

MEGA-EVENT & TRANSPORTATION:
ANALYZING NEW DELHI & XIX COMMONWEALTH GAMES, 2010

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ABSTRACT

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This thesis communicates the affects of a sporting mega event on the urban transportation fabric of a city. It specifically examines the XIX Commonwealth Games 2010 hosted by the capital city of India, New Delhi and analyzes the development process during the preparation period of the Commonwealth Games. It focuses on three types of developments *planned and constructed, planned but not constructed* and *additional* developments. The transport infrastructure development like roads and flyover and in transit sector modifications and expansion of the Delhi metro (rapid rail transit) was analyzed according to the above mentioned categories. Finally, it was deduced that the Commonwealth Games accelerated the development process that was initially planned by the city, but it also compelled the city to invest in developments that were required for the successful delivery of Commonwealth Games.

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CHAPTER 1

INTRODUCTION

PROBLEM STATEMENT

Mega events have started to play a vital role in the socio-economic development as well as the urban regeneration of the city that hosts the event. Amongst all kinds of mega events, recently Sports Mega Events (SME) has gained immense popularity. They have evolved as a common tool for urban regeneration and to create a global image.

India, with not much of the sporting history also wants to be in the race of global fame. In doing so, XIX Commonwealth Games (CWG) 2010 in the capital city of New Delhi, was the next goal for India to achieve. This was not the first time for India to host a SME, the Asian Games of 1982 was the 1st SME in which major sporting developments were done, and the future to that was unpleasant. The scenarios of the two SME's organized are the same with respect to developments. Here, in my research, it's an attempt to find whether the changes occurred this time are meant for long term benefit or a global status symbol.

RESEARCHABLE QUESTION

How did the alterations in transportation system, which were incurred while hosting XIX Commonwealth Games 2010 in New Delhi changed the transportation structure of the city?

AIM

The aim of the research is to determine the transportation alterations that took place while hosting the XIX CWG 2010 in New Delhi, to analyze the changes and their effects on the city and to predict the long term consequences of those changes.

OVERVIEW

Chapter 2 Literature Review

This chapter examines the literature on sporting mega events and its relation with the transport infrastructure. In the review the author came across different types of transportation deliverables that are necessary to achieve a successful transportation system during the event. The chapter also explores the legacy that is involved with the hosting of a sporting mega event with respect to transportation.

Chapter 3 Background

This chapter studies the existing socio-economic, demographic and climatic conditions of the host city i.e. New Delhi, India as well as the location and its surroundings. It also looks into the existing transport scenario in terms of vehicular population and distribution of this vehicular population among various modes. It also looks into the transport infrastructure facilities and outcome of a previously hosted Asian Games.

Chapter 4 Methodology

The chapter looks into the methods used to acquire the information for the analysis purposes. It also looks into the criteria's that are included and excluded to make the analysis process easier.

Chapter 5 Analysis

The chapter looks into the transportation structure of the host city New Delhi, before and after the Games were awarded. The author analyzed in this chapter the infrastructural development related to transportation into three categories planned and constructed development, planned but not constructed development and additional development. Also, the transportation during the Games were looked into and analyzed. Last but not the least the legacy that was left behind by the Games was looked into.

Chapter 6 Discussion

In this chapter the author argued and discussed that the Commonwealth Games 2010 acted as a catalyst in the development process of the city's transport infrastructure. Also, it was discussed that in some cases it acted as a driver in building new infrastructure solely for fulfilling the requirement to host the Games.

Chapter 7 Conclusion

In this chapter the author answers the question of Games having a positive or a negative effect on the city as a whole. The author also discusses the future research areas in her opinion.

CHAPTER 2

LITERATURE REVIEW

MEGA EVENT

To start with, the easiest way to define a mega event is to take its parts, as ‘mega’ and ‘event’ to acquire a basic meaning of the word. Then we shall go into the details of the definition according to the context of this thesis. The Merriam–Webster dictionary defines ‘mega’ as *vast; of highest level of rank, excellence or importance* (Merriam Webster, 2011). Whereas ‘event’ is defined by The Chambers Dictionary as, *anything which happens; result; any incidence or occurrence esp. a memorable one; contingency or possibility of occurrence; an item in a program (of sports, etc); a type of horse-riding competition, often held over three days (three-day event), consisting of three sections* (Allied Chambers, 2006). Therefore, as one ‘mega event’ can be defined as an event that is widespread occurrence that happens and leaves behind memories.

Some of the attributes that define a mega event as mentioned by Jago and Shaw are infrequent occurrence, limited duration, attract tourist, raise awareness, image or profile of the region, a social experience and out of ordinary (Shaw, 1998, , p. 28). They even define mega events simply as ‘a one-time major event that is generally of an international scale.’ Another definition by D. Getz is on the similar path as Jago and Shaw’s attributes of mega event as mentioned above and adds to it ‘*yield extraordinarily high levels of tourism, media coverage, prestige, or economic impact for the host community, venue or organization.*’ (Getz, 2005 , p. 18).

C.M. Hall also defines mega event through their scale and adds up to the attributes discussed above i.e. the '*target market, level of public financial involvement, political effects, extent of television coverage, construction of facilities, and impact on economic and social fabric of the host community*?' (C.M.Hall, 1997).

These attributes can be classified into two broader concepts of internal and external characteristics. The internal characteristics being its duration and scale depending on the number of participants and spectators, levels of organizational complexity and the external characteristics being the media, tourist attraction and the impact on host city (M.Malfas, 2004, p. 210).

Thus a mega event can be understood as a large scale occurrence that is memorable and leaves an impression on the public and the place it is held. These large scale events have very short duration of operation, which may be few days or weeks but their imprint on the host city, region or country lasts for a long time. These impacts are not unidirectional depending on the type of event like commercial, cultural or sports. In fact these large scale events leave their impression on political, social, economical and physical dimension of the region or the city that hosts it.

Mega event can be categorized depending on the content of the event like cultural events (art and music festivals or religious festivals), business events (conferences, exhibitions and expositions), and sports events (Olympic Games, Commonwealth Games and World Cups) (Glenn Bowdin, 2011). Although there are many types of mega events this paper concentrates on the Sports Mega Event (SME).

SPORTS MEGA EVENT

Among all the categories of mega event as mentioned above, SME has gained a fair amount of popularity over the past few decades. The concept of SME is not new; it started with the Olympics of ancient Greece (Lyck, 2006) and has grown tremendously in scale which includes the number of participants and number of sports that these participants would compete for their own nation. The reasons for the popularity and growth of SME can be classified in three parts: 1) mass communication and technological advancements has connected the entire world; 2) the 'sport-media-business' alliance has transformed 20th century professional sports; and 3) the wide range of benefits for the host cities, regions and countries. (Manzenreiter, 2006)

SME are further categorized into different levels according to the specific sport or group of sports that are organized in an event. These include specialist 'world-level international' sports competitions like the World Cups of cricket and soccer, athletics, rugby and Grand Prix events for horseracing and motor racing. There is another version of these events i.e. 'world regional-level' sports competitions such as the Asian Games, the Pan-American Games and the Commonwealth Games, and to a lesser degree to the world-level specialist events such as the European zone compete for the soccer World Cup. (M.Malfas, 2004). This thesis emphasizes on Commonwealth Games which were recently hosted by New Delhi, India in 2010. In the recent years SME have acted as a catalyst for the urban regeneration of the cities or regions that host them. They fast forward the usual development process from a couple of decades to less than a decade. It has also become an incentive to propose and accomplish developments that were stagnant for a long period of time. Not only urban regeneration, these events bring significant

changes in the economic, socio-economic structure and tourism industry of the city, region or country. These also provide opportunities for regions and cities to develop in an internationally competitive environment and through place making and restructuring they can promote the city or region. (M.Malfas, 2004). Such changes that occur while hosting an SME is known as legacies. These are of two type's visible and invisible legacies which will be discussed later in this chapter.

COMMONWEALTH GAMES

History of Commonwealth Games

The Commonwealth is an association that comprises of several sovereign and independent states and countries all over the world. The association embraces 30% of the world's population with people from different races who speak different languages and follow diverse culture and traditions (Federation C. G., The Role of the CGF, 2012). The Games associated with the Commonwealth countries started in the year 1930, when the Commonwealth Games were held for the first time in the city of Hamilton, Canada. During this time there were only 11 countries that participated with a total of 400 athletes who took part in 6 sports and 59 events. The first games were under the influence of Bobby Robinson of Canada who funded the travel cost of all participants by providing an amount equal to \$30,000. This helped in making the Commonwealth Games possible for the first time which was only being discussed for the past 30 years among the Commonwealth Countries. (Federation C. G., 2011).

Since the first games, they have been organized periodically after every four years except during 1942 and 1946 due to World War II. The Games have seen huge changes including the

change in name. The Commonwealth Games were named as the ‘British Empire Games’ from 1930 to 1950, and then to the ‘British Empire and Commonwealth Games’ from 1954 till 1966 and to the ‘British Commonwealth Games’ in 1970 till 1974. Finally, in 1978 when the games were held in Edmonton, Canada where the Commonwealth Games were seen as unique, multi-sport event, its name was changed to what it is called today the ‘Commonwealth Games’. It is often referred as the ‘friendly’ Games and has seen a few benchmarks in the sporting history. First, was in 1998 Kuala Lumpur Games where team sports were introduced and second was 2002 Manchester games where for the first time medals were awarded for Elite Athletes with a Disability (EAD) (Federation C. G., 2011). The Commonwealth Games have grown tremendously over the period of eight decades in all dimensions. Following table 2.1 shows the increase in participation from the first Commonwealth Games that were held in 1930 and the recent one held in 2010 (Federation C. , <http://www.thecgf.com/games/growth.asp>, 2011).

Table 2.1 Growth of Commonwealth Games from 1930 - 2010

S.NO.	Year	Host City, Country	Countries Participated	Sports	Events Contested	Athletes
1.	1930	Hamilton, Canada	11	6	59	400
2.	2010	New Delhi, India	71	17	272	4352

Source: (Federation C. , <http://www.thecgf.com/games/growth.asp>, 2011)

The Commonwealth Games Federation (CGF) is a supreme authority that is responsible for the direction, policy and control of Commonwealth Games. The Federation makes sure that every Commonwealth Games is a success in terms of organization and celebration and that it promotes the best interest of athletes and helps in the development of sports throughout the Commonwealth Countries. The selection of the city is done in accordance with the Candidate City Manual which is provided to the Candidate City 18 months prior to the selection of the

host city. After a city is being selected, it has seven years to prepare for the Games (Federation C. , Constitution, Regulation and Code of Conduct, 2010). The CGF also took responsibility in expanding the sporting legacy amongst the youth of the Commonwealth nations and started the Commonwealth Youth Games (CYG), for athletes between the ages of 14–18 years. It was inaugurated in Edinburgh with an intension to provide opportunity to the young aspiring athletes (Federation C. G., 2011).

The Bid Book

The Bid Book is a document which is given to candidate cities that are competing to host the Games. The book provides an outline of planning steps that the city has to follow in order to deliver successful Games.

LEGACY

DEFINITION

In general legacy is ‘something transferred by or received from an ancestor or predecessor or from the past’ (Inc., 2011). Brook also defines legacy as the thing which is handed over from the past (Brook, 2010). In this thesis the word legacy is concentrated mainly on the one that is left after an SME. Gratton and Preuss (Pg. 1923) say that there are many types of legacies that originate from an SME and are found in literature but none of them define legacy (Preuss C. G., 2008). Although Cashman says that word legacy is ‘elusive, problematic and even dangerous’ for many reasons. He explains that legacy has a different meaning in different context for example it might be positive for organizing committees but may not be a beneficial legacy for the community in long term (Cashman, 2005). Gratton and Preuss (Pg. 1924) define legacy on

the basis of three dimensions i.e. degree of planned, positive and quantifiable structure as ‘planned and unplanned, positive and negative, tangible and intangible structures created through an SME that remain even after the event’ (Preuss C. G., 2008).

Brook further explains that ‘Legacy planning takes place ahead of major sporting events to ensure what is left after the event is beneficial for event’s stakeholders especially the host city and local community’. He broadly categorizes legacies into economic, social, environmental and sporting legacy (Brook, 2010).

KINDS OF LEGACY

With a fair amount of evidence Cashman identified six fields of legacies: economics, infrastructure, information and education, public life, politics and culture, symbols, memory and history (Cashman, 2005) (Preuss C. G., 2008). Furthermore Preuss categorizes legacies of an SME into positive (i.e. new event facilities, general infrastructure, urban revival, international reputation, increased tourism, improved public welfare, additional employment, local business opportunities, corporate relocation, city marketing, renewed community spirit, inter regional cooperation, production of ideas and cultural values, popular memory, education and experience and know – how) and negative (i.e. high construction costs, investments in non needed structures, indebtedness of public sector, temporary crowding problems, loss of permanent visitor, property rental increases, temporary increase in employment and business activities and socially unjust displacement) (Preuss H. , 2006). He also explains that legacy is different for different cities, events and times when they occur. He postulates them into three categories 1) same event in same city, 2) different events in same city and 3) same event in different cities. The three scenarios lead to different kinds of legacies. Also ATKearney a global

strategic management consulting firm says that a host can be successful if 'it believes the tangibles and intangibles are greater than the sum of their parts' and thus they concentrate on three areas 1) social legacy that includes community revitalization, education and culture, workforce skills, nation pride and unity 2) sports legacy with participation, competitive skills and commercialization and 3) environmental legacy which incorporates beautification and going for the green (ATKearney, 2011).

In case of XIX Commonwealth Games 2010 the legacies that were projected by the Organizing Committee was one, to enhance the image and stature of India; two, to project Delhi as a global destination; three, to act as catalyst in sustainable infrastructural development; four, to add up to the prevailing upbeat mood in the Indian economy and five, to create opportunities for trade, business, investment for Delhi and India (Majumdar, 2012)

Infrastructural Legacies

Apart from all the legacies mentioned above one of the major change that is brought by an SME is the urban renewal of the host city. An SME has been evolved as a promising tool and catalyst for the urban renewal of the host city. The renewal includes reconstructions and new developments in order to meet the world class requirements for the event which results in infrastructural legacies. These infrastructural legacies are either permanent or temporary. The thesis focuses on permanent infrastructural legacies that an SME leaves behind. As the scale of SME has been rising ever since they were first conducted, the need for sport infrastructure and supporting facilities have also increased. The emphasis is given to enhance the sport facilities in order to meet international standards. Not only the sport but additional supporting facilities like transport and telecommunications, accommodation and environmental improvements are essential for the success of an SME. Essex and Chalkley (pg. 7) have compared the

infrastructural improvements in Summer and Winter Olympic Games from 1896 – 2002. In their study the Games started with a small scale, poorly organized and with minimal or no new developments. Over the years Olympic Games grew in scale thus creating demand for new infrastructural facilities especially in transportation. Finally, the scale was increased to a level of regional and urban transformations including multiple Olympic villages (Chalkley, 2003). . Other urban infrastructural developments includes sport infrastructure for training and competition, general infrastructure of city like airports, roads, telecommunications, hotels, housings for athletes, officials and media, entertainment facilities, fair grounds , parks and more (Preuss H. , 2006). Even Szymanski says that it is better to invest in productive activities that are for a longer period of time than in short term activities (Szymanski, 2002).

Transportation Legacy

The thesis deals mainly with the changes made in transportation facilities and infrastructure leading to a transportation legacy, as transport plays an important role in the movement of participants, spectators and officials. An efficient transport facility is one with minimum to no congestion and delays in the movement of participants, spectators and officials. Any flaw in the system leaves a lasting impression on the visitors. To meet the huge influx of people while hosting an SME requires a range of changes in the transportation facilities of the host city like, expanding airport capacity, building new roads and flyovers, increasing capacity of road, and introducing and enhancing the public transit system (Chalkley, 2003). Thus, an SME is often seen as catalyst for transport and sport infrastructure development. Most of the transport projects go far beyond their role during an SME and is often a major legacy (Bovy P. H., 2008). Apart from the above mentioned alterations in the transportation system, transport plays a significant role in a scenario where there are a number of venues operating for the same SME.

In such a case transport services becomes essential in making the event a success. The next section of thesis will look into the significance and importance of transportation while hosting an SME.

TRANSPORTATION AND MEGA EVENTS

ROLE OF TRANSPORTATION IN MEGA EVENT

Transport is a means to provide access to various destinations and helps in the mobility of people and goods. Need of transport is a result of a demand caused due to any event. In case of attending a mega event ‘the demand for travel is heavily constrained both in time and space’ (Robbins, 2007, p. 303). It means that visitors and participants of the event share a common location as destination and a similar time as that of the event, creating a peak demand. While hosting a mega event, role of transport is to meet this peak demand without delays and congestion.

The function of transportation is twofold, first is accessibility to the host city by air, rail, road and in some cases by sea and second is accessibility and connectivity within the host city for residents, spectators, officials, athletes and their family (Bovy, 2008). Usually, airport plays an important role in accessing the host city and acts as a gateway for the city. Since, airport creates the first impression on the visitors it is essential that it functions properly with no delays and can handle the extra influx of passengers during the Games. Within the city, connectivity between competition venues (where the participants compete like stadiums) and non-competition venues (where the participants and visitor reside like the Games village or hotel) are critical. Any delays, accidents or other inconsistencies in the transportation system can ruin the image of the city. Finally, the following quote from Robbins et. al (2002) seems appropriate

to summarize the role of transportation “as *bringing a variety of impacts, but also potentially leveraging various benefits such as the ability to influence future transport behavior through the provision of new infrastructure, and providing an opportunity for people to try out alternatives to the car*”.

TRANSPORTATION SCENARIOS

The transportation system for any SME can be categorized by three time scenarios; before the event, during the event and after the event.

Prior to the event, the transportation scenario is the existing facilities and systems as well as the transport amenities that are too developed as per the requirement of hosting the Games. While planning for the Games, Robbins et. al. (2007) mentions that allocation of venues plays an important role. Furthermore, they elaborate on the existing and additional infrastructural facilities that are required with respect to the venue/venues where competitions are planned. While preparing for Olympics or Commonwealth Games the complexity of transportation increases if the competition and non-competition venues are spread over an urban settlement rather than having a single complex. The transportation requirement and demand is higher in a multi-venue scenario and thus creating demand for additional road infrastructure in order to increase connectivity. In addition, Kassens-Noor (2010) mentions that one must align the improvements in the city with the future development and growth in order to avoid pitfalls like underutilization of infrastructure.

During the Olympic Games, there is 'temporary dedicated chartered transport system' mentioned by Bovy (2002) that helps in handling the exceptional demands of the event. Furthermore, the performance of the transportation system is complemented with modal split and dedicated

lanes along with some policy change that was incorporated in Sydney Olympics as measures to meet the demand (Hensher and Brewer, 2002).

After an SME concluded, what are left behind are the transportation legacies like the infrastructural improvements, policy changes and even the behavior of the residents. In a study by Kassens-Noor (2010) on four Olympic cities i.e. Athens, Atlanta, Barcelona and Sydney, it can be inferred that in some cases the legacy of an SME could still be seen for example the use of ring roads in Barcelona has been useful in decreasing the traffic of inner city. Whereas in case of Sydney, they wished to change the ridership by showcasing a successful public transit system during the Games was not too influential.

MEETING EXCEPTIONAL DEMANDS

While hosting an SME the influx of millions of passengers, strain the existing transportation system beyond its maximum capacity (Kassens-Noor, 2010). According to Kassens-Noor's research exceptional demands can be met by making few alterations in the transportation system and in its management operations. Collaboration and coordination of public, private and active transport system is necessary and assigning one authority will help in communication and control of the system. She further mentions that segregation of travelers is essential to easily meet the requirements of peak demands. This can be explained by segregating athletes, spectators and officials from media and other logistics and staff. Thus, prioritizing the movements of certain category of travelers from one venue too another. Kassens-Noor (2010) also suggested that incorporating one-way routes in the transport system would avoid opposite flow of traffic and delays, and minimize the time taken from one

destination to another. She further mentions that restricting vehicular access to certain areas during the event also helps in managing the traffic.

TRANSPORTATION REQUIREMENTS

According to Robbins et.al. and Bovy, following are the factors that determine the transportation requirement during the Games.

Location: The geographical extent of an SME has a significant contribution in enumerating the transportation need. Robbins et.al. suggest that, urban locations are highly developed in their transportation system and infrastructure along with comprehensive network connections that integrate different modes of transport, thus ease the accessibility and connectivity within the urban setup. Additionally, they mention that, while hosting an event in rural location not only lacks in the infrastructural development but also in modal share. In a rural location the percentage of car travel is more than that of a public transit (Robbins et. al.2007).

Type: In some of the SME's like the Football World Cup or Cricket World Cup the event is not concentrated in one city but is dispersed all over the country in many cities and are held in permanent structures like stadiums in order to compete with the teams. Such a dispersal of competitions among multiple cities, limit and decrease the pressure on transportation system of a particular city. On the other hand in case of Olympic Games or Commonwealth Games, this is hosted by one city, meets with the complexity of different venues which are either scattered within the city or concentrated in one section of the city. In case of scattered venues the transportation system is challenged to a greater extent in order to meet the daily traffic requirements as well as the additional traffic that has been generated due to hosting the games.

Size: The size of the Games has been increasing ever since they were played for the first time. The increase in size has led to an increase in the number of visitors, families of athletes, officials, and more. According to Bovy (2002), the biggest challenge is to manage the additional 1.5 million people in the city along with the daily traffic.

Duration: The duration of Games plays an important role in determining the transport requirement. During Olympics or Commonwealth Games, a large influx of visitors, athletes and spectators are added to the city over a period of 2-3 weeks, thus facilitating them with proper transport facilities, which is done by constructing large scale infrastructural facilities and then justifying these facilities as a beneficial step for the host city (Robbins et. al., 2007).

Frequency: According to Bovy (2002) the transport issues and needs vary with respect to the frequency of the event occurrence. For instance if an event occurs recurrently like cricket or football tournaments, the transportation needs and issues are also experienced and handled by the city on a regular basis. Whereas, Olympics or Commonwealth Games have a very low or nil frequency of occurring in the same city consecutively and if the city is organizing for the first time the transportation needs are amplified and require implementation of new strategies to meet the exceptional demands.

Mono-multi Site: The transportation demand varies with the spatial concentration or distribution of event venues during an SME (Bovy, 2002). A multi-site event has a complicated and huge network, thus implementing strategic transport planning to move athletes, officials, visitors and spectators from one venue to another in specific time. While, in case of a mono-site like that of Sydney Olympics the main task was to create an efficient transport system to move the people from the city and surroundings to the competition venue (Bovy, 2002).

Mono-multi Scheduling: Mono-scheduling means one event per day and multi-scheduling means many events occurring simultaneously in one day. The latter scenario requires high level of transport planning as the frequency of participants, officials and visitors' travelling from one venue to another is high within a specific time period (Bovy, 2002).

ORGANIZING COMMITTEES INVOLVED

In order to meet the transport demand several strategies are used, but to run those it is essential to have a good organizational structure that helps in a successful delivery of an SME. Bovy (2008) briefly mentions not only about the organizational structure for the SME but also for the transport delivery. According to him an organizing committee is a prerequisite for the planning and delivery of the SME. The organizing committee also deals with government agencies and collaborates with them for infrastructural and other facilities for the SME. Along with this there should be a transport department whose major purpose is to develop strategic and operational planning as well as testing the delivery services before the commencement of the SME and a Director of the department who should coordinate the delivery of transport services Bovy (2008). Some of the examples of the above transport organization are Olympic Road and Transport Authority (ORTA) for Sydney Olympics (Hensher and Brewer, 2006) and Olympic Delivery Authority (ODA) for London Olympics (Bovy, 2008)

STRATEGIES USED IN PAST

In order to maintain an unobstructed movement of athletes and their families, visitors, officials and spectators, numerous strategies are used in previous SMEs.

First and foremost improvement, is the infrastructural developments that are done like repairing roads, extending roads by adding new lanes, constructing new roads, flyovers,

underpasses and expanding of subway stations (Kassens–Noor, 2010). Other improvements included enhancement of airports like adding a new terminal and runway, increasing the public transit fleet like buses and taxi cabs and connectivity between airport and different venues.

Second, managing the public transport system is an essential task to meet the requirements during an SME. To do so, temporary alterations are done like, provision of dedicated lane for the bus services and providing park and ride facility to access the public transport like subways (Hensher and Brewer, 2006). Furthermore, breaking down the transit system and the transport fleet into categories like Athlete’s Village bus service, free loop service in the center of the city and regular inner metropolitan area service, as it was done in Sydney Olympics in accordance with the routes they served (Hensher and Brewer, 2006).

Third, is the management of traffic during Games to prioritize and ease the traffic flow. Kassens–Noor (2010) mentions two methods of maintaining the free flow of traffic. One is the Intelligent Transport Systems (ITSS) and another is Traffic Management Center (TMCs). The ITSS helps in management and security of athletes, officials and spectators while travelling. This includes cameras on major roads, information boards for road conditions and detours and emergency signs. Whereas, the TMCs manages the overall traffic scenario in the city including other traffic management measures which incorporates road closures and driving and parking restrictions within the city (Kassens–Noor, 2010).

Fourth is, certain strategies that are used to manage the total transport demand of the city. As stated by Kassens–Noor number of trips of the workers could be eliminated by transferring them to branch offices outside the urban setup in order to reduce the basic traffic load on the transport system. She further mentions that by enabling a flexible schedule for businesses will

change the traffic load during rush hours of the day from 7–10 a.m. and 4–7 p.m. and also by avoiding some vehicle types and freight deliveries.

Fifth, encouraging alternative modes of transport like subway and buses instead of cars. As reported by Kassen–Noor some Olympic cities like Barcelona and Atlanta, organized informational public campaigns to encourage residents for using public transit. While in Sydney Olympics the provision of free ticketing method was incorporated (Hensher and Brewer, 2006), meaning, the Games ticket holder will be travelling free in all the public transport systems that were used to reach the destinations. Another policy was incorporated during the Olympic Games in Sydney which was increasing the tariff of taxis in the inner city to encourage public transport (Hensher and Brewer, 2006).

TRANSPORTATION MANAGEMENT DURING EVENT

For attaining success during the event, a few managerial strategies for logistics should be combined with the other aforementioned strategies. These include daily feedback and meeting during the Games, continuous tracking of drivers and the operators as well as record of the vehicle leaving and entering the depot (Hensher and Brewer, 2006). They also recommended that adequate information about the Games, acquaintance with the bus routes and living services for the drivers and staff is essential for an outstanding transport performance.

CHAPTER 3

BACKGROUND

LOCATION

New Delhi, the capital city of India is located in the northern part of India lying between latitudes 28°-24'-17" and 28°-53'-00" North and longitudes 76°-50'-24" and 77°-20'-37" East covering a total area of 1483 sqkm (572.58 sqmi) within the city limits. The maximum length and width of the city is 51.90km (32.24mi) and 48.48km (30.12mi) respectively. The geographical features that surround the city are the Yamuna River on the east and the terminal part of Aravali Ranges on the west (Limited I. E., 2006, pp. 2-1). The city is divided into three regions namely The Yamuna Flood Plain, The Plains and The Ridge. Along with this the city lays almost 300mts above the sea level (Limited C. I., 1999). The National Capital Region (NCR) comprises of numerous districts. These districts include entire National Capital Territory (NCT) of Delhi, and fourteen districts from adjoining states namely eight from Haryana, five from Uttar Pradesh and one from Rajasthan (Limited I. E., 2006).

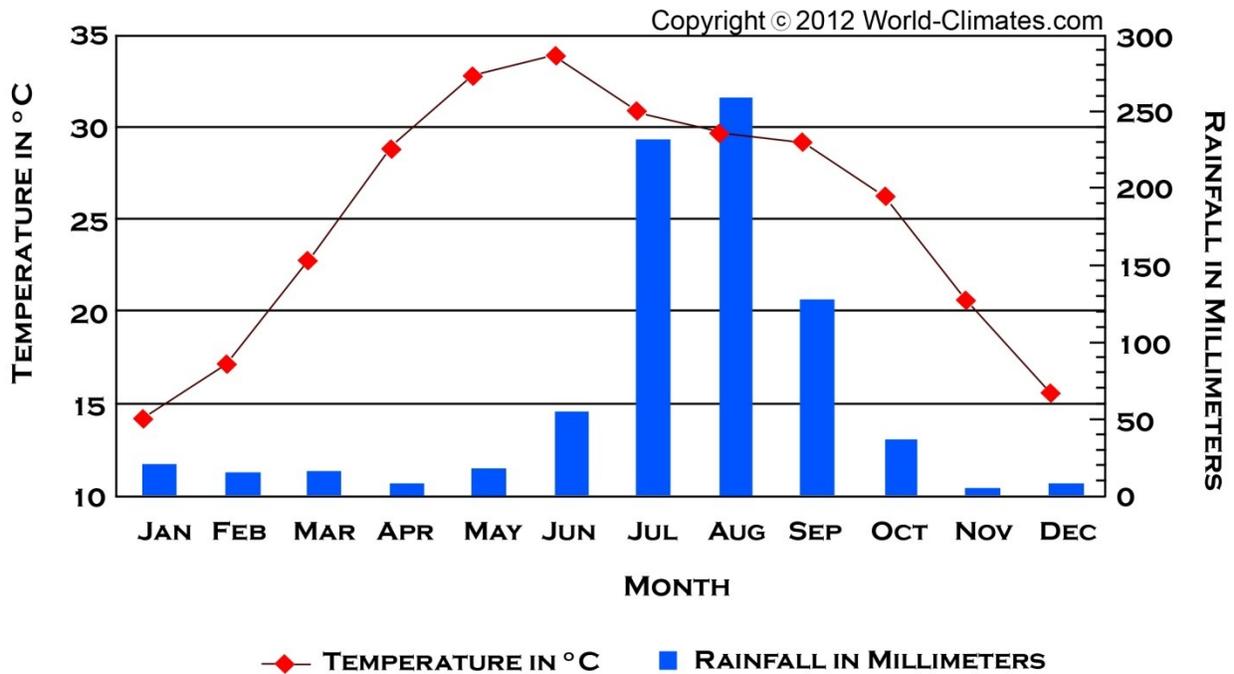
CLIMATE

New Delhi experiences extremities of weather conditions during summer and winters along with the sub-tropical humid climate. The city experiences long summers starting from mid April and extends up to mid June with temperatures ranging from 27°C-45°C (80°F-113°F) (Delhi Information, 2010). Comparatively city experiences short but harsh winters from November till March with temperatures ranging from 5°C-12°C (41°F-54°F). Average annual

rainfall received is 714mm that falls from mid June and extends up to October. The heavy rainfall in the region also leads to the flooding of the River Yamuna (Limited I. E., 2006, pp. 2-1).

Figure 3.1 Average Rainfall & Temperature in New Delhi, India.

(For the interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this thesis.)



Source: (Delhi Information, 2010)

SOCIO-ECONOMIC PROFILE

Being the capital city of the country, New Delhi has ample opportunities for employment thus, becoming one of the fastest growing cities in the country. The growth rate of the city for decennial year of 1991-2001 was 47% with a population change from 9.4 million in 1991 to 13.8 million in 2001 (Limited I. E., 2006, pp. 2-2). Although the growth rate of the city has declined to 20.90% for the next decennial year from 2001-2011 with a population of 16.7 million for the year 2011 (Imagin Mor, 2011). The population density of the city has increased

from 9,340 persons/sq km in 2001 to 11,297 persons/sq km in 2011 (Indian Census, 2011). The Gross State Domestic Product of Delhi has been increasing steadily from 11.8% in 2003-04 to 14.9% in 2007-08 (Planning Dept., 2009).

HISTORY

The city of New Delhi has been evolved in various stages with numerous names and characteristics. In all the stages except the post independence the city is recognized by the various forts built in and around it. Finally, during the colonial rule of Britishers the capital was shifted from Kolkata to Delhi in 1911 and its development started in 1931 and city changed from Delhi to New Delhi. Since then the city has been evolving and spreading over the decades. The New Delhi also known as the Lutyens Delhi was basically formed because Britishers wanted to shift their capital to an inland place. After the independence of India in 1947 New Delhi was declared the capital of India in 1953.

MODES OF TRANSPORTATION

Transportation demand has increased tremendously in many Indian cities due to exponential growth in population. This growth in population is not only due to natural increase but also due to migration from rural areas and adjacent small towns (Singh, 2005, p. 80). New Delhi with a population of 13.8 million in the year 2001 had a vehicular population of around 5 million (P.K. Sarkar, p. 111). The table below shows the vehicular growth in the four metropolitan cities in India. table 3.1 clearly shows that New Delhi has maximum amount of vehicular registration from 1995 – 2000.

Table 3.1 Number of Registered Vehicles in Metropolitan Cities of India from 1995 - 2000

Metropolitan Cities	1995	1996	1997	1998	1999	2000
Chennai	768	812	890	975	1056	1150
New Delhi	2432	2630	2848	3033	3277	3423
Kolkata	561	588	588	664	N.A.	N.A.
Mumbai	667	724	797	860	911	970

Source: (Singh, 2005, p. 82).

Along with the above listed vehicular population the city of New Delhi is supported by different modes of transportation. These are privately owned cars, motorbikes and bicycles in case of private transport. For mass transit the city has a large fleet of buses and Light Rail Transit (LRT) known as Delhi Metro. Along with this the city has auto-rickshaws (basically three-wheeled taxi) and cycle rickshaws. The city has a high demand of personalized mode of transport than for the mass transit system. This can be seen in table 3.2 below where the vehicular population is categorized into different private and public transport vehicles and is compared within the four major metropolitan cities in India.

Table 3.2 Private & Public Transport Vehicles in Metropolitan Cities of India (March '00)

Metropolitan Cities	Two-wheelers	Cars	Taxis & Auto-rickshaws	Buses	Others	Total
Chennai	848118	207860	45016	4409	44223	1149626
New Delhi	2184581	869820	104747	37733	226593	3423474
Kolkata	298959	238560	41946	8586	75995	664046
Mumbai	407306	325473	156261	15414	65226	969680

Source: (Singh, 2005, p. 83).

URBAN TRANSPORT INFRASTRUCTURE

There are three major transport infrastructure facilities that are provided to the residents of the city. These are airport, roads and railways.

Airport

The city of New Delhi is being served by two airports; one is the Safdarjug airport for a domestic purpose which was closed in 2001 but catered the domestic flights and another is the Indira Gandhi International (IGI) Airport caters both domestic and international flights. The Airport is a main gateway of the city to the other parts of the world. According to Sarkar et.al. the passenger both domestic and international as well as goods traffic has increased tremendously from 2001 with a growth rate of 12% (P.K. Sarkar, p. 115).

Roads

Motorized vehicles are the major mode of transport in New Delhi leading to the longest road networks. With the increase in the vehicular population there has been increase in the road network from 8380km (5207.09mi) in 1971-72 to 28,500km (17,709.08mi) in 2001 which is

almost three times in three decades. The roads in the city are categorized into four categories namely arterial, sub-arterial, minor arterial and collector roads (Limited I. E., 2006, pp. 11-3). Not only the city has the highest road infrastructure it also has the highest road density of 1284km/100sq km of area (P.K. Sarkar, p. 112).

Railway

New Delhi is the junction of five major northern railway lines providing a high level of connectivity with the other parts of the country. It has four major railway terminals i.e. New Delhi terminal, Old Delhi terminal, Hazrat Nizamuddin terminal and Sarai Rohilla terminal along with the container depot at Tughlakabad terminal. On an average the five corridors bring up to 350 passenger train and 40 cargo trains in to the city on a daily basis (P.K. Sarkar, p. 112).

PAST EXPERIENCE

The Asian Games of 1951 at New Delhi

Asian Games are the oldest and most prestigious games of the Olympic Council of Asia (OCA). The first Asian Games were held at New Delhi, India in 1951, starting from March 4th to March 11th. There were in all 11 participating countries with 489 athletes competing for 12 different sports. Almost all competitions took place in the Dhyan Chand National Stadium. This shows the scale of Asian Games as compared to the recent ones. Due to small scale of the Games the infrastructural developments and legacies left behind were also minimum.

The Asian Games of 1982 at New Delhi

India hosted the first ever Asian Games in 1951 just after the Independence with very small attendance of 11 countries competing for six sports (Vinayak Uppal, 2006). At that time the Dhyani Chand National Stadium former known as the 'National Stadium' was built. Again, India hosted the Games in 1982, this time the scale of the event was increased with more number of countries participating and competing for a higher number of sports. With such an increase in sports the facilities required were also huge in number considering the economy of the country. To achieve those requirements a number of stadiums, flyovers, hotels and the Games Village was built. The major new constructions that took place while the hosting of Asian Games and changed the skyline of the city.

Stadiums. Jawaharlal Nehru Stadium or the opening and the closing ceremonies of the event as well as for the athletic competitions'. Other stadiums were the Talkatora Stadium, Indira Gandhi Indoor Stadium and the Yamuna Velodrome. Pragati Maidan was developed as a major exhibition area.

Asiad Village. The residential area for the participants and the officials was a huge residential development in the South Delhi region near Siri Fort. The Players building was the VIP complex for the senior officials.

Hotels. Some of the luxurious hotels of New Delhi were built for the Asian Games. Among them Hotel Kanishka, the Mughal Sheraton and The Taj Palace were the main hotels.

Roads and Flyovers. Various major roads were widened and four flyovers were built during the preparation for the Asian Games. Three out of the four flyovers were built in the South Delhi

region for the ease in movement of the players from the games village to the competition venues.

Some of the shortcomings that were experienced during the building up of the city for the Asian Games is that least importance was given to the economics and the normal planning procedures for the development and even the master plan was kept aside to meet the requirements for the Asian Games. For example the Siri Fort area which was developed as the Games Village was originally assigned as the green space in the master plan (Vinayak Uppal, 2006). It is believed that such mega events provide enough jobs but it was observed that during Asian Games the labor was paid wages lower than the usual.

Legacies from the Asian Games

One of the most significant developments that occurred was the development of the Games Village. It had a direct impact on the development of the city's southern part. Along with this the Moolchand, Sewa Nagar and Oberoi flyovers were built in South Delhi, which provided the appropriate transport infrastructure for development (Vinayak Uppal, 2006). Apart from the transport infrastructure the area was also provided with amenities like water, electricity and other civic facilities.

Some of the negative legacies were poor construction methods and materials used to construct the buildings which became non usable by the 1990's. Constructions were left as they were when the Asian Games concluded. The Players building was abandoned for 15 yrs after the Asian Games and then converted into Delhi Secretariat (Vinayak Uppal, 2006). The condition of the buildings deteriorated for example the Yamuna Velodrome was filled with cracks and the Nehru Stadium was falling apart due to lack of maintenance and minimal to no usage of the facilities. The Talkatora stadium was not completed before the Games and was left the same as the Games ended. (Vinayak Uppal, 2006).

CHAPTER 4

METHODOLOGY

For the purpose of this research the author looked retrospectively into various mega events. The goal of the study is to understand the relationship between mega events and developments that is involved. The study is a retrospective cohort study; this type of study is historic in nature and is accompanied by certain variables. There are many types of mega events but in this specific study Sports Mega Event (SME) is taken into account like Olympic Games, Commonwealth Games, and Asian Games etc. Similarly there are several developments that occur while organizing an SME for a successful delivery; these are infrastructural, transportation, logistics and more. The focus of this thesis is to study the transport developments that occurred while delivering an SME.

As an objective of this research the SME that was studied by the author is the XIX Commonwealth Games 2010, New Delhi, India. This mega event was organized by the city after 28 years i.e. after the 1982 Asian Games. There were certain inclusive and exclusive criteria's which were determined so as to choose the XIX Commonwealth Games, 2010.

Inclusion Criteria

The inclusion criteria for the study was an SME that occurs at a frequency of 4-7 years with duration of a week to a fortnight or even more. The criteria also includes that the SME is hosted by a developing country and in an urban location. Finally, to look into transport infrastructural developments amongst all the developments that occurred while hosting an SME.

Exclusion Criteria

The exclusion criteria were to include no other type of mega event like an expo or a music festival. In terms of sports, the single sport events like football or cricket world cups were excluded. The events that occurred every year or even every alternate year were not included in the study. Also events that occurred in different urban locations of a country were eliminated from the study.

DATA ACQUISITION

The data acquired for the research was gathered through archival database which was collected during the process of preparation for the Games. These were the official documents that were issued by the Government of India, the Organizing Committee for the CWG 2010, the Government of National Capital Territory of Delhi, Commonwealth Games Federation as well as research papers by various authors on the subject.

METHODS

The aforementioned criteria's and data acquired were examined qualitatively by researching previous investigations on the related topic and understanding the lessons derived by them. Most of the studies related to mega events and transportation are done on Olympic Games and these studies are the basis of the author's research. The parameters that include the study are the prior status of transport within the city when the Commonwealth Games were not awarded. Then the development that occurred during the preparation for the Commonwealth Games, which is this study, is 7 years. The final parameter is to understand the transport delivery during the Commonwealth Games. These three are the main parameters that are analyzed in this thesis.

The method used to analyze the role of Commonwealth Games 2012 in catalyzing the development process is a 'qualitative data analyses. In order to perform the above mentioned method the author looked into the archival data about developments that were planned before the Commonwealth Games were awarded, through the Master Plan of 2001 of New Delhi. Furthermore, the data gathered during each economic year related to the development of transportation was analyzed. Therefore, the content analysis of the data acquired before and after the Games as well as during the Games was analyzed so as to understand the planned and unplanned developments that occurred during the seven year preparation time for the Commonwealth Games.

Finally, the analyzed data would be discussed to understand how these alterations in transport system affect the behavior of residents towards an alternate system that was developed and promoted during the course of Commonwealth Games.

CHAPTER 5

ANALYSIS

XIX COMMONWEALTH GAMES 2010

The XIX Commonwealth Games were awarded to New Delhi, India in November 2003 against Hamilton, Canada at a Commonwealth Games Federation general assembly held in Montego Bay, Jamaica after submitting the bid in May 2003 in London. The 12 day event was commenced on October 3rd 2010 and concluded on October 14th. The Commonwealth Games was the biggest sporting mega event that was conducted by the city after the 9th Asian Games of 1982. Before analyzing transport infrastructural changes that the Commonwealth Games incurred, it is important to understand the major stakeholders and the organizational structure that was involved in delivering successful Commonwealth Games.

Stakeholders

Commonwealth Games Federation

The Commonwealth Games Federation (CGF) is the supreme authority concerning Commonwealth Games. It helps in preparation and conduct of the Commonwealth Games along with following the mission of maintaining the integrity of the Commonwealth Games. It acts as a link between International Federations and Commonwealth Games Association and ensures their corporation during the preparation and gaming period. Its vision is to promote world class games and sporting spirit among the Commonwealth countries and to ensure that the Games are a success (Federation C. G., www.thecgf.com, 2012).

Indian Olympic Association

The Indian Olympic Association was established in 1927 and is a national federation representing each sport. It works in conjunction with the State Olympic Associations in order to select the participants for Olympics, Commonwealth and other games. Some of its responsibilities are to decide the organization of Olympic, Commonwealth and Asian Games. It also acts as a link between Government of India and member federations or associations. It protects the amateur status of sportsmen and promotes the development of the Olympic Movement (Association, 2010).

Organizing Committee Commonwealth Games 2010 Delhi

The Organizing Committee for the Commonwealth Games was a nonprofit organization which was incorporated on February, 2005 as a registered society under Societies Registration Act, 1860. Its objective was to prepare, organize and conduct the XIX Commonwealth Games 2010 in National Capital Region of Delhi. It played a major role in planning, coordinating and implementing all operating activities that were necessary for the staging of successful Games (Committee O. , 2010)

The Government of the National Capital Territory of Delhi

This is a government body that represented the host city (New Delhi) and ensured to deliver all the requirements for successful Commonwealth Games. These requirements include civic, transport and other infrastructure, amenities and services. The two agencies attached for the delivery of Commonwealth Games were the Delhi Development Authority for the infrastructural improvements and Delhi Police for the security of the venues and guests (Committee O. , d2010.thecgf.com, 2010)

Government of India

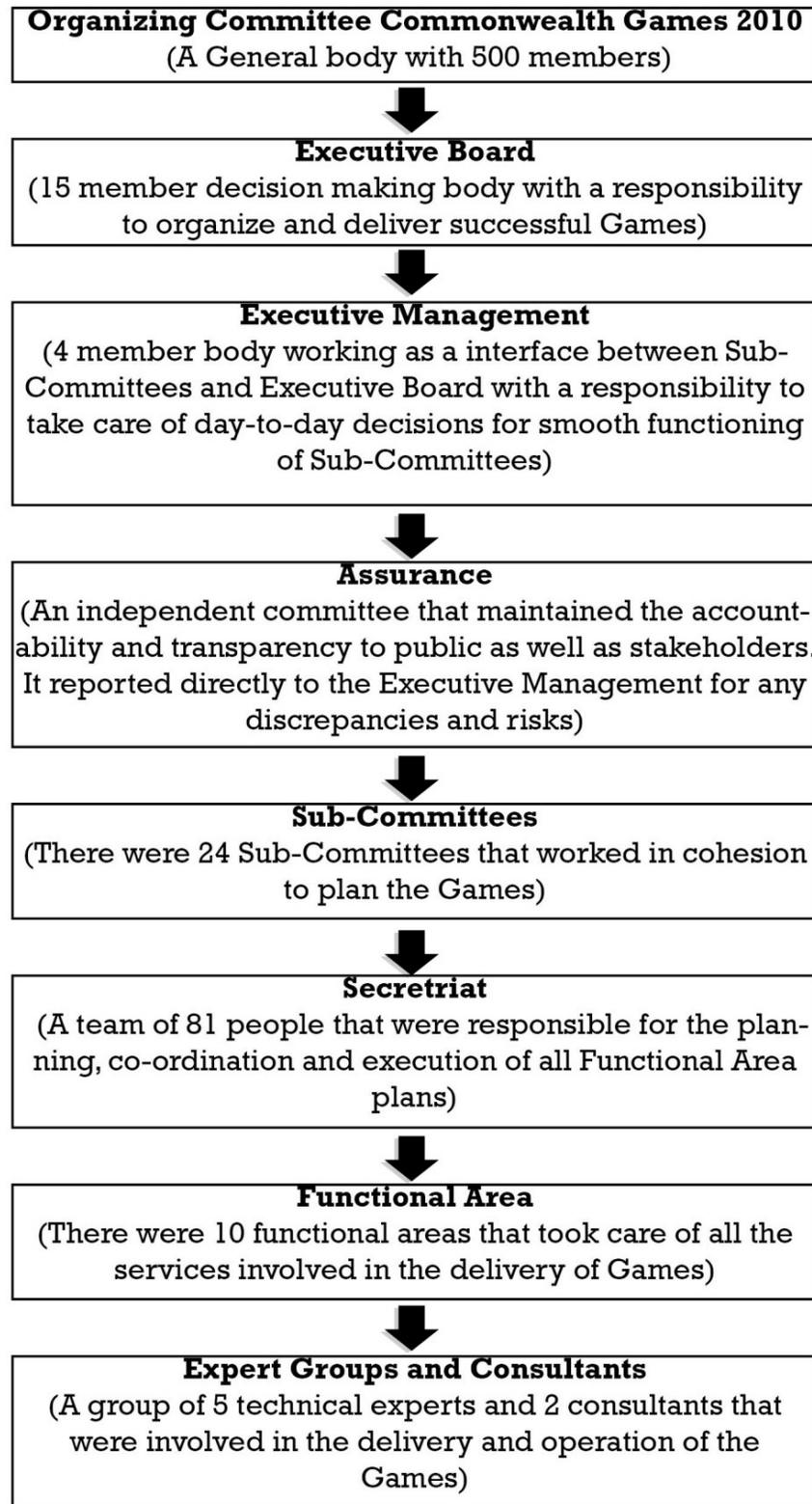
The Government of India is a sovereign government that helped and supported in the initial bidding process and also ensured the funding to conduct the Games. There were various agencies that were involved during the preparation process. They were:

1. Ministry of Home Affairs which took care of the conduct contingency planning and security measures.
2. Ministry of External Affairs assisted in visa and work permits.
3. Ministry of Youth Affairs and Sports was responsible for the organization of the Games according to the constitution, protocols and regulation. It also provided funds for infrastructure and organization.
4. Ministry of Commerce and Industry helped in locating the centers for publicity and promotion.
5. Sports Authority of India developed the venues for competition and training according to the requirements in the bid and also the dope laboratory. (Committee O. , d2010.thecgf.com, 2010)

Organizational Structure for XIX Commonwealth Games 2010

In order to deliver a successful Commonwealth Games it is essential to have a hierarchal structure of organization that was responsible for the planning process and delivery of Commonwealth Games. For this purpose the organizations that were responsible are mentioned in the figure 5.1 below in their hierarchal order.

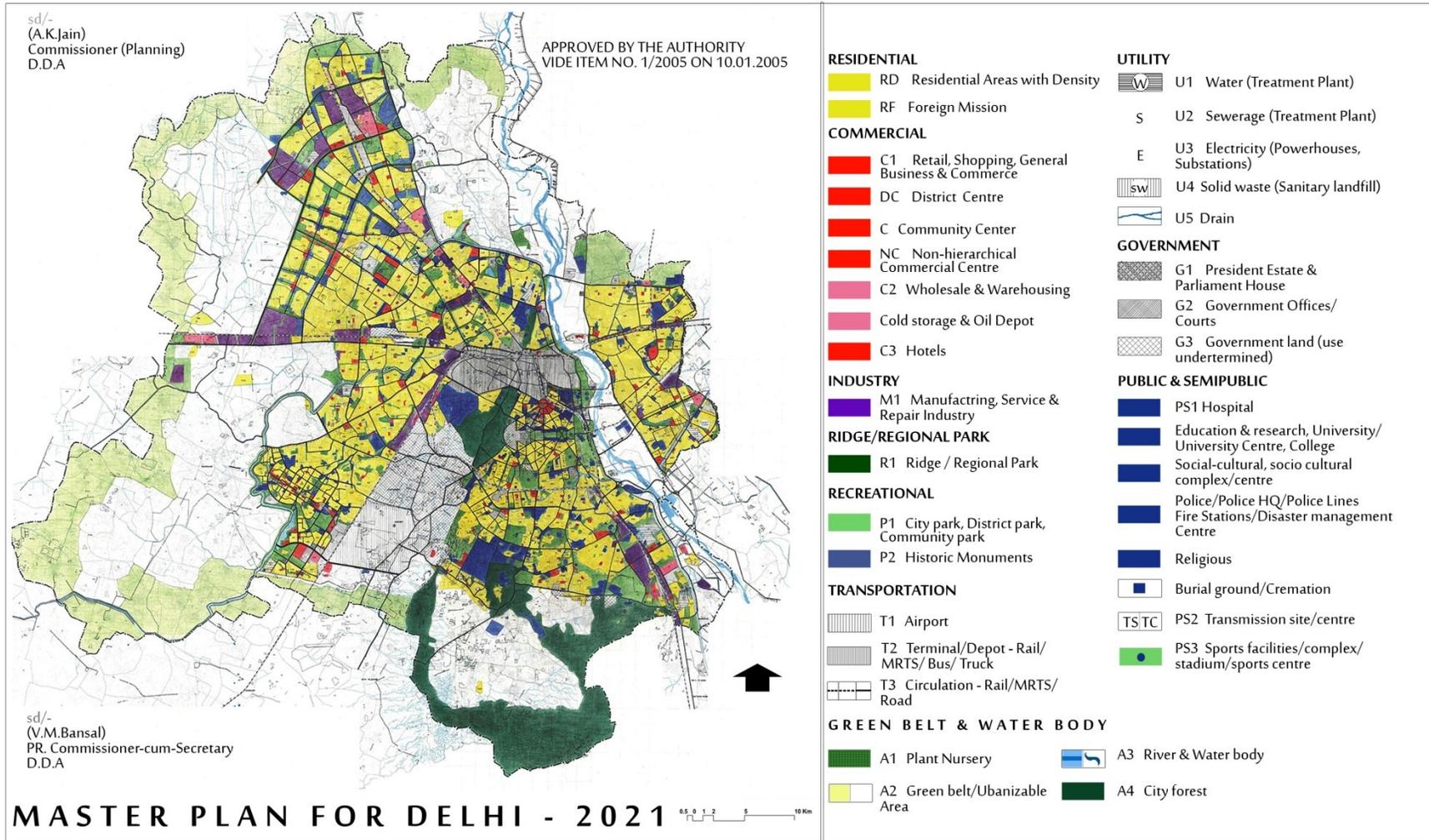
Figure 5.1 Shows the Organizational Structure of the XIX Commonwealth Games, 2010



Source: (Commitee, 2010)

In the next two sections of analysis emphasizes would be given to transport infrastructure modifications. The first section reveals the transport scenario in New Delhi that prevailed during the period of 2001 until 2003, when the bid was won by the city. In the second section that extends from 2003 until the Games commenced i.e. in 2010. This section explores the revisions in transport infrastructure that incurred in order to meet the requirements for the Commonwealth Games.

Figure 5.2 The Map below shows the Master Plan of New Delhi for the year 2021 (The text is not meant to be readable but is for visual reference only)



Source: (Authority, 2011)

TRANSPORTATION BETWEEN 2001 – 2003

This section of analysis will shed light upon the background of transportation system in New Delhi before the Games came into picture. Also, in this section we will know about the goals of the Delhi Development Authority for the next couple of decades through the 2001 Master Plan of New Delhi.

VEHICULAR TREND and RIDERSHIP

According to the Economic Survey of Delhi done in the year 2001-2002, shows the number of vehicles registered had increased from 192 per 1000 persons in 1991 to 251 per 1000 persons in 2001. The distribution of vehicular population into various categories suggests that there has been rapid proliferation in the number of cars/jeeps and a relative decline in the share of 2-wheelers, taxis, and auto rickshaws and goods carrier. There has also been a steep decline from 60% to 40% in bus ridership over the past two decades. Also, a gradual decline in the vehicular growth was seen since 1997-98 but the numbers of vehicles were still increasing. This can be explained by regional migration of population and through traffic which is very common phenomenon in the Delhi region. Also, it was determined that the daily trips made by the citizens were 30 billion within the National Capital Region (NCR) out of which the usage of public transport was less than 50%. Along with this most of the trips made were short distances i.e. less than 10 kms and the residents making these short trips were almost 85% whose requirement was not met by the current public transit system (Chhikara, 2011). The table 5.3 and 5.4 below shows the distribution of population travelled by different modes and distribution of vehicular population among different modes of transport in New Delhi.

Table 5.1 Distribution of Population Travelled by different Modes

Modes	% of population travelled
Rail	1
Buses	60
Cars	30
Others	9

Source: (Planning, 2001-2002)

Table 5.2 Distribution of Vehicular Population into different Modes

Modes	% of vehicular population
Buses	1.2
Two-wheelers	64.5
Four-wheelers	26.6

Source: (Planning, 2001-2002)

ROADS

New Delhi has an extensive road network connecting its satellite towns with the city center.

According to the Economic Survey of New Delhi in 2001-2002 it was established that the road network has increased almost three times i.e. from 8380 kms in 1971-72 to 28508kms in 2000-2001. Not only this, the road density was way pass the national average. It was calculated that the road density of New Delhi was 1749kms per 100 sqkms as compared to national average of 73 kms per 100 sqkms in 1995-96 (Gupta, 1990).

The structure of road network comprises of five National Highways (NH) that pass through the capital city. These are NH-1, NH-2, NH-8, NH-10 and NH-24. Also, the road structure comprises of ring roads that surround the city and caters the heavy traffic of the city. In addition, the road network is categorized by the neighborhood it serves and speed limits. The table 5.3 below shows the categories of roads, their right of ways (R/W), speed limits and the type of traffic it caters.

Table 5.3 Types of Roads that create the Road Network in New Delhi

Road Type	Sub- categories	R/W outside Urban Limits (Mts)	R/W within Urban Limits (Mts)	Description
National Highway	-	100	60-80	-
Arterial Roads	Primary Roads	80	60	Heavy volume of traffic at high speeds of 60km/hr
	Primary all purpose Roads	60	81.45	Heavy volume of traffic at high speeds of 50km/hr. Mass Transit routes
Sub-Arterial Roads	Primary Collector	40	30	Arterial with residential district collectors; separate bicycle tracks
	Secondary Collector	28	18-24	Traffic collector from local street with one residential district including bicycle tracks
Local Streets	-	-	12-20	For neighborhood use

Source: (Gupta, 1990)

According to the 2001 Master Plan of New Delhi the city had an ambiguous development plan which included some of the road developments mentioned below along with other generic development.

1. Proposal of a 94km-long peripheral expressway along the western boundary of New Delhi.
2. 11 flyovers, railway over bridge and grade separators were to be constructed between 1997 and 2002.
3. Proposal of 45 flyovers and 27 bridges along with 21 new projects consisting of railway over bridges, railway under bridges and grade separators on busy intersections in 2002-07.

4. Creation of a multi-modal transport system in order to connect the electrified ring-rail, bus transport and light rail system on selected corridors.
5. Introduction of Mass Rapid Transit System as a necessity with the rapid increase in population.
6. Since buses are currently the main mass transit system; there is a demand of connecting the satellite towns with the main city.
7. Introducing bicycle paths in densely populated area like Old Delhi, Sadar Bazar and Karol Bagh areas in order to improve traffic management (Gupta, 1990).

Other than the developments mentioned above that were initially planned by the Delhi Development Authority there was no mention of up gradation and expansion of the New Delhi airport.

RAIL

The rail network in India is one of the most extensive railway systems in the world and New Delhi acts as one of the major junction in the network. The intercity network has 8 corridors that converge at New Delhi bringing 350 passenger trains per day with an inflow and outflow of around 500,000 passengers per day. The current broad gauge rail network does the intercity and intracity connectivity. Priority was given to the intracity rail network development in 2001 Master Plan in order to increase the intracity connections for the movement of people. It was initially planned to change the locations of three ring-rail stations namely Chanakyapuri, Pragati Maidan and Tilak Bridge which never occurred. Furthermore, there was a proposition of installing five new stations on the current route which never happened. Also, the

introduction of new broad gauge link was proposed from Kirtinagar to a satellite town ‘Gurgaon’ which is now converted into a metro link.

MASS RAPID TRANSIT SYSTEMS (Metro & Rail)

Phase I started in October 1998 and was to be completed by 2005. The revised corridors in phase I was as mentioned below in the table 5.4.

Table 5.4 Revised Corridors of Phase I Delhi Metro

Type	Route	Distance (Kms)
Metro	Delhi University - Central Secretariat	11
Rail	Shahdara - Barwala	28
Rail	Connaught Place - Dwarka	23.16

Source: (Planning, Economic Survey of Delhi, Transport (ESD), 2003–2004)

The phase II of the Delhi Metro was to be commissioned by 2005 and completed by 2010. The corridors planned for phase II are mentioned below in the table 5.5.

Table 5.5 Initial Phase II of Delhi Metro

Type	Route	Distance (Kms)
Metro	Barakhamba - Indraprasth - Dilshad Garden	14
Metro	Central Secretariat - Safdarjung - Vasant Kunj	18.5

Source: (Planning, Economic Survey of Delhi, Transport (ESD), 2003–2004)

TRANSPORTATION FROM 2003 – 2010

Requirement from candidature

The candidature divided the transportation requirement into two sections; the demand of the transport system and its supply. In terms of supply the intention of the candidature was to understand the resources that a host city has to fulfill the demand. These resources included existing transport infrastructure, pre-planned developments (i.e. developments planned prior to winning the bid) and any other infrastructure that is necessary to meet the demand. Furthermore detailed information about the airport like its capacity in terms of passengers handled per hour, number of runways, terminals and departure gates was needed. On the other hand, demand consists of all the participants, their family, officials of different associated organizations, visitors and logistics which include media, press, sponsors, security and technicians. Furthermore, information about the public transport system, their infrastructure, connectivity and fleet size was required. Also, the major road networks and parking areas with their capacity that will be used during the Games. Along with this detailed information about the venues, their distances from each other and journey time between the venues had to be submitted ((CGF), 2003).

Apart from the demand and supply of the transport system, the candidature requires every candidate city to provide a strategic transport plan and operational concepts that will be used during the Commonwealth Games. The strategic transport plan includes operational traffic management and performance plan. Whereas the latter one is further categorized into four sections. One, being organization of transport systems according to the respective group of people like the athletes and officials. Two, was to describe the measures that would be taken to ensure traffic flow, punctuality of athletes and officials and the reliability of the system. Three,

was the ticketing process i.e. if it was to be linked with the transport and parking access. Four, was the training and testing of the transport system along with the officials and staff involved. Lastly, the candidature wanted an authority which is solely responsible for the delivery of transport during the Games ((CGF), 2003).

Transport infrastructure for Games (according to bid)

In total the demand estimated for transport delivery during the Games was around 2.34 million. Following table 5.6 shows the distribution of demand during the Commonwealth Games.

Table 5.6 Distribution of Demand for Transportation during the Games

Category	Number of Attendees
Athletes & Officials	8,000
Commonwealth Games Association representatives	71
Volunteers	30,000
Spectators	22,00,000
National & International Media	5,000
Visitors	1,00,000
Technicians	1,500
Staff Members	1,600
Total	23,46,171

Source: (CWG, 2010)

Transit modes

In all to meet the aforementioned demand there were three transit modes that were used namely private transport services like cabs & taxis. In terms of public transport system there was bus and metro services that were used during the Games.

This was done by constructing the metro system and expanding the fleet. The Games acted as a catalyst in the development of the two phases of metro system. The first phase of the project covered a total of 65.05kms. There were initially three corridors but after continuous revisions following corridors were constructed.

Table 5.7 Alterations in Phase I of Delhi Metro after winning the Bid

S.No.	Corridor	Length (Kms)
1.	Delhi University - Central Secretariat	11
2.	Shahdara - Rithala (Rail, surface/elevated)	22.06
3.	Indraprasth - Barakhamba - Dwarka	25.65
4.	Dwarka - Dwarka 6	6.50
	Total	65.05

Source: (Department, 2005-2006)

In the second phase of metro 11 new corridors were constructed covering a total of 117.25kms. The table 5.8 below shows the corridors and their lengths.

Table 5.8 Final Phase II of Delhi Metro after winning the Bid

S.No.	Corridor	Length (Kms)
1.	Delhi University - Jahangir Puri	6.36
2.	Central Secretariat - Qutab Minar	10.87
3.	Indraprasth - New Ashok Nagar	8.07
4.	Shahdara - Dilshad Garden	3.09
5.	Yamuna Bank - Anand Vihar	6.16
6.	Mundka - Indraprasth	18.47
7.	Qutab Minar - Shushant Lok	15.93
8.	Central Secretariat - Badharpur	19.55
9.	New Ashok Nagar - Noida Sector 32	7.05
10.	Airport Express Link (New Delhi - IGI)	19.02
11.	Extension of Airport Link - Dwarka Sector 21	3.50
	Total	117.25

Source: (Department, ESD Transport, 2008-2009)

The development of these corridors can be seen through Figure 5.5 to Figure 5.12 that are attached in the later part of this chapter. The figures show the completion of metro corridors over the years starting from 2002 till 2010. Through the figures it is visible that the rate of

completion of the corridors increased after 2005 and most of the corridors were finished and started operating in 2009 and 2010.

Another effort was made to integrate the two public transport system; metro and the bus services. In order to compliment the metro, bus system was restructured in a way to act like a feeder system for the metro. Also additional parking facilities were provided at the metro stations to encourage park and ride facilities.

The Delhi Transport Corporation (DTC) provides an efficient public transport system (i.e. Buses) for the city. The fleet of DTC has been increasing continuously along with the ridership. By 2007-08 it made an effort to include 525 low floor air-conditioned (AC) and Non-AC buses. In addition to this the corporation proposed to procure 4500 more of the aforementioned buses by 2009 (Department, ESD Transport, 2008-2009). Apart from this several bus queue shelters were built and the idea of promoting multi-modal transport system was brought into action and its 1st phase to be completed by 2010. Finally, according to the Economic Survey of Delhi in 2008-09 purchase orders were placed for to procure 1500 non-AC and 1000 AC low floor buses for the Commonwealth Games (Department, ESD Transport, 2008-2009).

Infrastructure

In order to run the ground transportation system smoothly during the Games a number of new constructions were done. These construction included flyover and bridges, strengthening and widening of roads and parking near the venues (India, 2009). According to a report of the Commonwealth evaluation commission New Delhi proposed the following infrastructural developments that the city will incur while preparing for the Games. One was construction of 74 new flyovers to improve the traffic flow. Two, was to build a new ring road around the

existing two ring roads to access Games Village and accommodate the increased traffic. Three, was the anticipated total fleet of 2225 including cars, buses and pickup vans to meet the transport requirement for the Commonwealth Games (Commission, 2003).

To ensure the safety of pedestrians a number of foot over bridges and traffic lights were incorporated. The locations of these were strategically marked at T-junctions, other road junctions and at major bus stops. In some cases the foot over bridges was facilitated by escalators.

Airport

The Indira Gandhi International (IGI) Airport of New Delhi consists of four terminals out of which three are dedicated solely to domestic and cargo flights. Terminal 3 (T3) is the latest addition to the airport whose construction started in early 2007 and was opened for public in July 2010 (Ltd., 2012). The development of the airport can be seen in the figure 5.3 below.

Figure 5.3 Development of IGI



Figure 5.3 (Cont'd)



Source: Google Earth Timeline

This airport caters both domestic and international flights and is rated as 6th largest airports in terms of its capacity. It also consists of four boarding piers, 48 boarding gates and 78 aerobridges. The main building of the airport is 8-storied and has 168 check-in counters with 95 immigration counters (Ltd. D. I., 2009). The terminal catered a total of 25.01 million passengers and 0.23 million aircrafts in the year 2009-2010 and it is projected that these numbers would increase (Ltd).

TRANSPORTATION DURING GAMES

Finally, to understand the legacy that was left behind by the Commonwealth Games, it is important to seek knowledge about the transport system that prevailed during the Commonwealth Games. It was a multi-site and multi-scheduled event, which means that there were multiple competition and non-competition venues and there was more than one sporting event scheduled for a particular day. This kind of an arrangement in a sporting event requires a meticulous and precise transportation structure and system to move athletes and spectators from one venue to another.

There were 12 competition venues and 17 non-competition venues which were being connected during the XIX Commonwealth Games. In order to do so, several modes of transport and strategies were used for a comfortable and precise delivery of transportation during the Commonwealth Games. The main objective of the system was to ensure smooth movement of Games related traffic by allowing minimum dislocation of the usual traffic of the city. Apart from this another objective was to promote public transport system with the help of Public awareness program (Police, 2010).

Transit and Strategies used

There were mainly three modes of transport that were used. These were buses, cars and the Delhi metro. The officials, athletes and their families were transported by cars and buses respectively with an utmost priority. For this purpose dedicated Games lane were used as one of the strategies. The designated routes for the lanes were between airport and Games Village, Games Village and completion venues and hotels where the family of participants resided to the competition venues. These lanes were usually on the extreme right side with some exceptions. The lanes were denoted by a separate color with the Commonwealth Games logo on it. Manual regulation was one of the operational strategies that was used at all intersections of dedicated routes. The operational time and duration of the lanes were notified on daily basis according to the schedule of events and proper signage on roads were implemented on lane-change zones. Various methods were used in order to enforce the regulations of Commonwealth Games lane. Some of the methods were by using manpower like traffic officers, volunteers etc., by mass/multimedia, by signage and physical segregation and through social network. Finally charging a fine of Rs 2000/- (\$40) by a person for breaking the rules.

For spectators, park & ride as well as park & walk facilities and schemes were incorporated. Along with this drop off and pick up points were designated for spectators. Furthermore, pedestrian corridors were assigned to access the competition venues (Police, 2010).

The Delhi metro connected 10 out of 12 Competition venues thus providing easy access for the spectators. Metro shuttles and park & ride facilities were provided on the metro stations adjacent to the venues. Moreover the opening and closing ceremony was held in Jawaharlal Nehru Stadium which is on the route of metro. During the Games the main emphasis was to promote metro services among the residents. This was done by increasing parking at the stations and providing limited parking at the venues.

In addition to this people were advised to maintain traffic discipline and to avoid or minimize the use of certain roads like Safdarjung Rd, Kamal Attaturk Marg, Pansheel Marg, Sardar Patel Marg, Siri Fort Rd, Purana Quila Rd and Mother Teresa Crescent Rd as they were two lane roads with one Commonwealth Games dedicated lane. Another measure taken was to close down the schools for the Games period which helped in reducing the traffic. People were also advised to avoid unnecessary trips and to bypass the Commonwealth Games traffic as much as possible.

The DTC with a fleet of 4000 buses dedicated 600 buses solely for Commonwealth Games officials and athletes. A well equipped bus depot was built near the Games Village with a parking space for 1000 buses, washing pits, gas stations and baggage scanning area. The depot could also accommodate maximum of 500 officials and staff of DTC. The Organizing Committee and DTC divided Delhi into 5 zones which acted as focal points for pick up and drop off the passengers. These were 'East', 'West & South West', 'North', 'South & South East' and 'West & North West'. These zones had 'Hub Points' which were the metro stations to collect

and drop the riders. These ‘hub points’ were Anand Vihar ISBT, Dhaula Kuan/R. K. Puram, ISBT (Kashmere Gate), Nehru Place Terminal and Shivaji Stadium. This effort was made in order to integrate metro system with the bus service and further strengthen the connectivity and easy flow of traffic. To conclude, in total there was a fleet of 3,500 Non-AC , 1,250 AC low floor Compressed Natural Gas (CNG) buses and 15,000 radio taxis and private cabs as well as the metro connection covering 138kms of Delhi along with an Airport express link that covered 22.7 kms to deliver a successful transport facility during the Games.

Furthermore, during the Games intelligent transportation systems (ITS) was used to run the transport efficiently. The ITS was involved in many aspects of the transport delivery like scheduling, mapping, driver training, routing and parking.

LEGACY

Legacy as discussed in chapter 2 of this thesis is a remnant that is inherited once an event is concluded. As the final aim of the paper is to analyze the transport related legacies that XIX Commonwealth Games in 2010 left behind for the city. These legacies are classified as both tangible and intangible legacies.

Tangible Legacy

The tangible legacy is the one that could be seen like the physical developments in transport infrastructure. These physical developments are two-fold. One is the road alterations and additions and another is the transit development.

Road Development

In terms of infrastructure, there were several developments that were done like construction of flyovers, over and under road bridges to increase the connectivity and to reduce the traffic

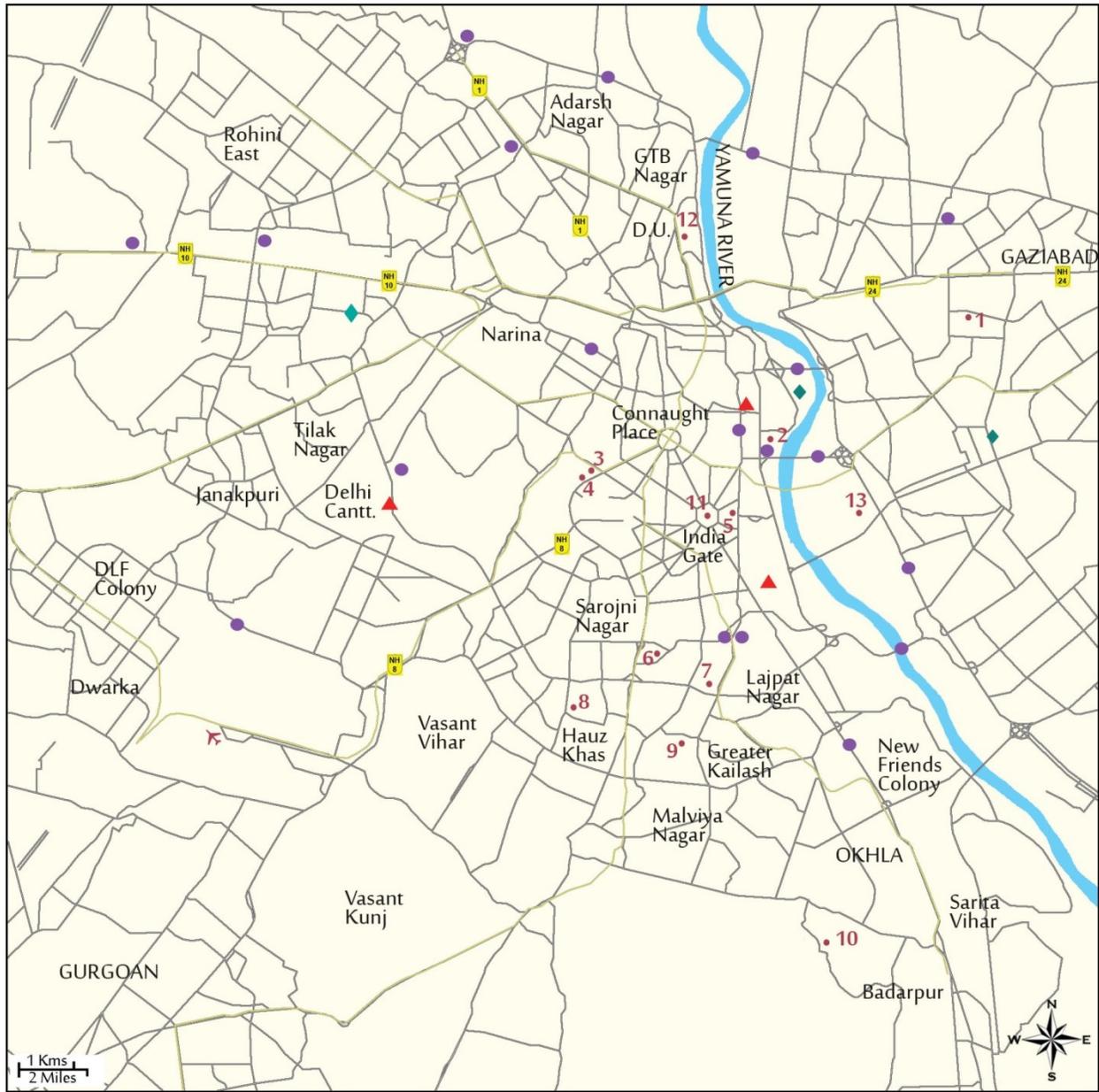
congestion on selected routes and ensured free flow of traffic. In addition to this, implementation of sidewalks, walking bridges helped the pedestrians' movement and also increased their safety. While analyzing the alterations and extensions of the road network it was seen that some of the development was planned. These planned developments were dual in nature. First, was the initial plan that was incorporated in the 2001 Master Plan of Delhi. The Master Plan vaguely talked about the details of the improvements like expanding lanes, constructing grade separators, and also the roads on which these developments will occur. The second plan was incorporated when the bid was won to host the Commonwealth Games of 2010. In the second plan, which was revised over and over again for a period of seven years and was to be completed before the Commonwealth Games commenced included all the details like what kind of grade separators for example flyovers, over & under road bridges, additional lanes, and road improvements.

In the map below, the developments are categorized into three categories *planned and constructed*, *additional* and *planned but not constructed*. The *planned and constructed* developments are the one that were planned by the Delhi Development Authority in the 2001 Master Plan of New Delhi and were constructed while preparing for the Games. The *additional* developments are the ones that were added last minute in the transport infrastructural plan during the preparation period. These developments were not initially planned but were added especially in order to meet the requirements for the Games. The *planned but not constructed* structures were the ones which were initially planned in the early years of execution of 2001 Master Plan but were not constructed while preparing for the Commonwealth Games. In all, there were 20 road constructions that were supposed to be completed before the Commonwealth Games commenced. Amongst all the planned developments there were some

developments which were initially sought to be important were not built. These were the developments that were *planned but not constructed*. As shown in figure 5.4 there were three such constructions that were supposed to be built but were never started before the Games. These three were the elevated corridor on Ring Road, Link Road to connect Lodhi Road to NH24 and another flyover at Bahadur Shah Zafar Marg.

Apart from the *planned and constructed* developments and the *planned but not constructed* developments. There was a third category of development that took place was the *additional* developments or eleventh hour developments that were necessary in the transport system during the Games. Although, there were not many last minute additions but three projects were undertaken to be completed before the Games. These were the flyover of Gazipur crossing, Ring Road bypass from Salimgarh fort to Velodrome and corridor improvement of Road No. 56.

Figure 5.4 Map shows the Categories of Road Developments that occurred during '03-'10 (The text is not meant to be readable but is for visual reference only)



Source: Map by Author

Figure 5.4 (Cont'd)



Transit based

The transit based developments during the Commonwealth Games was much more as compared to the road developments. The Commonwealth Games acted as an impetus for the development of Metro and up gradation of the bus services in the capital region. It also fast forwarded the two phases of metro development and also helped in increasing the total distance that metro covered by the end of 2010. After the completion of the two phases of metro most of the Delhi was covered, thus, easing the daily commute for the residents. In terms of the bus service the new fleet of low floor buses has increased the safety and convenience of the residents manifold. Amongst all the improvements mentioned above one of the vital and visible legacy was the Delhi Metro which is a dominating transit system of Mass Rapid Transit System (MRTS). The following schematic maps will help in deducing the changes that were incorporated before and after the bid was won. These series of maps indicate the development of metro since 2001. It also shows that how the development of this system was motivated

towards modification and expansion once the bid was won. The reason being, the first map shows all the initial corridors that were decided when the very first Phase I & II of Delhi Metro was designed in the year 2001-02 that was to be completed by 2010 Source: (Planning, 2001-2002). Along with this it is prominent that the Phase II of Delhi Metro was extensively revised and enlarged. This is evident in the total length of the Phase II corridors, which was initially 32.5kms (approx. 20.2mi) comprising two corridors that were to be completed by 2010, expanded to 117.25kms (approx. 72.9mi) that was to be constructed before the Games were inaugurated.

Figure 5.5 Delhi Metro corridors Planned in 2001-02 (The text is not meant to be readable but is for visual reference only)

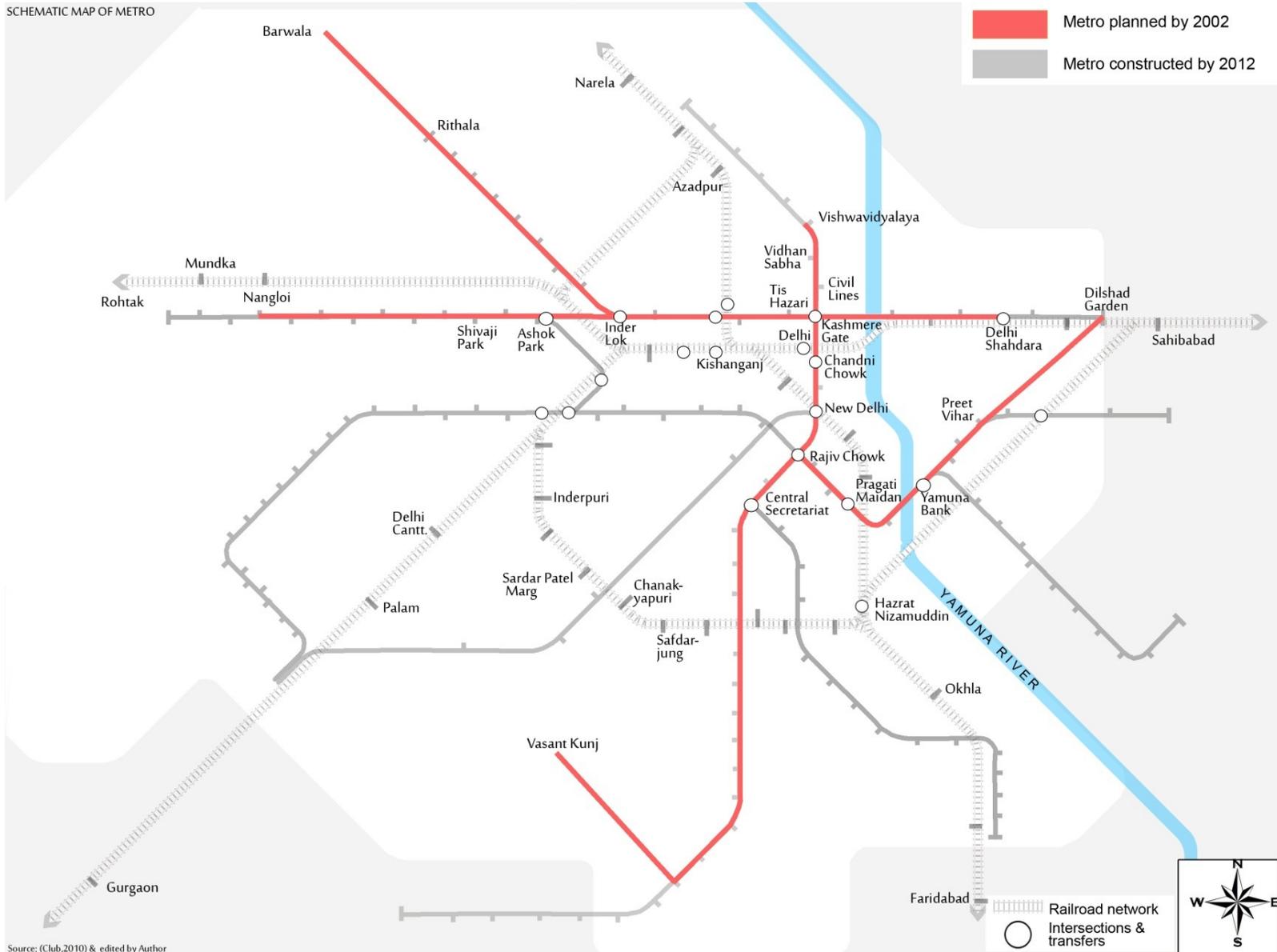


Figure 5.6 Delhi Metro corridors Planned in 2003-04 (The text is not meant to be readable but is for visual reference only)

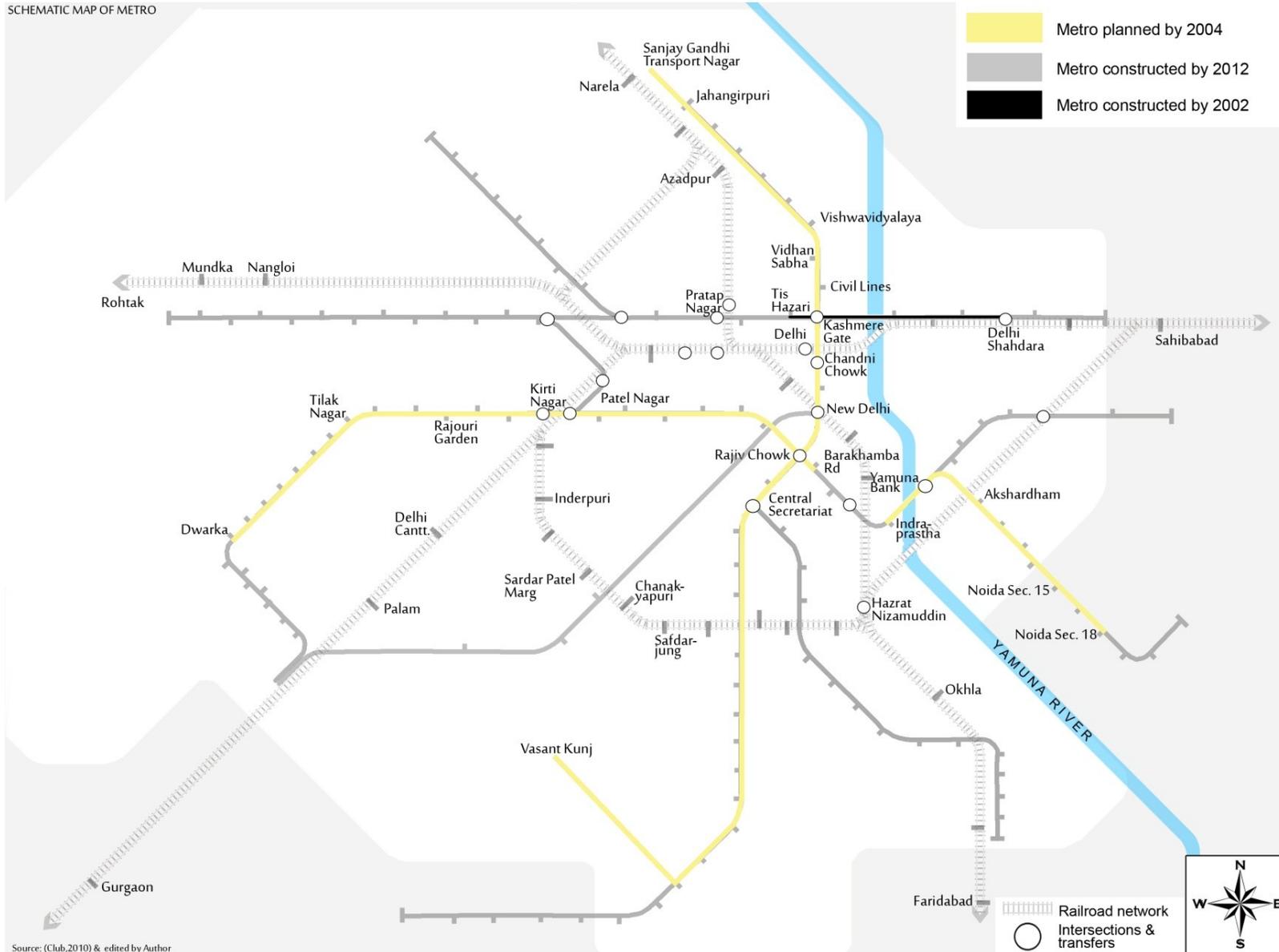


Figure 5.7 Delhi Metro corridors Planned in 2005-06 (The text is not meant to be readable but is for visual reference only)

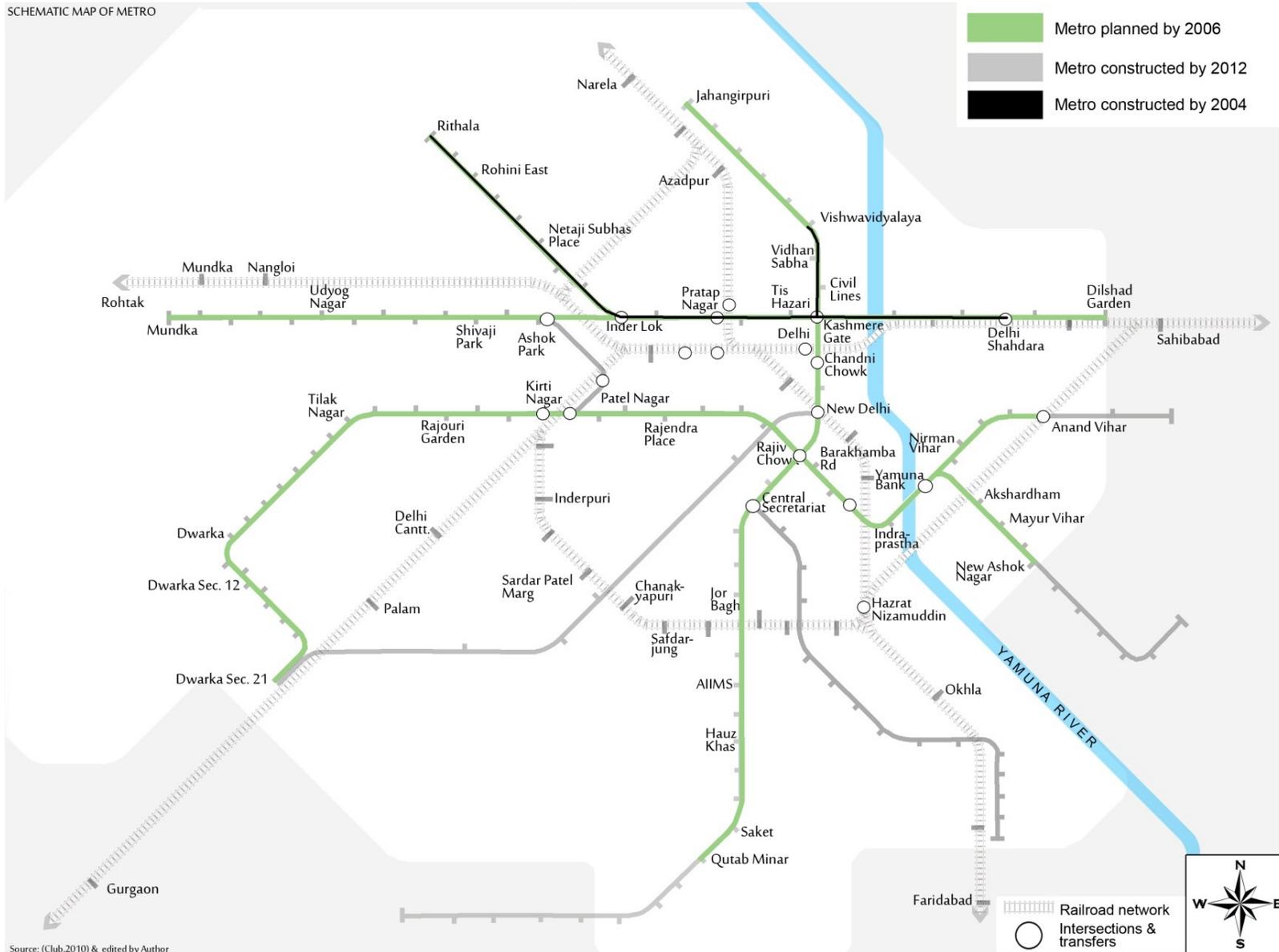


Figure 5.8 Delhi Metro corridors Planned in 2007-08 (The text is not meant to be readable but is for visual reference only)

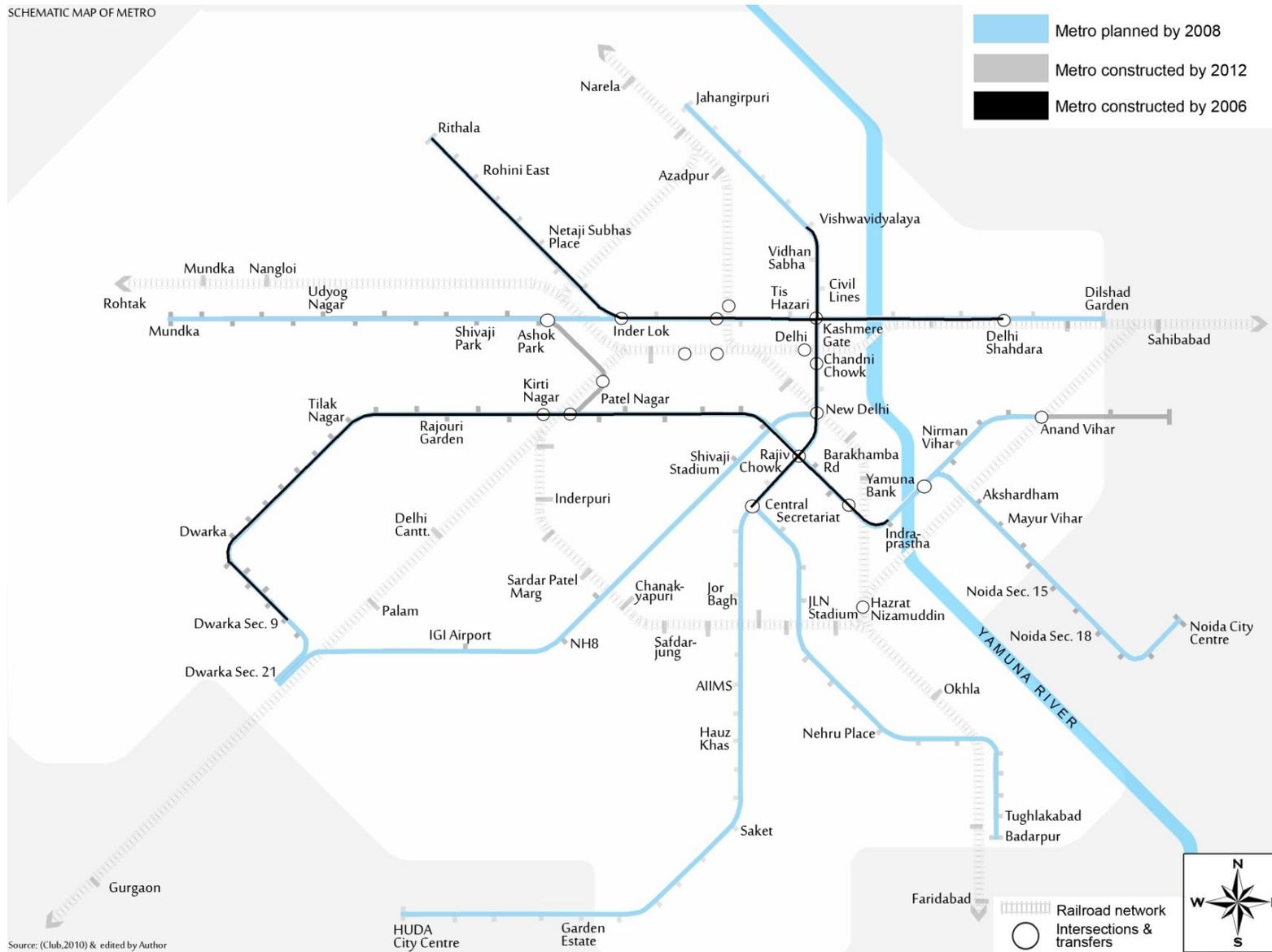


Figure 5.10 Delhi Metro corridors completed by 2009 (The text is not meant to be readable but is for visual reference only)

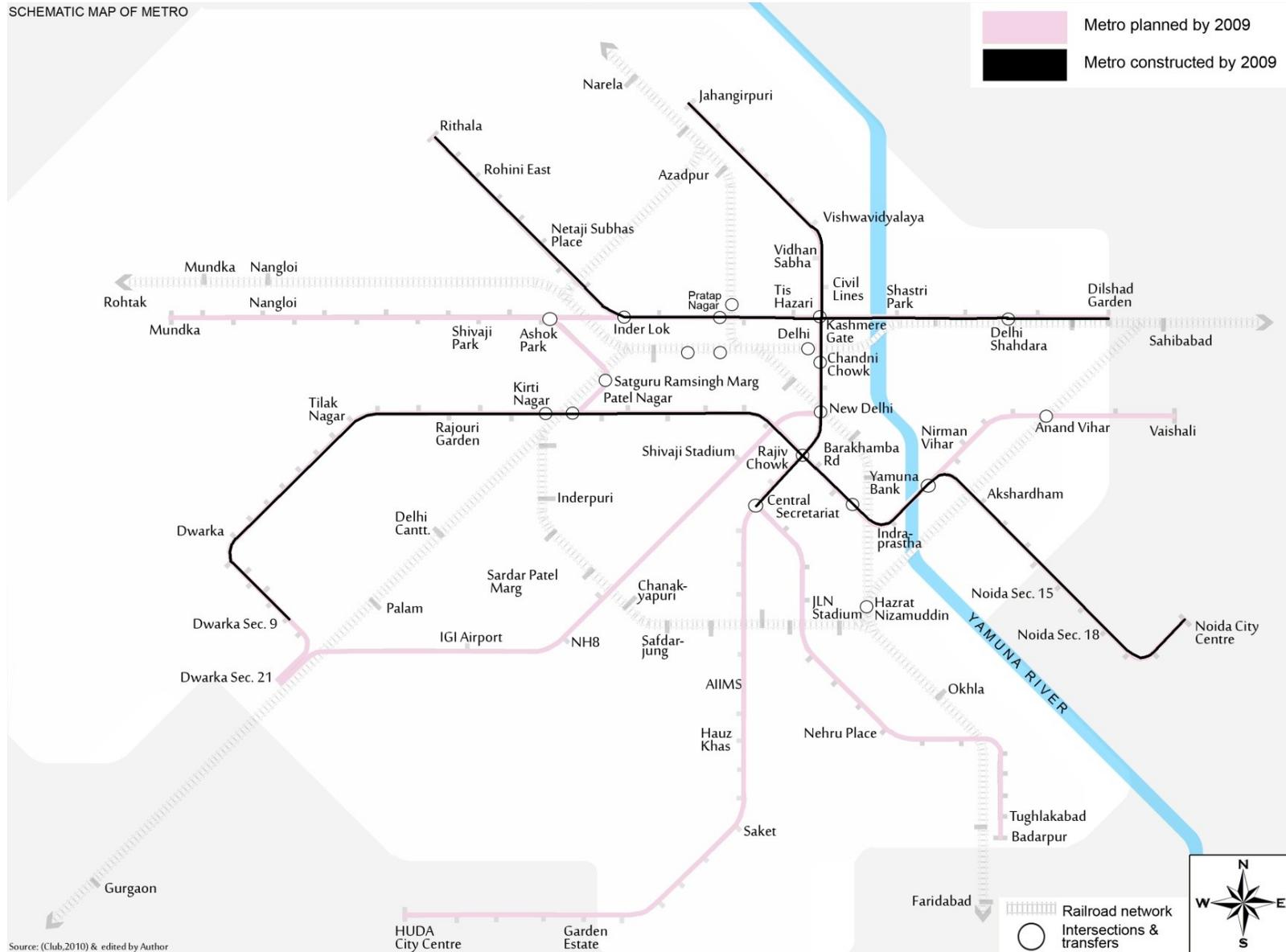


Figure 5.11 Delhi Metro corridors completed by 2010 (The text is not meant to be readable but is for visual reference only)

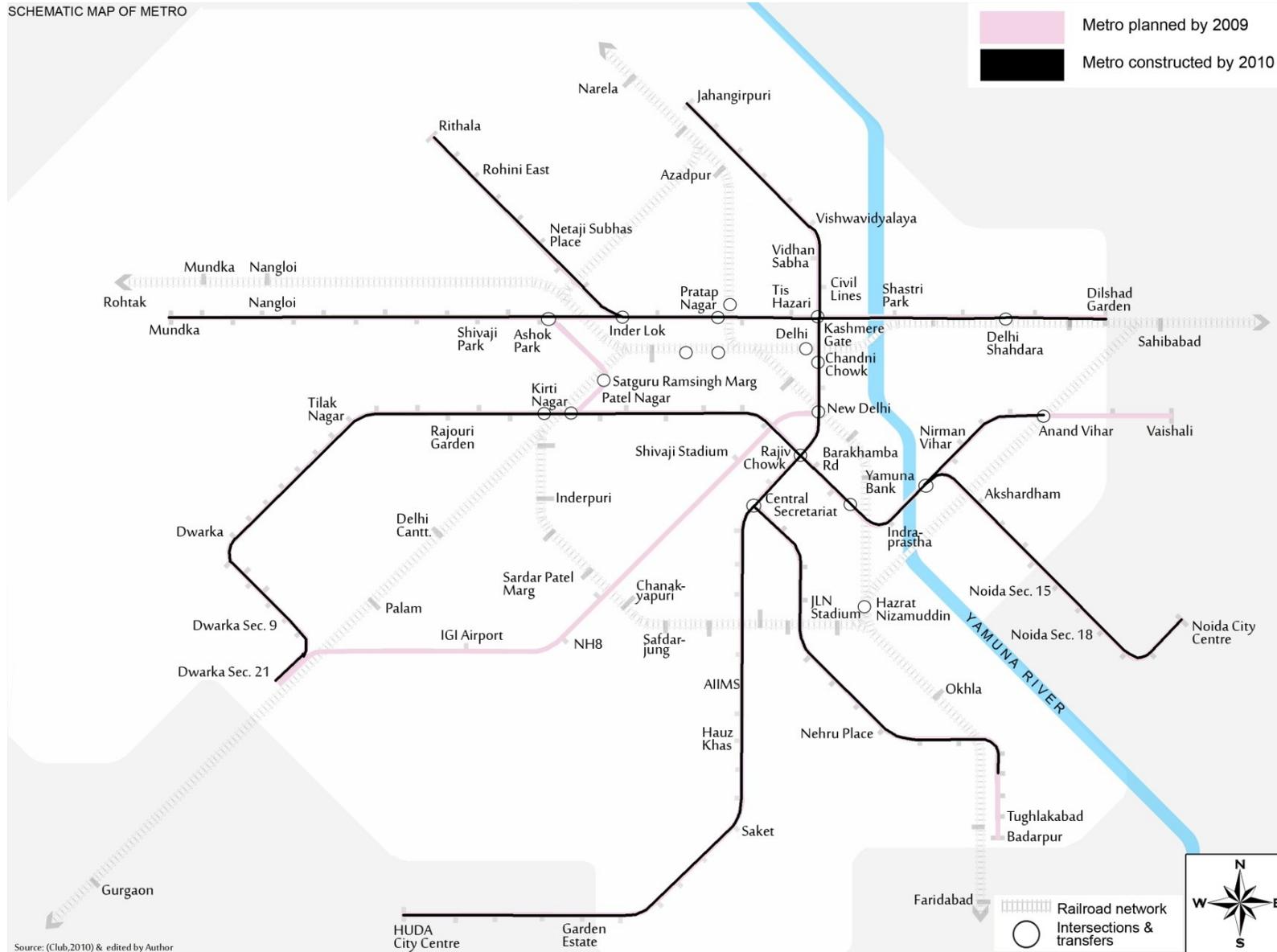
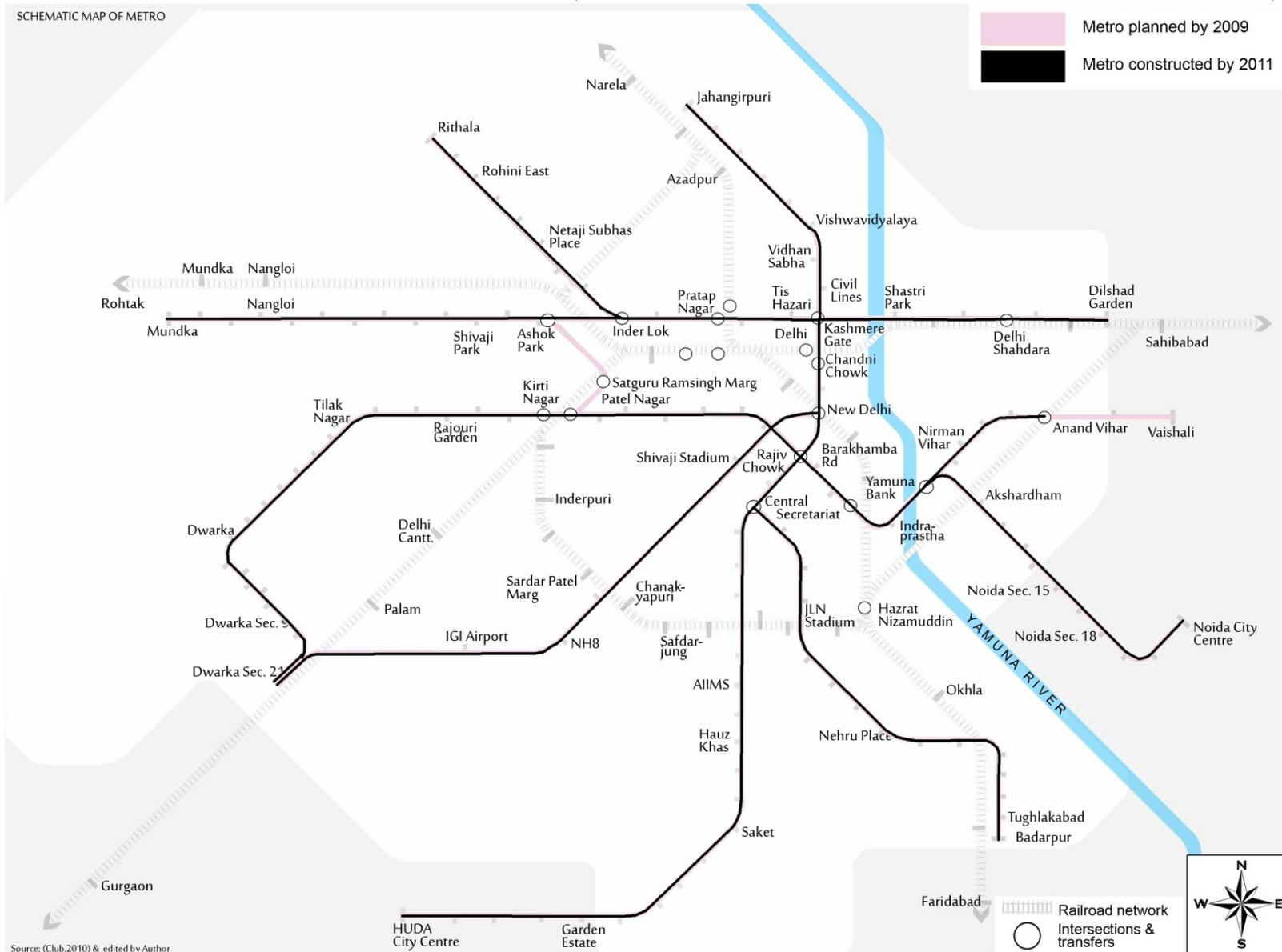


Figure 5.12 Delhi Metro corridors completed by 2011 (The text is not meant to be readable but is for visual reference only)



The latest addition in Phase II was done in the fiscal year of 2008-09. These included extension of four corridors with a total length of 64.23kms (approx. 40mi). one of the corridors in this last minute addition was the Airport Express that connected International Airport of New Delhi and the New Delhi Railway Station, which also a transfer point for another major corridor. The irony of this corridor is that it was specifically built to cater the visitors and participants of the Games but was never completed and was unused during the Games, defying its initial purpose. In the following final map, which is an overlay of all the years, shows that very little of the original plans till 2004 were constructed but was largely altered.

Figure 5.13 Overlaying Planned but not Constructed & Planned Development of Delhi Metro (The text is not meant to be readable but is for visual reference only)

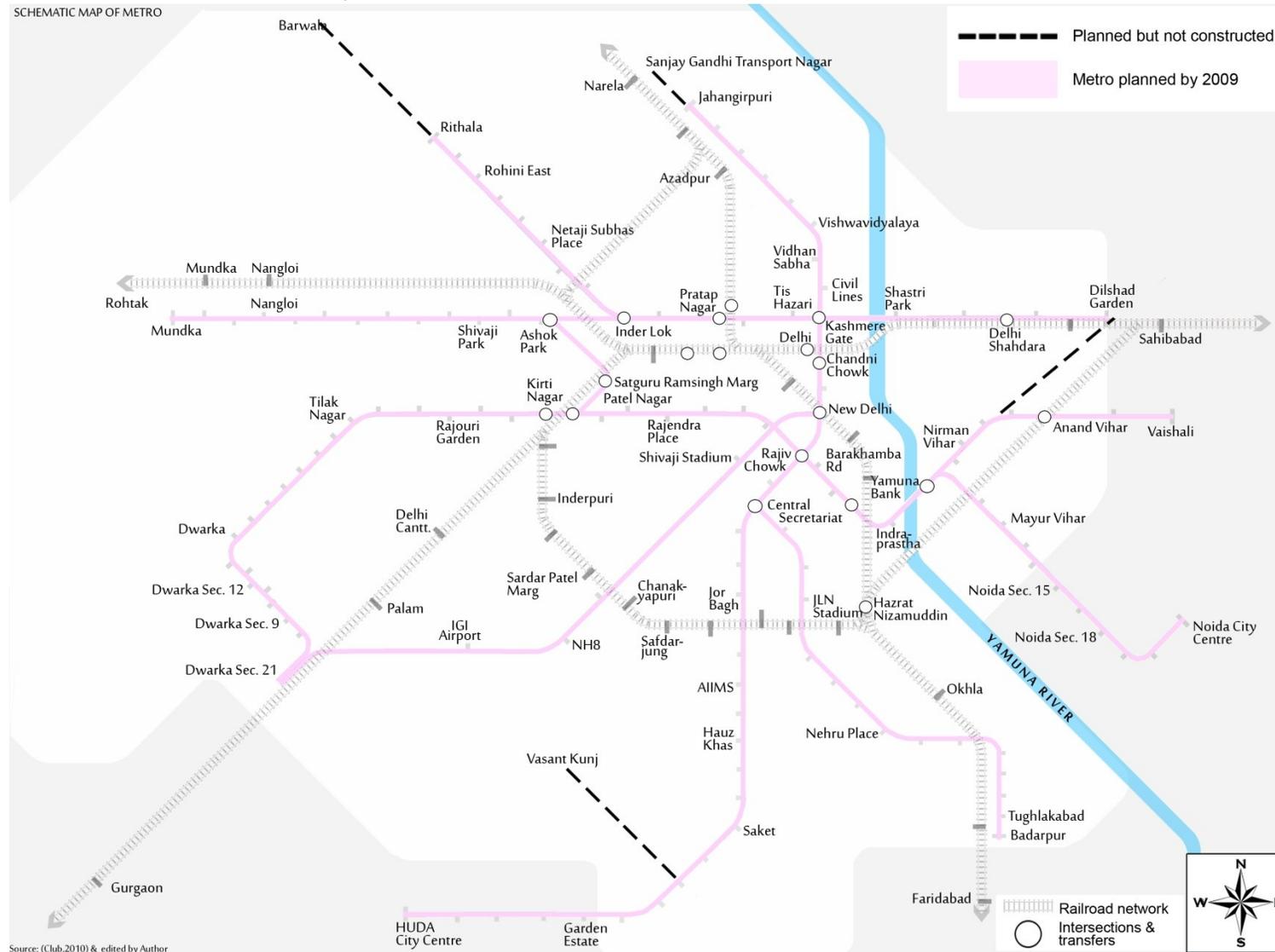


Table 5.9 Compilation of all the Categories of Developments that occurred till 2010

Projects	Planned and Constructed	Planned but not Constructed	Additional
Roads	<ul style="list-style-type: none"> • Flyover on outer Ring Road at Mangol Puri crossing • Flyover at Nangloi NH-10 crossing • Flyover on Ring Road at Naraina • Flyover at Azadpur Intersection • Mukarba Chowk Flyover • Underpass on Vikas Marg near ITO Chungi Crossing • Corridor connecting NH-8 to district center Janakpuri • Corridor between Wazirabad and Mukundpur Chowk • Outer Ring Road link from Okhla to Wazirabad • N-S corridor Majnu-ka-Tilla to Dhaula Kuan • E-W corridor from Rajghat to Punjabi Bagh • Road over Najafgarh Drain Meera Bagh to Wazirabad • 6-lane road over Barapulla Nalah • Road over Bridge (ROB) on level crossing on Road No.68 • Flyover on Bahadurshah Zafar Marg • ROB on on G.T. Road near Shyamlal College • Clover leaves on U.P. Link Road • Flyover at Apsara Border • Elevated E-W corridor connecting Connaught Place to East Delhi 	<ul style="list-style-type: none"> • Elevated Corridor on Ring Road • Link Road connecting Lodhi Road to NH-24 • Another Flyover at Bahadurshah Zafar Marg 	<ul style="list-style-type: none"> • Flyover at Gazipur Crossing • Corridor improvement of Road No.56 • Ring Road bypass from Salimgarh Fort to Velodrome
Metro	<ul style="list-style-type: none"> • Jahingirpuri - Central Secretariat • Central Secretariat - HUDA City Center • Central Secretariat - Badarpur • Dilshad Garden - Mundka • Rajiv Chowk (Connaught Place) - Dwarka Sector 21 • Rajiv Chowk - Yamuna Bank • Yamuna Bank - Vaishali • Yamuna Bank - Noida City Center 	<ul style="list-style-type: none"> • Shahdara - Barwala • Delhi University - Sanjay Gandhi Transport Nagar • Central Secretariat - Vasant Kunj 	<ul style="list-style-type: none"> • Airport Express Link from Indira Gandhi International Airport to New Delhi to Dwarka Sector 21

Source: Compiled by Author

CHAPTER 6

DISCUSSION

The initial objective of the thesis was to determine the changes that the city of New Delhi was subjected to while preparing for the Commonwealth Games 2010. It was inferred from the literature review that there are infrastructural improvements and increase rate of development in the host city. Furthermore, there are the legacies left by the Commonwealth Games or any other SME.

From the research in this thesis two main topics arrive. One was the changes that were made apart from the planned developments designed in the city's master plan. It was also noticed that most of the developments concentrated near and around the competition or non-competition venues and two, was the legacy left behind by the Commonwealth Games.

HOW DID COMMONWEALTH GAMES ALTER THE PLANS

A mega event can affect the development of a city in two ways; first, it changes the course of development i.e. it sometimes alters the initial plan of development of the region either at a small or large scale. Second, is it catalyzes the development process i.e. it motivates the plan of development by the host city to complete in a shorter time period. But this change is done at the cost of choosing what is important for a successful delivery of the event. In case of Commonwealth Games 2010 whose bid was won in 2003, many changes were made to the original 20 year master plan. The developments that occurred during the seven-year span of preparation before the Games were both planned and unplanned. Although the developments

in master plan were ambiguous, the yearly economic survey documentation of the city mentions the developments or projects that were undertaken by the government for infrastructural improvements.

Amongst all the improvements and additions in the infrastructure of the city some of them were already planned by the city before the Commonwealth Games were awarded and others were planned after the Commonwealth Games were awarded. In the midst of the planned and unplanned development, were the projects that were either cancelled or added especially by the event. Usually the development occurred in areas that catered the competition and non-competition venues. For example extension of Delhi Metro covered all the venues especially the competition venues in order to ease the movement of spectators between the venues. Furthermore, it was observed that the infrastructural developments of flyovers and bridges were also concentrated near the venues of the Commonwealth Games. Also there were some developments that were far from the venues or even beyond the limits of the city. These developments were especially seen in Delhi metro.

Aforementioned is the summary of what happened when the Commonwealth Games 2010 intervened with the development of the city. In my opinion the Games had a dual effect on the transport infrastructural development of the city that was mentioned in the starting of this section. In case of metro there were a lot of alterations that occurred during the preparation time. Furthermore the construction and expansion of metro was motivated with the introduction of the Games.

The uniqueness in transport development during Commonwealth Games 2010 was an extensive development of the metro system as compared to expansion and new construction of roads and introduction of bust rapid transit system in New Delhi. This not only introduced

high technology based construction system to the Indian community but also facilitated the residents of New Delhi with a comfortable commuting system. Due to this uniqueness in transport development during the Commonwealth Games the commute from one end of the city to another became easy, without any delays and less time consuming for the commuter. Also the spread of the metro system is equally in all directions and is a comfortable commuting system for long distances. Although every system has grey areas and the same happened with the metro development during the Commonwealth Games. The 'Airport Express Link' which was an *additional development* was designed and implemented for the purpose of catering the Commonwealth Games crowd from the international airport to one of the transferring points on the metro network i.e. the New Delhi station. The downturn of this line was that it was not completed and was not in function during the Commonwealth Games and thus did not fulfill its initial purpose and is recently being non-operative. This kind of hasty decision-making during the Commonwealth Games in order to meet the requirement was a total waste of resources which might have been utilized somewhere else.

In case of roads and flyovers, special attention was given to the routes that were utilized by the participants and other officials and visitors of the Commonwealth Games. The effort was to develop the east Delhi which was at that time developing at a slower rate. The Games did motivate the 20 year master plan to meet most of its requirements while preparing for the Commonwealth Games. Another positive development was the introduction of low-floor DTC bus fleet into the bus transit system. This not only provided the residents of Delhi with an option but it was a better, more reliable and cleaner option as compared to the privately owned Blue Line bus system that used to run within the city. Even though there was an introduction of low-floor buses in the transport system, very less importance was given to bus rapid transit

(BRT) system during the preparation process for the Games. There are several reasons behind it, one being shared bus service between a private provider i.e. the blue line and public provider which is DTC and two, even though the BRT concept was initiated in 1995-96 its construction was not commenced until 2006 and the first corridor trial was done in 2008 (Department, 2008).

Also, during the Commonwealth Games the feeder system was introduced which met the requirements of residents commuting from their residence to the nearest metro station. Although, the Commonwealth Games acted as a promising factor in bringing positive changes in the City, it is necessary to implement certain measures to optimize the usage of the development that happened. The ITS used during the Games should be incorporated in the system. It is also necessary to meet the requirement of short distance travelers to create and run a successful transportation system. The system would be a failure if it is not able to integrate and accommodate all the transit resources that are available into one big transit network.

LEGACY

The legacy left behind by a mega event is enormous. It not only provides the city with infrastructural facilities but also helps in altering the mindset of people regarding various transit systems. In case of Commonwealth Games 2010, one of the biggest legacies that were left behind by the Commonwealth Games was Delhi metro network that extended throughout the city as well as connected the satellite towns of the city. Along with this the improvement in bus fleet and its infrastructure was a major legacy that the Commonwealth Games left behind. In my opinion the Games altered the city for better than for worse. Since, the Commonwealth Games were introduced in the development process, the city was provided with a deadline to meet and a motivation to stage the city as one of the world cities. This was also reflected in the

delivering of the Commonwealth Games, where one of the requirements was to meet the transportation needs without delays. The metro legacy has made commuting larger distances easier, but, travelling shorter distances are still inconvenient. Since, the commuting has become simple the people prefer travelling through metro than by other means of transport. Even the new DTC buses are playing a major role in altering the outlook of residents towards the bus transit system. The DTC provides the citizens with an option of both AC and non-AC buses in order to meet the requirement of all citizens in term of money and comfort.

Also, the legacy of transport infrastructure of flyovers and road over bridges and under bridges as well as grade separators are a better solution for traffic congestion and encourage free flow of traffic. These developments also change the texture of the city and help in the development of the surrounding land. The unobstructed movement within the city helps in better connectivity and decreases the chances of delays in the commute. But, I think there should be more bus dedicated corridors within the city so that people prefer public transport over the private transport alternatives. Currently, the ridership of the public transport is mainly students or people with blue collar jobs or people with jobs below them. In order to maintain the legacy of metro and DTC bus that was created by the Games it is essential to promote them and make them more efficient. Although the metro system is proving itself to be one of the major public transit system in the city which is definitely a success story for the Commonwealth Games. The development of metro provides an excellent example of mega event acting as a catalyst in fast forwarding the development process of the system.

One of the objectives of the thesis was to determine whether the mega event hosted by New Delhi acted as a catalyst in the development process. In my opinion the Games provided a

momentum to the development process and also helped the city to meet some of their goals of the master plan in a shorter period of time as initially expected.

The other legacy which is an indirect one is the land development in the areas with a rapid transit system like metro. We know that transportation and land development goes hand in hand and they have equal effect on each other. This will help in developing the areas as transit oriented development which is not only sustainable but is a right choice for city with high density and ever growing population. The transit oriented development can be seen clearly in the images below of different areas in New Delhi. Following are few areas that saw development as the metro came into place.

Figure 6.1 Transit Oriented Development as this area was connected through Metro (The text is not meant to be readable but is for visual reference only)



Source: Google Earth timeline

CHAPTER 7

CONCLUSION

MOVING FORWARD

When we look into the transport infrastructural developments that the city went through when the XIX Commonwealth Games were awarded, the author believes that it was positive catalyst that drove the development process. Although the development of the city was planned by the Delhi Development Authority but due to the intervention of Commonwealth Games, the process of development fast-forwarded and was achieved in a shorter period of time than planned earlier. For example, the Delhi metro was already in the planning process before the Commonwealth Games were awarded but the extent of metro was less than what the development authority achieved in the period of seven years which was the preparation time for the Commonwealth Games. The resources were distributed in a way so that the delivery of the Games was a success whether it was in the field of transportation or in portraying New Delhi as a global and world class city. According to the author, the Commonwealth Games had its own advantages as well as disadvantages. One of the benefits that the city of New Delhi experienced and acknowledged was the improvement in the public transportation system of the city through increasing bus fleet and expanding metro's reach. Other than this expanding of roads and constructing more flyovers may solve the problem of traffic and congestion but not for long. These measures were feasible to provide better transport during the Commonwealth Games but not for the city in a longer run. For a long term improvement it is necessary to cater more and more residents from all classes of income to use the public

transport system. Also, some of the tit-bit improvements like making walking over bridges in areas where the usage is lowest after the Commonwealth Games is a waste of resources and is of no use for the common resident. Overall, apart from transportation, the other infrastructural developments like the stadiums and other sports venues that were improved and built for the Commonwealth Games should be utilized often and the history of Asian Games should not be repeated so as to utilize the resources invested during the Commonwealth Games. In a nutshell, the connectivity of the city through public transport system is not only increased in its expanse but also increased in quality and quantity in a shorter period of time than expected due to the Commonwealth Games.

FURTHER RESEARCH

Now it is necessary to expand the research further into public transport system i.e. buses and metro and their effect in the development of the city and in the choices and preferences that a citizen would make while choosing his/her mode of transport.

According to the author it is necessary to look into the relationship between land use and transportation, as these two sectors are closely interrelated and affect each other when either one of them is developed. It is necessary to understand the land development pattern in areas that are affected by metro and its stations.

Another area that is to be researched is the attitude of citizens of all classes towards the new and enhanced public transportation system. It is essential to understand that, the usage of public transport increasing in all income groups? Is there a shift in the usage from private transport modes to public transport modes in the daily trips that are made by the citizens? Is the use of metro increasing at a rate similar to the rate of population or it is more that the increase in population rate?

Furthermore, it is necessary to understand that, will these sporting mega events will change the importance of sports in the Indian society or they only play role in pinning Indian cities on a world map as 'Global Cities'?

REFERENCES

REFERENCES

(CGF), C. G. (2003). *Candidate City Manual 2010*. London: CGF.

Allied Chambers, L. (2006). *The Chambers Dictionary*. Edinburgh: Chamber Harraps Publisher.

Association, I. O. (2010). Retrieved May 21, 2012, from www.olympic.ind.in:
www.olympic.ind.in/iaa_history.html

ATKearney, I. (2011). <http://www.atkearney.com/index.php/Publications/building-a-legacy.html>. Retrieved October 29, 2011, from www.atkearney.com:
<http://www.atkearney.com/index.php/Publications/building-a-legacy.html>

Authority, D. D. (2011). *Master Plan for Delhi 2021*. New Delhi.

Bovy, P. H. (2008, January 22). *The Role of Transport in Mega Event Organization*. Retrieved September 24, 2011, from www.mobility-bovy.ch: http://www.mobility-bovy.ch/resources/15_UITP-megaevents-08.pdf

Bovy, P. (2002). Mega sports event transportation and main mobility management issues. *Transport and Exceptional Public Events* (pp. 235 – 259). Paris: European Conference of Ministry of Transport.

Brook, N. (2010, October 25). *Brook Sport and Lesiure News*. Retrieved September 25, 2011, from Brook Sport and Lesiure:
<http://brooksportandleisure.wordpress.com/2010/10/25/planning-a-sporting-legacy-for-major-sporting-events/>

C.M.Hall. (1997). Mega Events and Their Lagacies. *Quality Management in Urban Tourism* , 75 – 87.

Cashman, R. (2005). *The Bitter – sweet Awakening: The legacy of the Sydney 2000 Olympic Games*. Sydney: Walla Walla Press.

Chalkley, S. E. (2003). *Urban transformation from hosting the Olympic Games*. Barcelona : Centre d'Estudis Olímpics (UAB).

Chhikara, A. (2011). Retrieved June 8, 2012, from www.anilchhikara.in.
<http://www.anilchhikara.in/city-transportreforms.aspx>

Club, T. I. (2010). *FAQ Map Delhi Metro Schematic*. Retrieved January 10, 2012, from www.irfca.org: <http://www.irfca.org/faq/faq-map-delhi-metro-schematic.html>

Commission, E. (2003). *The Report of Commonwealth Games Evaluation Commission for 2010 Commonwealth Games*. London: Commonwealth Games Federation.

Committee, O. (2010). *Organization Structure*. Retrieved May 25, 2012, from www.cwgdelhi2010.org: http://d2010.thecgf.com/organisation_structure

Committee, O. (2010). Retrieved May 21, 2012, from d2010.thecgf.com.
http://d2010.thecgf.com/organising_committee_games_2010_delhi

Committee, O. (2010). Retrieved May 21, 2012, from d2010.thecgf.com.
http://d2010.thecgf.com/government_delhi

Committee, O. (2010). Retrieved May 21, 2012, from d2010.thecgf.com.
http://d2010.thecgf.com/government_india

CWG, O. C. (2010). *XIX Commonwealth Games 2010, 100 Days to go an Overview*. New Delhi: Organizing Committee.

Delhi Information. (2010). Retrieved March 05, 2012, from www.delhiinformation.org:
<http://www.delhiinformation.org/weather-climate.html>

Department, T. P. (2005-2006). *ESD Transport*. Retrieved April 25, 2012, from www.delhi.gov.in:
http://www.delhi.gov.in/wps/wcm/connect/DoIT_Planning/planning/economic+survey+of+delhi/content3/transport

Department, T. P. (2008–2009). *ESD Transport*. Retrieved April 25, 2012, from www.delhi.gov.in:
http://www.delhi.gov.in/wps/wcm/connect/DoIT_Planning/planning/economic+survey+of+delhi/content+2008-09/transport

Department, T. (2008, September 22). *Bus Rapid Transit in delhi*. Retrieved December 11, 2012, from www.slideshare.net: <http://www.slideshare.net/jaaaspal/brt-system-in-delhi-presentation>

Federation, C. (2010). *Constitution, Regulation and Code of Conduct*. London: CGF.

Federation, C. G. (2011). *Commonwealth Games Federation*. Retrieved 08 14, 2011, from www.thecgf.com: <http://www.thecgf.com/games/story.asp>

Federation, C. G. (2012). *The Role of the CGF*. Retrieved December 11, 2012, from www.thecgf.com: <http://www.thecgf.com/about/role.asp>

Federation, C. (2011). <http://www.thecgf.com/games/growth.asp>. Retrieved October 30, 2011, from www.thecgf.com: <http://www.thecgf.com/games/growth.asp>

Getz, D. (2005). *Event Management and Event Tourism (second edition)*. New York Cognizant Communication Corp.

Glenn Bowdin, J. A. (2011). *Events Management 3rd Edition*. Elsevier Butterworth – Heinemann.

Gupta, R. (1990). *Master Plan for Delhi*. New Delhi: Delhi Development Authority.

Imagin Mor. (2011). Retrieved March 05, 2012, from www.imaginmor.com:
<http://www.imaginmor.com/census-of-india-2011.html#Statement> 3 Ranking of States and

Union Territories by population: 2001 and 2011

Inc., M. W. (2011). *Merriam Webster*. Retrieved October 29, 2011, from <http://mw1.merriam-webster.com/>: <http://mw1.merriam-webster.com/dictionary/legacy>

India, C. &. (2009). *A report on preparedness for XIX Commonwealth Games 2010*. New Delhi.

Indian Census, 2. (2011). *Density*. Retrieved December 11, 2012, from www.census2011.co.in.
<http://www.census2011.co.in/density.php>

Limited, C. I. (1999). *Maps of India*. Retrieved March 03, 2012, from www.mapsofindia.com.
<http://www.mapsofindia.com/delhi/geography/location.html>

Limited, I. E. (2006). *City Development Plan, Delhi*. Delhi: Dept. of Urban Development, Govt. of Delhi.

Ltd, D. I. (n.d.). *fact-sheet*. Retrieved October 24, 2012, from www.newdelhairport.in.
<http://www.newdelhairport.in/fact-sheet.aspx>

Ltd., D. I. (2009, December 29). *me-second-largest-terminal-after-beijing-set-to-wow-the-world*. Retrieved October 24, 2012, from www.newdelhairport.in.
<http://www.newdelhairport.in/me-second-largest-terminal-after-beijing-set-to-wow-the-world.aspx>

Ltd., D. I. (2012). *Milestones*. Retrieved October 24, 2012, from www.newdelhairport.in.
www.newdelhairport.in/milestones.aspx

Lyck, L. (2006, November). Mega Sports Event: Can we, will we, should we go for such events in Copenhagen? *Working paper Series for Center for Tourism and Cultural Management at Copenhagen Business School*. Denmark: Scandinavian Digital Printing.

M.Malfas, E. T. (2004, September). Impacts of the Olympic Games as Mega Event. *Municipal Engineer 157*, 209 - 220.

Majumdar, N. M. (2012). For a monsoon wedding: Delhi and the Commonwealth Games. In A. Z. (ed), *International Handbook on The Economics of Mega Sporting Events* (pp. 504-526). Cheltenham, UK and Northampton MA, USA: Edward Elgar Publishing.

Manzenreiter, J. H. (2006). An Introduction to the Sociology of Sports Mega - Events. *The Sociological Review 54 (2)*, 1 - 24.

Merriam Webster, I. (2011). <http://mw1.merriam-webster.com/dictionary/mega>. Retrieved October 29, 2011, from mw1.merriam-webster.com: <http://mw1.merriam-webster.com/dictionary/mega>

P.K. Sarkar, S. B. (n.d.). A Critical Appraisal of Traffic and Transportation Sector in Delhi and Possible Solutions. *Indian Road Congress*, 111 - 121.

Planning, D. o. (2003-2004). *Economic Survey of Delhi, Transport (ESD)*. Retrieved April 25, 2012, from www.delhi.gov.in:

http://www.delhi.gov.in/wps/wcm/connect/DoIT_Planning/planning/economic+survey+of+delhi/content2/transport

Planning, D. o. (2001-2002). *Transport*. Retrieved April 25, 2012, from www.delhi.gov.in:

http://www.delhi.gov.in/wps/wcm/connect/DoIT_Planning/planning/economic+survey+of+delhi/content1/transport

Planning Dept., N. D. (2009). *Economic survey of Delhi 2008-09*. New Delhi: Government of New Delhi.

Police, D. T. (2010). *citeHR*. Retrieved June 20, 2012, from www.citehr.com:

<http://www.citehr.com/282993-traffic-arrangements-map-cwg-2010-delhi-traffic-police.html>

Preuss, C. G. (2008). Maximizing Olympic Impacts by Building Up Legacies. *The International Journal of History of Sport*, 1922-1938.

Preuss, H. (2006, December 13). *Nordic Sports Science Forum*. Retrieved September 20, 2011, from <http://www.idrottsforum.org/>:

http://translate.googleusercontent.com/translate_c?hl=en&ie=UTF8&rurl=translate.google.com&sl=auto&tl=en&twu=1&u=http://www.idrottsforum.org/articles/articles06.html&usg=ALkJrhgmPRl-D22ncGmHd8x87PAkfXyh7g

Robbins, D. (2007). Planning Transport for Special Events: A Conceptual Framework and Future Agenda for Research. *International Journal of Tourism Research*, 303 - 314.

Shaw, L. K. (1998,). Special Events: A Conceptual and Definitional Framework. *Festival Management & Event Tourism* , pp. 21 - 32.

Singh, S. K. (2005). Review of Urban Transportation in India. *Journal of Public Transportation*, Vol. 8, No. 1, , 79 - 97.

Szymanski, S. (2002). The Economic Impact of the World . *World Economics Journal* , 169 - 177.

Vinayak Uppal, D. D. (2006, December). *The Impact of the Commonwealth Games 2010 on Urban Development of Delhi, An analysis with a historical perspective from Worldwide experiences and the 1982 Asian Games*. Retrieved august 08, 2011, from www.niua.org: http://www.niua.org/Publications/working_papers/commonwealth%20games_vinayak.pdf