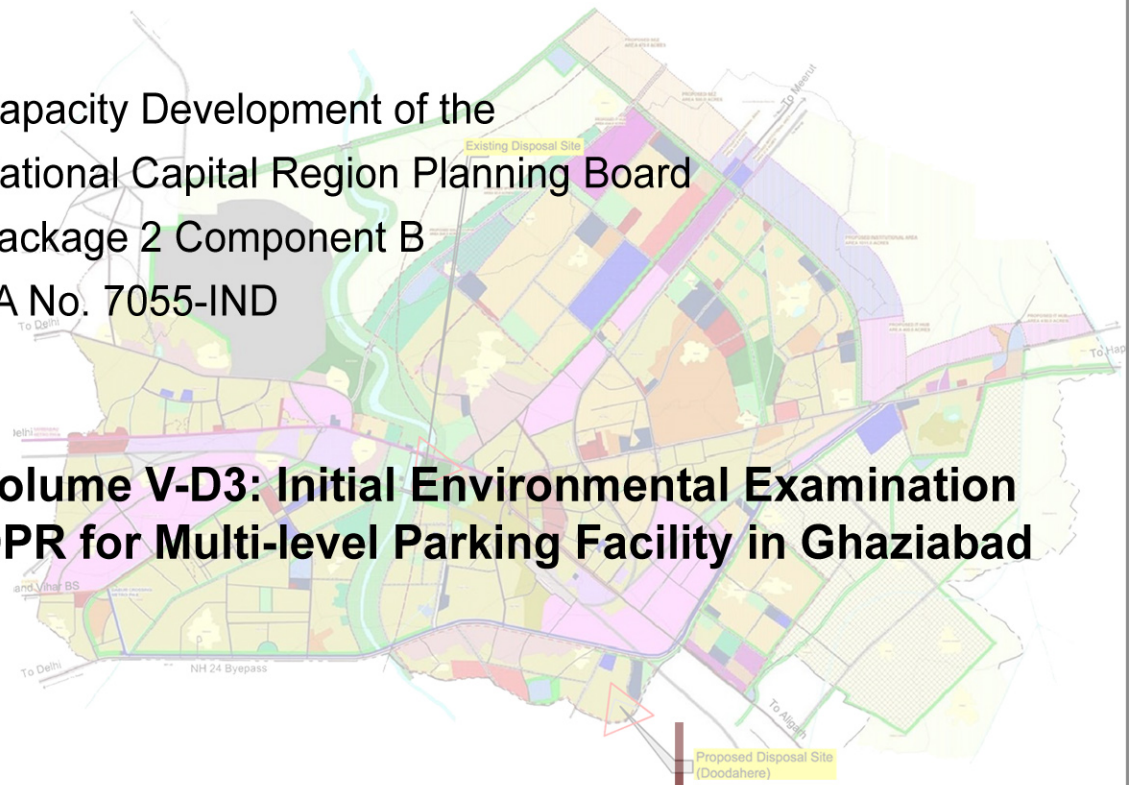
# FINAL REPORT

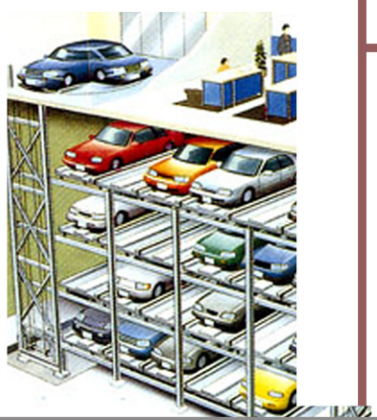
Asian Development Bank

National Capital Region Planning Board

Capacity Development of the
National Capital Region Planning Board
Package 2 Component B
TA No. 7055-IND




## Volume V-D3: Initial Environmental Examination DPR for Multi-level Parking Facility in Ghaziabad



WilburSmith ASSOCIATES

July 2010

NCR Planning Board
Asian Development Bank

# Capacity Development of the National Capital Region Planning Board (NCRPB) – Component B

(TA No. 7055-IND)

FINAL REPORT

Volume V-D3: DPR for Construction of Multi-Level Parking Facility in Ghaziabad

Initial Environmental Examination Report

July 2010

## Abbreviations

| | | |
|---|---|---|
| ADB | : | Asian Development Bank |
| BOD | : | Biochemical Oxygen Demand |
| CC | : | Construction Contractor |
| CGWA | : | Central Ground Water Authority |
| CGWB | : | Central Ground Water Board |
| CMA | : | Counter Magnet Areas |
| COD | : | Chemical Oxygen Demand |
| DFR | : | Draft Final Report |
| DPR | : | Detailed Project Report |
| EAC | : | Environmental Appraisal Committee |
| EC | : | Environmental Clearance |
| EIA | : | Environmental Impact Assessment |
| EMP | : | Environmental Management Plan |
| ESMC | | Environmental & Social Management Cell of NCRPB |
| ESMS | | Environmental & Social Management System of NCRPB |
| GDA | : | Ghaziabad Development Authority |
| GNN | : | Ghaziabad Nagar Nigam |
| GoH | : | Government of Haryana |
| GoI | : | Government of India |
| GoUP | : | Government of Uttar Pradesh |
| IA | : | Implementing Agencies |
| IEE | : | Initial Environmental Examination |
| IPT | : | Intermediate Public Transport |
| IRC | : | Indian Road Congress |
| Km | : | Kilometer |
| KMPH | : | Kilometer per Hour |
| LA | : | Land Acquisition |
| LCV | : | Light Commercial Vehicle |
| LPCD | : | Liters per capita per day |
| MLD | : | Million Liters per Day |
| MLP | : | Multi-Level Parking Facility |
| MoRTH | : | Ministry of Road Transport and Highways |
| MoEF | : | Ministry of Environment & Forests |
| NCR | : | National Capital Region |
| NCRPB | : | National Capital Region Planning Board |
| NCT | : | National Capital Territory |
| NGO | : | Non-governmental Organizations |
| NH | : | National Highway |
| O & M | : | Operation and Maintenance |
| PCU | : | Passenger Car Unit |
| ROW | : | Right of Way |
| RCC | : | Reinforced Cement Concrete |
| SH | : | State Highway |
| SPM | : | Suspected Particulate Matter |
| TA | : | Technical Assistance |

| | | |
|---|---|---|
| UP | : | Uttar Pradesh |
| UPJN | : | Uttar Pradesh Jal Nigam |
| UPSRTC | : | Uttar Pradesh State Road Transport Corporation |

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# 1. INTRODUCTION

## A. Background

1. Ghaziabad City is located in the western part of Uttar Pradesh State sharing the borders with the National Capital Territory Delhi. It is the district headquarters of Ghaziabad District. Owing to its location close to Delhi, and with good connectivity, it is one of the important and fast developing city in the State of Uttar Pradesh and as well as in the National Capital Region. City is well connected with important cities of the state and the country; three National Highways (NH 58, NH 91 and NH 24 - Delhi-Lucknow-Muradabad Road) pass through the City connecting it will Delhi, Meerut, Lucknow, Sikandrabad, Kolkata etc. Besides, it is well connected with its hinterland and surrounding towns by regional and local road network. It is also well connected with railways. Location of Ghaziabad is depicted in **Figure 1-1**.

2. The rapid development of city has also put its infrastructure on tremendous pressure. Due to rapid increase in vehicles and traffic, the road infrastructure is severely affected. The unprecedented growth of personalized vehicles and the unplanned road infrastructure have made the provision for parking an important aspect of transportation planning. The area surrounding the old Bus Stand at Navyug Chowk is a major centre and is the CBD of Ghaziabad. This centre is busy with various activities; a number of commercial establishments, markets, government offices and the bus stand are situated here. Since most of these places are frequented by public and busy with floating population, the demand for parking has increased. The growth of personal transport vehicles is another main reason for increasing parking demand. Since the existing bus stand is proposed to be shifted to a new location on Loni Road as per the Ghaziabad Master Plan 2021, this site is proposed for development of multi-level parking facility to cater to the parking demand.

3. The subproject of construction of Multi-Level Parking Facility at Old Bus Stand location is selected for detailed study and preparation of a model Detailed Project Report under this ADB TA Component B. NCR Planning Board, a statutory body of Ministry of Urban Development, Government of India, is a likely source of funding for the subproject in Ghaziabad.

4. This Initial Environmental Examination (IEE) Report is prepared in accordance with NCRPB Environmental and Social Management System (ESMS) and Policy for project funding.


# Capacity Development of the NCRPB: Component B (ADB TA 7055-IND)

Regional Setting of Ghaziabad

Legend

- NCR
- State Boundary
- District Boundary
- District Hq.
- Counter Magnet Areas
- River / Stream

Client:
Asian Development Bank
National Capital Region Planning Board

Consultant
Wilbur Smith Associates Pvt. Ltd.

| | |
|---|---|
| Drawn: Roopa | Checked: |
| Date: | Approved: |
| Scale: Not to scale | |

Figure 1-1

# 2. POLICY & LEGAL FRAMEWORK

## A. Extent of IEE Study

5. The subproject implementation shall comply with the policies of Government of India (GoI), Government of Uttar Pradesh (GoUP) and procedures/policies of NCRPB. Government regulations and the NCRPB policy require that impacts of the development projects have to be identified at the beginning and mitigation measures be incorporated in the project to reduce those impacts to acceptable levels. This is generally done through the process of environmental impact assessment.

## B. Government Law and Policies

6. The GoI EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for Environmental Assessment in India. This states that Environmental Clearance (EC) is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts.

7. Category A projects require EC from the national Ministry of Environment and Forests (MoEF). The proponent is required to provide preliminary details of the project in the prescribed manner with all requisite details, after which an Expert Appraisal Committee (EAC) of the MoEF prepares comprehensive Terms of Reference (ToR) for the EIA study. On completion of the study and review of the report by the EAC, MoEF considers the recommendation of the EAC and provides the EC if appropriate.

8. Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorizes the project as either B1 (requiring EIA study) or B2 (no EIA study), and prepares ToR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the EC based on the EAC recommendation. The Notification also provides that any project or activity classified as category B will be treated as category A if it is located in whole or in part within 10 km from the boundary of protected areas, notified areas or inter-state or international boundaries.

9. With the total built up area of over 20,000 sq. m, this sub project falls under the ambit of the EIA Notification under Category B project. This requires environmental clearance from SEIAA of Uttar Pradesh State.

## C. Environmental and Social Management System of NCRPB

10. Recognizing the importance of environmental and social issues that can arise in infrastructure projects, NCRPB has formulated an Environmental and Social Management Systems (ESMS) in line with Government and other multilateral agencies like ADB safeguard requirements for Financial Intermediaries (FIs). The ESMS provides an overall management system to NCRPB to identify, assess, and mitigate environmental and social issues that are likely to arise in projects funded by NCRPB. The ESMS outlines the policies, methods of assessments and procedures that will enable NCRPB to ensure that a project that it funds is developed in accordance with ESMS and is adequately protected from associated risks. Implementing Agencies (IAs) will have to comply with the ESMS and Policy.

### *1. Environmental Policy*

11. *Policy Statement*. "National Capital Regional Planning Board (NCRPB) will continually strive to ensure and enhance effective environmental management practices in all its operations". This is aimed to achieve through:

- Minimizing negative environmental (including health & safety) impacts in its operations and risks to the environment (particularly eco-sensitive areas and culturally important areas) and people who may be affected through formulating and implementing commensurate plans
- Ensuring that environmental safeguards - defined as requirements of applicable Indian environmental legislation and multilateral / bilateral funding agencies - are being adequately integrated by the project proponent / IA in the planning, design, construction prior to its financing and in its implementation during the operational phase.
- Ensuring that compliance to all applicable national and local environmental legislation.
- Encouraging that public and stakeholder consultation be carried out by the project proponent / IA and disclosing the required information in all stages of the project cycle.
- Integrating environmental risk into its overall internal risk management analysis.
- Including environmental management considerations in all aspects of operations and interactions with the project proponent / IAs in all stages of the project cycle.

12. This policy statement emphasizes NCRPB's sensitivity, concern and commitment to environmental safeguards. NCRPB will strive to ensure that the projects that it supports meets government policies and as well as of the bilateral/multilateral agencies such as ADB.

*2. Environmental Assessment Requirements*

13. The nature of the assessment required for a project depends on the significance of its likely environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. According to NCRPB ESMS, the projects are screened for their expected environmental impacts and are assigned to one of the following categories: E1, E2 or E3.

**Table 2-1**: Environmental Category

| **Environmental Scenario** | **NCRPB's Categorization** | **MOEFs Categorization** | **ADB Categorization** |
|---|---|---|---|
| Significant impacts or in eco-sensitive area | E1 | A | A |
| Limited impacts | E2 | B1 or B2 or No Category | B |
| No impacts | E3 | No Category | C |

(i) Significant impacts or in eco-sensitive areas (Category E1): If the project has significant adverse environmental impacts that are irreversible, diverse, or unprecedented, then it is regarded to have environmental scenario. These impacts may affect an area larger than the sites or facilities subject to physical works. These impacts will be considered significant if these are in eco-sensitive areas.

(ii) Limited environmental impacts (Category E2): If the project has impacts that are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed.

(iii) No environmental impacts (Category E3): If the project is likely to have minimal or no adverse environmental impacts, then it is regarded to have this environmental scenario.

14. The proposed subproject of Construction of Multi-level Parking Facility in Ghaziabad is unlikely to have significant impacts. The project site is also not located or near any eco-sensitive area. The subproject is however likely to have typical impacts associated with the construction activity in urban areas and therefore classified as Category E2.

15. According to ESMS, E2 projects require carrying out Initial Environmental Examination (IEE) and preparation of IEE Report. This IEE report is prepared accordingly.

# 3. DESCRIPTION OF PROJECT

## A. Project Need

16. The unprecedented growth of personalized vehicles and the unplanned road infrastructure have made the provision for parking an important aspect of transportation planning. As part of the traffic study conducted in this ADB TA, a parking study was conducted at important locations in Ghaziabad. The area surrounding the old Bus Stand at Navyug Chowk is a major centre and is the CBD of Ghaziabad. This centre is busy with various activities; a number of commercial establishments, markets, government offices (Ghaziabad Nagar Nigam and Ghaziabad Development Authority) and the bus stand are situated here. Since most of these places are frequented by public and busy with floating population, the demand for parking has increased. The growth of personal transport vehicles is another main reason for increasing parking demand.

17. On-street parking is observed on all the roads surrounding Old Bus Stand and Navyug Market. Many cars and two wheelers are seen parked on either side of the roads. Both angular as well as parallel type of parking was noticed on almost all the stretches of the roads. This has reduced the capacity of the carriageway and endangering pedestrians and motorists alike. The frontage of almost all the roads in this area has been converted into commercial land use without taking into account the demand for parking of the vehicles. There is no planned parking space available.

18. Recognizing the importance of decongesting this area, Ghaziabad Master Plan -2021, has identified and earmarked a site along NH 24 for shifting the existing Bus Stand and constructing a new Bus Terminal. In view of this, the GDA is considering the existing Bus Stand site in the CBD to develop a multi-level parking facility. The project preparation for the same is taken up for model DPR.

19. Subsequently, detailed parking surveys were conducted in the area and the present and future demand has been estimated (**Table 3-1**). These values are used as base to develop a multi-level parking facility on the bus stand site.

**Table 3-1**: Projected Parking Demand

| S. No | Year | Demand (No. of Vehicles) |
|---|---|---|
| 1 | 2010 | 650 |
| 2 | 2020 | 723 |
| 3 | 2025 | 805 |
| 4 | 2039 | 896 |

## B. Project Description

20. The existing Bus Stand, the site for proposed multi-level parking facility, is located next to GDA Office and the near junction of Dr Ambedkar Road and NH-24 (Hapur Road). The total area of the site is 10,040 sq m and is located in a busy commercial and institutional area.

21. Considering the demand, the multi-level parking facility is designed to accommodate parking of 2-wheelers and cars. As shown in the following Table, the proposed facility will have space for parking 777 cars and 330 two-wheelers. In addition to parking facility, commercial space will also be developed within the building to generate additional revenue and make it attractive for private sector participation. The facility will be developed in 4 levels, with the upper most level open to sky. Ground floor (lower most level) is reserved for developing commercial area and parking facility for two wheelers. The upper floors will be utilized for car parking.

**Table 3-2**: Particulars of Proposed Multi-level Parking Facility

| S. No. | Parameter | Unit | Value |
|---|---|---|---|
| 1 | Site area | Sq. m | 10,040 |
| 2 | Area (Ground Floor) | Sq. m | 8,323 |
| 3 | Area (1st, 2nd and 3rd Floors) | Sq. m | 25,833 |
| 3 | Commercial/Retail (Ground Floor) | Sq. m | 5,000 |
| 4 | Parking (Ground Floor) – 2-wheelers | No. s | 117 |
| 5 | Parking (1st floor ) – 2-wheelers | No. s | 213 |
| 6 | Parking (1st, 2nd and 3rd Floors) – Cars | No.s | 777 |

22. Map of the proposed site is shown in **Figure 3-1**. Plan of the proposed building is shown in **Figure 3-1**and **Figure 3-2**.

**Figure 3-1**: Proposed Site for Multi-level Parking Facility

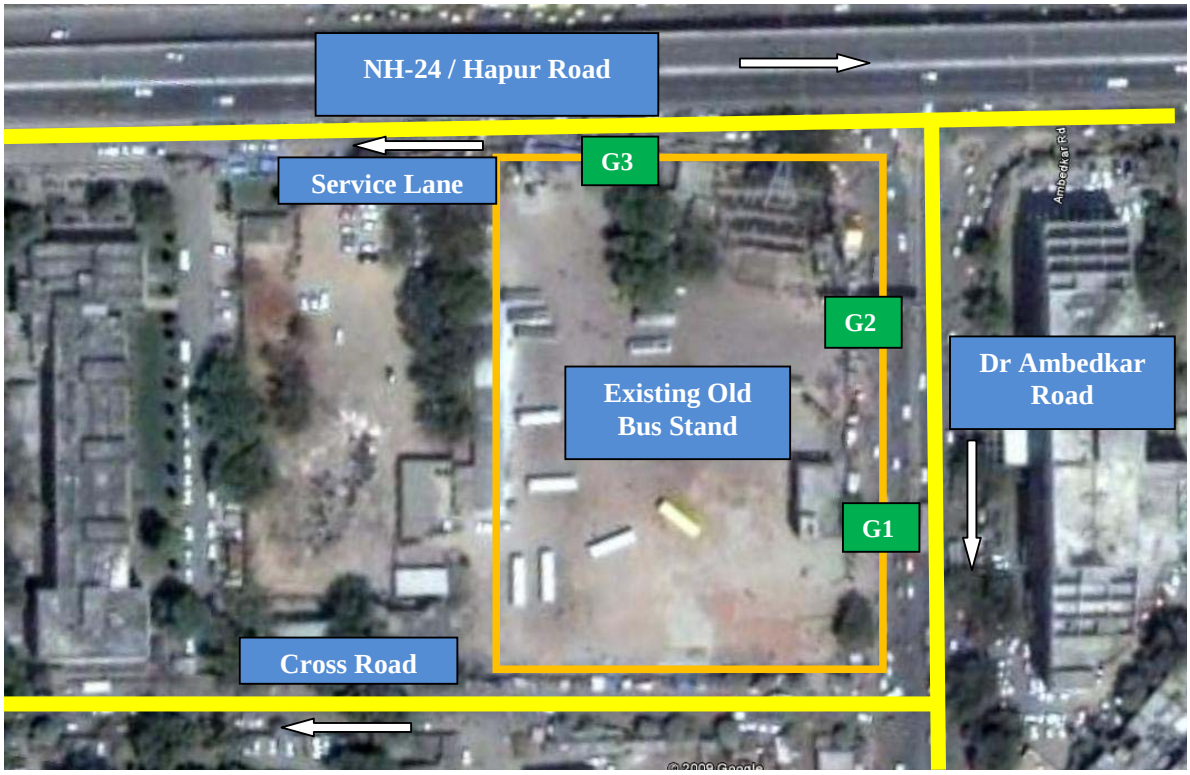


**Figure 3-2**: Ground Floor Plan of the Proposed Multilevel Parking

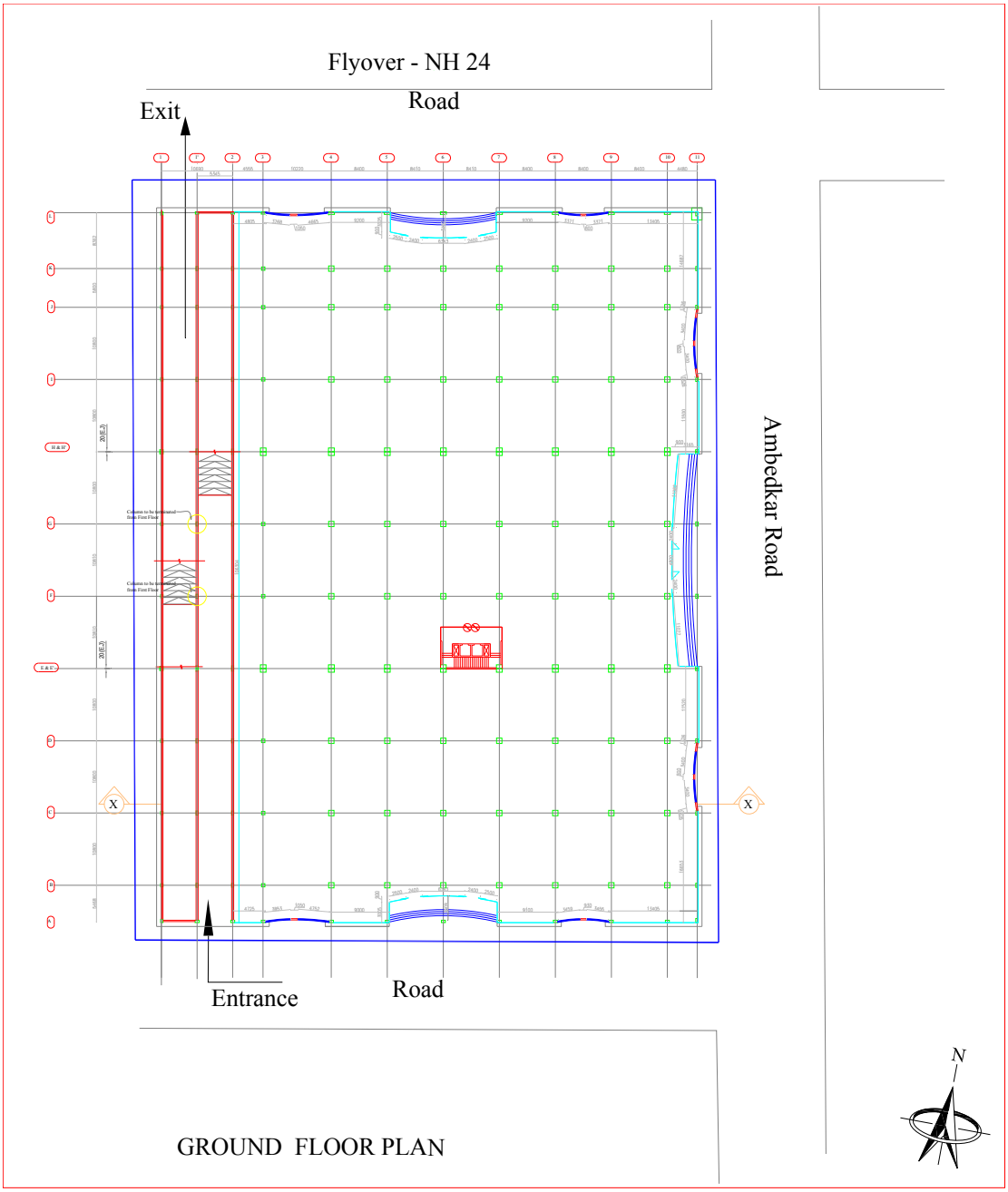
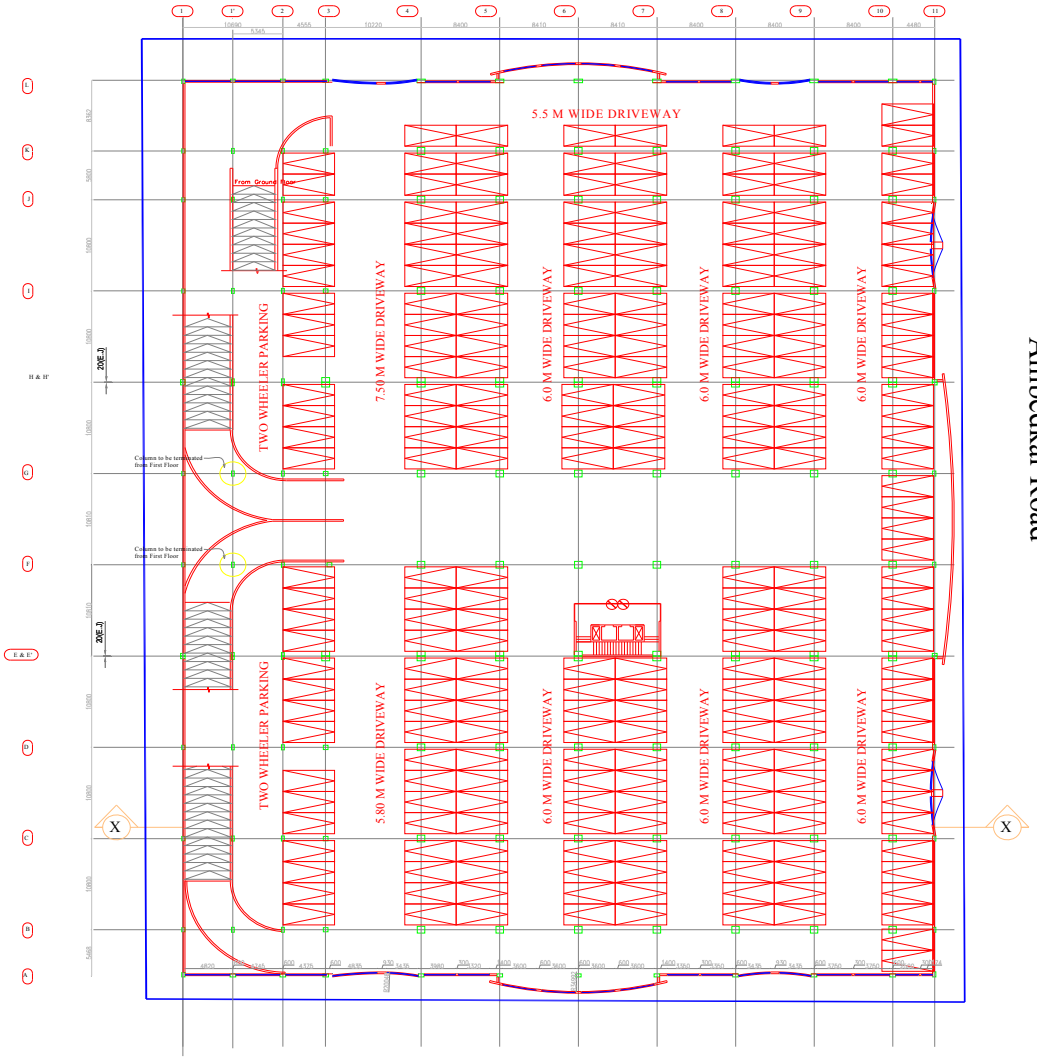


**Figure 3-3**: Typical Floor Plan of the Proposed Multilevel Parking Facility




Typical Floor Plan

# 4. DESCRIPTION OF ENVIRONMENT

## A. Physical Resources

### *1. Location*

23. Ghaziabad City is located in the western part of Uttar Pradesh State sharing the borders with the National Capital Territory Delhi. It is the district headquarter of Ghaziabad District. Owing to its location close to Delhi, and with good connectivity, it is one of the important and fast developing city in the State of Uttar Pradesh and as well as in the National Capital Region. Geographically, Ghaziabad is situated at $28^0$ 40' N latitude and $77^0$ 25' E Longitude. Ghaziabad is situated at about 20 Km east of Delhi, and 432 km west of the State Capital, Lucknow.

24. It is well connected with important cities of the state and the country; three National Highways (NH 58, NH 91 and NH 24 - Delhi-Lucknow-Muradabad Road) pass through the City connecting it will Delhi, Meerut, Lucknow, Sikandrabad, Kolkata etc. Besides, it is well connected with its hinterland and surrounding towns by regional and local road network. The Main railway line and the two branches of northern railway (Meerut Branch & Moradabad Branch) pass through the City. It is an important railway junction in the Northern Railway. Base map of Ghaziabad is at **Figure 4-1**.

### *2. Topography, soil and geology*

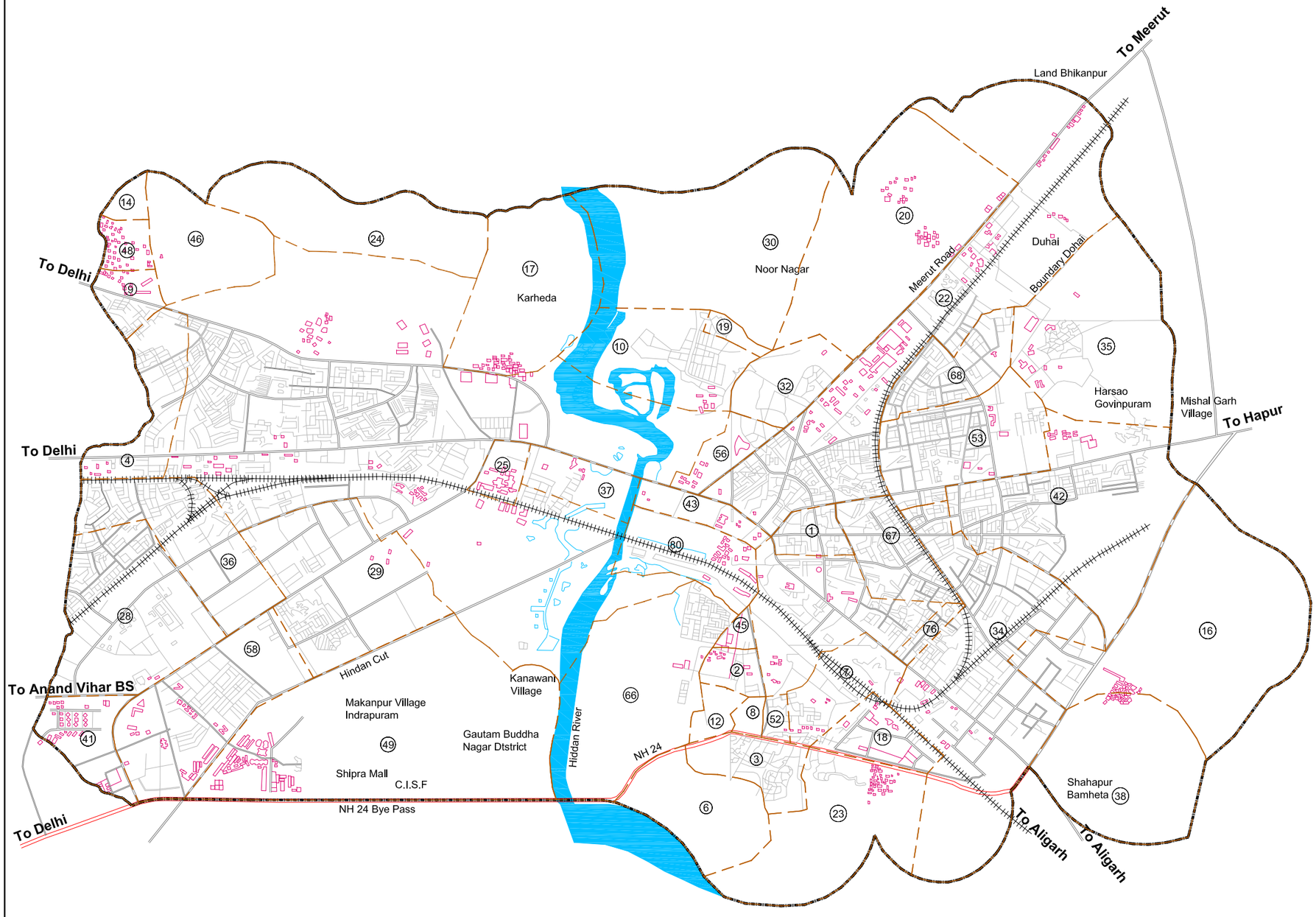
25. Originally established on the eastern side of River Hindon, present sprawling development of Ghaziabad can be observed on both sides of the River. Hindon River is an important tributary of Yamuna River of the Ganges River System. Flowing north-south, Hindon River passes through middle of the City and meets Yamuna about 35 km south of Ghaziabad. The topography of the City is almost plain and the general slope is from north to south.

26. Geologically, Ghaziabad forms a part of the Indo-Gangetic alluvium. Soil is characterized mainly by silty sand and loamy soils. Geotechnical investigations conducted at the proposed flyover site indicates that there is no hard rock till 25 m below ground level.

27. As per the seismic zoning map of India, Ghaziabad falls in sever intensity zone (Zone IV). However, there were no major earthquakes occurred in Ghaziabad till date.

# Capcity Development of the NCRPB: Component B (ADB TA-7055)

**Ghaziabad**
Base Map




**Legend**

- Municipal Boundary
- Ward Boundary
- (16) Ward Number
- National Highway
- Other Roads
- Buildings
- River, Stream

Client

**Asian Development Bank**
**National Capital Region Planning Board**

Consultant

**Wilbur Smith Associates**

| | |
|---|---|
| Drawn:SK | Checked: SKG |
| Date: August. 2009 | Approved: NSS |
| Scale: NTS | |

**Figure 4-1**

## *3. Climate*

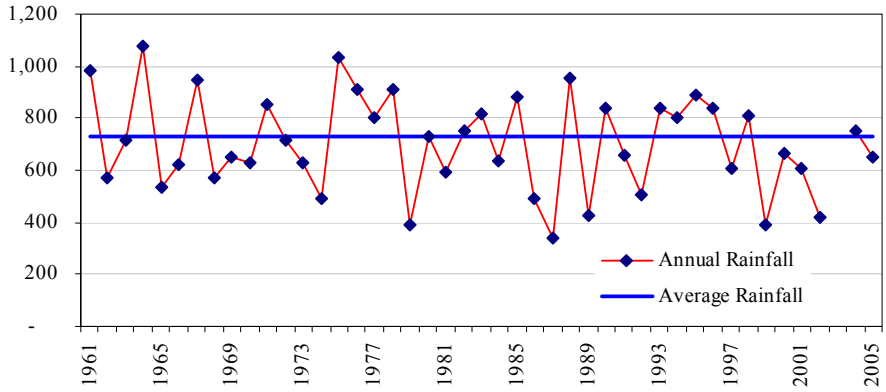
28. Typical humid subtropical climate of north India prevails in Ghaziabad, with high variation between summer and winter temperatures and precipitation. There are three distinct seasons – first of which is the monsoon season - hot and humid season from mid-June to September. Second season, winter, is the cool and dry season from October to March. The third phase, summer, is characterized by hot and dry weather which prevails from April to mid-June.

29. Rains in the region are concentrated in the monsoon season. The region receives rainfall mainly under the influence of southwest monsoon from July to September. Over 75 percent of the total rainfall is received during the monsoon months and the remaining rainfall is received during December to February. The annual average rainfall is 732 mm. Dust and thunderstorms occur in summer season while fog occurs in the winter.

**Table 4-1**: Rainfall Pattern in Ghaziabad (2004-2008)

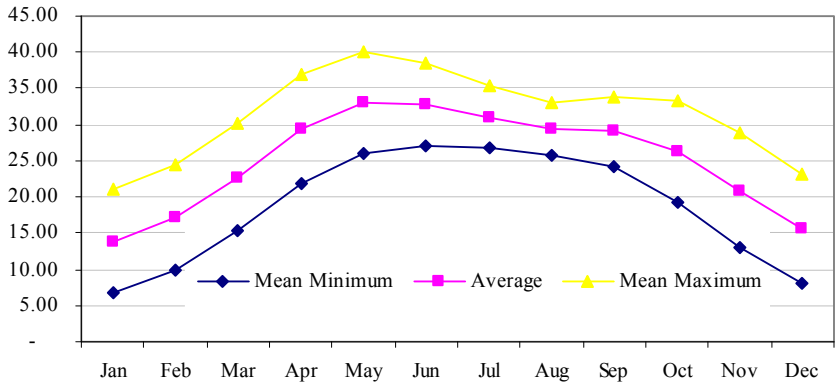
| **Month** | **Rainfall (mm)** | | | | | |
|---|---|---|---|---|---|---|
| | **Normal** | **2004** | **2005** | **2006** | **2007** | **2008** |
| January | 20.5 | 7.8 | 0 | 0 | 0 | NA |
| February | 20.6 | 0 | 23.9 | 0 | 45 | NA |
| March | 17.4 | 0 | 19 | NA | 64 | NA |
| April | 5.8 | 30.4 | 0 | 0 | 0 | NA |
| May | 12.8 | 75 | 0 | 0 | 0 | NA |
| June | 43.8 | 20.6 | 80.5 | 34.2 | 64.1 | 16.4 |
| July | 216.5 | 36.8 | 185.7 | 250.5 | 84.1 | 124.4 |
| August | 234.5 | 520.6 | 57.9 | 20.4 | 99.8 | 58.1 |
| September | 129.2 | 50.4 | 284.2 | 114 | 4.7 | 8.7 |
| October | 34.1 | 12.6 | 0 | 16 | 0 | 0 |
| November | 4.3 | 0 | 0 | 0 | NA | 2 |
| December | 6.1 | 0 | 0 | 0 | 0 | NA |
| **Total** | **745.6** | **754.2** | **651.2** | - | **-** | - |

**Figure 4-2**: Long-term Annual Rainfall Pattern of Ghaziabad (in millimeter)



30. Owing to its sub-tropical continental monsoon climate with hot summers and cold winters, Ghaziabad experiences large variations in temperature across the year. May and June experiences high temperatures and the lowest is recorded in the months of December and January. **Figure 4-3** depicts the monthly averages of minimum, mean and maximum temperature. Winds predominantly blows from north, north-west and west direction, followed by from east and south-east direction.

**Figure 4-3**: Average Monthly Temperature (in Degrees Centigrade)




*4. Air Quality*

31. Ambient Air Quality in Ghaziabad is monitored by Uttar Pradesh Pollution Control Board (UPPCB). Due to dry weather coupled with dusty roads, particulate matter is high while levels of oxides of sulphur and nitrogen are well within the National Ambient Air Quality Standards (NAAQS). According to UPPCB, air pollution status in Ghaziabad has been termed as "low".

**Table 4-2**: Air Pollution Status in Ghaziabad (2008)

| Land use | Sulphur Dioxide (SO2) | Nitrogen Dioxide (NOx) | SPM |
|---|---|---|---|
| Residential | L | L | C |
| Industrial | L | L | H |

C – Critical; L – Low; H – High (see below Table for values); NA: Data not available

**Table 4-3**: Air Pollution Classification based on Annual Mean Concentration Range (µg/m3)

| Air Pollution Status | Industrial Area | | Residential Areas | |
|---|---|---|---|---|
| | SO2 & NOX | SPM | SO2 & NOX | SPM |
| Low ( L ) | 0 – 40 | 0 - 180 | 0 – 30 | 0 – 70 |
| Moderate (M) | 40 – 80 | 180 - 360 | 30 – 60 | 70 - 140 |
| High (H) | 80 – 120 | 360 - 540 | 60 – 90 | 140 - 210 |
| Critical (C) | >120 | >540 | >90 | >210 |

Source: UPPCB

**Table 4-4**: NAAQ Standard – Annual Average Concentration in µg/m3

| **Land use** | RSPM | SPM | SOx | NOx |
|---|---|---|---|---|
| Residential | 60 | 140 | 60 | 60 |
| Industrial | 120 | 360 | 80 | 80 |

Source: CPCB

*5. Surface Water*

32. Hindon River is an important tributary of Yamuna River of the Ganges River System. Hindon meets Yamuna about 35 km south of Ghaziabad. The confluence is located about 40 Km downstream of Okhla barrage. A short cut canal called the Hindon Cut joins River Yamuna at Okhla barrage from where the Agra canal takes off. The Hindon Cut thus serves to make the Hindon river water, including the supplemental discharge from the upper Ganga Canal, available for diversion to the Agra canal for irrigational use. The river stretch remains dry, except during rains. During winter and summer seasons, river flow is mainly limited to industrial effluents discharged from various industries located in Ghaziabad and as well as upstream areas.

33. Due to illegal entry of industrial and domestic wastewater, Hindon River water is polluted. As per the CPCB, the dissolved oxygen content in the river is low and BOD is presence in notable quantities. Illegal disposal of untreated/partially treated effluent from textile dying and printing industries located in Shahid Nagar and Janakpuri in the trans-Hindon area are said to be one of the main reasons for pollution of Hindon River stretch in Ghaziabad.

*6. Groundwater*

34. Due to its location in Gangetic Plains, the underlain aquifers have good groundwater potential. However, the rapid development and increase in demand for water has put tremendous stress on groundwater reserves, both in terms of quantity and as well as quality. The groundwater decline is at much rapid phase and considering this alarming situation the Central Ground Water Authority (CGWA) has notified the area under GMC limits for regulation and control of groundwater extraction. No groundwater extraction is allowed without prior permission of Central Ground Water Board (CGWB).

35. General groundwater quality in Ghaziabad is good except in certain industrial and residential pockets where there is concentration of nitrates, fluorides and heavy metals beyond permissible limits. Indiscriminate disposal of untreated industrial and domestic wastewater is said to be the main reason for pollution of groundwater.

## B. Ecological Resources

36. There are no forests or any other environmental sensitive locations in or near project site. Ghaziabad City is an urban area surrounded by land that was converted for agricultural use many years ago. There is no remaining natural habitat in the city, and the flora is limited to artificially planted trees and shrubs, and the fauna comprises domesticated animals plus

other species able to live close to man. Tree cover along few main corridors is considerable; main tree species include Keekar (*Acacia karoo);* Neem (*Azadirachta indica*); Peepal (*Ficus religiosa*); Honge (*Pongamia Pinnata*); and eucalyptus.

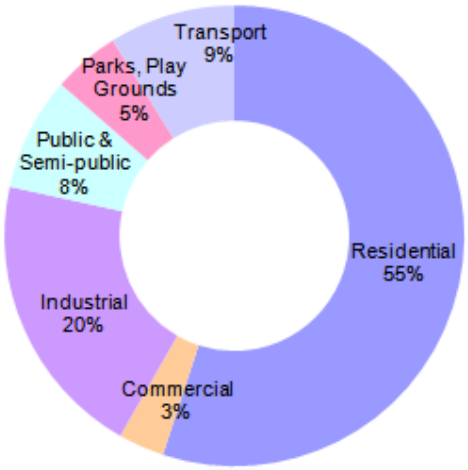
## C. Economic Development

### *1. Land Use*

37. Owing to its location, adjacent to the National Capital, Delhi, over the years, Ghaziabad City has experienced a very rapid development and urbanization. Originally established on the eastern side of River Hindon, present sprawling development of Ghaziabad can be observed on both sides of the River. The City is almost merged with Delhi - City's development stretching towards Delhi on west side and vis-à-vis Delhi expanding to east towards Ghaziabad.

38. Ghaziabad Master Plan 2001 was formulated for an area of 100.4 sq. km, of which by 2001, about 84.8 sq. km was developed. As depicted in the following figure, the existing land use of Ghaziabad development area (84.8 sq km) shows that 60 percent of the land is under residential use followed by industrial areas. There are no agricultural areas within this development area. The gross density of the population is 130 persons per hectare. Anticipating a big growth in the near future, the Ghaziabad Master Plan 2021 has been formulated to an area of 155.54 sq. km.

**Figure 4-4**: Existing Land Use




### *2. Industry & Agriculture*

39. The City of Ghaziabad is known for medium and large scale industries. During 1970-80 decade a number of prestigious and large scale industries are established along Meerut Road, Bulandhshahar Road, Link Road, Sahibabad and Loni Road in Ghaziabad City. In addition to UPSIDC developed industrial areas, there are a number of industries located in

Mohan Nagar and Mohan Industrial Area. Ghaziabad houses a variety of industries including distilleries, chemical, engineering, steel, and textile and dying units etc.

40. Industrial sector is a major employment generator in Ghaziabad. Industrial development in Ghaziabad however declined in the decade of 1991-2001 and no new industries were established during that decade.

41. Within the city limits, there are no agricultural areas left. Almost all of the land is converted for residential or for other development.

### *3. Infrastructure*

42. *Water Supply*. Two agencies are involved in provision of water supply service in Ghaziabad; while the state line agency Uttar Pradesh Jal Nigam (UPJN) is responsible for development of new infrastructure and all capital works, the Ghaziabad Nagar Nigam (GNN) is responsible for its day-to-day operation and maintenance. Water supply system in Ghaziabad is groundwater based. Water is extracted from 186 bore wells and a total of 160 MLD of water is supplied everyday at a rate of 145 LPCD (gross supply). In industrial areas, water is supplied by UPSIDC.

43. *Sewerage System*. UPJN carries out all new and capital works while the GNN operates and maintains the sewerage system in the City. Around 70 – 75 percent of the city population is covered with underground sewerage system. At present an estimated 128 MLD of sewage is generated in the City. There are 17 sewage pumping stations in the City to pump the sewage to two sewage treatment plant for treatment and further disposal. The total treatment capacity available is 126 MLD however present usage is only about 71 percent. Industrial waste water treatment and disposal is managed by individual industries and UPSIDC.

44. *Solid Waste Management*. Municipal solid waste management is the responsibility of Ghaziabad Nagar Nigam. At present about 750 tons of solid waste is generated daily in Ghaziabad at a rate of 550 gm per capita per day. City is divided into five zones for better management of solid waste collection and disposal. There is no door-to-door collection system in the City. The solid waste is collected through bins located at various places in the neighborhood. Sanitary workers collect waste from bins and transport to disposal site at Sai Upvan on the banks of Hindon River. There is no proper disposal facility; the waste is disposed by crude open dumping method.

### *4. Transportation*

45. Ghaziabad City is well connected with important cities of the state and the country; three National Highways (NH 58, NH 91 and NH 24 - Delhi-Lucknow-Muradabad Road) pass through the City connecting it with Delhi, Meerut, Lucknow, Sikandrabad, Kolkata etc. Besides, it is well connected with its hinterland and surrounding towns by regional and local road network. The Main railway line and the two branches of northern railway (Meerut Branch & Moradabad Branch) pass through the City. It is an important railway

junction in the Northern Railway.

46. It is 20 km east of Delhi and 46 km southwest of Meerut. Other roads lead northwest to Loni and Baghpat and east to Hapur and Garhmukteshwar. Buses run at frequent intervals to Delhi, Meerut, Aligarh, Bulandshahar, Moradabad, Lucknow and other cities. The City acts as the main entrance of Uttar Pradesh and is also called the "Gateway of Uttar Pradesh".

47. Internal road network within the town is well developed. Most of the roads however are congested with traffic, pedestrians and activities such as parking of trucks/other vehicles and presence of informal business activities (squatters and vendors) within the ROW.

48. According to available 2003 data, over 70 percent of the vehicles in the town are two wheelers followed by cars. Internal travel in the city is mainly through public transport (buses and mini buses) and intermediate public transport system consisting of Auto Rickshaws.

## D. Social and Cultural Resources

### *1. Demography*

49. According to the national census the population of Ghaziabad was 968,521 in 2001, increased from 511,759 in 1991, recording an unprecedented growth rate of 89.3 percent over the decade. The population of overall GDA area in 2001 was 1,327,330, which was increased from 732,957 in 1991, with a growth rate of 81 percent.

**Table 4-5**: Population Growth of Ghaziabad City

| Year | Population | Decadal Growth Rate (%) |
|---|---|---|
| 1971 | 128,036 | |
| 1981 | 287,170 | 124.3% |
| 1991 | 511,759 | 78.2% |
| 2001 | 968,521 | 89.3% |

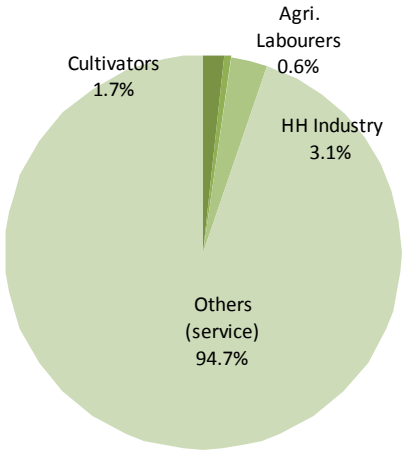
**Source:** Census of India

50. Overall literacy is 80 percent, reported at 87 percent for males and 72 percent for females, which is considerably better than literacy in the state, which is 60.4 percent overall, and 75.7 percent for males and 44.0 percent for females. Sex ratio is however significantly below the natural 1:1 ratio, being 858 females per 1000 males, lower than both the state and national averages (879 and 929 respectively).

51. According to the census 2001, workforce participation rate (WPR) in Ghaziabad was 28 percent. As shown in the following figure, nearly 95 percent of the total workforce was engaged in service sector (formal, informal, trade, commerce and industrial and other service sectors). Contribution of other sectors is very minimal – about 3.1 percent are

engaged in household industries the remaining 2.3 percent of population are engaged in primary sector activities.

**Figure 4-5**: Occupational Structure




52. Majority of people in Ghaziabad are Hindus and the remainder are mainly Muslims, Sikhs, Jains, Christians and Bhudhists. Hindi is the main language of the area. Around 16% of the population belongs to scheduled castes (SC) category. Population belonging to Scheduled Tribe (ST) category in Ghaziabad are negligible and are part of the mainstream population.

*2. Health & Education Facilities*

53. Ghaziabad is a main centre for educational and health facilities in the region. There are a number of schools, colleges, professional education institutions, general and special health care facilities in the City, serving a large number of population from the City and the other near and far areas.

*3. History, Culture and Tourism*

54. The City was founded in 1740 by the Emperor, Ghazi-ud-din, who called it Ghaziuddin Nagar after himself and built a spacious structure consisting of 120 rooms of masonry with pointed arches. Only the gate, a few portions of the boundary wall and a massive pillar about fourteen feet high remain now, the precincts now being inhabited. His mausoleum still stands in the city but is in a bad state. Ghaziabad played active role in the Indian freedom struggle, the revolt of 1857. An encounter took place between the freedom fighters and British force in Ghaziabad during that time. This was regarded as the first war of independence and it brought Ghaziabad much of its glory. On 14th November 1976, Ghaziabad became a separate district. Then on, Ghaziabad has developed in all fronts and it is now one of the biggest and fast developing centers in NCR.

55. There are no notified or protected monuments or sites of archeological and historical

importance in the City. The tourism potential of is minimal.

## E. Profile of Proposed Flyover Site

56. The site is located in the central location of the city (**Figure 4-6** ). Site is bounded by roads on all sides and there are no residential or sensitive areas in the vicinity. Ghaziabad Development Authority (GDA) office is located adjacent to the site. This is predominantly a commercial and institutional area. The topography of the site is plain. There are no water bodies/streams in the vicinity. The soil is characterized by silty sand and clay. Groundwater depth is 25 m below ground level.

57. A bus stand is presently functioning at the site. The site consists of a building housing its UPSDRTC office and some commercial establishments. In addition there are temporary structures, a water tank, and few open covered sheds with seating arrangement, and toilet and water facilities provided for commuting bus passengers. Except, these, the site has no structure, buses are parked on open site. Bus stand is protected by a compound wall all around. There are three matured Neem trees within the site.

**Photographs of the Site**:


# 5. ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

## A. Overview

58. As a general practice, an IEE should evaluate impacts due to the location, design, construction and operation of the project. Construction and operation are the two activities in which the project interacts physically with the environment, so they are the two activities during which the environmental impacts occur. In assessing the effects of these processes therefore, all potential impacts of the project should be identified, and mitigation is devised for any negative impacts. Following sections evaluate the impacts of the proposed Multi-level Parking Facility in Ghaziabad.

## B. Construction Impacts

59. This subproject will involve construction of the following elements at the old bus stand at Navyug Chowk in Ghaziabad:

- Construction of a building with 4 levels including the ground level with a ramp facility to approach different levels with adequate fire protection and lighting facilities
- Provision of basic facilities such as water, sewer, to cater for operation of commercial establishments in ground floor

**Table 5-1**: Construction Method & Materials of Flyover

| Element | Construction Details | Construction Activities |
|---|---|---|
| Multi-level Parking Facility | Construction of 4 level structure (Ground floor + 3 floors)<br>Total site area: 10,040 sq. m<br>Build-up area: 34,156 sq. m<br>Capacity (floor area and parking space):<br>Ground floor: parking space of 11t two-wheelers and 5000 sq. m of commercial space<br>First to third floor: Parking 213 two-wheelers and 777 cars | • Dismantling of existing structures & site clearance<br>• Excavation for foundations<br>• Casting of foundations, columns, slab and ramp in reinforced cement concrete<br>• Construction of brick walls<br>• Providing door and windows and fixtures<br>• Building finishes<br>• Water supply & sewerage facilities - internal plumbing works, water & sewer connection with main city network |

60. Total quantity of earthwork excavation has been estimated as 7,792 $m^3$. In addition, waste rubble will be generated from dismantling of existing structures on the site. All reusable/recyclable material like wooden, steel, glass, roof sheets etc will be retrieved. The waste material will mostly be cement concrete and brick rubble.

61. Ready mix concrete, procured and brought to site on truck from nearest plant, will be utilized in construction. The other construction material that is required in bulk will be sand, aggregate, cement, cement concrete blocks/clay bricks, etc. Construction materials like sand and aggregate will be sourced from quarries approved by the respective Mines & Geology Departments. Yamuna Nagar in Haryana about 200 km away is a known source for stone aggregates, Ghaghar, 180 km away and Haridwar, 160 km away are sources for sand.

*1. Impacts on Physical Resources*

62. Construction will involve dismantling of existing structures, excavation for foundations, and disposal of the waste material which could have physical impacts.

63. In earthwork most of the impacts are related to disposal of surplus soil. Therefore the rubble and surplus soil needs to be disposed without any major impacts. The contractor shall therefore implement the following measures:

- Salvage the recyclable and reusable material as much as possible and reduce the quantity that needs to be disposed off
- Estimates the quantity of rubble and prepare a rubble management plan
- Dispose rubble only in solid waste dumping sites or filling up abandoned quarries or as recommended by UPPCB
- Utilize excavated soil in construction – to raise the ground-level or road construction
- The waste soil can be utilized for raising the ground-level of the site on Loni Road, which is proposed for development of new Bus Terminal.

64. Dismantling and excavation activities could cause physical impacts, including creation of the dust during dry weather and silt-laden runoff during rainfall, both of which would affect people who live and work near the site and reduce the quality of adjacent land. Earthwork will not mostly be conducted in rainy season, so this will avoid any problems from runoff. In Ghaziabad, dry weather prevails in most part of the year, and therefore generation of dust may be significant. Since the site is located in a busy commercial and institutional area the impact will be significant. It will therefore be necessary to prevent dust, which could be generated in quite large quantities. The Contractor should therefore:

- Wrap the site/construction area with geo-textile fabric or install dust barriers to the necessary height
- Apply water and maintain soils in a visible damp or crusted condition for temporary stabilization

- Apply water prior to leveling or any other earth moving activity to keep the soil moist throughout the process;
- Use tarpaulins to cover loose material/soil that is transported to and from the site by truck
- Control dust generation while unloading the loose material (particularly aggregate) at the site by sprinkling water and unloading inside the barricaded area
- Clean wheels and undercarriage of haul trucks prior to leaving construction site
- Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition where loaders, support equipment and vehicles will operate
- Don't allow access in the work area except workers to limit soil disturbance and prevent access by fencing

65. As the shallow excavations (maximum depth 3.25 m) will be made for foundations, there is no possibility of groundwater collecting in voids. The groundwater table depth at the site is about 25 m below ground level.

*2. Ecological Resources*

66. There are no protected areas in or around the site and no known areas of ecological interest. There are three trees in the site, which need to be cut off.

67. Necessary approvals from competent authority (Forest Department/Ghaziabad Nagar Nigam) shall be obtained and the guidelines for compensatory measures, if any of the competent authority, must be adhered to. In any case, as a compensatory measure, three trees will be planted and maintained for each tree felled.

*3. Economic Development*

68. The proposed site (existing bus stand) belongs to Uttar Pradesh State Road Transport Corporation (UPSRTC), a state-government owned autonomous corporation. It is proposed to shift the existing bus stand to a newly identified site as per the Ghaziabad Master Plan. The existing bus stand site will be transferred to Ghaziabad Development Authority for development and maintenance of proposed parking facility. This project therefore does not involve any private land acquisition.

69. Within in the bus stand premises, seven shops of different functional types and a bi-cycle stand is located. Those shops and the bi- cycle stand were provided space by UPSRTC on monthly lease rent. The proposed sub-project will directly impacted upon the livelihood of those 7 affected persons. NCRPB Environmental and Social Management System (ESMS) and Policy provides that the owners and tenants of these businesses do not suffer economically as a result of the project, and a Resettlement Plan have been prepared to assess the nature and extent of the losses and the compensation that is needed.

70. The traffic on the surrounding roads, which are already congested by vehicles and pedestrians, will be increased further due to movement of construction vehicles transporting material to the site. Following measures shall be followed by the Contractor:

- Plan work to avoid peak traffic hours
- Plan routes to avoid narrow streets, congested roads, etc

*4. Social and Cultural Resources*

71. There are no historical or cultural heritage sites in Ghaziabad in general or at the project site in particular. Therefore there are no likely impacts.

72. The site is located in a central area of the city, with large commercial and institutional areas. Action should be taken to minimize nuisance and disturbance due to construction work as far as possible. This will require:

- Consultation with the local community to inform them of the nature, duration and likely effects of the construction work, and the mitigation measures in place
- Implementing measures to reduce dust generation (as stated above)
- Implementing measures to control noise:
    - During construction work ambient noise level should not exceed more than 65 dB(A).
    - Do not cut materials (like floor tiles) without proper dust control/noise control facility
    - Proper planning of work programme so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times;
- Utilising modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensuring that these are maintained to manufacturers' specifications at all times.

73. There is invariably a safety risk when substantial construction such as this is conducted in an urban area, and precautions will thus be needed to ensure the safety of both workers and citizens. This should include such measures as:

- Following standard, safe and quality construction practices;
- Excluding the public from the site – enclosing/barricading the construction area; providing warning boards and sign boards and posting of security guards throughout the day and night
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (helmet, hand gloves, boots, masks, safety hoists when working at height, etc);
- Barricade the entire area that may come under influence in case of accidents – this may particularly critical if heavy duty cranes are used;
- Follow standard practices of safety checks as prescribed before use of equipments

such as cranes, hoists, etc.

- Provide on -site Health and Safety Training for all site personnel;
- Report accidents to the authorities promptly, and maintain records

74. There could be some short-term socio-economic benefits from the construction work if local people gain employment in the workforce. To ensure that these benefits are directed to local people, the Contractor should be required to employ as much of his labour force as possible from the local communities. Drawing of majority of workforce from local communities will avoid problems that can occur if workers are imported, including social conflicts and issues of health and sanitation due to labour camps. If temporary labour camps are to be provided; Contractor should ensure that they are maintained well with proper water supply and sanitation facilities.

## C. Operation Stage Impacts

75. The parking facility would operate without the need for major maintenance or repair, therefore there are no major impacts envisaged. During operation, the impacts are mainly due to resource consumption (water and electricity), generation of wastewater (from toilet and bath facilities to cater to the commercial space provided in the facility), health & safety hazard (fire and other accidents) and noise generation (from moving vehicles in the facility at higher elevation).

76. Water consumption will be very minimal and limited to commercial space requirements. An individual water connection of commercial category will be taken from Ghaziabad Nagar Nigam. This additional demand generated by the proposed parking facility unlikely to have any effect on the existing water supply infrastructure or consumption pattern. Similarly, the domestic wastewater that is generated from toilets and baths will be disposed into the nearest sewer of GNN for treatment and further disposal. The contribution of this sewage to the total sewage generation of the city (about 128 MLD) is negligible. Nevertheless, at present, the sewage treatment plants are underutilized at 71 percent and therefore the additional sewage generation will not have any impact on the existing facilities.

77. Electricity consumption will be limited by designing environmental friendly building that requires less power.

78. The facility will be designed as per the local guidelines and meeting approved fire and hazard safety norms. Exit facilities shall be designed so as to enable evacuation from the facility in not more than 2.5 minutes. Fire escape routes shall be enclosed by fire resistant construction. The Developer will design, erect, test, and commission the entire Fire Protection System (FPS) as per the requirements of National Building Code of India (NBC). Fire Alarm System shall be complete with detectors, manual call points, fire alarm panels, battery, etc and shall be in accordance with the National Building Code. It is the responsibility of the Developer to get the building and installed Fire Protection System inspected and approved by the local Fire Service Officer, or other Government and /or Local Authorities.

79. Generation of noise from vehicles parking at higher level may have impacts on surrounding buildings. This impact however is considered minimal as there are no sensitive land uses in the immediate vicinity. The facility surrounded by roads on three sides.

80. There could be a positive impact as it is proposed to develop a rainwater harvesting system for the building.

81. To sum up the above, the following measures being included in the design and development of the proposed multi-level parking facility to minimize the operation stage impacts, if any.

- Water supply shall be sourced from water supply network of Ghaziabad Nagar Nigam; no bore wells or any groundwater extraction structures shall be built in the site;
- Develop rainwater harvesting system; minimize water usage
- Connect the wastewater outlet to nearest sewer of GNN
- Design the structure utilizing more natural light to reduce artificial lighting requirement;
- Minimize use of air conditioners in the commercial area by good orientation and appropriate construction materials
- Design the building in compliance with fire safety norm and provide Fire Protection System as per the requirements of National Building Code of India (NBC)

## D. Location and Design Impacts

82. In many environmental assessments there are certain effects that, although they will occur during either the construction or operation stage, should be considered as impacts primarily of the location or design of the project, as they would not occur if an alternative location or design was chosen.

83. However in case of this subproject it is not considered that there are any impacts that are a result of the design or location. This is because:

- The project will be built on a government owned site and involves straightforward construction and low-maintenance operation, in an environment that is not especially sensitive, so it is unlikely that there will be major impacts;
- Most of the predicted impacts are associated with the construction process, and are produced because that process involves quite extensive construction work. However the routine nature of the impacts means that most can be easily mitigated, and
- The operation stage impact mostly related to fire risk and safety hazard, which are duly considered in the design and necessary measures and included in the project.

# 6. INSTITUTIONAL ARRANGEMENTS

## A. Institutions Involved

84. Following agencies will be involved in implementing this Multilevel Parking Facility subproject at Navyug Chowk in Ghaziabad:

(i) NCRPB: National Capital Region Planning Board is the funding agency for the project.

(ii) Implementing Agency (IA): Implementing Agency of the Project will be Ghaziabad Development Authority. IA will be responsible for the project implementation. Operation & maintenance will also be the responsibility of the IA.

(iii) Design and Supervision Consultants: Implementing Agency will be assisted by Design and Supervision Consultants (DSC) in tendering, and reviewing and revising designs during the construction, if required, and supervising the construction to ensure quality.

(iv) Construction Contractors: IA will appoint Construction Contractors (CC) to build the infrastructure elements.

85. Implementing the project according to and in compliance with the policies the funding agency, NCRPB, will be the responsibility of the Implementing Agency (IA). The Environmental and Social Management Cell (ESMC) of NCRPB will deal with environmental and social safeguard issues. ESMC would guide and monitor IA in complying with its ESMS and Policy.

86. *ESMC*. The ESMC will be housed inside the appraisal function of NCRPB and will have two distinct sub-functions, i.e. managing environmental safeguards and social safeguards. ESMC will be provided with one full-time staff - safeguards officer, who will look after the day-to-day activities related to the safeguard compliance. Safeguard Officer will be responsible for both environmental and social safeguard functions. Based on the necessity, the Safeguards Officer will source expertise from outside/external consultants on a case-to-case basis.

87. ESMC will review and approve IEE, oversee disclosure and consultations, and will monitor the implementation of environmental monitoring plan and environmental management plan where required. The Construction Contractor (CC) will implement mitigation measures in construction. IA or DSC will monitor the implementation of mitigation measures by the CC. ESMC will oversee the implementation of EMP. Implementation of mitigation and monitoring measures during the operation and maintenance (O&M) stage will be the responsibility of the implementing agency.

# 7. ENVIRONEMNTAL MANAGEMENT PLAN

## A. Environmental Management Plan

88. The proposed subproject and its components, the baseline environmental profile of the subproject area, the anticipated environmental impacts and appropriate mitigation measures to avoid/ reduce/ mitigate/compensate for the identified impacts have been discussed in detailed in earlier sections.

89. This Environmental Management Plan is developed for implementation listing the impacts, appropriate mitigation measures, delegating the responsibility of implementation to concerned agencies. This is shown in the following **Table 7-1**.

## B. Environmental Monitoring Plan

90. A program of monitoring will be conducted to ensure that all the parties take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. Regular monitoring of implementation of mitigations measures by Construction Contractor will be conducted by the Implementing Agency. Periodic monitoring and overseeing of implementation of mitigation measures will be conducted by the ESMC of NCRPB. Monitoring during operation stage will be conducted by the Operating Agency.

91. Most of the mitigation measures are fairly standard methods of minimizing disturbance from building in urban areas (public inconvenience and traffic disruptions). Monitoring of such measures normally involves making observations in the course of site visits, although some require more formal checking of records and other aspects.

106. **Table 7-2** shows the proposed Environmental Monitoring Plan (EMP) for this Project, which specifies the various monitoring activities to be conducted during different phases of the project. The EMP describes: (i) mitigation measures, (ii) location, (iii) measurement method, (iv) frequency of monitoring and (v) responsibility (for both mitigation and monitoring).

**Table 7-1**: Environmental Management Plan

| Potential Negative Impacts | Sig | Dur | Mitigation measures | Responsibility | Location | Cost |
|---|---|---|---|---|---|---|
| **Preconstruction** | | | | | | |
| Involuntary resettlement<br><br>*Description*: Displacement of lease holders and squatters | L | P | • Implement compensatory measures as recommended by the Resettlement Plan prepared in accordance with NCRPB ESMS<br>o | GDA | MLP Site | Part of RP Cost |
| **Construction** | | | | | | |
| Tree Cutting<br><br>*Description*: The proposed work requires cutting of 3 trees of domesticated local species | | | • Obtain necessary approvals from Forest Department/Ghaziabad Nagar Nigam for tree cutting<br>• Plant and maintain three trees for each tree felled as a compensatory measure | CC | MLP Site | Part of project cost |
| Dismantling and excavation will produce large quantity of waste soil, which needs proper disposal. | L | P | • Salvage the recyclable and reusable material as much as possible and reduce the quantity that needs to be disposed off<br>• Estimates the quantity of rubble and prepare a rubble management plan<br>• Dispose rubble in only in solid waste dumping sites or filling up abandoned quarries or as recommended by UPPCB<br>• Utilize excavated soil in construction – to raise the ground-level or road construction<br>• The waste soil can be utilized for raising the ground-level of the site on Loni Road proposed for development of new Bus Terminal. | CC | MLP Site and Disposal Site | Part of standard contract |

| Potential Negative Impacts | Sig | Dur | Mitigation measures | Responsibility | Location | Cost |
|---|---|---|---|---|---|---|
| Dust nuisance due to construction<br><br>*Description*. Dismantling, earthwork excavation, refilling, handling and transportation of construction materials (like sand and aggregate), and handling, and transportation produce large volumes of dust if it is not done properly. | M | T | • Wrap the site/construction area with geo-textile fabric or install dust barriers to the necessary height<br>• Apply water and maintain soils in a visible damp or crusted condition for temporary stabilization<br>• Apply water prior to leveling or any other earth moving activity to keep the soil moist throughout the process;<br>• Use tarpaulins to cover loose material/soil that is transported to and from the site by truck<br>• Control dust generation while unloading the loose material (particularly aggregate) at the site by sprinkling water and unloading inside the barricaded area<br>• Clean wheels and undercarriage of haul trucks prior to leaving construction site<br>• Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition where loaders, support equipment and vehicles will operate<br>• Don't allow access in the work area except workers to limit soil disturbance and prevent access by fencing | CC | MLP Site | Part of standard contract |
| Impacts due to improper mining for construction materials<br>. | L | P | • Ensure that construction materials (sand, aggregate and gravel) are obtained from quarries licensed by Geology and Mining Departments of respective state governments (Haryana/ Uttar Pradesh /Uttarakhand) | CC | NA | Part of standard contract |
| Increase in traffic due to trucks carrying construction material and heavy equipment | L | T | • Plan work to avoid peak traffic hours<br>• Plan routes to avoid narrow streets, congested roads, and places of religious importance | CC | NA | Part of standard contract |

| Potential Negative Impacts | Sig | Dur | Mitigation measures | Responsibility | Location | Cost |
|---|---|---|---|---|---|---|
| Nuisance to noise, dust and other construction related activities to the general public and surrounding land use | | | • Consul with the local community to inform them of the nature, duration and likely effects of the construction work, and the mitigation measures in place<br>• Implement measures to reduce dust generation (as stated)<br>• Implementing measures to control noise:<br>o During construction work ambient noise level should not exceed more than 65 dB(A).<br>o Do not cut materials (like floor tiles) without proper dust control/noise control facility<br>o Proper planning of work programme so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times;<br>• Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensuring that these are maintained to manufacturers' specifications at all times. | CC | MLP Site | Part of standard contract |
| Workers and public at risk from accidents on site<br><br>*Description*. Deep excavations, operating heavy-duty construction equipment | M | T | • Following standard, safe and quality construction practices;<br>• Excluding the public from the site – enclosing/barricading the construction area; providing warning boards and sign boards and posting of security guards throughout the day and night<br>• Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (helmet, hand gloves, boots, masks, safety hoists when working at height, etc);<br>• Barricade the entire area that may come under | CC | MLP Site | Part of standard contract |

| Potential Negative Impacts | Sig | Dur | Mitigation measures | Responsibility | Location | Cost |
|---|---|---|---|---|---|---|
| | | | influence in case of accidents – this may particularly critical if heavy duty cranes are used;<br>• Follow standard practices of safety checks as prescribed before use of equipments such as cranes, hoists, etc.<br>• Provide on -site Health and Safety Training for all site personnel;<br>• Report accidents to the authorities promptly, and maintain records | | | |
| Economic benefits for people employed in workforce | L | T | • Ensure that most of the unskilled workforce is from local communities | CC | MLP Site | NA |
| **Operation Impacts** | | | | | | |
| Impact on water resources; water supply and sewerage infrastructure | | | • Water supply shall be sourced from water supply network of Ghaziabad Nagar Nigam; no bore wells or any groundwater extraction structures shall be built in the site;<br>• Develop rainwater harvesting system; minimize water usage<br>• Connect the wastewater outlet to nearest sewer of GNN | GDA/developer | MLP Site | |
| Power consumption | | | • Design the structure utilizing more natural light to reduce artificial lighting requirement;<br>• Minimize use of air conditioners in the commercial area by good orientation and appropriate construction materials | GDA/developer | MLP Site | |
| Safety & fire risk | | | • Design the building in compliance with fire safety norm and provide Fire Protection System as per the requirements of National Building Code of India (NBC) | GDA/developer | MLP Site | |

**Table 7-2**: Environmental Monitoring Plan

| Mitigation measures | Responsible for Mitigation | Monitoring Method & Parameters | Monitoring Frequency | Responsible for monitoring | Cost |
|---|---|---|---|---|---|
| **Pre-Construction** | | | | | |
| • Implement measures as recommended by RP | GDA | Records review; interview with APs | As needed | ESMC | Part of project management cost |
| • Obtain necessary approvals for tree cutting<br>• Plant and maintain three tree for each tree felled | CC | Records review; on site-observation | As needed | GDA | Part of construction supervision cost |
| • Water supply shall be sourced from local network<br>• No bore wells or groundwater extraction structures<br>• Develop rainwater harvesting system<br>• Connect the wastewater outlet to nearest sewer of GNN<br>• Design the structure to reduce power consumption<br>• Design the building in compliance with fire safety norms | GDA | Design review and site observations | As needed | ESMC | Part of project management cost |
| **Construction** | | | | | |
| • Salvage the recyclable material as much as possible<br>• Prepare a rubble management plan<br>• Dispose rubble only in solid waste dumping sites or filling up abandoned quarries<br>• Utilize excavated soil in construction<br>• Wrap the site/construction area with geo-textile fabric or install dust barriers to the necessary height<br>• Apply water and maintain soils in a visible damp<br>• Apply water prior to leveling or any earth moving activity<br>• Use tarpaulins to cover loose material/soil in transport<br>• Control dust generation in unloading the loose material<br>• Clean wheels and undercarriage of haul trucks<br>• Stabilize surface soils in work place | CC | Observations on-site/off-site; CC records | Weekly | GDA | Part of construction supervision cost |

| Mitigation measures | Responsible for Mitigation | Monitoring Method & Parameters | Monitoring Frequency | Responsible for monitoring | Cost |
|---|---|---|---|---|---|
| • Don't allow access in the work area except workers<br>• Obtain construction materials from approved mines<br>• Plan routes to avoid narrow streets/congested roads<br>• Plan work to avoid peak traffic hours<br>• Consult with the local community to inform them of work<br>• Ambient noise level not to exceed 65 dB(A)<br>• Utilize modern vehicles and machinery<br>• Follow standard, safe and quality construction practices<br>• Ensure that all workers are provided with and use PPE<br>• Barricade the entire area<br>• Follow standard practices of safety checks for cranes<br>• Provide on -site Health and Safety Training<br>• Report accidents and maintain records<br>• Draw unskilled workforce is from local communities | CC | Observations on-site/off-site; CC records | Weekly | GDA | Part of construction supervision cost |

# 8. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

## A. Project Stakeholders

92. Most of the main stakeholders have already been identified and consulted during preparation of this IEE, and any others that are identified during project implementation will be brought into the process in the future. Primary stakeholders are:

- People near the old bus stand area and Navyug market;
- Public representatives and prominent citizens;
- Ghaziabad Nagar Nigam;
- Ghaziabad Development Authority

93. Secondary stakeholders are:

- Other concerned government institutions (utilities, regulators, etc)
- NGOs and CBOs working in the local area;
- Other community representatives (prominent citizens, religious leaders, elders, women's groups);
- The beneficiary community in general
- NCRPB as the Funding Agency

## B. Consultation and Disclosure

94. A series of public consultation meetings were conducted during project preparation. Various forms of public consultations (consultation through household surveys, ad hoc discussions on site) have been used to discuss the project and involve the community in planning the project and mitigation measures.

# 9. RECOMMENDATION AND CONCLUSION

## A. Recommendation

95. The process described in this document has assessed the environmental impacts of the proposed Multi-level Parking Facility in Ghaziabad. Potential negative impacts were identified in relation to design, location, construction and operation of the proposed flyover. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and measures have been included in the designs. This means that the number of impacts and their significance has already been reduced by amending the design. These include:

- Construction of the facility on government owned site
- Design as per seismic zone to eliminate risk
- Compensatory tree plantation – 3 trees for each tree felled

96. Regardless of these and various other actions taken during the IEE process and in developing the project, there will still be impacts on the environment when the infrastructure is built. This is mainly because clearance of lease holders of commercial establishments in the bus stand area and as well as squatters. Following are some of the important mitigation measures suggested:

- Implementation of compensatory measures for clearance of encroachments as recommended by the Resettlement Plan prepared in compliance with NCRPB policies
- Condition that the all compensatory/resettlement measures must be implemented before the signing of contract for civil works

97. During the construction phase, impacts mainly arise from generation of waste and dust from dismantling of existing structures, soil excavation and refilling; and from the disturbance to surrounding offices and commercial establishments by the construction work. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. Among these, disposal rubble and waste soil; dust and noise nuisance, and public and worker safety due to large scale construction is considered to be significant. Important measures suggested include:

- Salvaging the recyclable and reusable material as much as possible and reduce the quantity that needs to be disposed off
- Preparation of a rubble management plan
- Wrap the site/construction area with geo-textile fabric or install dust barriers
- Apply water and maintain soils in a visible damp or crusted condition Use

tarpaulins to cover loose material/soil that is transported to and from the

- Don't allow access in the work area except workers to limit soil disturbance and prevent access by fencing
- Noise control measures; during construction work ambient noise level should not exceed more than 65 dB (A).
- Following standard, safe and quality construction practices;
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment (helmet, hand gloves, boots, masks, safety hoists when working at height, etc);
- Provide on -site Health and Safety Training for all site personnel;

98. During the operation, the impacts are mainly due to consumption of resource like water and electricity, stress of existing infrastructure and disposal of wastewater generated from toilet and bath facilities. Fire safety is another impact aspect. The following measures are included in the design:

- Water supply shall be sourced from water supply network of Ghaziabad Nagar Nigam; no bore wells or any groundwater extraction structures shall be built in the site;
- Develop rainwater harvesting system; minimize water usage
- Connect the wastewater outlet to nearest sewer of GNN
- Design the structure utilizing more natural light and air to reduce the power consumption
- Design the building in compliance with fire safety norm and provide Fire Protection System as per the requirements of National Building Code of India (NBC)

99. The main beneficiaries of the facility will be the citizens of Ghaziabad and parking users in general.

100. Mitigation will be assured by a program of environmental monitoring conducted to ensure that all measures are provided as intended, and to determine whether the environment is protected as envisaged. This will include observations on and off site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the NCRPB.

101. Stakeholders were involved in developing the IEE through both face-to-face discussions on site and a large public meeting will be held in the town, after which views expressed will be incorporated into the IEE and the planning and development of the project.

102. There are two essential recommendations that need to be followed to ensure that the environmental impacts of the project are successfully mitigated. The IA shall ensure that:

- All mitigation, compensation and enhancement measures proposed in this IEE

report and in the Resettlement Plan (RP) of the subproject are implemented in full, as described in these two documents;

- The Environmental Monitoring Plan proposed in this report and the internal and external monitoring proposed in the Resettlement Plan are also implemented in full.

## B. Conclusion

103. The environmental impacts of the proposed Multi-level Parking Facility in Ghaziabad have been assessed by the Initial Environmental Examination reported in this document, conducted according to the NCRPB ESMS. Issues related to Involuntary Resettlement were assessed by a parallel process of resettlement planning and will be compensated by measures set out in detail in the Resettlement Framework for the subproject.

104. The overall conclusion of both processes is that providing the mitigation, compensation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject.

105. There are no uncertainties in the analysis, and no additional work is required to comply with NCRPB procedure or national law. There is thus no need for further study or Environmental Assessment.

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