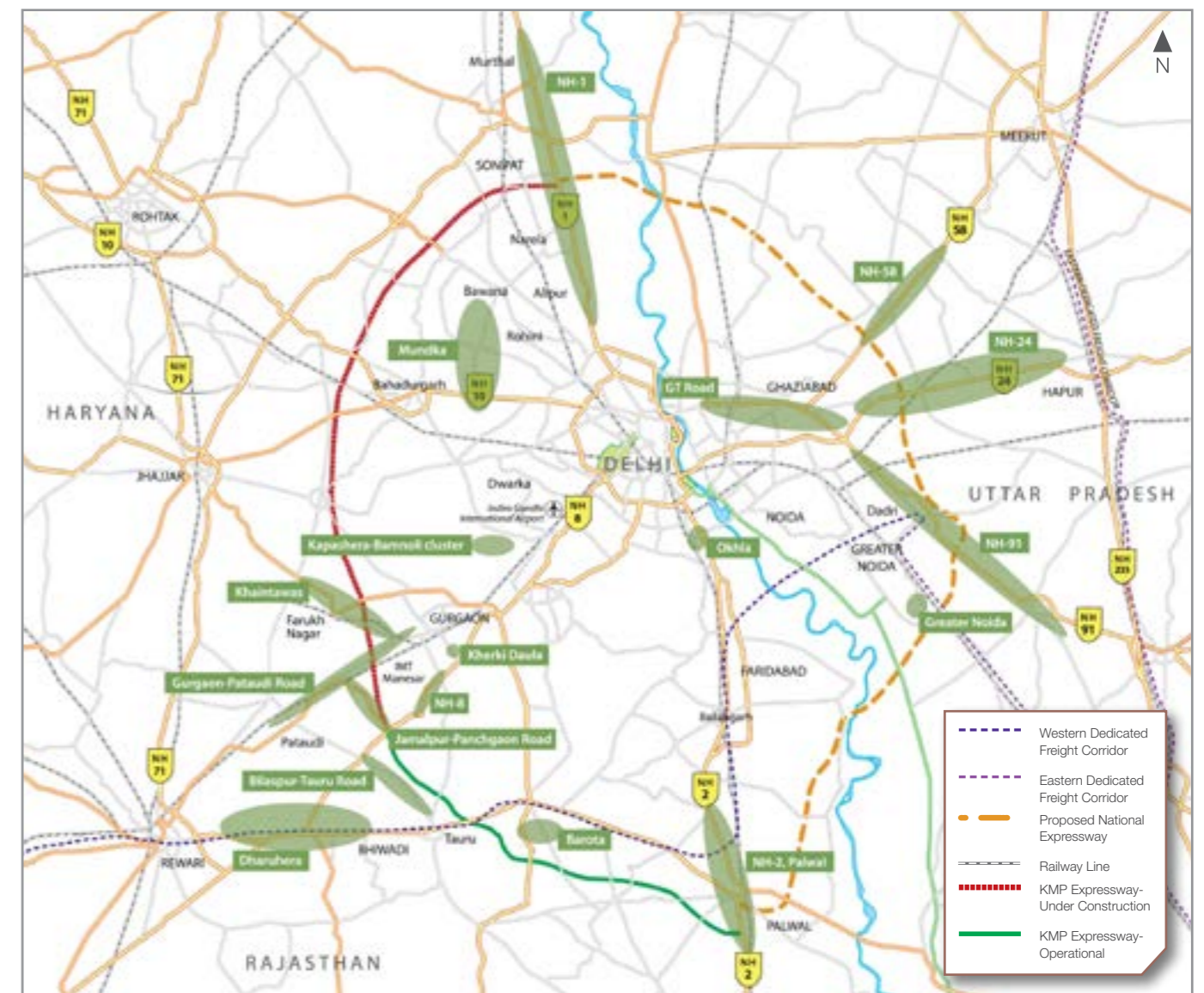
warehousing activities as land prices on GT Road became unviable.

Over the last ten years, with residential and commercial development mushrooming on the NH-8 stretch, warehousing activities have gradually shifted towards locations on the internal roads of Haryana. These locations are just off the main national highway but well connected to it. Locations such as the Gurgaon-Pataudi road, Jamalpur-Panchgaon road, Bilaspur-Tauru road and Barota have witnessed a phenomenal growth in terms of warehousing space over the last decade. Similarly, Dharuhera on NH-8 and Palwal on NH-2

have observed massive warehousing development in recent years.

For the purpose of this report, we have classified the various warehousing markets into two major clusters: NH-8 cluster and Ghaziabad cluster, based on factors such as geographical location, proximity to the national highway, access to the Delhi city centre and distance from the major manufacturing hubs. Since these two clusters collectively account for the majority of the warehousing space demand in the NCR market, the rest of the locations have been classified into the 'Others' category.

MAJOR WAREHOUSING LOCATIONS IN NCR



CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

Warehousing cluster	Major warehousing locations
NH-8 cluster	Dharuhera, Gurgaon-Pataudi road, Jamalpur-Panchgaon road, Bilaspur-Tauru road, Barota, Kherki Daula, Palwal and other such areas accessible from NH-8 and NH-2
Ghaziabad cluster	Ghaziabad, Dadri and other such areas accessible from NH-24, NH-91 and NH-58
Others	Alipur, Kundli, Sonipat, Murthal and Mundka

Source: Knight Frank Research

2. SNAPSHOT OF MAJOR WAREHOUSING CLUSTERS IN NCR

	NH-8 cluster	Ghaziabad cluster
Major roads	NH-8 and NH-2	NH-91, NH-24 and NH-58
Connectivity	Connects to various ports in western India and the industrial belt of the Delhi-Mumbai Industrial Corridor (DMIC)	Connects to various ports in eastern India and the industrial belt of the Eastern Dedicated Freight Corridor (Eastern DFC)
Infrastructure	NH-8 is a six-lane national highway with flyovers and service lanes at all the major junctions.	NH-91 is a 2x2 ill-maintained road with vehicular and pedestrian congestion, leading to traffic snarls.
	NH-2 is a four-lane highway and witnesses frequent traffic congestion.	The NH-24 Hapur-Ghaziabad stretch is a 2x2 good quality road with a host of educational institutes.
	The expressway between Manesar and Palwal, which is part of the Kundli-Manesar-Palwal (KMP) Expressway, connects NH-8 and NH-2.	The NH-58 Ghaziabad-Meerut Road is a 2x2 good quality road with a host of old residential developments along the highway.
Demand drivers: major manufacturing sectors	Auto and auto ancillary, metals, textile and engineering	Food processing, metals, chemicals and pharmaceuticals
Demand drivers: consumption/retail sector	Delhi, Gurgaon and Faridabad	Delhi, Ghaziabad, Noida, Greater Noida and Faridabad
Warehousing space requirement from manufacturing sector	94 mn sq ft	57 mn sq ft
Warehousing space requirement from consumption/retail sector	30 mn sq ft	34 mn sq ft

Select warehouse operators	Ashiana Logistics, IndoSpace, Acorn Warehouses & Logistics Parks, Adani Group, Value Logistics	Satvik Logistics, Good Luck Warehouse, Future Warehouse Solutions, Lord Balaji Warehousing, Om Kiran Warehouse Complex
Rental value range (₹/sq ft/month)	12 - 21	14 - 20
Land cost range (₹ mn/acre)	25 -40	20 - 40
Competitive advantages	Proximity to the most industrialised region in NCR. More than 43% of NCR's manufacturing activity is located within a two-hour drive from this cluster.	Proximity to the manufacturing hubs of Ghaziabad, Faridabad and Sonipat. 42% of NCR's manufacturing activity is located within a two-hour drive from this cluster.
	Easily accessible to the two most important retail markets in NCR- Gurgaon and Delhi. Gurgaon and Delhi together account for more than 86% of the total retail spending in NCR.	Proximity to the densely populated consumption hubs of Ghaziabad, Delhi, Noida and Greater Noida. These hubs together account for 95% of the total retail spending in NCR.
Challenges	Rapid urbanisation, leading to unviable land rates for warehousing activity.	Frequent traffic congestion due to poor infrastructure and densely populated urban areas
		Takes significant time to convert land use from agriculture to industrial/warehousing
		Rapid urbanisation leading to unviable land rates for warehousing activity.
		Quality of internal roads starkly inferior compared to the national highways. This restricts the opening up of new land parcels for warehousing activities.

3. TOTAL REQUIREMENT FOR WAREHOUSING SPACE

Currently, NCR's total requirement for warehousing space is estimated to be 223 mn sq ft, of which more than 80%, or 187 mn sq ft, is from the manufacturing sector. However, the majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses. Although the trend of leasing a warehouse rather than owning it is steadily picking up with the emergence of third-party logistics players (3PL), it is still at a nascent stage compared to developed markets such as Europe and the US. These 3PL players, such as Safexpress, Blue Dart, TCI and Future Supply Chain, among others, provide end-to-end logistics services, including a common warehousing facility, to multiple

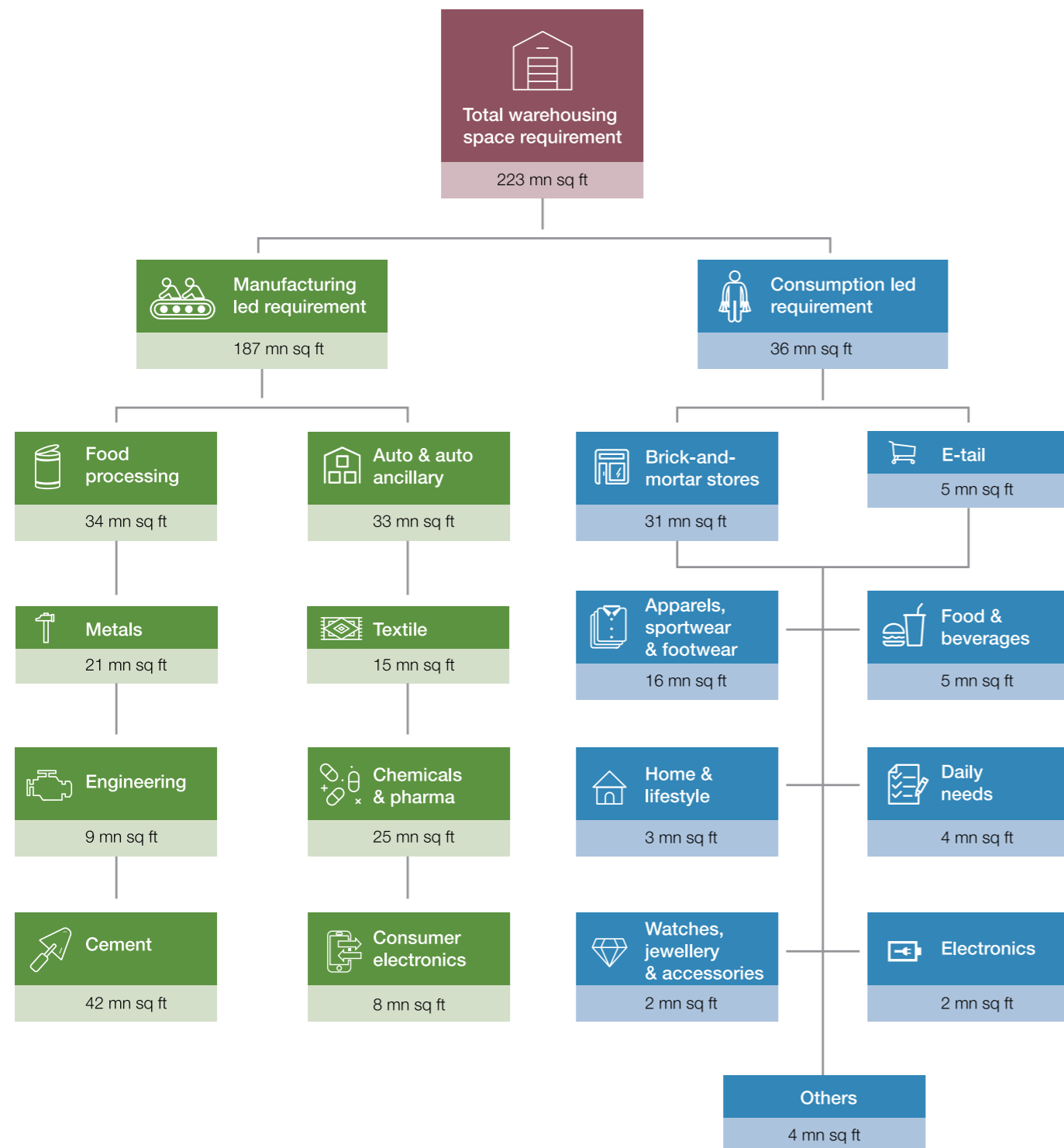
manufacturers, thereby reducing the need to have a separate warehouse. Such a leasable market in NCR is currently estimated to be in the range of 100-120 mn sq ft. However, the share of annual transacted volume is approximately 7 mn sq ft.

With the Goods and Service Tax (GST) set to become operational, the need for captive warehouses will reduce further. We believe that a large number of manufacturers will outsource their logistics and warehousing requirements and focus on their core operations. This will create an additional demand for leasable warehousing space in NCR in the coming years.

In contrast to the manufacturing-led

requirement for warehousing space, consumption-led requirement is mostly for leasable space, with very few operators fulfilling their needs through a captive warehouse. This is primarily due to the need to have a fulfilment centre as close to the urban area as possible in order to ensure quick delivery. Over the last ten years, this segment has witnessed a renewed traction, especially in the E-tail sector. As the time between placing an order and delivery has shrunk drastically with the advent of the E-tail sector, the need for warehousing space has also increased significantly. With the share of E-tail expected to rise steadily in the coming years, we estimate the demand for warehouses from this segment to increase proportionately as well.

TOTAL REQUIREMENT FOR WAREHOUSING SPACE IN NCR



Note I: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses.

Note II: The food and beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

Source: Knight Frank Research

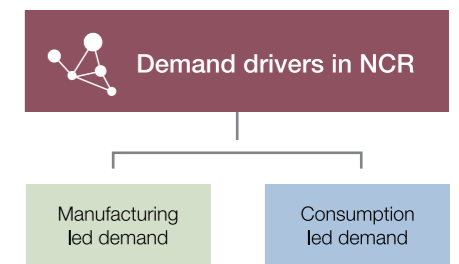
4. DEMAND DRIVERS OF WAREHOUSING SPACE IN NCR

The primary demand drivers of warehousing space in NCR can be broadly classified into two categories: manufacturing-led demand and consumption-led demand. The demand from the manufacturing sector arises predominantly due to the distance between the manufacturer's factories, raw material suppliers and the consumption markets of the final goods. The need to store the raw materials or final goods due to this distance, determines the amount of space required by each manufacturer. The quantum of space required is also dependent on the type of product that is manufactured. Hence, each manufacturer will have a different requirement for space, depending on these factors.

Consumption-led demand, which is an equally important demand driver for warehousing space, is largely dependent on population, income level and the propensity to spend. The changing dynamics of the retail industry has resulted in the business model of a retailer becoming heavily dependent on a smooth and efficient supply chain network. In addition to this, the advent of E-tail in recent years has necessitated the need for huge warehouses close to urban centres in order to deliver in the shortest possible time. Such factors have brought the warehousing industry to the forefront of the retail business and compelled retailers to focus on this segment.

In the following sections, we have

identified the key manufacturing industries in NCR, their current warehousing requirement, the major manufacturing hubs and the various regions within NCR from where the requirements originate. Similarly, in terms of consumption, we have identified the major product categories, their current warehousing requirements and important consumption clusters in the region.



4.1 MANUFACTURING-LED DEMAND

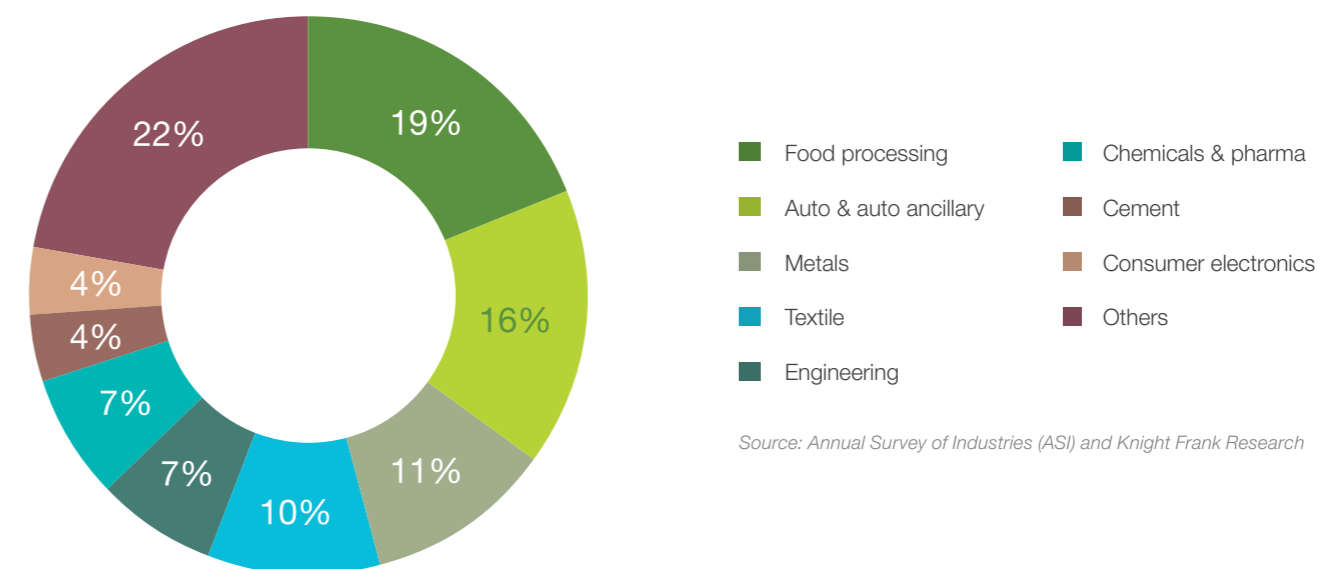
NCR is one of the largest manufacturing hubs in the country and accounts for the majority of the production activity in north India. Food processing, which includes dairies, rice mills, sugar mills, confectionaries, and alcoholic and non-alcoholic beverages, among others, has the largest share in the output in NCR. This is followed by the auto and auto ancillary and metals industries.

However, in terms of the requirements for warehousing space, the cement sector leads with more than 42 mn sq ft. As discussed earlier, the quantum and type of warehousing space required for each manufactured product is different. Additionally, each industry follows a different inventory cycle, which influences the amount of space required to a great extent. Hence, despite the cement sector contributing just 4% of NCR's total output, its warehousing

space requirement is the highest. The cement sector accounts for 23% of the total warehousing requirement from the manufacturing-led demand.

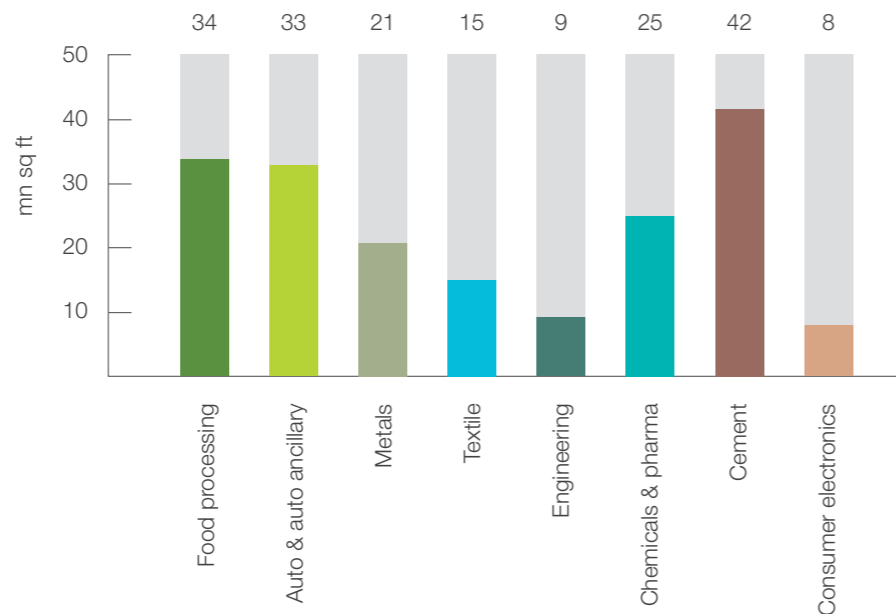
The other big demand drivers for warehousing space in NCR are the food processing, auto and auto ancillary, chemicals and pharmaceutical sectors. Just the top four sectors account for more than 70% of the total warehousing space requirement of the region.

SHARE IN OUTPUT OF THE VARIOUS MANUFACTURING INDUSTRIES IN NCR



Source: Annual Survey of Industries (ASI) and Knight Frank Research

WAREHOUSING SPACE REQUIREMENTS OF MAJOR MANUFACTURING INDUSTRIES IN NCR



Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from ASI. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses.
 Source: Knight Frank Research

Manufacturing activities are concentrated largely in the southern and north-eastern parts of NCR. Currently, the NH-8 and NH-2 clusters in the southern region and the NH-24, NH-91 and NH-58 clusters in the north-eastern region together account for 85% of the total manufacturing activity within NCR. This is one of the primary reasons for which most of the existing warehouses operate from one of these clusters. While Delhi, NH-1 and NH-10 also have various

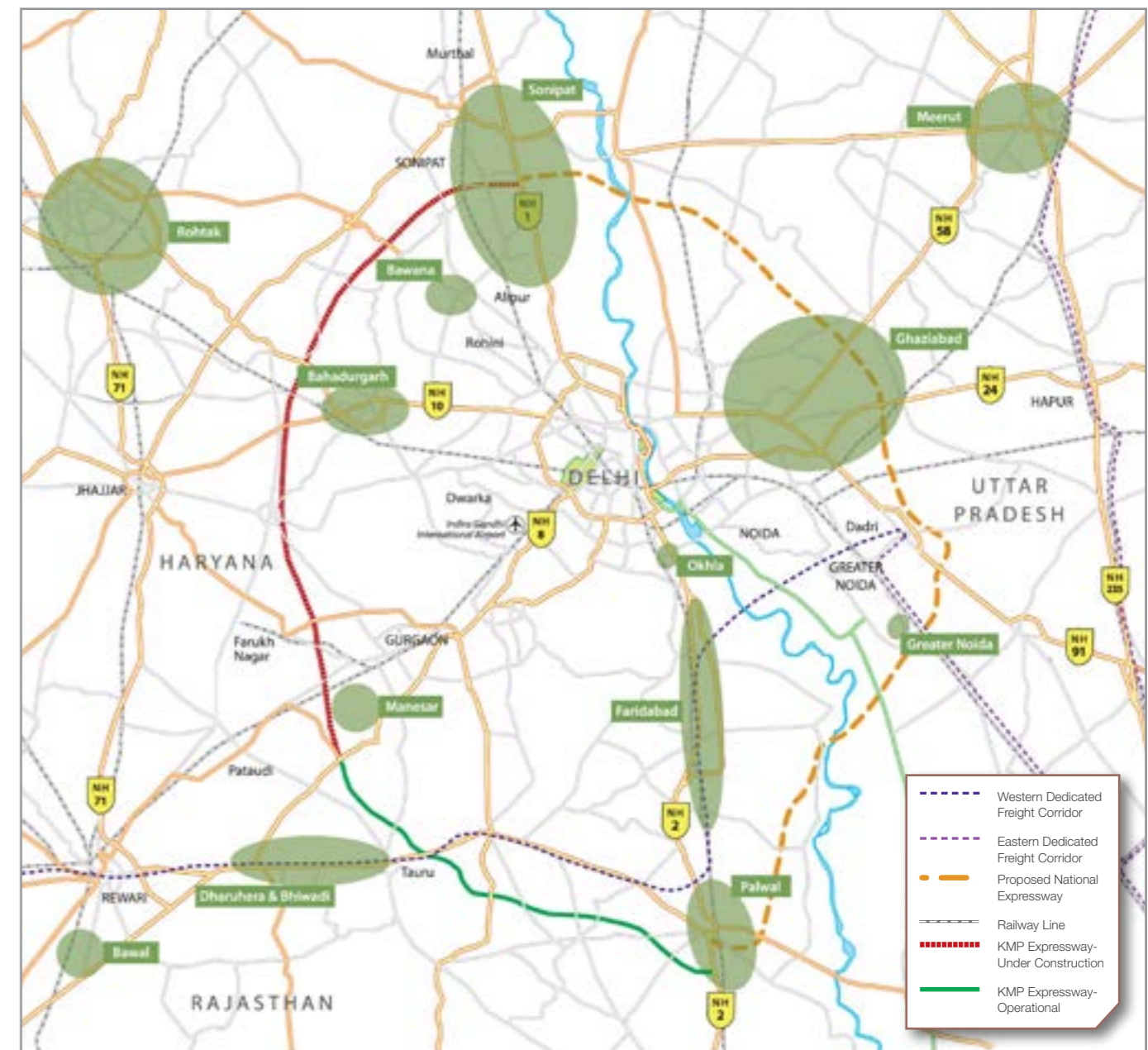
manufacturing units, their share in NCR's total production output is considerably lower than the other regions.

The factors clearly indicate that the demand for manufacturing-led warehousing space in NCR will be concentrated primarily in the NH-8 and Ghaziabad clusters, with sectors such as auto and auto ancillary, cement, chemicals and pharmaceuticals and food processing leading in terms of this demand.

Manufacturing Cluster	Industrial areas
Delhi	Industrial areas within Delhi, such as Narela, Okhla, Bawana and Rohtak Road, among others
NH-8 & NH-2	Industrial areas accessible from NH-8 and NH-2, such as Manesar, Bhiwadi, Neemrana, Faridabad and Palwal, among others
NH-1 & NH-10	Industrial areas accessible from NH-1 and NH-10, such as Sonapat, Panipat, Bahadurgarh and Rohtak, among others
NH-24, NH-91 & NH-58	Industrial areas accessible from NH-24, NH-91 and NH-58, such as Ghaziabad, Dadri and Meerut, among others

Currently, NCR's total requirement for warehousing space is estimated to be 223 mn sq ft, of which more than 80%, or 187 mn sq ft, is from the manufacturing sector. However, the majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses. Such leasable market in NCR is currently estimated to be in the range of 100-120 mn sq ft. However, the share of annual transacted volume is approximately 7 mn sq ft.

MANUFACTURING CLUSTERS WITHIN NCR

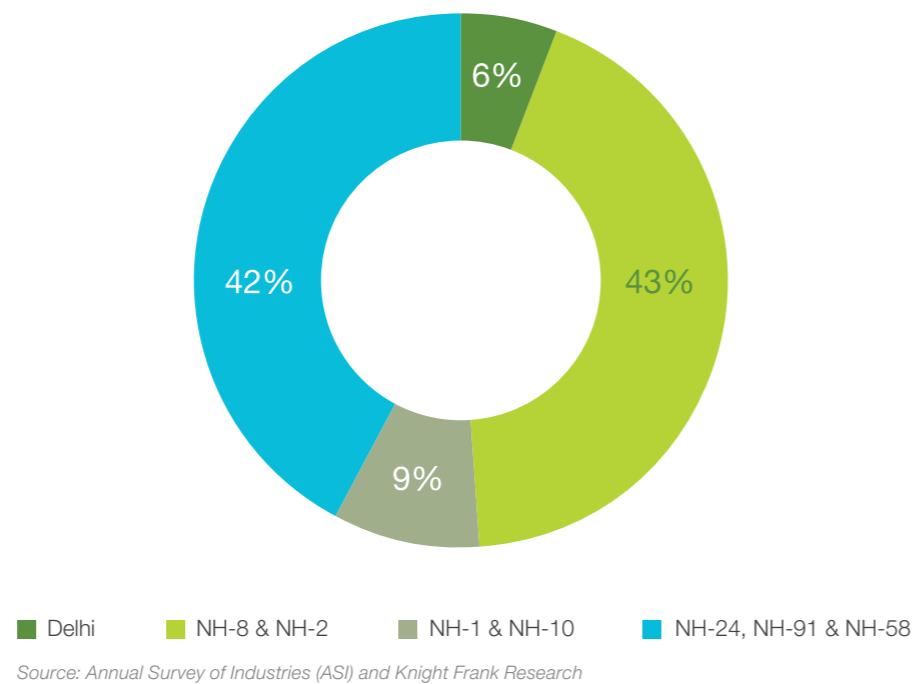


MAJOR MANUFACTURING CLUSTERS IN NCR

Manufacturing activities are concentrated largely in the southern and north-eastern parts of NCR. Currently, the NH-8 and NH-2 cluster in the southern region and the NH-24, NH-91 and NH-58 cluster in the north-eastern region together account for 85% of the total manufacturing activity within NCR. This is one of the primary reasons for which most of the existing warehouses operate from one of these clusters. While Delhi, NH-1 and NH-10 also have various manufacturing units, their share in NCR's total production output is considerably lower than the other regions.

These factors clearly indicate that the demand for manufacturing-led warehousing space in NCR will be concentrated primarily in the NH-8 and Ghaziabad clusters, with sectors such as auto and auto ancillary, cement, chemicals and pharmaceuticals and food processing leading in terms of this demand.

Share in output of each manufacturing cluster within NCR



The E-tail sector has emerged as a major driver for the incremental warehousing space requirement in recent years and currently accounts for 14% of the total space requirement of the consumption-led demand. While brick-and-mortar stores still lead in terms of space requirement, at 31 mn sq ft, the E-tail segment contributes upto 5 mn sq ft. However, we estimate space requirement from the E-tail segment to increase by 60%, to more than 8 mn sq ft by 2020.

4.2 Consumption-led demand

In terms of retail spending, NCR is the largest market in India with Delhi, Gurgaon and Noida contributing the most. This retail spending not only includes traditional brick-and-mortar stores, malls, shopping streets and mom-and-pop stores but also accounts for the spending by consumers through the e-commerce medium. Hence, any type of consumer goods consumed within NCR, whether offline or online, is categorised in the retail spending.

Among the various product categories, apparel, sportswear and footwear together have the highest share, at 43%, in the total retail spending in NCR. Thus, even in the warehousing space requirement, this category contributes the most, at 14 mn sq ft or 38%. Other prominent product categories include food and beverages, department stores and daily needs. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis. Just the top four categories account for more than 80% of the total warehousing space requirement in NCR.

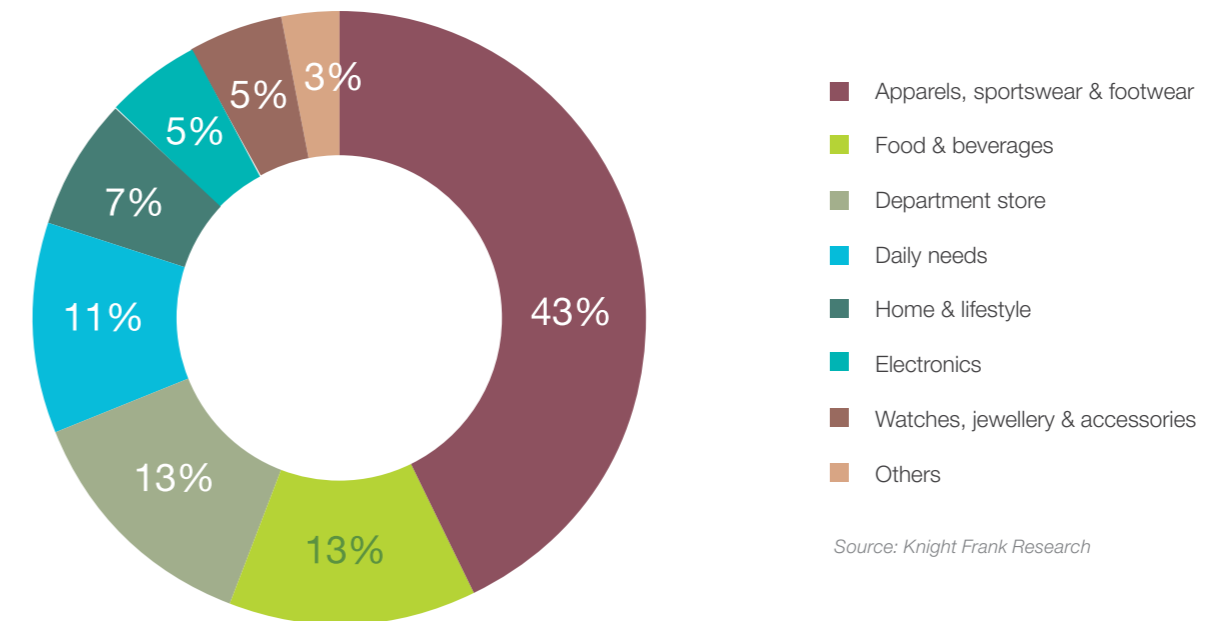
The E-tail sector has emerged as a major driver for the incremental warehousing space requirement in recent years and

currently accounts for 14% of the total space requirement of the consumption-led demand. While brick-and-mortar stores still lead in terms of space requirement, at 31 mn sq ft, the E-tail segment contributes upto 5 mn sq ft. This is significant, considering that until just a few years ago, this entire segment was non-existent.

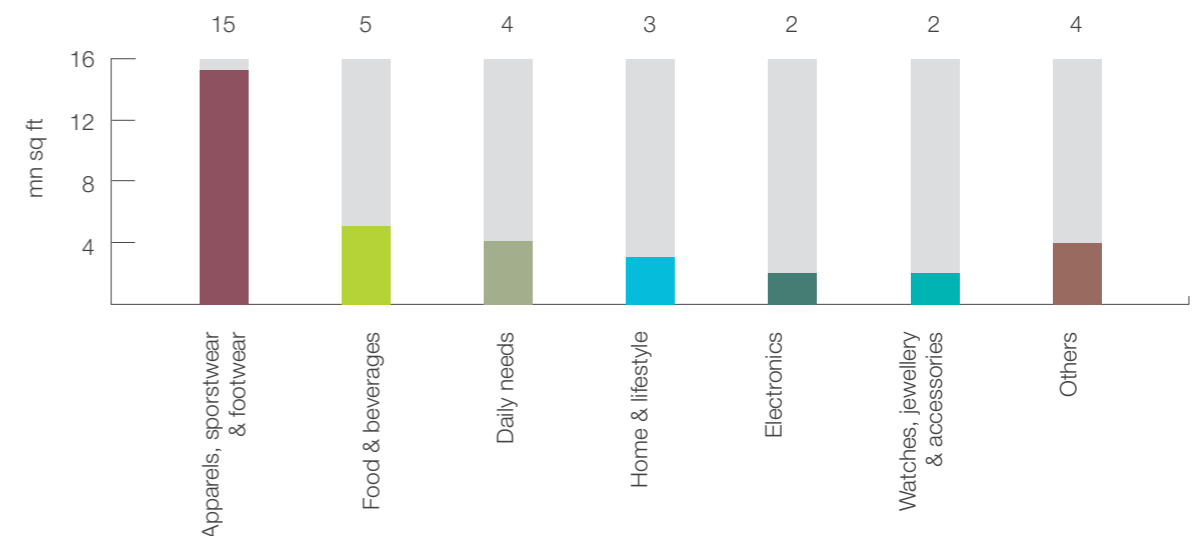
While the boom in the E-tail sector may have eaten into the market share of the brick-and-mortar stores to a great extent, our analysis indicates that the advent of this segment has expanded the overall consumption pie and led to a substantial increase in the urban consumers' propensity to spend. Hence, the warehousing space requirement by the E-tail segment is largely the incremental demand for space and not just a replacement of the demand for space by brick-and-mortar stores.

Going forward, we believe that the share of the E-tail sector will increase further in the total retail spending of consumers. This will invariably lead to a higher demand for warehousing space from this segment in the coming years. As per our estimates, the warehousing space requirement from the E-tail segment will increase by 60%, from the current 5 mn sq ft to more than 8 mn sq ft by 2020.

CATEGORY-WISE SPLIT OF RETAIL SPENDING IN NCR



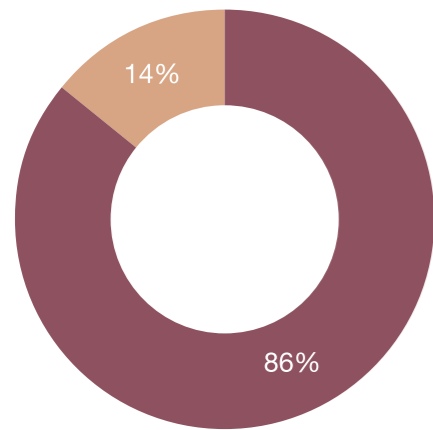
WAREHOUSING SPACE REQUIREMENTS FOR THE MAJOR RETAIL CATEGORIES IN NCR



Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. The food and beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

Source: Knight Frank Research

WAREHOUSING SPACE REQUIREMENTS BY E-TAIL AND BRICK-AND-MORTAR STORES



■ Brick-and-mortar stores ■ E-tail

Source: Knight Frank Research

The NCR market can be further classified into five sub-markets — Delhi, Gurgaon, Faridabad, Noida and Greater Noida, and Ghaziabad — for the purpose of gauging the consumption-led demand. Delhi, the largest sub-market among these, accounts for 75% of NCR's population. However, it contributes to more than 80% of the total retail spending in the region. This is primarily due to the higher level of per capita income and the greater propensity to spend among Delhi's residents.

The above analysis indicates that the

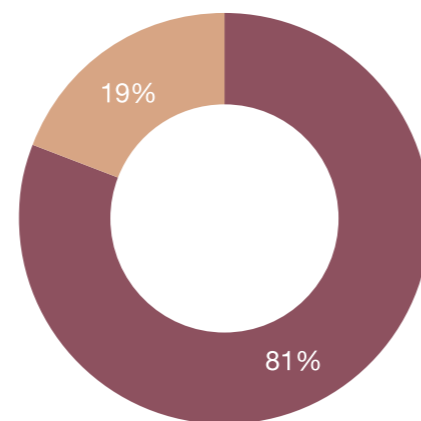
majority of the warehouses in NCR will have to be located in areas that have easy access to Delhi, with minimal time to deliver products. This opens up the potential for all the major entry points into Delhi to be developed as warehousing hubs, be it NH-8 and NH-2 in the south, NH-1 in the north, NH-10 in the west and NH-24, NH-91 and NH-58 in the east. Currently, all these clusters have warehousing activities in some or the other form. However, NH-8 has the highest concentration of such warehouses, which are driven by consumption-led demand.

CLUSTER-WISE POPULATION SPLIT IN NCR



Source: Census 2011

SHARE OF EACH CONSUMPTION CLUSTER IN RETAIL SPENDING IN NCR



■ Delhi ■ Others including Gurgaon, Noida, Greater Noida, Ghaziabad and Faridabad

Source: Knight Frank Research

5. NH-8 WAREHOUSING CLUSTER

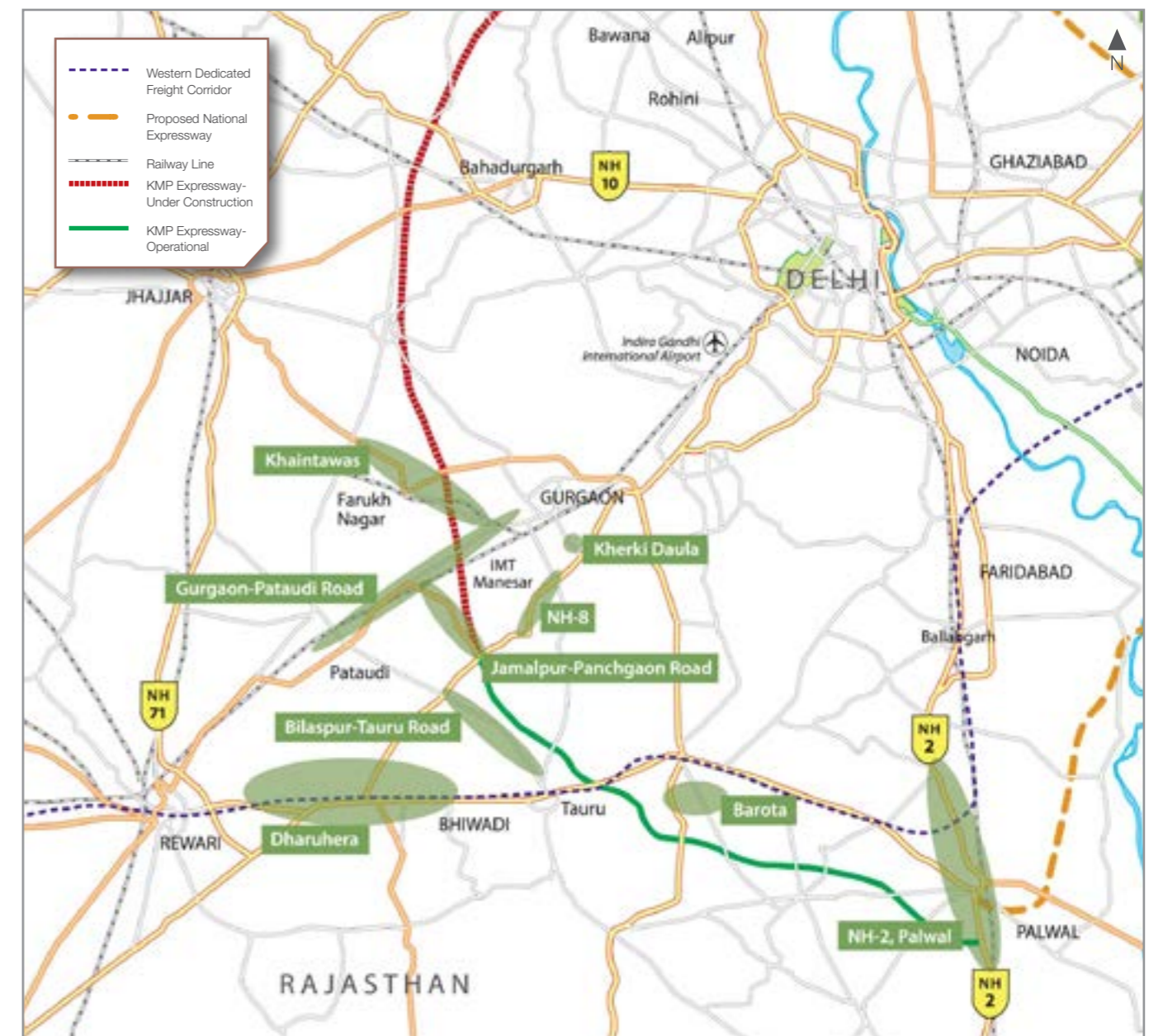
National Highway 8 (NH-8) and National Highway 2 (NH-2) are the two most important roads that connect NCR to the western and central regions of India. Apart from providing direct access from NCR to Jawaharlal Nehru Port Trust (JNPT), one of the busiest ports in the country, NH-8 is also connected to other important ports in Gujarat. Additionally, most of the industrial areas in Haryana and Rajasthan are concentrated along these highways. These factors have resulted in NH-8 becoming one of the busiest national highways in the country

over the last few decades.

Factors such as easy connectivity to NCR, access to the major industrial areas of Haryana and Rajasthan and direct port connectivity have led to a huge demand for warehousing space along these roads. Apart from the massive development of warehouses on either side of the national highway, locations such as Gurgaon-Pataudi road, Jamalpur-Panchgaon road, Bilaspur-Tauru road and Barota have witnessed an unprecedented construction of warehouses in recent

years. Since the demand drivers for all the warehouse locations along NH-8 and NH-2 are similar, we have clubbed these locations into a single warehousing cluster for the purpose of this report and called it as the 'NH-8 warehousing cluster'. In the following sections, we have explained the primary demand drivers of the warehousing space in this cluster, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook.

NH-8 WAREHOUSING CLUSTER



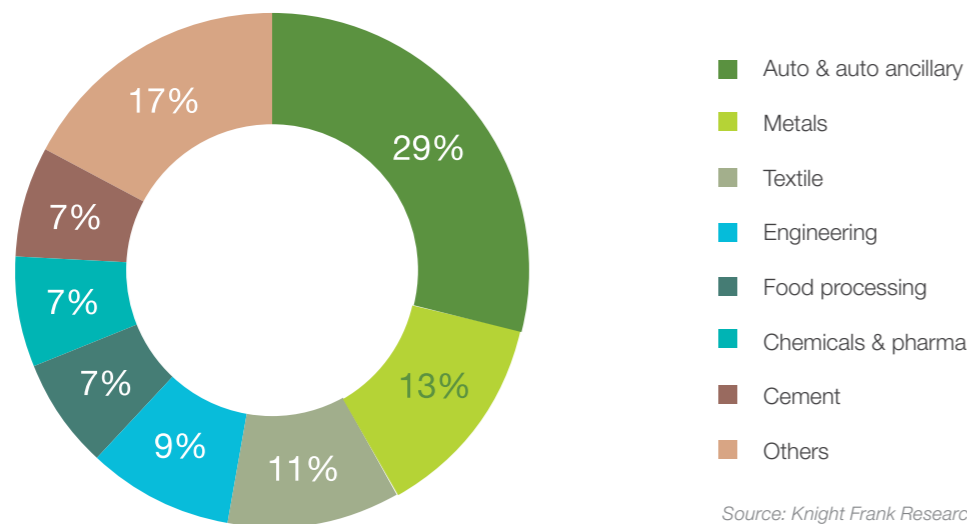
5.1 DEMAND DRIVERS OF WAREHOUSING SPACE IN THE NH-8 CLUSTER

The demand drivers of warehousing space in this cluster can be broadly classified into two sub-segments: manufacturing-led demand and

consumption-led demand. Of the two categories, the manufacturing-led demand accounts for the lion's share due to the massive concentration of industrial activity along these routes. Within the manufacturing segment, the auto and auto ancillary sector leads in terms of output, with auto majors such as Maruti

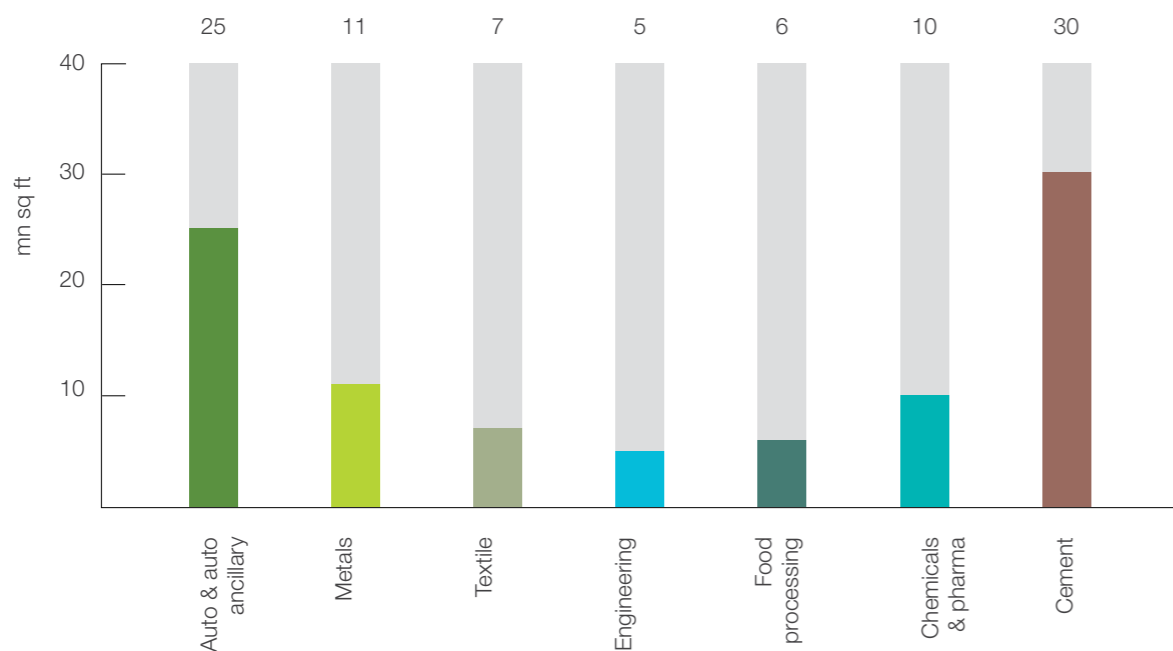
Suzuki, Honda Motorcycle & Scooter and Hero MotoCorp having their plants located within this cluster. Among the other manufacturing industries, the metals, textile and engineering sectors constitute a major portion of the output, followed by food processing, chemicals and pharmaceuticals, and cement.

SHARE IN OUTPUT OF VARIOUS MANUFACTURING INDUSTRIES IN THE NH-8 CLUSTER



Source: Knight Frank Research

WAREHOUSING SPACE REQUIREMENT OF MAJOR MANUFACTURING INDUSTRIES IN THE NH-8 CLUSTER



Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from ASI. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses.

Source: Knight Frank Research

The demand for warehousing space is closely linked to the type of manufacturing industries that are serviced through them. Hence, despite the auto and auto ancillary sector accounting for the largest share in terms of output within this cluster, it is the cement industry that requires the maximum warehousing space. Currently, the estimated requirement of warehousing space in this cluster by the cement sector is 30 mn sq ft, followed by the auto and auto ancillary sector, at 25 mn sq ft. The total warehousing space requirement from the manufacturing sector is in excess of 94 mn sq ft.

Apart from the manufacturing sector, there is also a very strong demand for warehousing space from the retail sector. The retail sector primarily includes all the consumption-led products, such as grocery, FMCG products, apparel, consumer durables and furniture, among others, which are consumed by end users. This also includes the demand serviced by online players, such as Flipkart, Snapdeal, Pepperfry and Big Basket. Since the NH-8 and NH-2 warehousing clusters are located in close proximity to the major consumption centres of NCR such as Delhi and Gurgaon, there is an inherent demand for warehouses from such companies and their dealers.

Currently, Delhi and Gurgaon account for more than 86% of the total retail spending in NCR. This means that upto 86% of NCR's retail market can be serviced through the warehousing cluster on NH-8. As per our estimates, the total requirement of warehousing space originating from consumption-led demand in this cluster is 30.6 mn sq ft, including 4.4 mn sq ft from the E-tail segment.

5.2 TYPES OF WAREHOUSES AND MAJOR PLAYERS

Warehouses in locations such as Gurgaon-Pataudi road, Jamalpur-Panchgaon road, Bilaspur-Tauru road and Barota are relatively recent constructions. Most of the development on these roads comprises pre-engineered building

(PEB) type structures with 24-foot clear height and basic infrastructure such as power backup, ample parking space, fire-fighting equipment and insulation, among others. Some of the prominent occupiers are Lifestyle Home Centre, Arvind Brands, Amazon, TCI, Gati KWE and Fedex. However, most of the warehouses in Kherki Daula and certain parts of NH-8 are old godown-type structures with minimal amenities and poor infrastructure.

Currently, most of the incremental demand comes from E-tail sector companies that not only require adequate clear height within the warehouse for multi-level stacking of products, but also look for added amenities such as power backup, fire-fighting equipment and enhanced security. This has resulted in the majority of the new warehouses being constructed to adhere to such standards and move away from the traditional godown-type structure.

Select warehouse operators

Ashiana Logistics

Indospace

Acorn Warehouses & Logistics Parks

Adani Group

Value Logistics

5.3 LOCATION AND INFRASTRUCTURE

The NH-8 warehousing cluster can be divided further into two sub-markets based on their access from the two major roads: NH-8 and NH-2. NH-8 is a six-lane national highway starting from Delhi and passing through the most industrialised regions of country – Gurgaon, Jaipur, Ahmedabad, Vadodara, Surat and Vapi. The road finally connects to Mumbai and JNPT through NH-4. Apart from being the busiest national highway, it is also a part of the upcoming Delhi-Mumbai Industrial Corridor (DMIC).

Despite passing through Gurgaon, one of the most urbanised areas in the

country, NH-8 seldom witnesses traffic congestions due to the provision of flyovers and service lanes at all the major junctions. Although the majority of the warehouses are located on the internal roads of NH-8, the travel time from these roads to the highway is less than 15 minutes due to their excellent quality. This ensures seamless road connectivity between the various warehousing markets located in this cluster and the industrial areas situated along this route. Additionally, the Delhi city centre can be reached within a travel time of about 60-100 minutes from most of the warehouses located in this cluster.

NH-2, which connects Delhi and Faridabad to central and eastern India, is a relatively narrower four-lane highway and witnesses frequent traffic congestion. The presence of various manufacturing units along the highway makes it difficult for a smooth flow of traffic. However, the recently inaugurated expressway between Manesar and Palwal, which is part of the Kundli-Manesar-Palwal (KMP) Expressway, has reduced the travel time between NH-2 and NH-8 significantly. The effective travel time has reduced to less than 60 minutes from the earlier 100-120 minutes. This has brought the various manufacturing units and warehouses located on NH-2 considerably closer to NH-8, thus narrowing the difference between the two warehousing clusters.

Warehouses located on the NH-8 cluster can service the two major consumption markets in NCR (Delhi and Gurgaon) within 100 minutes. Additionally, all the major industrial hubs located close to NH-8 and NH-2 can be accessed within two hours. However, servicing the industrial hubs of Ghaziabad, Bahadurgarh, Bawana, Sonipat and Rohtak from this cluster may exceed two hours and could extend upto three hours in certain cases. In addition to this, the transport of goods through Delhi in large commercial vehicles is taxed heavily and there is a strict restriction on their entry time. Such factors make these industrial hubs located on the northern and eastern part of NCR even more inaccessible from NH-8 and NH-2.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM WAREHOUSING CLUSTERS ON NH-8 AND NH-2

Distance from	km	Travel time in mins
Delhi City Centre (Connaught Place)	40 - 80	60 - 100
Gurgaon city centre (DLF CyberCity)	22 - 60	28 - 90
IMT Manesar	5 - 65	10 - 80
Dharuhera & Bhiwadi industrial belt	5 - 55	10 - 70
Bawal industrial area	28 - 100	30 - 100
Neemrana industrial area	52 - 120	50 - 130
Faridabad industrial belt	24 - 95	36 - 100
Palwal industrial area	5 - 80	10 - 90
Ghaziabad industrial belt	80 - 100	130 - 150
Bahadurgarh industrial cluster	40 - 110	60 - 140
Bawana industrial area	60 - 100	100 - 170
Sonipat industrial area	82 - 120	120 - 180
Rohtak Industrial cluster	70 - 90	140 - 160

Source: Knight Frank Research

5.4 RENT AND LAND COST OF
WAREHOUSES

Currently, warehouses that are closer to Gurgaon or located on the national highways are quoting the highest rental values. As we move away from the national highways towards the internal roads, the rental values reduce, based on the distance and travel time taken from the national highways. Also, warehouses located away from the urban centres

(Gurgaon and Faridabad) have lower rents, primarily due to the relatively lower cost of land in such areas. However, there are certain other factors that could influence the rental values, apart from the location and cost of land. Technical aspects, such as floor strength, fire safety equipment, power back-up, security, common amenities and quality of approach road, among others, have a direct bearing on the rent of the property.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Quoted rent (₹/sq ft/month)	Quoted land rate (₹ mn/acre)
NH-8	16 – 19	30 – 40
Gurgaon-Pataudi Road	12 – 17	28 – 40
Jamalpur-Panchgaon Road	15 – 21	30 – 40
Bilaspur-Tauru Road	14 – 18	30 – 40
Barota	11 – 14	25 – 35
Dharuhera	12 – 17	25 – 40
NH-2, Palwal	15 – 18	30 – 40

Source: Knight Frank Research

5.5 COMPETITIVE ADVANTAGES

The biggest competitive advantage of this warehousing cluster is its proximity to the most industrialised region in NCR. More than 40% of NCR's manufacturing activity is located within a two-hour drive from this cluster. Additionally, the concentration of auto companies in this region accentuates the need for warehouses to be located in the vicinity to their plants. This is primarily to service these auto plants in a minimum time period, as most of them follow the 'just-in-time' inventory system.

Another advantage is the ease of access to the two most important retail markets

in NCR- Gurgaon and Delhi. Gurgaon and Delhi together account for more than 86% of the total retail spending in NCR and hence, it becomes imperative for retailers to have their warehouses located as close to their target market as possible. Moreover, with the emergence of E-tail, the delivery time from the warehouse to the customer has shrunk to under three hours. In order to cater to such demand, it becomes necessary for E-tailers to have a warehouse within a driving distance of 60-90 minutes. Since the city centre of Delhi and Gurgaon can be reached within a time frame of 30-90 minutes from most of the warehousing markets situated in this cluster, it gives the cluster an edge.

Currently, the estimated requirement of warehousing space in the NH-8 warehousing cluster by the cement sector is 30 mn sq ft, followed by the auto and auto ancillary sector, at 25 mn sq ft. The total warehousing space requirement from the manufacturing sector is in excess of 94 mn sq ft.

5.6 CHALLENGES

The biggest challenge of this warehousing cluster is the rapid urbanisation that this region has witnessed over the last ten years. This has inherently led to an exponential rise in land rates, thereby making most of the locations unviable for warehousing business. This is primarily because the appreciation in rental values has significantly lagged the increase in land prices. While developers that had previously purchased land at low rates are able to survive, any new development at the current costs seems unviable.

Going forward, if the current pace of residential and commercial development continues, we believe that even the existing warehousing players may convert their land into more lucrative uses, such as residential or commercial. This could push the future development of warehouses further south on the national highways or deeper into the interiors of Haryana. The downside of such a scenario is the likely increase in driving time and delays in servicing the target segment due to the poor quality of roads and infrastructure in these regions.

5.7 OUTLOOK

NH-8 is expected to further consolidate its position as a manufacturing hub with the development of the Delhi-Mumbai Industrial Corridor (DMIC) along this route. Additionally, the presence of various automobile majors will continue to attract auto ancillary and engineering sector companies. With rising land rates and unaffordable rentals, warehouses are expected to gradually move towards the various internal roads in Haryana and the periphery of the highway.

Warehouse rents on locations such as NH-8, NH-2 near Palwal, and Jamalpur-Panchgaon Road within the NH-8 warehousing cluster have already moved beyond ₹15/sq ft/month and are quoting as high as ₹21/sq ft/month in certain cases. Such high rentals have already rendered warehousing activity for certain manufacturing industries unviable, and any further rise in rents could push the remaining occupiers towards alternative cheaper locations. Going forward, the rapid development of residential and commercial projects in the vicinity could threaten the feasibility of warehouse operations in certain locations of this cluster, such as Manesar and pockets of Gurgaon - Pataudi

Road. Such developments could lead to a sharp appreciation of land prices in the adjoining localities and this could push up the rental expectations of land owners even further.

Since land cost is the most critical component of warehousing development, it influences the realisable returns to a great extent. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay in this cluster in order to achieve the expected return in the range of 10%-16% per annum, subject to the achievable rents. For example, with a returns expectation of 14% per annum and an achievable rental value of ₹18/sq ft/month, the feasible land cost amounts to ₹26 mn/acre. In other words, investors can fetch a 14% per annum return only if they are able to purchase land at or below ₹26 mn/acre at present and lease it at ₹18/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

FEASIBLE LAND COST MATRIX IN THE NH-8 WAREHOUSING CLUSTER (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum				
	10%	12%	14%	16%	18%
12	18	14	11	8	5
14	25	20	16	12	10
16	31	25	21	17	13
18	37	31	26	21	18
20	43	36	31	26	21

Note: The table presents 25 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 10 options which are possible to source in the NH-8 warehousing cluster and are upward of the minimum prevailing land rate, which is ₹ 25 mn/acre in this cluster, have been highlighted.
Source: Knight Frank Research

Currently, most of the locations within the NH-8 cluster are feasible for warehousing activities at the prevailing land rates, subject to a minimum achievable rental value of ₹14/sq ft/month. However, rental values below this level may not even fetch returns of 10% per annum to the investors at the current land prices.

For investors to achieve returns upwards of 14% per annum, it is imperative that the land acquisition cost does not exceed ₹26 mn/acre and that it can be leased out at a minimum rental value of ₹18/sq ft/month. Considering the current market scenario, only certain locations, such as NH-8, Jamalpur-Panchgaon Road, Bilaspur-Tauru Road and NH-2 near Palwal are able to command a rental value upwards of ₹18/sq ft/month. However, the prevailing market price of land in these locations is higher than ₹30 mn/acre, thereby rendering them unfeasible for the 14% per annum investor return.

In order to achieve returns upwards of 14% per annum, investors will have to consider new locations within the NH-8 warehousing cluster where the land acquisition cost is minimal, and is well connected to the national highway through a good quality 40-60 foot road. Locations that fit these criteria will be able to attract occupiers. We believe that the NH-71 stretch between Rewari and Jhajjar offers such an opportunity for future development. Although this stretch is located further away from NH-8, the driving time to most of the manufacturing hubs located near the highway is less than 90 minutes due to the good quality 2x2 roads on this stretch. Additionally, the Delhi city centre can be reached within 120 minutes from here. Hence, based on these factors, we believe that the NH-71 stretch between Rewari and Jhajjar will witness considerable warehousing development in the coming years.

In order to achieve returns upwards of 14% per annum, investors will have to consider new locations within the NH-8 warehousing cluster where the land acquisition cost is minimal, and is well connected to the national highway through a good quality 40-60 foot road. Locations that fit these criteria will be able to attract occupiers. We believe that the NH-71 stretch between Rewari and Jhajjar offers such an opportunity for future development.

Assumptions

Construction cost (₹/ sq ft) 1,200

Ground coverage 57%

Rental escalation per annum 5%

Occupancy 50%: First year

75%: Second year

100%: Third year onwards

Debt funding 80% of construction cost

Interest rate 12%

Tax rate 30%

Cap rate 10%

6. GHAZIABAD WAREHOUSING CLUSTER

To the east of the National Capital Region (NCR) are the warehousing markets of National Highway 24 (NH-24) and National Highway 91 (NH-91). Spread around Ghaziabad, the gateway to the densely populated state of Uttar Pradesh, this cluster predominantly comprises markets along the Ghaziabad–Dadri stretch on NH-91, the Ghaziabad–Hapur belt on NH-24 and the Ghaziabad–Meerut

stretch on NH-58. Besides, warehouses can also be identified in parts of GT Road and Greater Noida.

Since the demand drivers for all these warehouse locations are similar, we have clubbed the locations into a single warehousing cluster for the purpose of this report and named it the ‘Ghaziabad warehousing cluster’. In the sections

below, we have explained the primary demand drivers of warehousing space in this cluster, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook.

GHAZIABAD WAREHOUSING CLUSTER

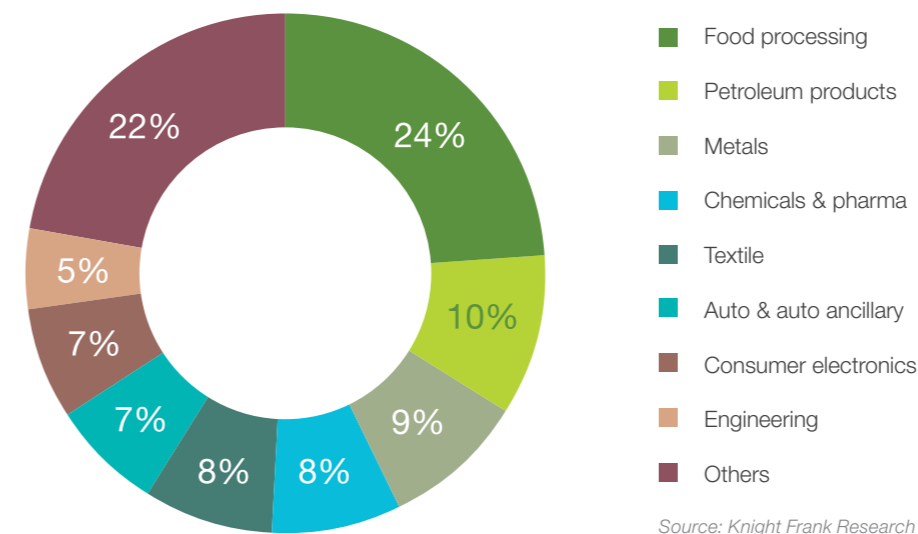


6.1 DEMAND DRIVERS OF WAREHOUSING SPACE IN THE GHAZIABAD CLUSTER

The demand drivers of warehousing space in the Ghaziabad cluster can be broadly classified into two sub-segments: manufacturing-led demand and consumption-led demand. Of the two categories, the manufacturing-led demand accounts for the lion's share due to the massive concentration of

industrial activity along these routes. In the manufacturing segment, the food processing sector leads in terms of output, with food processing and dairy product firms, such as Mother Dairy and Amul Dairy, having their plants in this cluster. The food processing industry accounts for a quarter of the industrial output. This is followed by other manufacturing industries, such as petroleum, metals, chemicals and the pharmaceutical sector.

SHARE IN OUTPUT OF VARIOUS MANUFACTURING INDUSTRIES IN THE GHAZIABAD CLUSTER



The Ghaziabad cluster accounts for 42% of the manufacturing sector output across NCR – only marginally lower than the 43% share of the NH-8 and NH-2 clusters. The prominence of such manufacturing sector activity creates the demand for warehousing space depending on the nature of the cargo and the target delivery timelines of the supply chain.

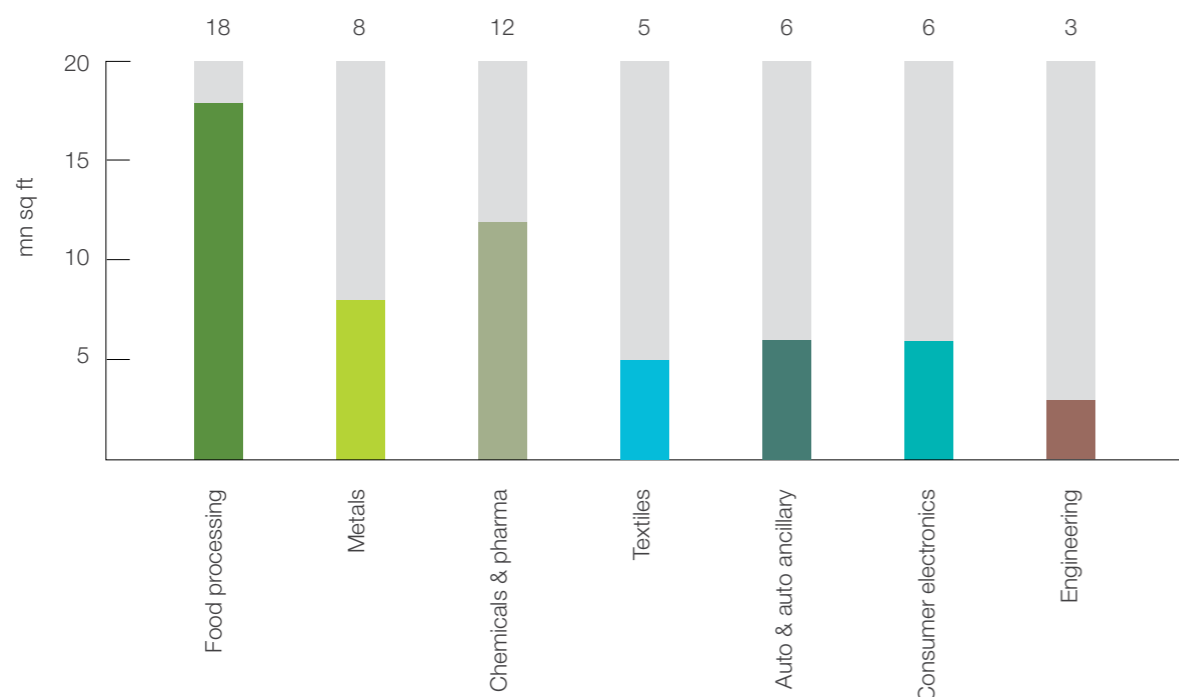
Knight Frank Research estimates the warehousing requirement from the manufacturing sector to be 57 mn sq ft in the Ghaziabad cluster. The food processing sector accounts for 31% or 18 mn sq ft of the manufacturing-led market due to the agrarian landscape and the presence of numerous dairies and ancillary activities in the cluster. The dairy products ecosystem has been created

with companies manufacturing products such as milking machines, milk testing equipment, butter churners, cream separators and milk analysers.

The chemical and pharmaceutical sector is the second largest occupier of warehouses in the cluster, with a warehouse market size of 12 mn sq ft or 21% of the manufacturing-led market. Companies such as Dabur, Century Laminating, Modi Paints and Simbhaoli Sugars are present in the cluster and are involved in the production of medicines, plywood, paints, alcohol, industrial chemicals and gases, among others. The warehousing demand composition favours the metals, auto and auto ancillary, consumer electronics, textiles and engineering sectors.

Knight Frank Research estimates the warehousing requirement from the manufacturing sector to be 57 mn sq ft in the Ghaziabad cluster. The food processing sector accounts for 31% or 18 mn sq ft of the manufacturing-led market due to the agrarian landscape and the presence of numerous dairies and ancillary activities in the cluster.

WAREHOUSING SPACE REQUIREMENT OF MAJOR MANUFACTURING INDUSTRIES IN THE GHAZIABAD CLUSTER



Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from ASI. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer’s plant or company-owned warehouses.

Source: Knight Frank Research

Besides the manufacturing sector, consumption-led warehousing requirement is also prevalent in this market. The consumption-led demand emanates from the storage requirement of product categories ranging from apparel, food and beverages (F&B),

electronics, and home and lifestyle. Such warehousing demand across NCR is estimated to be around 36 mn sq ft, which also includes 5 mn sq ft by e-tail players such as Flipkart, Snapdeal and Amazon. However, the most accessible consumption centres that can be

serviced from the Ghaziabad cluster are Ghaziabad, Noida, Greater Noida and Delhi. Together, these markets account for a warehouse requirement of 32 mn sq ft, which includes the e-tail demand of 4.3 mn sq ft.

6.2 TYPES OF WAREHOUSES AND MAJOR PLAYERS

The warehouses in this cluster are a mixed bag of old warehouses by unorganised players and those with modern facilities. The warehouses at the beginning of the Ghaziabad–Dadri stretch on NH-91 are primarily old structures from the unorganised sector. The amenities and construction quality of these old warehouse facilities are of a lower specification. However, there are options of new facilities coming up in localities such as Dhoom Manikpur, Pilkhuwa-Hapur Road and Meerut Road (NH-58).

The project size in the cluster ranges

from 50,000–500,000 sq ft and are predominantly pre-engineered buildings (PEB). A few of the warehouse facilities only have sheds, and still fewer have only the RCC structure. The nature of the cargo handled by the occupier determines the choice of the structure. Since PEB structures offer relatively more vertical storage space on account of their greater floor–ceiling height, such structures are preferred by occupiers that use pallets and electric-powered forklifts for the purpose of stacking cargo. PEB structures generally provide a side/clear height of 24–28 ft. In contrast, RCC structures provide just 12–14 ft of vertical space for storage. The load bearing capacity of the floor is trimix 5 metric tonne per sq m.

Select warehouse operators

- Satvik Logistics
- Good Luck Warehouse
- Future Warehouse Solutions
- Lord Balaji Warehousing
- Om Kiran Warehouse Complex

6.3 LOCATION AND INFRASTRUCTURE

The Ghaziabad cluster enjoys proximity to the manufacturing and consumption hubs of Uttar Pradesh, Haryana and Delhi. This strategic location has established it as an important warehousing cluster in NCR.

The NH-91 Ghaziabad–Dadri belt is a national highway, but has poor infrastructure. It is a 2x2 ill-maintained road with vehicular and pedestrian congestion, leading to traffic snarls. It is an old industrial town, dotted with old warehouses and residential development. Such a situation makes multi-axle truck movement slower. The situation is better around Dadri, where the bypass of the town area is managed with a 3x3 well-maintained stretch of NH-91. Going forward, the warehousing activities will

benefit immensely with the upcoming Eastern Dedicated Freight Corridor (DFC) alignment at Dadri.

The NH-24 Hapur–Ghaziabad stretch also enjoys good connectivity, with the presence of the manufacturing and consumption hubs of NCR, as listed in the adjoining table. The stretch is a 2x2 good quality road with a host of educational institutes. On account of its accessibility to the agricultural markets and dairy farms that dot the cluster, this warehouse space has been taken up by many food processing and milk product companies, such as Mother Dairy.

The NH-58 Ghaziabad–Meerut Road, which is part of the same cluster, is a 2x2 good quality road with a host of old residential developments along the highway. The warehousing market here benefits on account of the ample

availability of land and its proximity to the industrial hubs of Faridabad, Ghaziabad and Sonipat. Notable names, such as Dr. Reddy’s and Safexpress, have warehouse facilities in this belt.

The warehouses present in this cluster have the strategic advantage of being located within a two-hour distance from the manufacturing hubs of Ghaziabad, Faridabad and Sonipat. However, the automobile cluster of IMT Manesar is located more than two hours away, making the industry’s ‘just in time’ delivery requirement challenging. Servicing Bhiwadi and Neemrana would entail even more time. The most vibrant consumption hubs of Delhi and Gurgaon are located approximately two hours away.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM THE GHAZIABAD WAREHOUSING CLUSTER

Distance from	km	Travel time in mins
Ghaziabad industrial belt	5–35	15–50
Delhi City Centre (Connaught Place)	25–65	60–120
Faridabad industrial belt	40–70	90–130
Sonipat industrial area	55–90	100–140
Gurgaon city centre (DLF CyberCity)	45–85	90–150
Palwal industrial area	75–100	120–160
Bawana industrial area	45–80	100–160
IMT Manesar	70–110	120–180
Bahadurgarh industrial cluster	55–90	120–180
Dharuhera & Bhiwadi industrial belt	90–130	150–200
Bawal industrial area	120–155	160–220
Rohtak industrial cluster	100–140	170–220
Neemrana industrial area	140–180	180–240

Source: Knight Frank Research

The industrial setups in the Ghaziabad cluster are within the urban area, unlike the NH-8 cluster, where industrial activity is well beyond the Gurgaon city area. The presence of dense residential and industrial activity together has impacted the vehicular traffic movement. Additionally, quality of internal roads is starkly inferior compared to the national highways. This restricts the opening up of new land parcels for warehousing activities.

6.4 RENT AND LAND COST OF WAREHOUSES

The rental values in the cluster are almost similar on the highways, with the Dadri region commanding marginally higher rentals in the cluster. The rentals are lower on the internal roads, as one moves away from the national highway. The rents displayed in the adjoining table reflect the facilities with standard construction and amenities. It would be higher if there are specific requirements for flooring, structure height, insulation and other capex within the facility.

Other terms of tenancy may also have a bearing on warehouse rents, specifically clauses related to the security deposit, rent escalation and lease tenure. The market practice for the security deposit is 4–6 months of rent. The rent escalation clause, which determines the quantum and frequency of rental increments, is usually 5% p.a. The market practice for lease tenure, i.e. the minimum period for which the landlord and tenant are bound to honour the occupancy, varies largely on a case-to-case basis, usually in excess of five years.

INDICATIVE RENTAL VALUES AND LAND RATE

Location	Quoted rent (₹/sq ft/month)	Quoted land rate (₹ mn/acre)
Ghaziabad–Dadri, NH-91	16–20	30–40
Ghaziabad–Hapur, NH-24	15–19	20–35
Ghaziabad–Meerut, NH-58	14–19	20–35

Source: Knight Frank Research

6.5 COMPETITIVE ADVANTAGES

The biggest competitive advantage of the Ghaziabad warehouse hub is its proximity to the densely populated consumption hubs of Ghaziabad, Delhi, Noida and Greater Noida. This makes it a credible location for consumer-oriented (B2C) companies that can serve the NCR consumption market from their warehouses in this cluster. The next advantage is its proximity to the manufacturing hubs of Ghaziabad, Faridabad and Sonipat.

Warehouse occupiers are sensitive to rentals and thus, warehousing clusters that are in a position to offer affordable space would enjoy a competitive advantage over the others. With warehouse rentals in the range of ₹14–20 per sq ft per month, Ghaziabad fares well. The ample

land availability implies that the rentals will continue to remain affordable for a considerable amount of time.

The Dadri node of the cluster is on the Eastern Dedicated Freight Corridor alignment and will thus lead to heightened cargo movement along the eastern part of the country. This will increase the warehousing requirement in the Ghaziabad cluster.

The availability of manpower is another factor that lends competitive strength to this cluster. NCR is a densely populated urban agglomeration, and the presence of residential catchments for all income groups in and around Ghaziabad ensures an abundant supply of skilled, semi-skilled and unskilled workers.

6.6 CHALLENGES

The Ghaziabad warehouse cluster has its share of challenges. Being an old industrial town, the industrial setups in this cluster are within the urban area, unlike the NH-8 cluster, where industrial activity is well beyond the Gurgaon city area. The presence of dense residential and industrial activity together has impacted the vehicular traffic movement. The cargo movement is also impacted by the quality of roads, which are generally 2x2-lane roads without service lanes. These are inferior compared to those in the competing NH-8 cluster and thus, cargo movement at similar distances take a longer delivery time. Additionally, quality of internal roads is starkly inferior compared to the national highways. This restricts the opening up of new land parcels for warehousing activities.

Our interactions with landowners and warehouse developers highlight another difficulty regarding the regulatory environment. Due to the ambiguity of land laws, the conversion of land use from agriculture to industrial takes much longer in the Ghaziabad cluster compared to the NH-8 cluster in Haryana. Such a situation results in taking a longer time for any development project.

Another set of challenges arises on account of the competition from the development of alternative residential real estate, which influences the land price in warehouse localities near Ghaziabad city. While the rents continue to remain at an affordable level, land has become expensive, mainly for land parcels abutting the highways.

The other critical challenge arises on account of the NH-8 warehouse cluster, which offers a relatively superior occupier profile at a similar occupancy cost. This is the case for both, the manufacturing-led and consumption-led demand, which includes e-commerce. The manufacturing base of NH-8 is much stronger on account of the strong presence of the automobile industry, which pays relatively higher rentals because of its 'just in time' inventory model. The auto and auto ancillary sector contributes 29% of the manufacturing output in the competing

NH-8 cluster in contrast to just 7% in the case of the Ghaziabad warehouse cluster. Such industrial activity implies that the demand for automobile space in the competing NH-8 cluster is 25 mn sq ft or four times that of the Ghaziabad cluster, resulting in a better occupier profile.

Similar is the case with the consumption-led demand on account of the vibrant Gurgaon residential and office development over the last decade. The consumption markets of Delhi and Gurgaon can be serviced through a warehouse on the NH-8 cluster, in line with the tight delivery requirements of even the e-commerce players. Likewise, companies such as Amazon, Arvind Brands and Lifestyle, and several logistics firms such as Future Supply Chain, Fedex, TCI and Safexpress, have favoured the cluster. Further, the overall infrastructure and business environment are superior in the NH-8 cluster compared to the Ghaziabad cluster. The completion of the Manesar–Palwal stretch of the upcoming Kundli–Manesar–Palwal (KMP) expressway has added sheen to this warehouse cluster.

The Ghaziabad cluster will be dominated by the food processing industry, and manufacturing companies from the lower end of the spectrum. The ample availability of land at feasible costs that is in sync with the quoted rents implies a steady supply of warehouse space in the cluster. Hence, we believe that no new markets will emerge in this cluster in the near future.

6.7 OUTLOOK

In terms of geography, the warehouses are currently concentrated mainly on the Ghaziabad–Dadri stretch on NH-91, Ghaziabad–Hapur belt on NH-24 and the Ghaziabad–Meerut stretch on NH-58, besides some presence on GT Road and Greater Noida.

The future demand for warehousing will be shared mainly between the NH-8 and Ghaziabad clusters. The competing NH-8 cluster has superior infrastructure, well developed internal roads, celebrated manufacturing clusters and a growing residential and office catchment. Thus, the bulk of the warehousing demand from high-value manufacturing sector occupiers and e-commerce companies would be centred in this cluster. The progress on the Kundli–Manesar–Palwal Expressway and the Western Dedicated Freight Corridor (Western DFC) will improve the future prospects of this competing market even further.

On the other hand, the Ghaziabad cluster will be dominated by the food processing industry, and manufacturing companies from the lower end of the spectrum. The ample availability of land at feasible costs that is in sync with the quoted rents implies a steady supply of warehouse space in the cluster. Hence, we believe that no new markets will emerge in this cluster in the near future.

From the pricing perspective, i.e. the achievable rent or on-going land rates, this hub offers a range of options. With land rate as the most important determinant of warehouse financial feasibility, it is crucial to get it right to achieve success in a warehouse development project. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay in this cluster in order to achieve the expected returns in the range of 10–18% per annum, subject to the achievable rents. For example, with a return expectation of 14% per annum and an achievable rental value of ₹18/sq ft/month, the feasible land cost amounts to ₹26 mn/acre. In other words, investors can fetch a 14% per annum return only if they

are able to purchase land at or below ₹26 mn/acre at present and lease it at ₹18/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

FEASIBLE LAND COST MATRIX IN THE GHAZIABAD WAREHOUSING CLUSTER (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum				
	10%	12%	14%	16%	18%
12	18	14	11	8	5
14	25	20	16	12	10
16	31	25	21	17	13
18	37	31	26	21	18
20	43	36	31	26	21

Note: The table presents 25 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 14 options which are possible to source in Ghaziabad and are upward of the minimum prevailing land rate, which is ₹20 mn/acre in this cluster, have been highlighted.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%





1. MAJOR WAREHOUSING CLUSTERS IN PUNE

Historically, Pimpri-Chinchwad was developed as an industrial town with large production facilities of companies like Bajaj Auto, Forbes Marshall and Alfa Laval, among others. However, with the city expanding and residential development gaining priority over manufacturing activity, the viability of existing industrial clusters in the city reduced. This led to the gradual exodus of industries to newer industrial areas where the Maharashtra Industrial Development Corporation (MIDC) was allotting plots for carrying out manufacturing activities. Chakan, in North Pune and Ranjangaon, in North-east Pune were developed by the MIDC as alternate hubs, since a large number of auto and auto ancillaries and consumer durables' companies established their manufacturing base in these locations. While companies like Volkswagen, Bajaj Auto, Mahindra & Mahindra and Bridgestone, among others, are located in Chakan, Ranjangaon is host to the manufacturing facilities of FIAT, Whirlpool, LG Electronics and Haier Appliances, among others. With vacant land slowly getting exhausted here, the MIDC developed an alternate industrial area in Talegaon situated in North-west Pune that has companies such as General

Motors, JCB and INA Bearings.

The development of three large MIDCs in the northern region of Pune has led this belt to be commonly referred to as the manufacturing hub of Pune. It is also referred to as the 'auto hub' due to the presence of a large number of auto and auto ancillary units. Another major industrial cluster that has gradually developed in Pune is the Sanaswadi-Shikrapur belt. This is also situated in the north-eastern part of the city where manufacturing units of companies like John Deere, Tranter and Yamazaki Mazak are located. Since this industrial cluster is not developed by the MIDC, it is relatively small compared to the other clusters in Pune.

Rising land prices and non-availability of contiguous land within the above mentioned clusters have led to the emergence of Shirwal in South Pune as an alternate manufacturing hub and many companies have already shifted their base here. Although this cluster is not developed by the MIDC, leading manufacturing companies such as Godrej & Boyce, Alfa Laval and Finolex, among others, have shifted here.

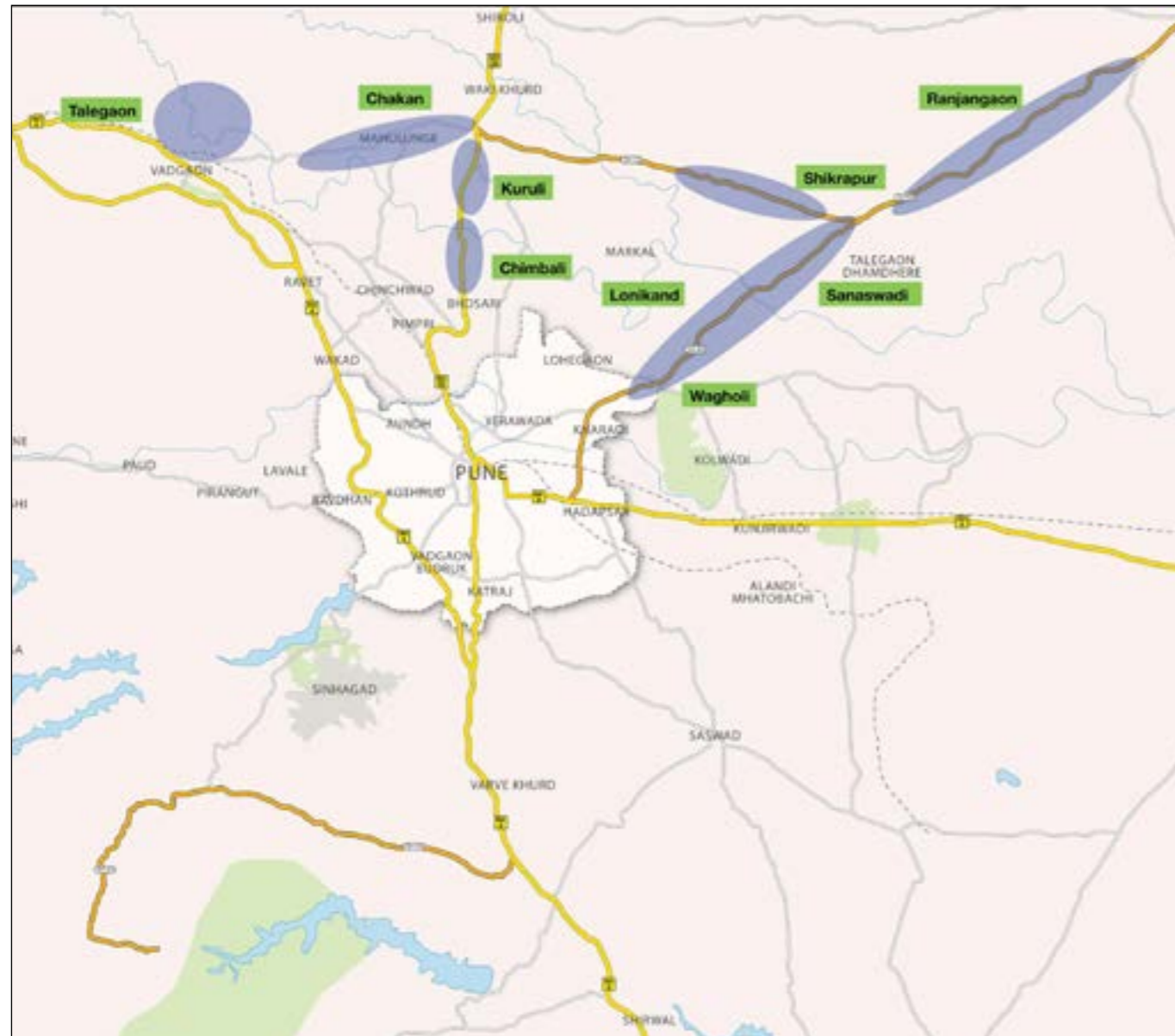
The development of these manufacturing

hubs seeded the growth of the warehousing industry in Pune. Chakan emerged as the preferred location among warehouse occupiers due to its proximity to multiple MIDCs and easy connectivity with Mumbai and Nashik. Alternatively, Wagholi in North-east Pune gained prominence as a warehouse destination due to its proximity to Pune city centre and the manufacturing hub of Sanaswadi. However, with the rapid urbanisation of East Pune and residential development gaining priority over warehousing activity, Wagholi has been witnessing a gradual exodus of warehouses towards the Lonikand-Sanaswadi-Shikrapur belt. This belt is located 8 - 16 km further east of Wagholi on the Pune-Ahmednagar Highway.

For the purpose of this report, we have classified the various warehousing markets into two major clusters: Chakan-Talegaon belt and Wagholi-Ranjangaon belt, based on factors such as geographical location, proximity to the national highway, access to the city centre and distance from the major manufacturing hubs. These two clusters collectively account for the majority of the warehousing space demand in the Pune market.



MAJOR WAREHOUSING LOCATIONS IN PUNE



Source: Knight Frank Research

CLASSIFICATION OF WAREHOUSING LOCATIONS INTO MAJOR CLUSTERS

Warehousing cluster	Major warehousing locations
Chakan-Talegaon belt	Chakan, Talegaon, Kuruli, Chimbali
Wagholi-Ranjangaon belt	Wagholi, Lonikand, Chakan-Shikrapur road, Sanaswadi, Ranjangaon

Source: Knight Frank Research

2. TOTAL REQUIREMENT FOR WAREHOUSING SPACE

Currently, Pune's total requirement for warehousing space is estimated to be 45 mn sq ft, of which more than 80%, or 36 mn sq ft, is from the manufacturing sector. However, the majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses. Although the trend of leasing a warehouse rather than owning it is steadily picking up with the emergence of third-party logistics players (3PL), it is still at a nascent stage compared to developed markets such as Europe and the US. These 3PL players, such as Safexpress, Blue Dart, TCI and Future Supply Chain, among others, provide end-to-end logistics services, including a common warehousing facility, to multiple

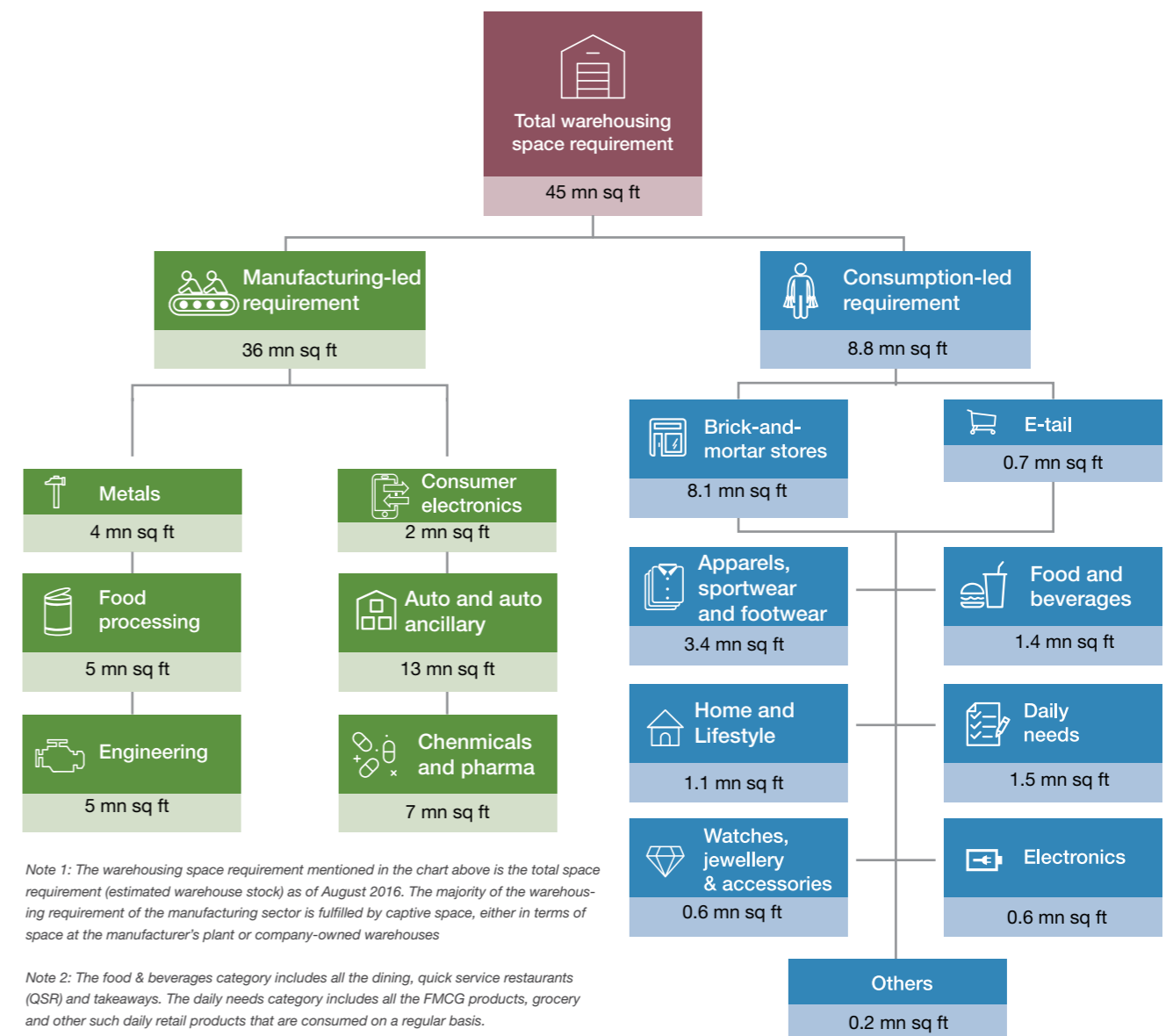
manufacturers, thereby reducing the need to have a separate warehouse. Such leasable market in Pune is currently estimated to be in the range of 20-25 mn sq ft. However, the share of annual transacted volume is approximately 1 mn sq ft.

With the Goods and Services Tax (GST) set to become operational, the need for captive warehouses will reduce further. We believe that a large number of manufacturers will outsource their logistics and warehousing requirements and focus on their core operations. This will create an additional demand for leasable warehousing space in Pune in the coming years.

In contrast to the manufacturing-led

requirement for warehousing space, consumption-led requirement is mostly for leasable space, with very few operators fulfilling their needs through a captive warehouse. This is primarily due to the need to have a fulfilment centre as close to the urban area as possible in order to ensure quick delivery. Over the last ten years, this segment has witnessed a renewed traction, especially in the E-tail sector. As the time between placing an order and delivery has shrunk drastically with the advent of the E-tail sector, the need for warehousing space has also increased significantly. With the share of E-tail expected to rise steadily in the coming years, we estimate the demand for warehouses from this segment to increase proportionately as well.

TOTAL REQUIREMENT FOR WAREHOUSING SPACE IN PUNE



Note 1: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses

Note 2: The food & beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

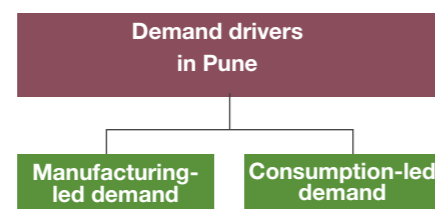
Source: Knight Frank Research

3. DEMAND DRIVERS OF WAREHOUSING SPACE IN PUNE

The primary demand drivers of warehousing space in Pune can be broadly classified into two categories: manufacturing-led demand and consumption-led demand. The demand from the manufacturing sector arises predominantly due to the distance between the manufacturer's factories, raw material suppliers and the consumption markets of the final goods. The need to store the raw materials or final goods due to this distance, determines the amount of space required by each manufacturer. The quantum of space required is also dependent on the type of product that is manufactured. Hence, each manufacturer will have a different requirement for space, depending on these factors.

Consumption-led demand, which is an equally important demand driver for warehousing space, is largely dependent on population, income level and the propensity to spend. The changing dynamics of the retail industry has resulted in the business model of a retailer becoming heavily dependent on a smooth and efficient supply chain network. In addition to this, the advent of E-tail in recent years has necessitated the need for huge warehouses close to urban centres in order to deliver in the shortest possible time. Such factors have brought the warehousing industry to the forefront of the retail business and compelled retailers to focus on this segment.

In the following sections, we have identified the key manufacturing industries in Pune, their current warehousing requirement, the major manufacturing hubs and the various regions within Pune from where the requirements originate. Similarly, in terms of consumption, we have identified the major product categories and their current warehousing requirements.



3.1 MANUFACTURING-LED DEMAND

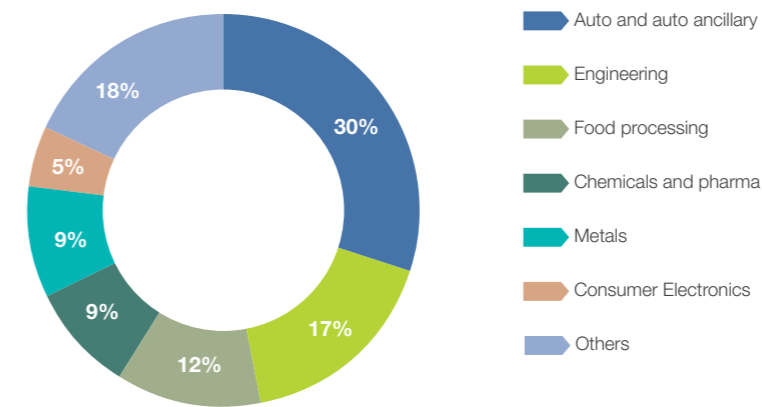
Pune is one of the largest manufacturing hubs in west India and accounts for the majority of the production activity in Maharashtra. Auto and auto ancillary has the largest share in the total manufacturing output in Pune, with companies such as Volkswagen, Bajaj Auto, Mahindra & Mahindra and Mercedes-Benz leading in terms of auto sector output in the region. This is followed by engineering and food processing sectors. Food processing includes dairies, rice mills, sugar mills, confectionaries, and alcoholic and non-alcoholic beverages, among others.

In terms of the requirements for warehousing space, the auto and auto ancillary sector leads with more than 13 mn sq ft. This is largely spread across locations such as Chakan, Talegaon, Sanaswadi and Ranjangaon. The other big demand drivers for warehousing space in Pune are the chemicals and pharmaceutical, food processing and engineering sectors. Just the top four sectors account for more than 82% of the total warehousing space requirement of the region.

In terms of the requirements for warehousing space, the auto and auto ancillary sector leads with more than 13 mn sq ft. This is largely spread across locations such as Chakan, Talegaon, Sanaswadi and Ranjangaon. The other big demand drivers for warehousing space in Pune are the chemicals and pharmaceutical, food processing and engineering sectors.

FIGURE 1

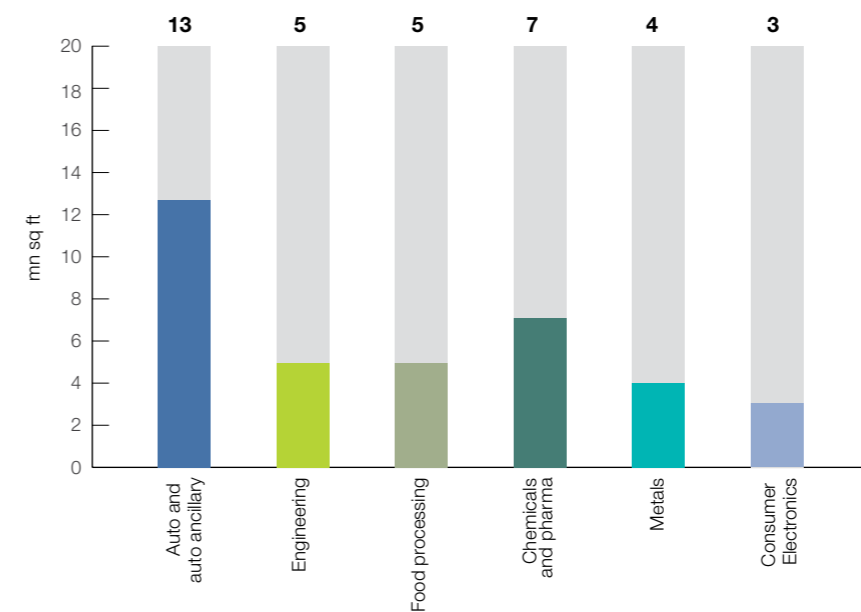
SHARE IN OUTPUT OF THE VARIOUS MANUFACTURING INDUSTRIES IN PUNE



Source: Annual Survey of Industries (ASI) and Knight Frank Research

FIGURE 2

WAREHOUSING SPACE REQUIREMENTS OF MAJOR MANUFACTURING INDUSTRIES IN PUNE



Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest output data from ASI. The majority of the warehousing requirement of the manufacturing sector is fulfilled by captive space, either in terms of space at the manufacturer's plant or company-owned warehouses

While brick-and-mortar stores still lead in terms of space requirement, at 8.1 mn sq ft, the E-tail segment contributes up to 0.7 mn sq ft. This is significant, considering that until just a few years ago, this entire segment was non-existent

MAJOR MANUFACTURING CLUSTERS IN PUNE



3.2 CONSUMPTION-LED DEMAND

In terms of retail spending, Pune is the second largest market in Maharashtra with a population base of more than 5 mn. This retail spending not only includes traditional brick-and-mortar stores, malls, shopping streets and mom-and-pop stores but also accounts for the spending

by consumers through the e-commerce medium. Hence, any type of consumer goods consumed within Pune, whether offline or online, is categorised in the retail spending.

Among the various product categories, apparel, sportswear and footwear together have the highest share, at

33%, in the total retail spending in Pune. Thus, even in the warehousing space requirement, this category contributes the most, at 3.4 mn sq ft or 38%. Other prominent product categories include food and beverages, daily needs and home and lifestyle. The daily needs category includes all the FMCG products, grocery and other such daily

retail products that are consumed on a regular basis. Just the top four categories account for more than 85% of the total warehousing space requirement in the city.

The E-tail sector has emerged as a major driver for the incremental warehousing space requirement in recent years and currently accounts for 8% of the total space requirement of the consumption-led demand. While brick-and-mortar stores still lead in terms of space requirement, at 8.1 mn sq ft, the E-tail segment contributes up to 0.7 mn sq ft. This is significant, considering that until just a few years ago, this entire segment was non-existent.

While the boom in the E-tail sector may have eaten into the market share of the brick-and-mortar stores to a great extent, our analysis indicates that the advent of this segment has expanded the overall consumption pie and led to a substantial increase in the urban consumers' propensity to spend. Hence, the warehousing space requirement by the E-tail segment is largely the incremental demand for space and not just a replacement of the demand for space by brick-and-mortar stores. Going forward, we believe that the share of the E-tail sector will increase further in the total retail spending of consumers. This will invariably lead to a higher demand for warehousing space from this segment in the coming years.

FIGURE 5 WAREHOUSING SPACE REQUIREMENTS BY E-TAIL AND BRICK-AND-MORTAR STORES

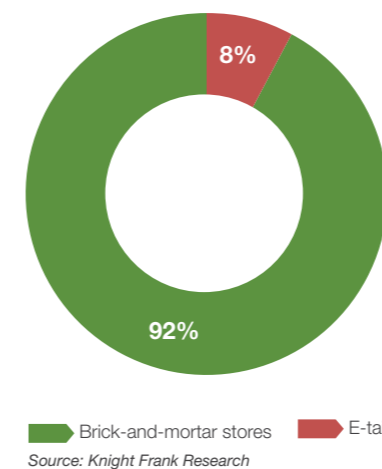
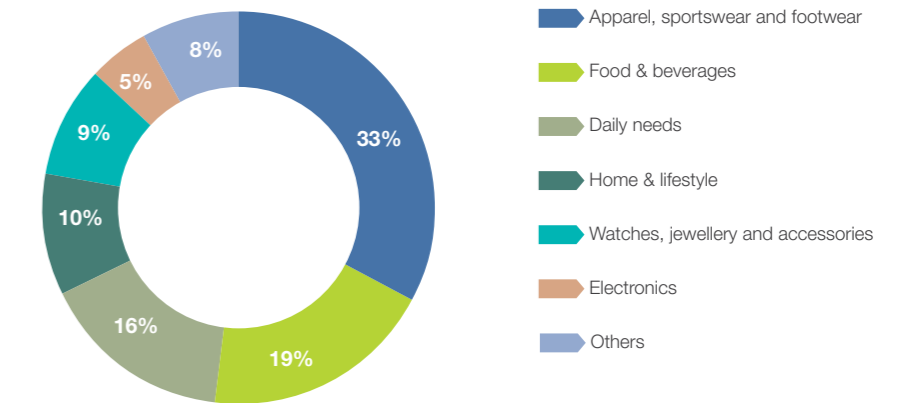
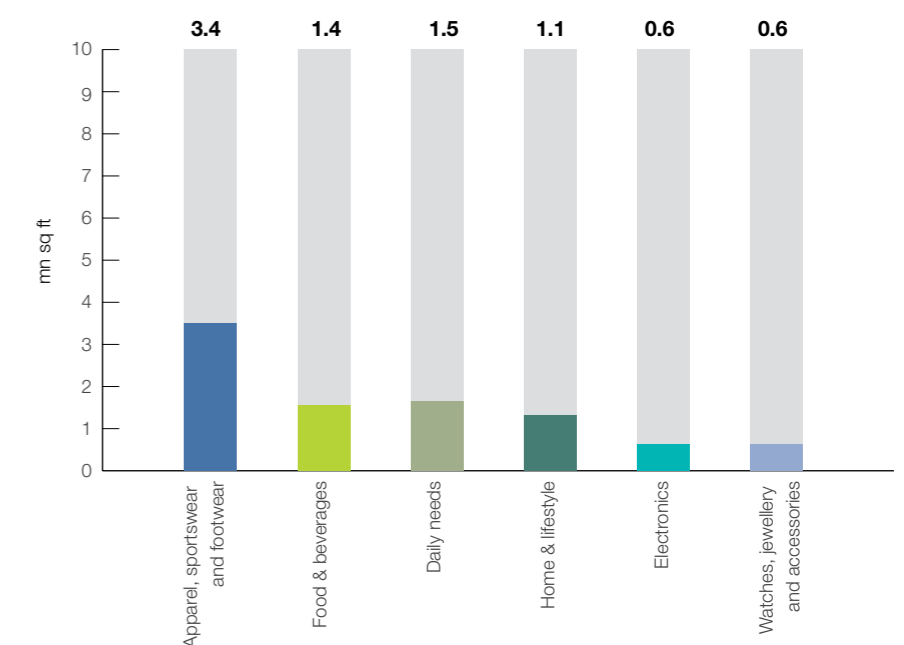


FIGURE 3 CATEGORY-WISE SPLIT OF RETAIL SPENDING IN PUNE



Source: Knight Frank Research

FIGURE 4 WAREHOUSING SPACE REQUIREMENTS FOR THE MAJOR RETAIL CATEGORIES IN PUNE



Source: Knight Frank Research

Note: The warehousing space requirement mentioned in the chart above is the total space requirement (estimated warehouse stock) as of August 2016. This is calculated on the basis of the latest consumption data. The food & beverages category includes all the dining, quick service restaurants (QSR) and takeaways. The daily needs category includes all the FMCG products, grocery and other such daily retail products that are consumed on a regular basis.

4. CHAKAN-TALEGAON WAREHOUSING BELT

Warehousing activity in the Chakan-Talegaon belt is primarily dominated by industrial warehouses. The presence of a large number of automobile manufacturers requires vendors to either set up their manufacturing unit here or have a warehouse in close proximity in order to ensure uninterrupted supply. Additionally, most of these auto companies follow the Just-in-Time (JIT) concept of production that necessitates their vendors and suppliers to be able to deliver at a very short notice. A short notice could be as little as 2-3 hours of window for delivery. This ensures constant demand for warehousing from companies that either do not have a production unit nearby or the amount of space in their plant is insufficient for storage.

Another type of warehousing that is prominent in the Chakan belt is service parts distribution centre of capital goods companies. These are the companies that supply heavy machinery to other manufacturing companies that use them for further production. As any breakdown in such heavy machinery due to the normal wear and tear can disrupt the production schedule, it becomes essential for these capital goods manufacturers to supply the spare parts within a minimal time frame. This warrants a service parts distribution centre in the vicinity of such clusters in order to maintain the steady flow of supply of such replacement parts.

Since the demand drivers for all the warehouse locations along the Chakan-Talegaon road including Kuruli and Chimbali are similar, we have clubbed these locations into a single warehousing cluster for the purpose of this report and called it as the 'Chakan-Talegaon warehousing belt'. In the following sections, we have explained the primary demand drivers of the warehousing space in this belt, market characteristics, infrastructure development, prevailing rentals and land rates, challenges and the future outlook.

4.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

Warehouses on the Talegaon-Chakan road are relatively recent constructions with most of the development comprising pre-engineered building (PEB) type structures. These warehouses have more than 24-foot clear height and basic infrastructure such as power backup, ample parking space, fire-fighting equipment and insulation, among others. However, most of the warehouses in Kuruli and Chimbali are old godown-type structures with minimal amenities and poor infrastructure.

Currently, maximum incremental demand comes from multinational companies that not only require adequate clear height within the warehouse for multi-level stacking of products, but also look for added amenities such as power backup, fire-fighting equipment and enhanced security. This has resulted in the majority of the new warehouses being constructed to adhere to such standards and move away from the traditional godown-type structure.

Select warehouse operators

Indospace

TCI

TVS Logistics Services

Vijay Logistics

Ash Logistics

4.2 LOCATION AND INFRASTRUCTURE

The concentration of manufacturing activities around Chakan has led to the development of this region as a warehousing hub. The Talegaon-Chakan road that is connected with the old Mumbai-Pune Highway on the west and the Pune-Nashik Highway on the east, has witnessed the development of numerous warehouses. Additionally, the stretch from Moshi to Chakan on the Pune-Nashik Highway has also attracted several warehousing companies.

A large part of the Chakan industrial area is developed and managed by the MIDC. Since MIDC is a special planning authority, units within the MIDC area have access to the infrastructure

facilities provided by it in terms of power connectivity, sewerage treatment, internal roads, water supply and other common amenities. However, units outside the MIDC campus fall under the local gram panchayat area and have to invest in their own infrastructure. Although power and water is supplied by the government agencies, construction of internal roads and sewerage treatment plants need huge investments.

Chakan is connected with the old Mumbai-Pune Highway and Pune-Nashik Highway by a two-lane state highway known as the Talegaon-Chakan Highway. Although this road is narrower compared to the national highways, multiple exit and entry points to the MIDC keeps it relatively free flowing without any major traffic congestion. Additionally, a large number of warehouses are located on the Pune-Nashik Highway, which is a four-lane road with a divider. Internal roads in non-MIDC areas within this cluster are in a relatively poor condition.

The upcoming Pune Ring Road on the periphery of Pune city will provide a major boost to the heavy vehicles, as it will bypass the city traffic once constructed. The ring road will connect the Mumbai-Pune Highway, Pune-Nashik Highway, Pune-Ahmednagar Highway, Pune-Solapur Highway and the Pune-Bengaluru Highway. As the alignment of this road is through Chakan, warehousing activity in this cluster will benefit immensely on the back of this road. However, the project is still at the conceptualisation stage and will take another 4-5 years to become fully operational.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM THE CHAKAN-TALEGAON WAREHOUSING BELT

Distance from:	Km	Travel time in mins
Pune city centre	32 - 34	60 - 70
Nearest port (JNPT)	115 - 130	140 - 180
Chakan MIDC	2 - 15	5 - 20
Talegaon MIDC	2 - 15	5 - 20
Ranjangaon MIDC	50 - 65	70 - 90
Sanaswadi industrial cluster	30 - 45	50 - 70
Pimpri-Chinchwad industrial area	20 - 22	40 - 45
Khed City industrial area	22 - 35	40 - 60
Shirwal industrial cluster	80 - 95	150 - 170

Source: Knight Frank Research

4.3 RENT AND LAND COST OF WAREHOUSES

Most of the warehouses on the Chakan-Talegaon belt are pre-engineered building (PEB) structures with a load-bearing capacity of 5 tonnes/sq m and height ranging from 9-10 metres. The rental values vary from ₹16 - 30/sq ft/month depending on the location and quality of the warehouse. While highway-touching warehouses command higher rent, those located on internal roads are available at a relatively lower cost. Additionally, the technical aspects such as floor strength, fire safety equipment and ventilation, security, amenities and approach road, among others, have a direct bearing on the rent of the property. Since Chakan is largely dominated by multinational companies, their requirement regarding the quality of warehouse and supporting infrastructure is according to global standards. This results in higher cost of construction for such warehouses, thus pushing the rentals further high. Also, rental value of built-to-suit warehouses could go further high depending on the requirement of the occupier.

4.4 COMPETITIVE ADVANTAGES

The biggest competitive advantage of this cluster is the location of two major MIDCs in its vicinity, namely Chakan MIDC and Talegaon MIDC. Additionally, it is also very well connected with the Ranjangaon MIDC and Sanaswadi industrial area, which are at a distance of 50 km and 40 km respectively. Hence, a warehouse in Chakan is within an hour's drive from four major manufacturing hubs of western India. Apart from this, JNPT and three major cities of Maharashtra, namely Mumbai, Nashik and Ahmednagar are linked via highways from Chakan.

Another advantage is the availability of talent pool due to the large number of educational institutes present in Pune. Also, affordable residential development around Pimpri, Chinchwad, Moshi and Chikhali of North Pune has ensured availability of skilled and semi-skilled labour.

4.5 CHALLENGES

Land availability is the biggest challenge in Chakan as the real estate cost has

already shot up drastically during the last five years. With land rates of highway-touching properties on the Talegaon-Chakan Highway already breaching ₹30 mn/acre, the viability of warehousing activity within this cluster is questionable. Scarcity of land has paved the way for innovative deals between the land owners and warehouse operator/occupier. The warehouse operator/occupier pays 18-20 months' rent in advance to the land owner who uses this money for constructing the warehouse. This helps both the parties as the operator/occupier is able to keep his balance sheet light by not capitalising the asset and the land owner gets construction funding in terms of advance. Although such a model ensures a built-to-suit property for the operator/occupier, he runs the risk of facing delays in delivery.

Another challenge is the gradual expansion of Pune's urban area. Although Chakan is around 30 km north of Pune city centre, the rapid urbanisation being witnessed around Chakan, Talegaon and Moshi could tilt the preference of land owners towards residential development

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/month)	Land rate (₹ mn/acre)
Chakan	22 - 30	20 - 34
Talegaon	18 - 25	10 - 22
Kuruli	16 - 22	20 - 30
Chimbali	16 - 22	20 - 30

Source: Knight Frank Research

in the distant future. The current residential property prices in Chakan and Talegaon range anywhere between ₹3,200 – 4,200/sq ft. This could pose a serious threat to warehousing activity, as viability of non-MIDC land will reduce further due to better remuneration from residential development.

4.6 OUTLOOK

The Chakan-Talegaon belt is expected to further consolidate its position as a manufacturing hub with the MIDC expanding its area beyond the existing cluster. Additionally, the presence of various automobile majors will continue to attract auto ancillary and engineering sector companies. With rising land rates and unaffordable rentals, warehouses are expected to gradually move towards the periphery of the Talegaon-Chakan Highway. Warehouse rents within Chakan have already moved beyond ₹22/sq ft/month and any further increase could render such activity unfeasible to most of the occupiers. Besides, demand for industrial land from the manufacturing sector could pose a challenge to warehousing activity as the threshold of paying rent by manufacturing units is comparatively higher. Additionally, the rapid development of residential projects in the vicinity could threaten the feasibility of warehouse operations in the area.

Going forward, construction of the Pune International Airport near Chakan could pose as a serious threat to warehousing activity in this region.

Airport development could lead to a sharp appreciation of land prices in the adjoining localities and this could further push rent expectation of land owners. Although the airport project is still at a very nascent stage, the explicit intention of the state government to locate the project near Chakan could pose a challenge to warehousing activity in the coming years.

Land cost is the most critical component of warehousing development, as it influences the realisable returns to a great extent. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay on this belt in order to achieve the expected return in the range of 14%-22% per annum, subject to the achievable rents. For example, with a returns expectation of 16% per annum and an achievable rental value of ₹24/sq ft/month, the feasible land cost amounts to ₹34 mn/acre. In other words, investors can fetch a 16% per annum return only if they are able to purchase land at or below ₹34 mn/acre at present and lease it at ₹24/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

Currently, most of the locations on this belt are feasible for warehousing activities at the prevailing land rates, subject to a

minimum achievable rental value of ₹16/sq ft/month. However, rental values below this level may not even fetch returns of 14% per annum to the investors at the current land prices.

For investors to achieve returns upwards of 22% per annum, it is imperative that the land acquisition cost does not exceed ₹31 mn/acre and that it can be leased out at a minimum rental value of ₹30/sq ft/month. Considering the current market scenario, only certain locations in Chakan with world-class warehousing facilities are able to command a rental value upwards of ₹28/sq ft/month. Hence, it is possible for an investor to earn returns up to 22% per annum from warehousing development on this belt, subject to sourcing land at a feasible cost and the ability to fetch rents upwards of ₹30/sq ft/month.

FEASIBLE LAND COST MATRIX ON THE CHAKAN-TALEGAON WAREHOUSING BELT (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum				
	14%	16%	18%	20%	22%
16	21	17	13	11	8
20	31	26	21	18	15
24	40	34	29	25	21
28	50	43	37	32	28
30	55	47	41	36	31

Note: The table presents 25 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 16 options that are possible to source on the Chakan-Talegaon belt and are upwards of the minimum prevailing land rate have been highlighted in colour.

Source: Knight Frank Research

Assumptions	
Construction cost (₹/sq ft)	1,200
Ground coverage	57%
Rental escalation per annum	5%
Occupancy	50%: First year
	75%: Second year
	100%: Third year onwards
Debt funding	80% of construction cost
Interest rate	12%
Tax rate	30%
Cap rate	10%

5. WAGHOLI-RANJANGAON WAREHOUSING BELT

Historically, warehousing activities in Pune have been concentrated in Wagholi with a large number of warehouses mushrooming here post 1995. These warehouses were primarily serving the Pune consumption market acting as the regional retail distribution centres. Post 2005, Wagholi witnessed large-scale residential development due to its proximity to the city centre and employment hubs of Kharadi and Hadapsar. Capital value of residential projects in Wagholi has appreciated substantially during the last five years with the ongoing quoted rate hovering around ₹4,200 – 5,500/sq ft, making it much more remunerative for land owners to opt for residential development instead of warehousing. Such a trend has resulted in a gradual exodus of warehouses further east on the Pune-Ahmednagar Highway towards Lonikand, Sanaswadi, Chakan-Shikrapur road and Ranjangaon.

Sanaswadi and Ranjangaon are home to a large number of engineering and auto ancillary companies and these markets are slowly emerging as alternate warehousing clusters to Wagholi. Lower land prices, absence of residential development and presence of manufacturing majors like John Deere, Tranter, Kalyani Forge and Comau India, among others, have attracted the interest of warehouse developers/occupiers. The warehouses located here are a mix of industrial warehouses and retail

distribution centres.

5.1 TYPES OF WAREHOUSES AND MAJOR PLAYERS

Since most of the development around Wagholi happened before 2005, the area is dominated by RCC type structures with poor supporting infrastructure and amenities. Most of these warehouses are owned/operated by local players and are much smaller in size compared to those in Chakan. While Wagholi is dominated by smaller warehouses catering to the retail distribution segment, warehouses in Lonikand, Chakan-Shikrapur road, Sanaswadi and Ranjangaon are relatively larger in size, primarily catering to the industrial segment.

Over the last five years, Ranjangaon has been attracting a lot of interest from occupiers and this has resulted in numerous warehouses mushrooming on the stretch between Shikrapur and Ranjangaon MIDC. Most of these warehouses are PEB structures with modern amenities such as power backup, fire-fighting equipment and enhanced security.

Select warehouse operators

Phoenix Warehousing

Sanghvi Logistics Park

Chamadia Group

Safe Express Logistics Park

Global Group

5.2 LOCATION AND INFRASTRUCTURE

The Wagholi-Ranjangaon warehousing belt is located in the north-eastern part of Pune along the Pune-Ahmednagar Highway, more commonly referred to as the Nagar Road. Warehouses are scattered across the entire 30 km stretch starting from Wagholi till Ranjangaon. However, Wagholi, Lonikand and Sanaswadi have the highest concentration of warehouses along this belt.

Unlike Chakan, the Wagholi-Ranjangaon belt has not been developed by the MIDC and the manufacturing units located here have been primarily developed on private land, except for those located within the Ranjangaon MIDC. This has led to sporadic development on both sides of the entire 30 km stretch with no common infrastructure facilities. The Pune-Ahmednagar Highway is a four-lane road connecting to Ranjangaon in the east and Chakan in the north-west via the Chakan-Shikrapur road. It is also connected with the Pune-Nashik Highway through the Alandi-Markal Road, which is a two-lane road passing through Phulgaon and Alandi. Although the quality of this road is relatively poor as compared to the Pune-Ahmednagar Highway, it is a shorter route from Lonikand towards Chakan. The traffic on these roads is usually fast moving except for certain junctions near Wagholi due to the presence of various residential projects here.

The upcoming Pune Ring Road is expected to further boost the connectivity of this hub with all the major highways on the periphery of Pune. The ring road will connect Wagholi with the Pune-Nashik Highway, Mumbai-Pune Highway, Pune-Solapur Highway and Pune-Bengaluru Highway, thereby giving an easy access to cities like Nashik, Mumbai, Solapur and Kolhapur. As the alignment of this road is through Wagholi, warehousing activity in this cluster will benefit immensely on the back of this road. However, the project is still at the conceptualisation stage and will take another 4-5 years to become fully operational.

ROAD DISTANCE AND TRANSIT TIME TO IMPORTANT LOCATIONS FROM THE WAGHOLI-RANJANGAON WAREHOUSING BELT

Distance from:	Km	Travel time in mins
Pune city centre	20 - 50	40 - 80
Nearest port (JNPT)	150 - 180	180 - 220
Chakan MIDC	40 - 55	60 - 70
Talegaon MIDC	55 - 75	80 - 100
Ranjangaon MIDC	5 - 40	10 - 50
Sanaswadi industrial cluster	0 - 20	0 - 25
Pimpri-Chinchwad industrial area	30 - 60	50 - 90
Khed City industrial area	40 - 45	60 - 70
Shirwal industrial cluster	70 - 100	120 - 150

Source: Knight Frank Research

5.3 RENT AND LAND COST OF WAREHOUSES

The Wagholi-Ranjangaon warehousing belt has a mix of retail distribution centres and industrial warehouses. While Wagholi has a higher concentration

of retail distribution centres due to its proximity to the city centre, Lonikand, Chakan-Shikrapur road, Sanaswadi and Ranjangaon are dominated by industrial warehouses. Additionally, the quality of warehouses in Wagholi is comparatively inferior to those in other locations of this belt as most of the construction activity in the area took place before 2005. Many of these structures resemble the erstwhile godowns with poor flooring, ventilation, lightning and fire-fighting systems. In contrast to this, the warehouses in Lonikand, Chakan-Shikrapur road, Sanaswadi and Ranjangaon are relatively new PEB structures with higher load-bearing capacity and height ranging between 8-10 metres.

The rental value is highest in Wagholi and decreases gradually as one moves towards Lonikand and Sanaswadi. This is primarily because of the high cost of land in Wagholi. However, due to the relatively better quality of construction in the remaining locations of this belt, the rental value of a large chunk of warehouses is equally high in these locations too. In fact some of the old godown-type structures in Wagholi quote a much lower rent despite being located on an expensive piece of land due to their poor quality of construction and lack of supporting infrastructure. Hence, depending on the location and quality of construction, the rental value in this cluster ranges from ₹14 – 22/sq ft/month. However, rent for built-to-suit structures with higher quality of construction and better amenities could go beyond ₹22/sq ft/month.

INDICATIVE RENTAL VALUES AND LAND RATES

Location	Rent (₹/sq ft/month)	Land rate (₹ mn/acre)
Wagholi	18 - 22	22 - 45
Lonikand	14 - 22	16 - 26
Chakan-Shikrapur road	14 - 22	16 - 26
Sanaswadi	14 - 22	12 - 22
Ranjangaon	14 - 22	8 - 15

Source: Knight Frank Research

5.4 COMPETITIVE ADVANTAGES

The biggest advantage of this warehousing belt is its proximity to the city centre. Wagholi is located barely 16-18 km from the Pune railway station and 12-16 km from the prominent retail destinations of the city. The travel time taken for the last mile distribution to the various parts of the city is less than an hour's drive from Wagholi, thereby increasing its attractiveness. Additionally, the connectivity with the major industrial hubs of Sanaswadi, Ranjangaon and Chakan is excellent from this cluster, as these hubs are located at a drivable distance of five minutes, 30 minutes and 60 minutes respectively. With the completion of the proposed Pune Ring Road in another 4-5 years, travel time to the Pune-Solapur Highway and Pune-Bengaluru Highway will also reduce significantly. This will provide an inherent competitive advantage for industrial warehousing activity in this cluster, as all the major manufacturing hubs are easily accessible from here.

5.5 CHALLENGES

Rapid urbanisation and expansion of residential areas beyond Wagholi could pose a serious challenge to warehouse developers, as the already high cost of land could inch up further. Additionally, the Development Plan (DP) of the Pune Municipal Corporation (PMC) could restrict the zoning of this cluster to residential development, thereby forcing warehouses to relocate further north-east in the coming years. Wagholi is already witnessing such a trend with residential projects rapidly replacing erstwhile warehouses. While Lonikand and Sanaswadi have substituted Wagholi as the new warehousing hubs in the last 4-5 years, it is only a matter of time that these areas will witness a similar type of urbanisation, leading to further exodus of warehousing activities.

5.6 OUTLOOK

The location of a retail distribution centre is primarily driven by the urban centres it services apart from rental and transportation cost. As India prepares to move towards a GST regime, consolidation of such warehouses is inevitable in the coming future. Since Pune is only a 3-4 hours' drive from Mumbai, any move towards such

consolidation is expected to shift the retail distribution activities in favour of locations closer to Mumbai. With rentals in Bhiwandi quoting much lower rates than the Wagholi-Ranjangaon belt, it would make more sense for retail companies to make Bhiwandi the regional hub and supply to the Pune market from here. Additionally, the sheer size of the Mumbai retail market skews the need for locating a regional distribution centre here instead of Pune. Such a trend could eventually limit the need for having a separate distribution centre in Pune in the coming years and restrict the growth of such centres in the Wagholi-Ranjangaon warehousing belt.

Contrary to retail distribution centres, demand for industrial warehousing is expected to remain strong in this cluster as manufacturing companies from the engineering and auto ancillary sectors continue to prefer locating here. Additionally, the accessibility to Ranjangaon MIDC and Chakan MIDC will work in favour of this belt due to its central location. The proposed Pune Ring Road will further boost the attractiveness of this belt as it will connect the Pune-Solapur Highway and Pune-Bengaluru Highway with Wagholi. Hence, the profile of warehouse occupiers is expected to gradually shift towards industrial warehouses from retail distribution centres.

The rapid urbanisation of this belt could put further pressure on land rates and render warehousing an unviable activity here. With rental value in certain

warehouses already touching ₹22/sq ft/month, it is only a matter of time that occupiers will begin scouting for alternate cheaper locations. Unlike Chakan, where there is a designated government planning authority (MIDC) that restricts the land use to industrial activities, development of the Wagholi-Ranjangaon belt has primarily taken place on private land. This could tilt the preference of land owners towards residential development, if such an opportunity presents itself in the near future. This scenario could open up the possibility of warehousing activities shifting towards the Chakan-Shikrapur road in the north and Ranjangaon in the east. While the cost of land is relatively cheaper here, they share similar characteristics with Wagholi in terms of connectivity and could emerge as an alternate warehousing hub in the coming years.

Since land cost is the most critical component of warehousing development, it influences the realisable returns to a great extent. In order to understand the feasibility of land cost for warehousing activities, we have developed a land cost matrix. This matrix explains the feasible land cost that an investor should ideally pay on this belt in order to achieve the expected return in the range of 18%-24% per annum, subject to the achievable rents. For example, with a returns expectation of 18% per annum and an achievable rental value of ₹20/sq ft/month, the feasible land cost amounts to ₹21 mn/acre. In other words, investors can fetch an 18% per annum return only if they are able to purchase land at or

below ₹21 mn/acre at present and lease it at ₹20/sq ft/month. As the purchase price of land goes higher, the realisable return reduces. Similarly, as the achievable rental value increases, the feasibility of higher-cost land also goes up.

Currently, most of the locations on this belt are feasible for warehousing activities at the prevailing land rates, subject to a minimum achievable rental value of ₹14/sq ft/month. However, rental values below this level may fetch returns downwards of 18% per annum to the investors at the current land prices.

For investors to achieve returns upwards of 24% per annum, it is imperative that the land acquisition cost does not exceed ₹15 mn/acre and that it can be leased out at a minimum rental value of ₹22/sq ft/month. Considering the current market scenario, only modern warehouses of PEB-type structure are able to command a rental value upwards of ₹20/sq ft/month. Since the prevailing market price of land on this belt ranges from ₹8-45 mn/acre, a warehouse developer can fetch annual returns upward of 24% if he is able to source land at the lower range.

Land parcels in locations such as Lonikand, Chakan-Shikrapur road, Sanaswadi and Ranjangaon are available in the range of ₹8-26 mn/acre. Hence, an investor who is able to source land at the lower range in these areas and lease it at a rental value of ₹20-22/sq ft/month, can aim to generate returns in excess of 22% per annum.

FEASIBLE LAND COST MATRIX ON THE WAGHOLI-RANJANGAON WAREHOUSING BELT (₹ MN/ACRE)

Rental value (₹/sq ft/month)	Investor return per annum			
	18%	20%	22%	24%
14	10	7	5	3
16	13	11	8	6
18	18	14	12	9
20	21	18	15	12
22	25	21	18	15

Note: The table presents 20 options of land cost in ₹ mn/acre at different investor returns and rental value combinations. The 13 options that are possible to source on the Wagholi-Ranjangaon warehousing belt and are upwards of the minimum prevailing land rate have been highlighted in colour.

Source: Knight Frank Research

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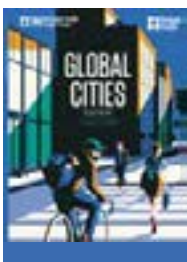
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