BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

Principal Bench, New Delhi

Original Application No. 651/2019

In the matter of: -

Shobha Agarwal — Applicant

Vs.

Delhi Metro Rail Corporation & Ors. — Respondent(s)

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(N. K. Gupta)
Scientist-E
Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi- 110032.

Date: 14.01.2021
Place: Delhi

Report in the Matter of OA No. 651/2019 before Hon'ble NGT titled as Residents of Delhi through Shobha Agarwal Vs Delhi Metro Rail Corporation & Ors.

1.0 Background

Hon'ble National Green Tribunal vide order dated 11.08.2020 **(Annexure A)** in above matter directed as follows:

> *"4. In view of above, we find it necessary that before the proposed constructions are carried out, Environment Impact Assessment (EIA) and carrying capacity studies must be conducted by a Joint Committee comprising Central Pollution Control Board (CPCB), IIT, Delhi and Delhi Pollution Control Committee (DPCC). CPCB will be the nodal agency for compliance. The Committee may take into account any other study on the subject and furnish a report within three months by e-mail at judicialngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF."*

Accordingly, Member Organizations were communicated seeking nomination from their side.

1.1 Constitution of the Committee

After communication with IIT, Delhi and Delhi Pollution Control Committee (DPCC), nominations had been received and Committees had been constituted comprising of following Members.

Sl. No.	Name & Designation	Organization
1.	Shri N. K. Gupta, Additional Director & Divisional Head UPC-I	Central Pollution Control Board, Delhi
2.	Dr. A. K. Nema, Professor	Department of Civil Engineering, Indian Institute of Technology Delhi
3.	Dr. Harsha Kota, Assistant Professor	Department of Civil Engineering, Indian Institute of Technology Delhi
4.	Shri Sunil Kumar Goyal, Environmental Engineer	Delhi Pollution Control Committee, Delhi

1.2 Proceedings of the Committee

1.2.1 First Meeting of the Committee

First Meeting of the Committee was convened on 29th September, 2020 through Video Conferencing **(Minutes of the Meeting is placed at Annexure B)**.

Records of Proceedings of the 1st Meeting

During presentation regarding subject matter as mentioned in Hon'ble NGT Order dated 11.08.2020 and briefing objectives of the meeting by Sh. N. K. Gupta, following points were highlighted:

i. In the year 2012, some open land (District Park) was transferred to DMRC which was to be redeveloped after completion of the construction work of Bhikaji Cama Place Metro Rail station, New Delhi.

ii. Construction work of the underground metro station has been completed but instead of redeveloping the park, DMRC has proposed to develop it as commercial complex which is objected by the Applicant.

iii. DMRC is planning to construct four floors above the ground floor of the metro station. Proposed development is subject to land-use change for which an application has already been moved by DMRC to DDA.

iv. Observations made by Principal Chief Conservator of Forest (PCCF), Delhi in compliance with Hon'ble NGT's previous Order dated 07.11.2019 were also discussed.

v. Validity and brief features / observations of the studies conducted by M/s TPA Engineering Consultants (I) Pvt. Limited for the site referred on behalf of DMRC are to be verified.

The matter was discussed at length on the following issues:

i. Designated use of the piece of land under question.

ii. Permissions, Clearances, Consents and NOCs obtained by DMRC for the proposed construction of commercial complex.

iii. Studies so far conducted to assess environmental impacts of the proposed construction work.

The Joint Committee realized that necessary documents for detailed examination of the case are presently not available with any of Member Organization. Details of such documents needed to proceed further in the matter are as follows:

i. Ownership document and designated land use of the piece of land under question.

ii. Permissions, Clearances, Consents and NOCs so far obtained by DMRC for the proposed construction of commercial complex including applications under process.
iii. Approved copy of the project report.
iv. Studies so far conducted by DMRC to assess environmental impacts of the proposed construction work.
v. Original Application as submitted by the Applicant i.e. 'Residents of Delhi through Shobha Agarwal' and replies submitted by the Respondent i.e. DMRC

Accordingly, following 'Course of Action' chalked out for further proceeding in the matter:

i. The Nodal Agency i.e. CPCB shall made interaction with DMRC and the Applicant (Petitioner) and obtain the necessary documents as referred above.
ii. These documents shall be circulated among the Committee Members for their reference and observations.
iii. An opportunity for hearing shall be given on Oct. 08, 2020 (3:00 PM) to both the parties i.e. Applicant Ms. Shobha Agrawal and DMRC for their submission in the matter.
iv. Site visit by the Committee shall be made after completion of the tasks mentioned in i to iii above and future Course of Action shall be decided accordingly.

1.2.2 2nd Meeting of the Committee

2nd meeting of the Committee was convened on 08.10.2020 to give opportunity to the Applicant Ms. Shobha Agarwal and Respondent DMRC for hearing through Video Conferencing. **(Minutes of the Meeting is placed at Annexure C)**.

Respondent DMRC has attended the Meeting but the Applicant didn't prefer the same.

Details of Committee Members and Respondent having attended the meeting are as follows:

Sl. No.	Name & Designation	Organization
1.	Sh. N. K. Gupta, Additional Director & Divisional Head UPC-I	Central Pollution Control Board, Delhi
2.	Dr. A. K. Nema, Professor	Department of Civil Engineering, Indian Institute of Technology Delhi
3.	Dr. Harsha Kota, Assistant Professor	Department of Civil Engineering Indian Institute of Technology Delhi
4.	Shri Sunil Kumar Goyal, Environmental Engineer	Delhi Pollution Control Committee, Delhi
5.	Anirudh Jain, Adviser (PD)	Delhi Metro Rail Corporation Limited, New Delhi
6.	S K Verma, GM, DMRC	Delhi Metro Rail Corporation Limited, New Delhi
7.	Shri Sanjay Srivastava, Sr. Deputy General Manager, Property Development III	Delhi Metro Rail Corporation Limited, New Delhi

Records of Proceedings of 2nd Meeting

It was informed to the members that, the requisite documents have been received from the both side - Applicant **(Annexure D)** and Respondent **(Annexure E)**. DMRC was invited for a presentation on the proposed project wherein following points were submitted:

- Land measuring 13,332 Sqm. had been allotted by Land & Development Office, Ministry of Housing and Urban Affairs (MoHUA) vide letter dated 16.04.2019 to DMRC Ltd. on permanent basis (4816 Sqm. for ancillary building and water boosting station and Vent Shaft, 6109 Sq.m. for proposed Property Development and 2407 Sq.m for Entry and Vent Shaft and lift) at Bhikaji Cama Place, New Delhi.
- MoHUA has permitted DMRC vide Order dated 30.03.2019 for property development above the metro station at Bhikaji Cama Place as a part of policy matters.
- Later-on 'No Objection Certificate' was also issued by MoHUA vide letter dated 13.12.2019 for change of land use of the land under question from 'District Park' to 'Transportation purpose'.
- DMRC is planning to construct four floors above the ground floor of the metro station under reference. Proposed development is subject to approval of Delhi Development Authority (DDA) for land-use change for which an application has already been moved by DMRC on 14.08.2020.
- There are Guidelines of MoHUA for property development at the Project Site.
- Approval of DDA is under process wrt land-use change.
- Quarries raised by the Committee Members were as follows:

    1. How shall the Project Proponent address the objection raised by the Applicant regarding loss of greenery on the land?

2. There are mentioning of traffic study; but, is there any other study regarding impact assessment?
3. Is public hearing conducted by them and is there any report submitted to any concerned organization?
4. What are the figures on FAR and other dimensions?

In response to above queries, submission of DMRC were as follows:

- DMRC has undertaken a mini EIA study for their own observations and agreed to share a copy of the same with Committee members.
- They are taking initiatives to compensate in other ways like, taking of measures for minimization of environmental degradation or restoration of the local area. To compensate loss of trees, afforestation has been taken place by them in some other land provided by Local Authority. Besides, on the land under question a portion (around 30-40 %) shall be kept dedicatedly for gardening or green belt development.
- Use of solar energy to save electricity issue, installation of sewage treatment plant (STP), Building Construction with ITPC code are also being taken care by them.
- They have not conducted any public hearing as it is not mandatory for them looking towards size of the project and applicable legislations i.e., Environmental Impact Asssment Notification, 2006 and its amendments.
- Details of the built-up area are as follows:
    - Total built-up area (excluding basement) – 13112 sq.metres
    - Total built-up area (including basement) – 16404 sq.metres
    - Total built-up area - 17555.5 sq. metres.
      (Including shaft, staircase, headroom, lifts head room etc.)

In addition, they have claimed that, they have Exemption Certificate from Government of India in respect of construction of proposed project.

After hearing, DMRC has been requested to submit the following documents:

i. Latest status of the land under question.
ii. Studies so far conducted by them to assess environmental impacts of the proposed construction work.
iii. Details of green and other areas available for recreation within 2 km radius.
iv. Details of the Exemption Certificate received from Government of India.

Based on the discussion with DMRC, it was observed by the Committee that DMRC has yet to obtain following clearances:

i. Permission from DDA for land-use change
ii. NOC/Clearances/Consents from concerned departments for construction of the proposed commercial complex.

Accordingly, following 'Course of Action' is chalked out for further proceeding in the matter:

i. After receipt of the requested documents from DMRC, the same shall be circulated among Members for review.
ii. Based on the review / observations as mentioned in (i) above, Site visit by the Committee shall be made in the presence of Project Head, DMRC and future Course of Action shall be decided accordingly.
iii. Based on (i) and (ii) above, the Committee may submit Interim Report before Hon'ble NGT.

1.3 Site visit of the Committee

Site under reference has been visited by all the Members of Joint Committee on 09.11.2020 which was a normal working day. The Applicant and Respondent were also informed about the visit and advised to be present at the site for making submission, if any.

On behalf of the Applicant, Advocate Shri Salik Shafique was present.

On behalf of Respondent – DMRC, Shri Anirudh Jain, Adviser (PD) and Shri Vikash Singhal, DGM-Env were present at the site with their team. Both the parties made their submissions before the Committee.

It is observed that the project site is located on a corner plot surrounded by Africa Avenue Road in the East and Mahatma Gandhi Marg (Inner Ring Road) in the South. The site is having adequate service roads/ slip roads on all the four sides.

It is located in a mixed area i.e., commercial as well as residential areas and it is just opposite to the Bhikaji Cama Place District Centre and on the other side of Mahatma Gandhi Marg (Inner Ring Road).

Some important and salient surrounding features are as follows (As per **Annexure O**):

Important Destination	***Description***
Nearest Railway Station	Safdarjung Railway Station: 1.33 km/NW New Delhi Railway Station: 8.49 km/NE Hazrat Nizamuddin Railway Station: 6.74 Km/NE
Airport	Indira Gandhi International Airport:6.73 km/SW Safdarjung Air Strip: 2.05 km/NE
Metro Station	Bhikaji Cama Place: 0.0 Km
Hospitals	Safdarjung Hospital-1.84 km/E All India Institute of Medical Sciences (AIIMS)-1.99 km/E
Religious Places	Lotus Temple: 7.07 km/SE Kalka Ji Mandir: 7.45 km/SE

Photo 1.31 and 1.32 : Site Visit by the Committee and Discussion with Applicant and Respondent

Photo 1.33, 1.34 and 1.35 : Site Visit by the Committee and Discussion with Applicant and Respondent

2.0 Submission of Applicant and Respondent

2.1 Submission of Applicant

The Applicant approached Hon'ble NGT vide original Application No. 651 of 2019 raising question of environment arising out of the proposed construction of a commercial complex above the underground Bhikaji Cama Place Metro Station by DMRC which was designated as District Park/ Green Belt as per the Delhi Master Plan, 2021. In the year 2012, some open land (District Park) was transferred to the DMRC which was to be redeveloped after completion of the construction work. Construction work has been completed but instead of redeveloping the park, the DMRC has proposed to develop it as commercial complex against the Environment norms and Public trust doctrine requiring the park to be maintained as such.

Table 1: List of Documents submitted by Applicant

Sl. N	**Documents**	**Under Annexure-D**
1.	Copy of Original application along with all the annexure submitted with Original Application	Page No. 31 within Annexure-D
2.	Copy of Affidavit submitted by DMRC	Page No. 13 within Annexure D
3.	Copy of the PCCF Affidavit	Page No. 22 within Annexure D
4.	Comparative photographs of the area as on 01.05.2009 and a satellite image as on 2011 along with present day situation	Page No. 72 within Annexure D

2.2 Submission of Respondent

Four floors above the ground floor of the metro station are proposed. The land allotted is subject to land-use change for which an application has been moved to the DDA.

Table 2: List of Documents submitted by Respondent

Sl. No.	*Documents*	***Under Annexure - E***
1.	Land and Development Office (L&DO), MoHUA Letter no. L-II-A-1(1863)Bhikaji/2018-PC/169 dated 16.04.2019 for allotment of land measuring 13332 sqm to DMRC on permanent basis for construction of metro station and Property Development.	Annexure – F
2.	L&DO (MoHUA) NOC dated 13.12.2019 for the Change of Land use of the area from 'Recreational (District Park)' to 'Transportation'.	Annexure – G
3.	MoUD order dated 30.03.2009 permitting DMRC to undertake Property Development as a part of DMRC Project is enclosed.	Annexure - H
4.	MoUD letter dated 27.09.2007 granting exemption to DMRC from obtaining prior building approval for structures above platform and over footprint of metro stations.	Annexure - H
5.	Architectural DBR of the proposed structure including conceptual plans and elevations and landscaping plans.	Annexure - I

6.	Traffic Impact Assessment study undertaken for the proposed development is enclosed.	Annexure - J
7.	Reply submitted by DMRC in the subject case before the Hon'ble NGT is enclosed.	Page No. 13 within Annexure D
8.	Copies of correspondence held between DMRC and DDA for the change of land use of the subject area from 'Recreational (District Park)' to 'Transportation'.	Annexure - K
9.	**DMRC Submission dated 15.10.2020 as per requirement of the Committee decided during 2nd Meeting**	**Annexure - L**
10.	Land allotment Letter of MoUD to DMRC vide dated 16th April 2019.	Annexure - M
11.	EIA Notification, 2006.	Annexure - N
12.	EIA Report prepared by DMRC.	Annexure - O
13.	DDA's letter dated 17.01.2020 regarding change of land use.	Annexure - P
14.	Break-up of built-up area on the land plot.	Annexure - Q
15.	Google Earth images of the Bhikaji Cama place area dated 10.02.2006, 12.02.2012, 25.03.2017 and16.06.2020.	Annexure - R

2.3 Committees observations on submission of Applicant and Respondent

DMRC has yet to obtain following clearances:

- Permission from DDA for land-use change
- Clearances / Consents from concerned departments i.e., Municipal Authorities, Delhi Jal Board, Delhi Pollution Control Committee etc. for construction of the proposed commercial complex.

3.0 Project Viability Assessment and Rapid Indicative Environment Assessment

The site was considered for examining possible impacts during construction and operational activities of the project. Since the project is a commercial one, hence, it was decided that probable environmental impacts may be considered wrt traffic management, ambient air quality and solid and liquid waste management .

3.1 Land use change

Applicant's Submission:

DMRC indulged in rampant illegal construction above the underground Bhikaji Cama Place Metro Station, New Delhi on an area designated as District Park as per the Delhi Master Plan, 2021. This is without any sanctions or change of land-use. After getting caught in the act they are attempting to take post-facto approvals and change of land use. This Green land was depicted as District Park/Green Belt located on Sudhir Tyagi Marg, Nataji Nagar, New Delhi (at the comer of Ring road and Africa Avenue) as per the Delhi Master Plan, 2021.

In this regard, the L&DO Department of Ministry of Housing and Urban Affairs (MoHUA) made two land transfers vide letters dated 11-7-2012. The first parcel of the land, which was part of the District Park (Green Belt), was transferred on temporary basis for easing the construction of the underground Metro Station and Metro lines. The second parcel of the land which is adjacent to the District Park (Green Belt) was transferred on permanent basis for Entry, Exit and Ventilation Shaft of the Metro Station. (Copies of the letter Page 28-31 of OA). EIA Report dated August, 2011 also records that some portion of land for the Phase - III of the project will be acquired in temporary basis and will be returned back once the construction of project is completed.

Respondent's Submission:

i. MoUD letter dated 27.09.2007 granted exemption to DMRC from obtaining prior building approval for structures above platform and over footprint of metro stations.

ii. Land and Development Office (L&DO), MoHUA issued Letter no. L-II-A-1(1863)Bhikaji/2018-PC/169 dated 16.04.2019 for allotment of land measuring 13332 sqm to DMRC on permanent basis for construction of metro station and Property Development. The site falls in Zone-D of MPD-2021 and designated land use of the area is 'Recreational (District Park)'.

iii. L&DO (MoHUA) issued NOC dated 13.12.2019 for the Change of Land use of the area from 'Recreational (District Park)' to 'Transportation'. MoHUA order dated 30.03.2009 permitted DMRC to undertake Property Development as a part of DMRC Project.

iv. However, about change of Land Use, it is submitted that permission for change of land use of the piece of land on which Metro Rail Station constructed is to be granted by DDA on request from DMRC. A request for change in Land Use for plot area under question at Bhikaji Cama Metro Station has been submitted to DDA vide letter dated 14.8.2019. DDA vide letter dated 17.01.2020 has asked DMRC to submit NOC of Principal Chief conservator of Forest GNCTD/ Hon'ble NGT order in the above referred case before the matter is placed before the Technical Committee of DDA for consideration of change in land use.

v. DMRC has deposited requisite amount for plantation of 12,900 trees with Delhi Government. As per the report of Principal Chief Conservator of Forest (PCCF), Delhi, report received from DCF (South), Department of Forests & Wildlife, Govt. of NCT of Delhi in lieu of felling of 1290 trees

which includes 178 nos. trees at the site of Bhikaji Cama Place metro station, planted 12900 trees as Compensatory Plantation at Tilpath Valley.

Committee's observation:

DMRC has requested DDA for the land use change for Property Development on the U/G Bhikaji Cama Place Metro station. Same is yet to be granted to DMRC.

3.2 Felling of trees

Applicant's Submission:

The construction at the Bhikaji Cama Place Metro Station begun in July, 2012 and DMRC started uprooting the fully grown trees with the help of the excavators. The local people were assured that the park/green belt will be redeveloped and more trees will be planted once the construction work of the Metro Station is complete.

Respondent's Submission:

The area around the station has many green patches particularly in the Netaji Nagar Colony area across the Shaheed Sudhir Tyagi Marg. These areas have been depicted in the enclosed Google images. In fact, construction of the station complex has only marginal effect on the green cover in the area as may be seen from Google Earth images of the Bhikaji Cama place area.

Committee's observation:

i. Project Proponent has informed that they have deposited an amount for plantation of 12,900 trees with the Delhi Government. As per the report of Principal Chief Conservator of Forest (PCCF), Delhi, received from DCF (South), Department of Forests & Wildlife, Govt. of NCT of Delhi in lieu of felling of 1290 trees which includes 178 nos. trees at the site of Bhikaji Cama Place metro station, planted 12900 trees as Compensatory Plantation at Tilpath Valley. As per the report 15,000 trees were planted during 2013-14 and 11,000 trees were planted during 2014-15 at Tilpath Valley including 12900 trees against Compensatory Plantation for this project. There were causalities in the plantation and by 2015 about 10,000 saplings were existing there. Subsequently, during July 2015 as per the directions of the Hon'ble Lt. Governor, Delhi, Tilpath Valley was handed over to DDA for development of Biodiversity Park by Prof. C. R. Babu, In-Charge, Centre for Environmental Management of Degraded Ecosystems (CEMDE). As per the report received, some more plantations were carried out by CEMDE in the area during the course of development of Biodiversity Park. An enumeration of the trees/saplings planted post 2013-14 was done by joint team of Forest Department and CEMDE during 01.01.2020 to 03.01.2020, according to which there are total 17,144 trees/sapling present on the site. However, this committee did not visit the said plantation site.

ii. As per the report of PCCF, Delhi, it had been observed that 1500 sqm. area along 'Shaheed Sudhir Tyagi Marg' having already existing trees is available outside the carpet area of the project. This land is having scope of planting at least 150 trees of pollution abating species in addition to shrubs in between the trees.

iii. DMRC has also proposed an area of 1100 sqm. as terrace garden for smaller plants on the built up areas as per the site plan.

3.3 Traffic Congestion

Applicant's Submission:

Any Commercial complex at a traffic congested zone like Bhikji Cama Place will only worsen the present traffic woes leading to further increase in air pollution levels. Traffic police is already at its wits' end to ease the congestion at Bhikaji Cama Place but the problem is intensifying. Entering or leaving the building there would become a task as vehicle upon vehicle would get uploaded onto the already meager & bursting arteries. The Residential Colony roads would become thorough fares which will cause more nightmares for all. Moreover, such a building will bring in more traffic congestion, with more cars converging into the area and using only the Ring road spine – that is already overcrowded & bursting. It will only bring more pollution into this already depleted area.

Respondent's Submission:

It is submitted that, during most intense peak hour, the generated traffic from project site is only 301 PCU's which is insignificant. The project site will contribute insignificant traffic to adjacent road network and hence cause no impact on the adjacent road network. In terms of volume capacity ratio, the said site is a negligible addition. As the contribution of generated traffic from the augmented facility to the existing road capacity is barely 1.5% to 8% of total road capacity. However, to correct the situation for future, few mitigating measures have been suggested.

Mitigation Measures:

The Traffic impacts of the Proposed Project Site "Proposed Property Development above U/G Metro Station at Bhikaji Cama Place" could be mitigated by adopting few measures as follows .

i. On street parking on approach roads outside the project site is proposed to be prohibited through regulatory measures.
ii. At the entry/ exit gates of project site, parking will be strictly prohibited to facilitate easy entry and exit as well to maintain sight distance for safety of entering and leaving traffic. Also, the timings of the vehicles related to construction and maintenance work should be regulated accordingly.
iii. Traffic Calming measures to be introduced along Shaheed Sudhir Tyagi Marg.
iv. The signage scheme within and around the project site is proposed to provide adequate information, in time and every time, in a simple sign language which will be appropriate for road users and as per IRC guidelines so that they can take safe measures, in time, with minimum confusion.
v. Pedestrians outside and inside the project site are proposed to be guided through signs and protected through footpath about 150 mm above the road surface. Wherever the pedestrians cross the road, a ramp of suitable gradients (1 in 12) is proposed to interchange between levels. On the road. Zebra crossings are suggested to guide the crossing pedestrians.

Committee's observation:

i. The Committee has reviewed the reports submitted by DMRC especially the 'Traffic Study'.
ii. During the site visit conducted on a normal working day, the Committee assessed the findings of the 'Traffic Study' and 'Traffic Management Plan' submitted by DMRC.
iii. The Committee has also gone through the report prepared by Central Road Research Institute (CRRI) in 2017 titled as *"Estimation of Fuel Consumption during Idling of Vehicles at Bhikaji Cama Intersection and Savings after Employing Suitable Mitigation Measures'*. This project was sponsored by Petroleum Conservation Research Association (PCRA) .

Overall observations are as follows:

Road Capacity analysis for the conditions 'With Project' and 'Without Project' in respect of arterial / slip roads and main roads are made by DMRC and the same are presented in the following table :

Table 5.4 Comparative Analysis of Capacity for With and Without Project

Year	Location	Approach Road	Without Project			With Project		
			Traffic Volume (PCU)	V/c Ratio	LOS	Traffic Volume (PCU)	V/c Ratio	LOS
Morning Peak Hour								
2019	A	Shaheed Sudhir Tyagi Marg	369	0.18	LOS A	369	0.18	LOS A
	B	Africa Avenue Marg	1755	0.34	LOS A	1755	0.34	LOS A
	C	Ring Road Slip Road	2135	0.42	LOS B	2135	0.42	LOS B
2021	A	Shaheed Sudhir Tyagi Marg	407	0.20	LOS A	600	0.30	LOS A
	B	Africa Avenue Marg	1935	0.38	LOS B	2227	0.43	LOS B
	C	Ring Road Slip Road	2354	0.46	LOS B	2645	0.51	LOS B
2026	A	Shaheed Sudhir Tyagi Marg	472	0.24	LOS A	665	0.33	LOS A
	B	Africa Avenue Marg	2243	0.44	LOS B	2536	0.49	LOS B
	C	Ring Road Slip Road	2729	0.53	LOS B	3020	0.59	LOS C
2031	A	Shaheed Sudhir Tyagi Marg	547	0.27	LOS A	740	0.37	LOS B
	B	Africa Avenue Marg	2600	0.51	LOS B	2893	0.56	LOS C
	C	Ring Road Slip Road	3163	0.62	LOS C	3455	0.67	LOS C
2036	A	Shaheed Sudhir Tyagi Marg	634	0.32	LOS A	827	0.41	LOS B
	B	Africa Avenue Marg	3014	0.59	LOS C	3307	0.64	LOS C
	C	Ring Road Slip Road	3667	0.71	LOS C	3959	0.77	LOS C
Evening Peak Hour								
2019	A	Shaheed Sudhir Tyagi Marg	263	0.13	LOS A	263	0.13	LOS A
	B	Africa Avenue Marg	2253	0.44	LOS B	2253	0.44	LOS B
	C	Ring Road Slip Road	2153	0.42	LOS B	2153	0.42	LOS B
2021	A	Shaheed Sudhir Tyagi Marg	290	0.14	LOS A	617	0.31	LOS A
	B	Africa Avenue Marg	2484	0.48	LOS B	2935	0.57	LOS C
	C	Ring Road Slip Road	2374	0.46	LOS B	2740	0.53	LOS B
2026	A	Shaheed Sudhir Tyagi Marg	336	0.17	LOS A	664	0.33	LOS A
	B	Africa Avenue Marg	2880	0.56	LOS C	3331	0.65	LOS C
	C	Ring Road Slip Road	2752	0.54	LOS B	3118	0.61	LOS C
2031	A	Shaheed Sudhir Tyagi Marg	390	0.19	LOS A	717	0.36	LOS B
	B	Africa Avenue Marg	3338	0.65	LOS C	3789	0.74	LOS C
	C	Ring Road Slip Road	3190	0.62	LOS C	3556	0.69	LOS C
2036	A	Shaheed Sudhir Tyagi Marg	452	0.23	LOS A	779	0.39	LOS B
	B	Africa Avenue Marg	3870	0.75	LOS C	4321	0.84	LOS D
	C	Ring Road Slip Road	3698	0.72	LOS C	4064	0.79	LOS D

Source: Consultant Estimate

* With Project – including additional population

* Without Project – excluding additional population

Legend of LOS and V/C Ratio:

	LOS A, B & C (=>0.77)	**Stable Flow**
	LOS D (0.77 – 0.92)	**Un-Stable Flow**
	LOS E & F (<=0.92)	**Congested Flow**

As per the traffic study report, it can be stated that due to proposed project, there will be marginal impact on the traffic pattern of the area.

i. A fly over has been provided at Bhikaji Cama intersection to make the traffic coming from Dhaula to AIIMS and vice-versa signal free. Accordingly, it has at-grade traffic as well as traffic on flyover. A line diagram of intersection is shown in figure giving name of arms as well as geometrical details of intersection.

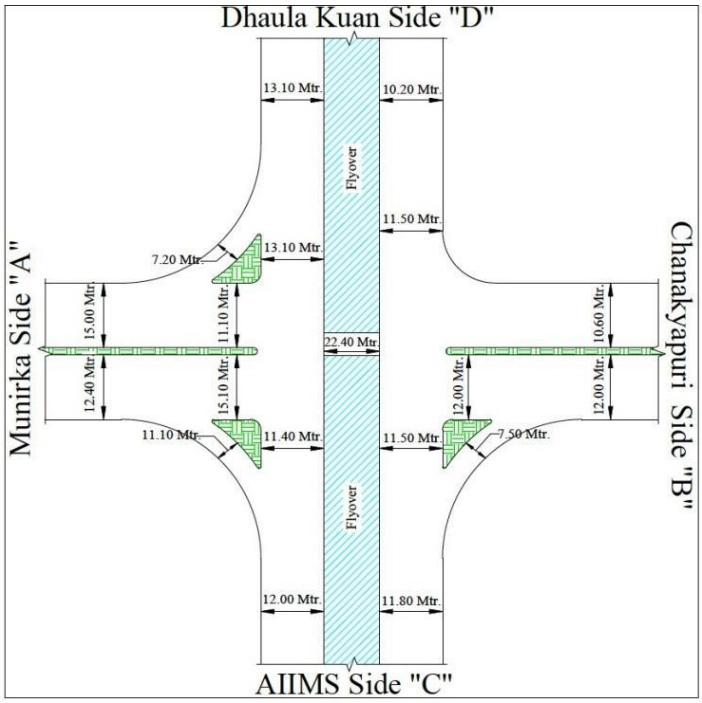


Fig 3.1 : **Geometrical details of Bhikaji Cama Place Intersection [CRRI]**

Being a four approach intersection, it handles 12 at-grade movements and 2 movements on flyover. Flyover handles straight movement from AIIMS side to Dhaula Kuan side and opposite direction. During primary surveys, traffic plying on all movements including flyover traffic was monitored by CRRI. Total vehicles observed at this intersection are 2.49 lakhs which includes 1.03 lakh vehicles plying at -grade, and 1.46 lakh on flyover in 24 hours. Here, it is to be noted that at-grade traffic is controlled by traffic signal for 9 movements excluding free left turning for three movements. [Source – CRRI]

As per study conducted by DMRC , during most intense peak hour, the generated traffic from project site is only 301 PCU's which is insignificant. Hence it can be stated that the project site will contribute insignificant traffic to adjacent road network and cause no impact on the adjacent road network. In terms of volume capacity ratio, the project site is a negligible addition. As the contribution of generated traffic from the augmented facility to the existing road capacity is barely 1.5% to 8% of total road capacity. However, it is necessary to implement the mitigation measures along immediate road network to control the situation for future.

Based on the traffic study reports, it can be stated that due to proposed project, there will be marginal impact on the traffic pattern of the area.

3.4 Air quality Management

Applicant's Submission:

As per conclusion of a Study carried out jointly by chest surgeons at the Centre for Chest Surgery in Sir Ganga Ram Hospital and Lung Care Foundation Delhi's polluted air could be leading nonsmokers being as likely to develop lung cancer as smokers. When data on patients who had undergone Treatment from March 2012 to June 2018 was compared with the data from1988 it was discovered that the figure, which was just 10% (of all cases) has increased to 50% now. The data analyzed indicates that over the long run, air quality may be impacting the inhabitants of Delhi severely. The impacts may not be immediate, but slow regression and eventually cancer is a possibility. It is time to note that almost 44% of schoolchildren in Delhi had reduced lung function compared to 25.7% in the other cities studied. Delhi kids were also 1.8 times more likely to suffer from upper respiratory symptoms.

Respondent's Submission:

On the basis of monitoring carried out during EIA study from March, 2020 to May, 2020 by the DMRC appointed Agency, it is reported that, the concentration of gaseous pollutants SO_2 and NOx are well within the prescribed limits of NAAQS. However, the concentration of PM10 , PM2.5 and Carbon monoxide (CO) are exceeding the norms. This is a common observation at all the intersections in Delhi. It is submitted that, proposed 4-storeys tower will act as barrier between the pollution source (vehicular emission from Ring Road, noise) and the residential colony - Netaji Nagar.

During the construction phase, some impact on ambient air quality is envisaged due to fugitive dust emission coming out of the construction site. However, this impact would be of temporary nature and will be localized. Following mitigation measures are suggested in the EIA Report :

- ✓ *Maintain all construction vehicles to minimize vehicle emissions.*
- ✓ *Payload area of the trucks or dumpers should be covered by tarpaulin when*
- ✓ *Transporting soil and crush materials in order to prevent fall out of fines and emissions*
- ✓ *The material carrying trucks or dumpers will carry on the haulage corridors provided for transport.*
- ✓ *Spray water on the stones while unloading from the truck/dumper at the primary crusher feeder chute and the transfer points from one belt conveyor to another,*
- ✓ *Facility for regular cleaning and wetting of the unpaved roads and exposed soil on construction sites should be provided in dry weather.*
- ✓ *Concrete batching plant or other machinery liable to generate dust should be kept away at safer distance from residential areas and should not be in predominant upwind direction of these areas.*
- ✓ *Ensure that all major construction machineries including batching plant placed on construction sites are inbuilt with appropriate dust reduction measures.*
- ✓ *The water sprinkling of trucks used, as construction vehicles, should be properly and regularly undertaken, so that dust deposition problem on vegetation is minimized.*
- ✓ *The haul freight corridors inside the quarry should be properly watered to arrest the dust arising out of it.*
- ✓ *Conduct periodic monitoring of ambient air quality as per NAAQS, 2009 and submit reports to local State Pollution Control Boards*

No major adverse impact on air quality is envisaged in the operational phase as it will be a tower only with no source of air pollution. The only adverse impact on air quality is envisaged in the form of gaseous and particulate emission from DG sets. The only mitigation measure required for mitigating the impact is to provide adequate height of

the stack of DG set to have wider dispersion of the gaseous emission and also to attain the mixing height.

Committee's observation:

As per the report, the predominant wind direction in Delhi is from North and North-west whereas the nearby residential colonies namely Netaji Nagar and Sarojini Nagar are located in the north and north-east of the proposed project. It means that the impact of air pollution (if any) generated at the project site on the nearby residential colonies would be marginal.

The Committee noted that the report has considered following sources of air pollution from the proposed project :

i. Construction Phase: Dust is the main source of air pollution from the construction activities. Major sources are demolition, earth work and excavation. In the present case, negligible air pollution will be generated because of following reasons:
    a. There will be no demolition work
    b. There will be no major earth-work or excavation as these have already been completed during construction of underground metro rail station.
    c. Basement work is also completed.
    d. Roads around the project site are paved.
    e. Plot area of the site is small i.e. 6109 sq. metres and basement has already been constructed on 3300 sq. metres (approx.).

    Aforesaid observations and present site conditions are evident from following photographs taken during site visit.

Photo 3.41 and 3.42 : Actual Site Photographs on the day of Visit

Photo 3.43 and 3.44 : Actual Site Photographs on the day of Visit

However, dust due to some of the activities in the construction of super-structure is expected which include preparation of concrete mix / operation of ready mix concrete plant, construction vehicles and machinery. These must be handled by way of application of 'Guidelines notified for Construction and Demolition Activities' under E(P) Act, 1986 and C&D Waste Management Rules, 2016.

Operational Phase : Expected sources of air pollution are as follows :

i. Operation of DG sets
ii. Use of coal in the Tandoors in the restaurants

To avoid these possibilities, it is suggested that:

i. CNG Gas-based DG sets may be installed as CNG is easily available in Delhi NCR. Alternatively, installation of DG sets equipped with acoustic enclosures and adequate stack height for proper dispersion of the exhaust gases be ensured.
ii. Only LPG and electricity based stoves / tandoors may be used in the kitchens of the restaurants.

Based on the above, it can be stated that impact of the proposed project on the air pollution levels of the area would be marginal.

3.5 Source of Water

Applicant's Submission: Applicant has no submission in this context.

Respondent's Submission:

The water requirement for the construction phase will include dust suppression, curing and formation of concrete mixtures and water for domestic consumption. The water required for both domestic purpose and construction activities will be sourced from DJB through water tankers. while drinking water for the labourers will be supplied

through packaged drinking water cans. No groundwater shall be abstracted for construction activities.

During operational phase, requirement of fresh water to the tune of 112 KLD may have marginal impact on the competing users. The water requirement shall be met from the Delhi Jal Board (DJB). Ground water shall not be tapped any stage of the project.

As a remedial measures, all applicable water quality standards would be complied with. It would be ensured that no liquid is discharged from any construction site/activity treatment.

In context of rainwater harvesting, it is informed that, rainwater outlets provided at various locations on terrace based on the criteria that minimum 1% slope is provided towards rain water outlet from the ridges. The rain water collected from the rooftop areas within the project area will be conveyed into the rain water harvesting system consisting of desilting finely recharges the ground water.

As per the mandated protocol of National Building Code of India 2005, Part IV, Fire Protection System, the PD building comes under low hazard occupancy type. As per business building, it will require 100000 Litres of water, but due to combined building i.e. station building and PD building, as per Fire Approval, UG water tank of 260000 ltrs capacity shall be commissioned. Apart from this an additional overhead tank of 100000 liters capacity is proposed to be commissioned on the roof top of PD building.

Committee's observation:

Submission of DMRC is in order. Figures on water demand shall exert marginal increase on the existing water supply system of the area.

3.6 Sewerage System

Applicant's Submission: Applicant has no submission in this context.

Respondent's Submission:

External Sewerage System will be designed as per CPHEEO Manual. Sewage Treatment Plant (STP) of capacity 70 KLD based on Membrane Bio Reactor (MBR) Technology shall be commissioned within the premises. Treated sewage shall be stored in a STP water tank of 30 KL capacity. The treated water shall be pumped to overhead tank for storage. This recycled water shall be used for gardening and flushing.
Water balance is presented in the following **Table 3.6** .

Table 3.6: Water Balance

Inflow from DJB (Raw Water Tank): 112 KLD		*STP Capacity : 70000 litres / day*	
Purpose of uses (LPD)		*Use of treated/recycled water (LPD)*	
Visitor Ground Floor	*1628*	*Gardening*	*5000*
Retail outlet	*880*	*Flushing*	*32164*
Restaurant	*15125*		
Office area	*28738*		
Visitors	*550*		
HVAC (Heating, Ventilation and Air Conditioning). It is for recoupment purpose and will not generate waste-water.	*60000*		
Floor cleaning	*5245*		
Total	*112166*	*Total*	*37164*

Committee's observation:

i. Figures on water demand shall exert marginal increase on the existing water supply system of the area.

ii. Waste-water treatment scheme proposed by DMRC should ensure the treated wastewater reuse and recycle. Reuse of treated waste-water to the tune of around 60-70 % of waste generated is proposed. Discharge of rest of the treated waste-water shall not exert any pollution load on the existing sewerage system if norms prescribed by DPCC are maintained.

3.7 Solid Waste Management

Applicant's Submission: Applicant has no submission in this context.

Respondent's Submission:

Construction Phase

There are multiple waste disposal facilities in the vicinity and disposal shall adhere to the Central Public Health and Environmental Engineering Organization (CPHEEO) , standards of Ministry of Urban Affairs, Government of India, including usage of such facilities. Recently after notification of the Construction and Demolition Waste Management Rules, 2016, municipal authorities have formulated guidelines for management of C&D waste. DMRC has also established recycling plant for re-use of the waste.

Since the contractors are at the vanguard of all construction activities, a contractual mechanism has been devised to address environmental issues and ensure compliance to

measures and methodologies that will ensure minimal environmental impact, judicious use of resources and minimal emission and generation of waste. Such methods and strategies during construction that maximize energy efficiency use cleaner technologies, reuse and or recycle materials and similar other efforts that help to prevent and reduce environmental degradation are elaborated in the DMRC's Environmental Manual prepared specifically for this purpose. It is an integral part of all contracts of DMRC and all contractors are vigorously monitored and pursued to implement the requirements contained therein.

In adherence to the C&D W M Rules 2016, following actions are envisaged to be taken:

1. Construction yards are proposed for storage of construction materials.
2. The excavated material such as topsoil and stones will be stacked for reuse during later stages of construction.
3. Excavated top soil will be stored in temporary constructed soil bank for landscaping during operational phase of the Project.
4. Remaining soil shall be utilized for refilling/roadwork/rising of site level at locations/ selling to outside agency for construction of roads etc.

Operational Phase

The project will adopt a systematic approach for solid waste collection and disposal. Solid waste generated shall be tackled as per the provisions of Solid Waste Management Rules, 2016. Waste shall be mainly categorized in two classes. 1. Biodegradable Waste and 2. Non-biodegradable waste. The biodegradable portion dominates the bulk of MSW. This is mainly due to food waste. These solid wastes will be collected separately by putting three types of separate bins at the source of generation as per the Standard Operating Procedures (SOP) outlined in the Environmental Policy of the DMRC and the guidelines mandated in the MSW Rules 2016.

Committee's observation:

i. During operational phase, following types of wastes are expected to be generated :
    a. Recyclable wastes – Papers, Plastics, Cloths, Packaging Materials, Steels, Metals, Glass etc. These items are having economic values and must be disposed-off to Authorized Recyclers by following notified guidelines.
    b. Biodegradable Waste from restaurants – Around 50-100 kg/day is estimated to be generated at full capacity operation which will impact marginally on the existing Municipal System. Its disposal shall be ensured by the project proponent as MSW Rules, 2016.

3.8 *Seismicity and Liquefaction potential*

Applicant's Submission: Applicant has no submission in this context.

Respondent's Submission:

Delhi and its surroundings are seismically active. It falls in Seismic Zone IV. Earthquakes of magnitude from 3 to 7.4 on Richter Scale have been observed in and around Delhi during the past three centuries. The epicentres of some moderate and large earthquakes, which occurred in Delhi region, as well as the events which occurred in the Himalayan region, along the Main Boundary Thrusts (MBT) and Main Central Thrusts (MCT), that have been felt in Delhi. The Himalayan thrust zone, just 200-250-Km north of the megacity, has been identified as a significant seismic gap in the Central Himalayas (Khattri, 1987; Bilham et al., 2001), thus it can be presently considered one of the most hazardous areas of the world.

Fault lines of consequence in the domain are - South Najafgarh sedimentary fill (Dabar) with Moderate Hazard due to high amplification and liquefaction and Zone of Basin margin and newer alluvium proximal to Yamuna river: High Hazard due to Liquefaction Potential.

Committee's observation:

Approval for Structural design of the building may be obtained from concerned Agency.

3.9 Socio-economic impacts

Applicant's Submission: Applicant has no submission in this context.

Respondent's Submission:

Bhikaji Cama Place Metro station has been ideally located to serve the requirements of the business establishments as well as residential colonies located in the area. It is well connected to other side of the Ring road through an underground passage and will encourage people to use Metro Rail Services, avoiding Motorized transport, thus helping the environment. Most of the area of the total allotted land of 13332 sqm by L&DO to DMRC has been utilized for station entry/exit, circulation pathways, auxiliary buildings and booster pump etc. Proposed PD project has a footprint of about 3000 sqm only. Even under the proposed PD Foot Print, station building and basement parking exits.

Thus it has not been feasible to provide a heavily wooded park in the plot. DMRC's PD Project may have larger public interest. The benefits that an efficient Metro system brings to the overall development of the area far exceed the adverse impact it have. While the Economic, Social and Environmental benefits will accrue to the population

establishments of the area in general, PD Project is important for Financial Sustainability of Metro Rail Projects.

Committee's observation:

Submission of DMRC appears to be reasonable. The project proponent must do all the due diligence and follow the best practices for keeping the environment sound and healthy during all the phases of the project.

3.10 Impact on Population Density of the Area

Since proposed project is a Commercial Complex only having visitors/ employees. I is not expected to result in an increase in the population of the area. No extra burden is expected to be exerted on the infrastructure facilities of the area created for local population.

4.0 Recommendation :

Hon'ble NGT vide Order dated 11.08.2020 directed that, before the proposed constructions are carried out, Environment Impact Assessment (EIA) and carrying capacity studies must be conducted by the Joint Committee.

Accordingly, the proposed project was examined for compliance/approval status for statutory requirements and an independent assessment of environmental and other impacts during the construction and occupancy phase have been undertaken. Specifically, all environmental and other components e.g. management of air quality, waste-water, solid waste, traffic congestion, impact on population density of the area (representing impact on services) etc. have been examined.

It is observed that the proposed project is a Commercial Tower having 4 floors above ground floor with a total built-up area to the tune of 18436 sq.metres. It building shall be located over the underground metro-rail station. It is expected to facilitate the commuters of metro-rail for their commercial needs and shopping without performing additional journeys and. It is an added facility for nearby residents and business establishments without exerting a significant burden on the infrastructure facility of the area and surrounding environment.

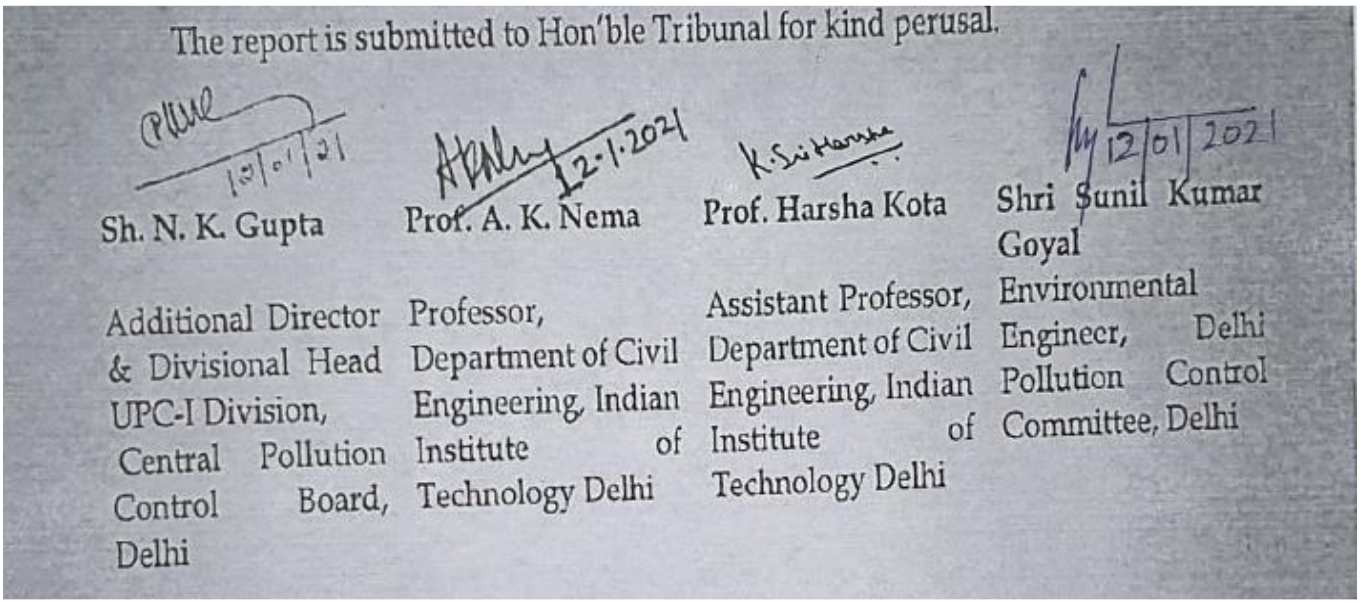
It is observed that project proponent has obtained necessary approvals from MoHUA only for the use of the land for property development, but approval from DDA for land use change is yet to be received. Also, Clearances/NOCs from other Agencies viz. Municipal Corporations, DPCC, Delhi Jal Board etc. for layout plan, sewerage, water supply etc., are not received. In these circumstances, the Committee members have suggested following measures for implementation:

- The project proponent must ensure that all necessary permission, approvals shall be obtained and be valid. All approval, permission, clearance conditions must be complied with at all times.
- An undertaking may be submitted by the project proponent that no groundwater will be extracted during the construction phase. Before dewatering (if needed) during construction, NOC may also be obtained from the District Advisory Committee on Ground Water of Govt. of NCT Delhi. At DJB freshwater supply line an inlet digital flow meter shall be installed.
- During construction and occupancy phase of the project, all environmental norms and proposed mitigation measures should be strictly adhered by the project proponent.

In view of the above, the project seems reasonable and viable on environmental accounts. However, the viability of the project is strictly contingent upon adequacy of the

environment management plan and adherence to the proposed actions/ guidelines and commitments made by project proponent and if same are practiced in letter and spirit.

These recommendations shall stand withdrawn / cancelled automatically in case size of the project is enhanced or proposed mitigation measures are not implemented in 'letter & spirit.



The report is submitted to Hon'ble Tribunal for kind perusal.

Sh. N. K. Gupta	Prof. A. K. Nema	Prof. Harsha Kota	Shri Sunil Kumar Goyal
Additional Director & Divisional Head UPC-I Division, Central Pollution Control Board, Delhi	Professor, Department of Civil Engineering, Indian Institute of Technology Delhi	Assistant Professor, Department of Civil Engineering, Indian Institute of Technology Delhi	Environmental Engineer, Delhi Pollution Control Committee, Delhi

Item No. 10 Court No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

(By Video Conferencing)

Original Application No. 651/2019

(With report dated 04.03.2020)

Residents of Delhi Through Shobha Agarwal Applicant(s)

Versus

Delhi Metro Rail Corporation & Ors. Respondent(s)

Date of hearing: 11.08.2020

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE S. P. WANGDI, JUDICIAL MEMBER
HON'BLE DR. NAGIN NANDA, EXPERT MEMBER

Applicant(s): Mr. Salik Shafique, Advocate

Respondent(s): Mr. ADN Rao, Advocate for DMRC

ORDER

1. A factual and action taken report was sought from the DMRC with reference to the allegation that a commercial complex was proposed to be constructed by Delhi Metro Rail Corporation (DMRC) in a park. The applicant stated that in the year 2012, some open land (District Park) was transferred to the DMRC which was to be redeveloped after completion of the construction work. Construction work has been completed but instead of redeveloping the park, the DMRC was proposing to develop it as commercial complex against the Environment norms and Public trust doctrine requiring the park to be maintained as such.

2. The matter was considered on 07.11.2019 directing as follows:

"The DMRC has filed an affidavit stating that four floors above the ground floor of the metro station are proposed. The land allotted is subject to land-use change for which an application has been moved to the DDA.

***In view of the allegation that the area was an open land and the open area was to be redeveloped after completion of the construction by the DMRC, any permission for land-use has to be based on an expert study whether open area was required to be preserved as per master plan or in the interest of environment**.*

Let the PCCF Delhi furnish an expert opinion by email at judicial-ngt@gov.in before the next date. Since it is stated that the applicant has deposited an amount for plantation of 12,900 trees with the Delhi Government, PCCF may also furnish the status of such plantations. The land which was transferred only for barricading may not be taken over by the project proponent."

3. In view of above, Principal Chief Conservator of Forest (PCCF), Delhi has filed a report on 04.03.2020 as follows:

*"4. That a site inspection of the underground (U/G) metro station at BhikajiCama Place was conducted by the undersigned along with the officers of DMRC and DDA. During the site visit, DMRC presented report on Traffic Impact Assessment study for the proposed commercial development on the U/G metro station at BhikajiCama Place. This study was carried out by TPA Engineering Consultants (I) Pvt. Ltd. (**Annexure-B).***

5. That as per this study report, there will be increment in the traffic load on the roads around the U/G metro station and this additional Project Development (PD) complex will generate insignificant traffic during peak hours and the project site may not cause any significant impact on road network or land use in immediate surrounding (within 1 Km radius) or over area wide road network (approx. 5 Km around project site) due to traffic dispersal on adjacent intersections. As per this report, during most intense peak hour, the generated traffic from the project site is only 301 PCU's which is insignificant. The report also suggests some mitigation measures to counter existing traffic flow due to proposed Property Development above U/G metro station at BhikajiCama Place.

*6. That DMRC had submitted a request to DDA for the change of land use for Property Development by DMRC on the U/G Bhikaji Cama Place station. This proposal for Project Development **comprises office space, retails and restaurant.** The project site is thus a commercial complex above U/G metro station. The total built up area involving Project Development on all floors (04 nos.), basement parking and the already existing built up are of U/G metro*

station is more than 20,000 sqm. And thus requires environmental clearance. This proposed Project Development proposal is extension of already existing U/G metro station.

7. That in additional to extra traffic load on Ring Road and Africa Avenue road, ***there will definitely be an increment in air pollution, water pollution & sound pollution due to addition in the traffic volume, population density and waste water generation****.*

8. That adjacent to this project site, on the Northern side the low density ***residential settlement for the Govt. Employees at 'Netaji Nagar' is being developed as high density residential colony under GPRA scheme of Ministry of Urban Development, which will also add to the vehicular and human population in this area****.*

9. That as per the report received from DCF (South), Department of Forests & Wildlife, Govt. of NCT of Delhi in lieu of felling of 1290 trees which includes 178 nos. trees at the site of BhikajiCama Place metro station, planted 12900 trees as Compensatory Plantation at Tilpath Valley. As per the report 15,000 trees were planted during 2013-14 and 11,000 trees were planted during 2014-15 at Tilpath Valley including 12900 trees against Compensatory Plantation for this project. There were causalities in the plantation and by 2015 about 10,000 saplings were existing there. Subsequently, during July 2015 as per the directions of the Hon'ble Lt. Governor, Delhi, Tilpath Valley was handed over to DDA for development of Biodiversity Park by Prof. C. R. Babu, In-Charge, Centre for Environmental Management of Degraded Ecosystems (CEMDE). As per the report received, some more plantations were carried out by CEMDE in the area during the course of development of Biodiversity Park. An enumeration of the trees/saplings planted post 2013-14 was done by joint team of Forest Department and CEMDE during 01.01.2020 to 03.01.2020, according to which there are total 17,144 trees/sapling present on the site. Letter from DCF (South) to this effect is attached as ***Annexure-C****.*

10. That during my site inspection, it has been observed that 1500 sqm. area along 'Shaheed Sudhir Tyagi Marg' having already existing trees is available outside the carpet area of the project. This land is having scope of planting at least 50 trees of pollution abating species in addition to shrubs in between the trees. DMRC has also proposed an area of 1100 sqm. as terrace garden for smaller plants on the built up areas as per the site plan attached as ***Annexure-D****.*

11. ***That in view of the aforementioned facts/observations, a proper Environment Impact Assessment (EIA) study is required to be conducted for the proposed construction/structures for Project Development by DMRC to assess the actual quantum of impact on the traffic, air quality, water quality and the overall environment and ecology of the area around the proposed Project Development activities****."*

4. In view of above, we find it necessary that before the proposed constructions are carried out, Environment Impact Assessment (EIA) and carrying capacity studies must be conducted by a Joint Committee comprising Central Pollution Control Board (CPCB), IIT, Delhi and Delhi Pollution Control Committee (DPCC). CPCB will be the nodal agency for compliance. The Committee may take into account any other study on the subject and furnish a report within three months by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF.

List for further consideration on 14.01.2021.

A copy of this order be sent to the CPCB, IIT, Delhi and the DPCC by email for compliance.

Adarsh Kumar Goel, CP

S. P. Wangdi, JM

Dr. Nagin Nanda, EM

August 11, 2020
Original Application No. 651/2019
SN

Central Pollution Control Board
Parivesh Bhawan
East Arjun Nagar, Delhi-110032

Minutes of 1st Meeting of the Joint Committee Comprising CPCB, IITD and DPCC

In the matter of Hon'ble NGT OA No. 651/2019 titled as Residents of Delhi through Shobha Agarwal Vs Delhi Metro Rail Corporation & Ors.

Meeting date & time	:	29th September, 2020 at 11:00 AM
Mode of Meeting	:	Video Conference
Agenda	**:**	To discuss about Course of Action of the Joint Committee constituted by Hon'ble NGT in the matter of OA No. 651/2019 titled as Residents of Delhi through Shobha Agarwal Vs Delhi Metro Rail Corporation & Ors.

Hon'ble NGT in the matter as referred above has directed as follows :

> ***"In view of above, we find it necessary that before the proposed constructions are carried out, Environment Impact Assessment (EIA) and carrying capacity studies must be conducted by a Joint Committee comprising Central Pollution Control Board (CPCB), IIT, Delhi and Delhi Pollution Control Committee (DPCC). CPCB will be the nodal agency for compliance. The Committee may take into account any other study on the subject and furnish a report within three months by e-mail at judicialngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF."***

In this context, first meeting of the Joint Committee was convened on 29.09.2020 through Video Conferencing and attended by all the Members. Details of Committee Members having attended the meeting are as follows:

1.	Prof. A. K. Nema, Professor	Department of Civil Engineering, Indian Institute of Technology Delhi
2.	Prof. Harsha Kota, Assistant Professor	Department of Civil Engineering Indian Institute of Technology Delhi
3.	Shri Sunil Kumar Goyal, Environmental Engineer	Delhi Pollution Control Committee , Delhi
4.	Sh. N. K. Gupta, Additional Director & Divisional Head UPC-I	Central Pollution Control Board, Delhi

At the onset, Shri N. K. Gupta welcomed the Members of the Committee. After introduction of Committee Members, Sh. Gupta briefed about objectives of the meeting and made a presentation regarding the subject matter as mentioned in the NGT Order dated 11.08.2020. Following points were highlighted:

i. In the year 2012, some open land (District Park) was transferred to DMRC which was to be redeveloped after completion of the construction work of Bhikaji Cama Place metro station .
ii. Construction work of the underground metro station has been completed but instead of redeveloping the park, DMRC has proposed to develop it as commercial complex which are objected by the Applicant.
iii. DMRC is planning to construct four floors above the ground floor of the metro station. Proposed development is subject to land-use change for which an application has already been moved by DMRC to DDA.
iv. Observations made by Principal Chief Conservator of Forest (PCCF), Delhi in compliance with Hon'ble NGT's previous Order dated 07.11.2019 were also discussed.
v. Validity and brief features / observations of the studies conducted by M/s TPA Engineering Consultants (I) Pvt. Limited for the site referred on behalf of DMRC are to be verified.

The matter was discussed at length on the following issues :

i. Designated use of the piece of land under question.
ii. Permissions, Clearances, Consents and NOCs obtained by DMRC for the proposed construction of commercial complex.
iii. Studies so far conducted to asses environmental impacts of the proposed construction work including carrying capacity of the impact-zone.

The Joint Committee realized that necessary documents for detailed examination of the case are presently not available with any of Member Organization. Details of such documents needed to proceed further in the matter are as follows :

i. Ownership document and designated land use of the piece of land under question.
ii. Permissions, Clearances, Consents and NOCs so far obtained by DMRC for the proposed construction of commercial complex including applications under process .
iii. Approved copy of the project report.
iv. Studies so far conducted by DMRC to asses environmental impacts of the proposed construction work including carrying capacity of the potential impact-zone.
v. Original Application as submitted by the Applicant i.e. 'Residents of Delhi through Shobha Agarwal' and replies submitted by the Respondent i.e. DMRC

Accordingly , following 'Course of Action' is chalked out for further proceeding in the matter :

i. The Nodal Agency i.e. CPCB shall made interaction with DMRC and the Applicant (Petitioner) and obtain the necessary documents as referred above.
ii. These documents shall be circulated among the Committee Members for their reference and observations.
iii. An opportunity for hearing shall be given on Oct. 08, 2020 (3:00PM) to both the parties i.e. Applicant Ms. Shobha Agrawal and DMRC for their submission in the matter.
iv. Site visit by the Committee shall be made after completion of the tasks mentioned in i to iii above and future Course of Action shall be decided accordingly.

Meeting ended with the vote of thanks to the member.

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Central Pollution Control Board
Parivesh Bhawan
East Arjun Nagar, Delhi-110032

Minutes of 2nd Meeting of the Joint Committee Comprising CPCB, IITD and DPCC

In the matter of Hon'ble NGT OA No. 651/2019
titled as
Residents of Delhi through Shobha Agarwal Vs Delhi Metro Rail Corporation & Ors.

Meeting date & time : 08th October, 2020 at 11:00 AM
Mode of Meeting : Video Conference
Agenda **:** To give opportunity for hearing through Video Conferencing to the Applicant Ms. Shobha Agarwal and Respondent DMRC and discuss about 'Course of Action of the Joint Committee' constituted by Hon'ble NGT.

Background :

First meeting of the Joint Committee had been convened on 29.09.2020 through Video Conferencing and attended by all the Members. It was decided by the Joint Committee to give opportunity to the Applicant Ms. Shobha Agarwal and Respondent DMRC for hearing on 08.10.2020 through Video Conferencing and accordingly both the Applicant and Respondent were communicated.

Records of Proceedings

Respondent DMRC has attended the Meeting but the Applicant didn't prefer the same. Details of Committee Members and Respondent having attended the meeting are as follows:

1.	Dr. A. K. Nema, Professor	Department of Civil Engineering, Indian Institute of Technology Delhi
2.	Dr. Harsha Kota, Assistant Professor	Department of Civil Engineering Indian Institute of Technology Delhi
3.	Shri Sunil Kumar Goyal, Environmental Engineer	Delhi Pollution Control Committee, Delhi
4.	Shri Anirudh Jain, Adviser (PD)	Delhi Metro Rail Corporation Limited, New Delhi
5.	Shri S K Verma, GM, DMRC	Delhi Metro Rail Corporation Limited, New

		Delhi
6.	Shri Sanjay Srivastava, Sr. Deputy General Manager, Property Development III	Delhi Metro Rail Corporation Limited, New Delhi
7.	Sh. N. K. Gupta, Scientist 'E' & Divisional Head UPC-I	Central Pollution Control Board, Delhi

At the onset, Shri N. K. Gupta welcomed the Members of the Committee and Representatives of the Respondent - DMRC. After introduction, objectives of the meeting were briefed. It was informed to the members that, the requisite documents have been received from the both side - Applicant and Respondent.

DMRC was invited for a presentation on the proposed project wherein following issues were highlighted:

- Land measuring 13,332 Sqm. had been allotted by Land & Development Office, Ministry of Housing and Urban Affairs (MoHUA) vide letter dated 16.04.2019 to DMRC Ltd. on permanent basis (4816 Sqm. for ancillary building and water boosting station and Vent Shaft, 6109 Sq.m. for Vent Shaft and proposed Property Development and 2407 Sq.m for Entry and Vent Shaft and lift) at Bhikaji Cama Place, New Delhi.

- MoHUA has permitted DMRC vide Order dated 30.03.2019 for property development above the metro station at Bhikaji Cama Place as a part of policy matters.

- Later-on 'No Objection Certificate' was also issued by MoHUA vide letter dated 13.12.2019 for the change of land use of the same land from 'District Park' to 'Transportation purpose'.

- DMRC is planning to construct four floors above the ground floor of the metro station. Proposed development is subject to approval of DDA for land-use change for which an application has already been moved by DMRC on 14.08.2020.

- There are Guidelines of MoHUA for property development at the Project Site.

- Approval of DDA is under process wrt land-use change.

Quarries raised by the Committee Members were as follows:

1. How shall the Project Proponent address the objection raised by the Applicant regarding loss of greenery on the land?

2. There are mentioning of traffic study; but, is there any other study regarding carrying capacity / impact assessment ?
3. Is public hearing conducted by them and is there any report submitted to any concerned organization?
4. What are the figures on FAR and other dimensions?

In response to above queries, submission of DMRC were as follows :

- DMRC has undertaken a mini EIA study for their own observations and agreed to share a copy of the same with Committee members.
- They are taking initiatives to compensate in other ways like, taking of measures for minimization of environmental degradation or restoration of the local area. To compensate loss of trees, afforestation has been taken place by them in some other land provided by Local Authority. Besides, on the land under question a portion (around 30-40 %) shall be kept dedicatedly for gardening or green belt development.
- Use of solar energy to save electricity issue, installation of sewage treatment plant (STP), Building Construction with ITPC code are also being taken care by them.
- They have not conducted any public hearing as it is not mandatory for them looking towards size of the project and applicable legislations.
- Details of the built-up area are as follows :
    - Total built-up area (excluding basement) – 13112 sq.metres
    - Total built-up area (including basement) – 16404 sq.metres
    - Total built-up area - 17555.5 sq. metres.
      (including shaft, staircase, headroom , lift head room etc.)

In addition, they have claimed that, they have Exemption Certificate from Government of India in respect of construction of proposed project.

After hearing, DMRC has been requested to submit the following documents:

i. Latest status of the land under question.
ii. Studies so far conducted by them to asses environmental impacts of the proposed construction work.
iii. Details of green and other areas available for recreation within 2 km radius.
iv. Details of the Exemption Certificate received from Government of India.

Based on the discussion with DMRC, it was observed by the Committee that DMRC has yet to obtain following clearances :

i. Permission from DDA for land-use change
ii. NOC / Clearances / Consents from concerned departments for construction of the proposed commercial complex.

Accordingly, following 'Course of Action' is chalked out for further proceeding in the matter:

i. After receipt of the requested documents from DMRC , the same shall be circulated among Members for review.
ii. Based on the review / observations as mentioned in (i) above , Site visit by the Committee shall be made in the presence of Project Head , DMRC and future Course of Action shall be decided accordingly.
iii. Based on (i) and (ii) above, the Committee may submit Interim Report before Hon'ble NGT.

Meeting ended with the vote of thanks to the Members.

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Before the Central Pollution Control Board

(Ministry of Env., Forest and Climate Change, Govt. of India)

Parivesh Bhawan

East Arjun Nagar, Delhi – 110032

IN THE MATTER OF:

Residents of Delhi

Through Shobha Aggarwal Applicant

versus

Delhi Metro Rail Corporation & Ors …Respondents

WRITTEN SUBMISSIONS ON BEHALF OF THE APPLICANT SHOBHA AGGARWAL BEFORE THE LD. COMMITTEE

1. That the Applicant approached the Hon'ble NGT vide original Application No. 651 of 2019 raising substantial question of environment arising out of the proposed illegal construction of a commercial complex above the underground Bhikaji Cama Place Metro Station by the Delhi Metro Rail Corporation (hereinafter DMRC) which is designated as District Park/ Green Belt as per the Delhi Master Plan, 2021.

2. The Hon'ble NGT vide order dated 09.08.2019 directed status quo to be maintained at the site. Below are some facts related to the project.
3. In this case the DMRC indulged in rampant illegal construction by professing to build an underground station & bring back the greens but surreptitiously & illegally carried out its nefarious plans to build a commercial complex above the underground Bhikaji Cama Place Metro Station by the Delhi Metro Rail Corporation (hereinafter DMRC) on an area designated as District Park as per the Delhi Master Plan, 2021. This is without any sanctions or change of land-use. After getting caught in the act they are attempting to take post-facto approvals and change of land use.
4. This Green land was depicted as District Park/Green Belt located on Sudhir Tyagi Marg, Nataji Nagar, New Delhi (at the comer of Ring road and Africa avenue) as per the Delhi Master Plan, 2021. (Land use plan as per Master Plan annexed at Page No. 25 of the OA)
5. This District Park proudly boasted of numerous varieties of foliage and fully-grown invaluable trees, many of which were decades old and portrayed the original vegetation of the historic city of Delhi. Not only did this green cover provided shade and protection to park visitors, it nestled within its folds various species of bees and birds. It was also a place for children to play at as

well as acted as green barrier and natural air filter against the continuously increasing deadly air pollution of Delhi & NCR.

6. In the year 2012, DMRC proposed construction of an Underground Metro Station at Bhikaji Kama Place Metro Station for expansion of the DMRC Phase III of MRTS Project (Majhlis Park to Shiv Vihar). The Metro Station was proposed to be built as an underground Metro Station and was designed to be constructed under the District Park.

7. In this regard, the L&DO Department of Ministry of Urban Development made two land transfers vide letters dated 11-7-2012. The first parcel of the land, which was part of the District Park (Green Belt), was transferred on temporary basis for easing the construction of the underground Metro Station and Metro lines. The second parcel of the land which is adjacent to the District Park (Green Belt) was transferred on permanent basis for Entry, Exit and Ventilation Shaft of the Metro Station. (Copies of the letter Page 28-31 of OA)

8. The EIA Report dated August, 2011 also records that some portion of land for the Phase - III of the project will be acquired in temporary basis and will be returned back once the construction of project will be completed. (Relevant Page annexed at Page No. 26 of OA).

9. The construction at the Bhikaji Cama Place Metro Station begun in July, 2012 and DMRC started uprooting the fully grown trees with the help of the excavators. The local people were assured that the park/green belt will be redeveloped and more trees will be planted once the construction work of the Metro Station is complete.

10. The DMRC gave false assurance to the local people regarding return of the Green belt back to its original form and the public did not protest the cruel felling of trees considering the fact that development of metro station will benefit the people at large. (The pictures of the area Before and After the felling of trees are attached)

11. The Bhikaji Cama underground Metro station is fully built & already being used & itself only occupies about 200 sq meters of land.

12. But shockingly instead of restoring the balance greens in the Park, in July 2019 the DMRC published notice inviting booking of the commercial complex comprising of four floors at the same location where the green District Park was earlier located. It was the only Green lung around the vast commercial area of Bhikaji Cama Place,

13. The **DMRC itself in their affidavit dated 18.09.2019 filed before the Ld. NGT admitted that land designated as park** (proposed construction site) was transferred from L& D Dept. only on 16.04.2019 subject to change in

land use. Hence, the DMRC is changing the landuse from park to commercial area for construction of the commercial complex and it is after thought after completion of the metro construction. The relevant excerpts of the affidavit is annexed as **Annexure A/1.**

14. Any Commercial complex at a traffic congested zone like Bhikji Cama Place will only worsen the present traffic woes leading to further increase in air pollution levels. Traffic police is already at its wits' end to ease the congestion at Bhikaji Cama Place but the problem is intensifying. Entering or leaving the building there would become a task as vehicle upon vehicle would get uploaded onto the already meagre & bursting arteries. The Residential Colony roads would become thoroughfares which will cause more nightmares for all.

15. Moreover, such a building will bring in more traffic congestion, with more cars converging into the area and using only the Ring road spine – that is already overcrowded & bursting. It will only bring more pollution into this already depleted area.

16. **The PCCF, Department of Forest, NCT of Delhi in compliance of the NGT order dated 07.11.2019 filed an affidavit before the NGT** in the present case stated the followings:

- The Project site is commercial complex above the underground metro station. The total buildup area involving the project on all floors including the basement parking is more 20,000 sq. mtrs and hence EC is required.
- Addition to extra traffic on ring road there will be definitely increment in air pollution, water pollution and sound pollution.

  The copy of the PCCF affidavit is marked and appended as **Annexure A/2.**

17. Today the citizens of Delhi stand at the doorstep of a severe health hazard. Not only are we fighting with the COVID-19 pandemic, but the rise in pollution levels will make the impact of the killer disease more severe.

18. The Guardian on 05.03.2019 reported that in the year 2018 22 out of 30 most polluted cities of the world are located in India and out of that 22 most polluted cities six are located in Delhi & NCR i.e. Delhi, Faridabad, Ghaziabad, Noida, Gurugram and Bhiwadi.

19. Further, as per conclusion of a Study carried out jointly by chest surgeons at the Centre for Chest Surgery in Sir Ganga Ram Hospital and Lung Care Foundation Delhi's polluted air could be leading nonsmokers being as likely to develop lung cancer as smokers. When data on patients who had undergone treatment from March 2012 to June 2018 was compared with the data from

1988 it was discovered that the figure, which was just 10% (of all cases) has increased to 50% now. The data analyzed indicates that over the long run, air quality may be impacting the inhabitants of Delhi severely. The impacts may not be immediate, but slow regression and eventually cancer is a possibility.

20. It is time for us to note that almost 44% of schoolchildren in Delhi had reduced lung function compared to 25.7% in the other cities studied. Delhi kids were also 1.8 times more likely to suffer from upper respiratory symptoms.

21. It is not enough that saplings are planted somewhere. It's a well-known fact that only about 10% of saplings survive. (Newspaper articles)

22. The greens must come up in the same place as an exemplary example to ensure that the laws of the land are followed both in letter and spirit.

23. National Capital Region Planning Board in their affidavit submitted before this Hon'ble Tribunal in O.A. 147 of 2014 titled as Legal Aid Committee, National Green Tribunal Bar Association versus Union of India & Ors mentioned satellite imageries and maps prepared and analyzed by the National Remote Sensing Centre (NRSC) on shrinking of green area in Delhi and NCR. That according to NCRPB, the shrinkage of the conservation zones is 25.97 per cent in Haryana sub-region, 15.43 per cent in Delhi, 43.88 per cent in Uttar Pradesh sub-region and 11.18 per cent in Rajasthan. It is pertinent to note that the arbitrary action of the Respondents in the present Application has only

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in Delhi, 43.88 per cent in Uttar Pradesh sub-region and 11.18 per cent in Rajasthan. It is pertinent to note that the arbitrary action of the Respondents in the present Application has only further damaged the already depleting tree cover in Delhi thus disrupting the natural environment of Delhi & NCR

24. There is already a concrete mass opposite this area in the form of Bhikaji Cama place and we do not need more concrete-just bring back the trees. We can still plant trees, shrubs, grass & plants & make the city livable for our children & future generations.

25. **That a comparative photographs of the area as on 01.05.2009 and a satellite image as on 2011 along with present day situation is annexed as Annexure A/ 3 (colly)**

26. In light of above submission, it is humbly requested before you that direct DMRC to re-instate the District Park at Bhikaji Cama Place in its original form & plant greens so that the people of Delhi can find some respite from the ever increasing pollution and breathe easy.

Shobha Aggarwal

Shobha Aggarwal

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Land taken over by DMRC for Underground Station at Netaji Nagar (Bhikaji Cama Place) – A Comparison

Before -All green status of Land on 1-5-2009

After -Concrete Jungle now after all trees cut & destroyed

Before -All Green & full of trees on 1-9-2009

After - All trees cut & green destroyed & now all concrete

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Annexure A/1

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH AT NEW DELHI

ORIGINAL APPLICATION NO. 651 of 2019

IN THE MATTER OF:

Residents of Delhi, Through Shobha Agarwal ... Applicant

Versus

Delhi Metro Rail Corporation & Ors. ... Respondents

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5.	***Annexure R1/4:*** A true Copy of the handing over and taking over of land admeasuring 3658 Sqm.	64-65
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Amber Sachdeva

A.D.N. RAO & Amber Sachdeva
Advocate for the Respondent
Chamber No.116, Post Office Block
Supreme Court Compound, Tilak Marg
New Delhi - 110 001
Phone: 23381057/6042

Date: 18.09.2019

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BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH AT NEW DELHI

ORIGINAL APPLICATION NO. 651/2019

IN THE MATTER OF:

Residents of Delhi, Through Shobha Agarwal ...Appellant

Vs.

Delhi Metro Rail Corporation &Ors. ...Respondents

REPLY ON BEHALF OF DELHI METRO RAIL CORPORATION (RESPONDENT NO. 1 HEREIN)

I Sanjay V. Kute S/o Late Sh. V.M. Kute aged about 55 years, working at Delhi Metro Rail Corporation Ltd., Metro Bhawan, Fire Brigade Lane, Barakhamba Road, do hereby solemnly sincerely affirm and state as under.

1. That I am presently working a General Manager/Legal with Respondent No. 1 herein and as such I am well conversant with the facts of the case from the records maintained in the office.I am competent and authorised to swear-in this Affidavit on behalf of the Chairman, Delhi Metro Rail Corporation Respondent No. 1 herein.

2. That I have gone through the copy of the Original Application No. 651/2019 and in Reply thereto, I submit that averments made therein and the contentions raised are factually incorrect, the averments or the contentions unless specifically admitted or adverted to herein after are denied and the Applicant is put to strict proof of the same.

3. I submit that the Applicant herein by placing a distorted, exaggerated and incorrect version has challenged the construction of a commercial complex by the Respondent No.1 by making a false allegation that the same is coming up in a District park which ought to have been restored.

Before adverting to Para wise reply I, Crave leave of this Tribunal to briefly indicate the true Facts

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5. I, submit that vide Communication No. DMRC/Land/15/MOUD/MKP-YV/1343/82 dated 06.02.2012 the Delhi Metro Rail Corporation has sent a requisition to the Land & Development Officer (L&DO), Ministry of Urban Development, Government of India for requirement of five Pockets of NDMC land at Bhikaji Cama Place on permanent/temporary basis for construction of Mukund Pur-Yamuna Vihar Corridor (Line-7) of Delhi MRTS Project, Phase-III for construction of an underground Metro Station The requisition made was as under:-

Present requirement		**Purpose**
Permanent basis (in Sqm)	**Temporary basis for 4 years (in sqm)**	
B1-4816.00		Ventilation Shaft, Entry, Lift Station
B2-6124.00		
	1002.00	Construction / Barricading
10940.00	**1002.00**	

6. The Plan which was appended to the Communication dated 06.02.2012 clearly showed that the area admeasuring B1 4816 Sqm and B2 6124 sqm are required for Vent Shaft, Entry & Lift of the Station along with proposed Property Development.

A true copy of the Communication No. DMRC/Land/15/MOUD/MKP-YV/1343/82 dated 06.02.2012 is being filed herewith marked as ***Annexure R1/1***.

7. That vide Communication dated 21.06.2012 the Ministry of Urban Development, Land & Development Office gave working permission to the Delhi Metro Rail Corporation in respect of Bhikaji Cama Place as under:-

Bhikaji Cama Place	**Temporary (revised)** Pocket 1 1002 **Total 1002** **Permanent (revised)**	The entire proposal temporary as well as permanent is on existing District Park. Hence change of land use is required. Certain portion of the land is heavily wooded. Therefore, equivalent

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	Pocket B1 4816 Pocket B2 6124 **Total: 10940**	area for District Park as compensation within Zone 'D' may be required to be identified. Three petrol pumps required to be shifted from 'D' zone for which alternative sites have already been identified and requires comments of DDA.

A true copy of the Communication No.LIIA-I(1836)/2011-PC/78 dated 21.06.2012 of the Ministry of Urban Development Land & Development Office is being filed herewith marked as ***Annexure R1/2.***

8. An area admeasuring 10,940 sqm comprising of Pocket B1 (4816 sqm) and Pocket B2 (6124 sqm) was handed over to Delhi Metro Rail Corporation.
A true copy of the handing over and taking over Certificate dated 11.07.2012 is being filed herewith marked as ***Annexure R1/3***.

9. That on 11.10.2012 land admeasuring 3658 sqm on permanent basis at Bhikaji Cama Place was handed over for construction of Entry, Lift and Plant Room.
A true copy of the handing over and taking over of land admeasuring 3658 sqm is being filed herewith marked as ***Annexure R1/4.***

10. That vide Communication dated 16.04.2019 the Land & Development Officer, Ministry of Housing and Urban Affairs conveyed the sanction of the President of India for allotment of land admeasuring 13,332 sqm comprising of 4816 sqm at NDMC Park for Ancillary Building and water boosting station and Vent Shaft, 6109 sqm at NDMC Park for Vent Shaft and proposed Property Development and 2407 Sqm for Entry and Vent Shaft and Lift as per LDO Plan No 4202 on permanent basis at Bhikaji Cama Place, New Delhi subject to the change of land use by the allottee itself.
A true copy of the Communication dated 16.04.2019 of the Land & Development Officer, Ministry of Housing and Urban Affairs is being filed herewith marked as ***Annexure R1/5.***

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11. That on 23.07.2019 in terms of the Communication dated 16.04.2019 an area admeasuring 13,332 sqm was handed over to the Delhi Metro Rail Corporation.

A true copy of the Site Plan indicating the handing and taking over of the possession of 13,332 sqm on 23.07.2019 is being filed herewith marked as ***Annexure R1/6.***

12. I submit that for the construction of the underground Metro Station at Bhikaji Cama Place, Department of Environment, Forests & Wildlife, Government of National Capital Territory of Delhi had granted tree cutting permission vide Communication No. R895/TO-(S)/TC-Felling/11-12/4609/467 dated 21.01.2013 for the Bhikhaji to Hazrat Nizammudin of Yamuna Vihar- Mukundpur corridor.

The permission for felling of 1290 trees was subject to condition that 12900 native type tree species shall be compensatory planted and DMRC shall make advance deposit of Rs. 3,97,32,000/- for creation and maintenance of compensatory plantation for a period of five years as per notification No. R-895/TO(S)/TC-Felling/11-12/6680-90 dated 11.01.2013. The payment for the same was made by DMRC to The Dy. Conservator of Forests vide letter no. DMRC/Land/15/MKP_YV/1340/24 dated 16.01.2013.

It is also pertinent to mention herein that tree felling permission stipulated a condition that Wood obtained from removal of trees shall be handed over by DMRC to the Officials of the concerned MCD for its use on Public Crematoria in Delhi.

A true copy of the Communication No. R895/TO-(S)/TC-Felling/11-12/4609/467 dated 21.01.2013, notification No. R-895/TO(S)/TC-Felling/11-12/6680-90 dated 11.01.2013 and letter no. DMRC/Land/15/MKP_YV/1340/24 dated 16.01.2013 are being filed herewith marked as ***Annexure R1/7, Annexure R1/8 and Annexure R1/9.***

13. It is incorrect to state that the construction of the building is an afterthought.

14. The proposed construction of the commercial complex above the Bhikaji Cama Place Metro Station was conceptualised as early as 2012 because of the following:-

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a. *Property Development by DMRC is in line with global examples as metros are highly capital intensive projects. The commercial activities apart from enhancing the appearance and ambience of the stations will also add to non-fare box revenue to DMRC. Further, it will attract more commuters to the metro system thereby improving ridership and assisting in traffic integration.*

b. *The Bhikaji Cama Place Station is strategically designed on intersection of Ring Road and Africa Avenue Road at Bhikaji Cama Place so that significant motorized traffic can take off the road.*

c. *Development control norms for metro stations and railway stations/ terminals in the Master Plan of Delhi – 2021, Chapter-12 stipulate that "metro stations along with Property Development (composite development) upto a maximum area of 3.0 ha shall be permitted in all Use zones, except in recreational and Regional Park/Ridge Zone, Lutyens' Bunglow Zone and Heritage Zones."*

d. *13,332 sqm of land has been allotted by L&DO to DMRC on permanent basis for the metro station ancillary structures and proposed Property Development vide allotment letter dated 16.04.2019 against payment of Rs.15.65 Cr."*

15. I submit that Development Control Norms for metro stations and Railway Stations / terminals in the Master Plan of Delhi – 2021 stipulate that "metro stations along with Property Development (composite developments) upto a maximum area of 3.0 ha shall be permitted in all Use zones, except in Recreational and Regional Park / Ridge Zone, Lutyen's Bungalow Zone and Heritage Zones.

16. I submit that the Proposal for construction of 4 floors above ground floor of the underground metro station at Bhikaji Cama Place with 12038 sqm PD area (i.e., 3077 sqm on each floor) was initiated by DMRC on 16.09.2014 and the process of appointment of DDC was finalised on 12.05.2015. Tenders for allotment of built-up spaces was floated in 2016, however, owing to the intrinsic location advantage of the station, mode of allotment of the built-up floors was envisaged through draw of lots of the Application forms. However, the project was put on hold till land allotment letter was

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issued by L&DO.

17. That in terms of the Communication dated 16.04.2019 wherein the L&DO has intimated that the permissions are subject to the change of land use by the allottee itself. The land was handed over on 23.07.2019 and the DMRC has vide Communication No. DMRC/Land/15/NSIC/1869/2074 dated 14.08.2019 applied for change of land use of subject land from recreational/district part for transportation.

18. **PARAWISE REPLY**

(i) The contents of Para 1 are matters of record.

(ii) The contents of Para 2 are to the exclusive knowledge of the Applicant and does not call for any Reply from the Answering Respondent.

(iii) The contents of Para 3 are matters of record. However, in terms of the letter of allotment dated 16.04.2019, the land was handed over on 23.07.2019 and the Applicant herein has on 14.08.2019 applied for change of land use.

(iv) In reply to the contents of Para 4 it is submitted that the averments made are general and not specific to the Project in question. Para 4.3.2 of the EIA report also state that "Like most other rail based mass urban transport systems, this system, now in its third phase of construction, also needs to undertake property development to make it financially viable and economically attractive."

(v) The contents of Para 5 are matters of record. It is denied that land in question was allotted on temporary basis.

(vi) The contents of Para 6 are incorrect and denied. The Answering Respondent having agreed to comply with the conditions of compensatory afforestation and having paid the huge amount has not assured anybody that the land would be re-developed or more trees will be planted once construction work of the underground metro station is completed.

(vii) The contents of Para 7 are matters of record.

(viii) The contents of Para 8 are matters of record.

(ix) The contents of Para 9 are incorrect and denied. As per the Order of the Ministry of Urban Development dated 30.03.2009 the DMRC has

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to raise 6% of the Project cost through Property Development in Phase-1, 5% of project cost in Phase-II and 4.5% of Project cost in Phase-III.

(x) The contents of Para 10 are incorrect and denied. On the contrary the underground station would facilitate the commuters and the vehicles would be off roads resulting in reducing the air pollution.

(xi) The contents of Para 11 to 15 are matters of record.

(xii) The contents of Para 16 are incorrect and denied. The Answering Respondent have not violated any provision of law.

(xiii) In Reply to the contents of Para 17 it is submitted that in view of what is stated herein above the grounds raised therein are devoid of any merit and does not call for any Reply.

19. I submit that in view of what is stated herein above Original Application No. 651/2019 is devoid of any merit, has been filed with an ulterior motive and as such does not call for any interference by this Hon'ble Tribunal. The same may be dismissed with cost.

20. I state that what is stated herein above is true and correct and that nothing material has been concealed there from.

IDENTIFIED

D SANJAY KUTE
General Manager/Legal
Delhi Metro Rail Corpn. Ltd.
Metro Bhawan, Fire Brigade Lane
Barakhamba Road, New Delhi.

NOTARY
Rajendra Kumar
Delhi
Regd. No. 5760
Date of Expiry
27th April-2023
GOVT. OF INDIA

VERIFICATION

I, the above named Deponent do hereby verify that the contents stated in paragraphs 1-20 above are true and correct to my knowledge and belief. No part of it is false nor has anything been concealed there from.

Verified at New Delhi on this the day of 17th September, 2019.

Date: 17 SEP 2019

Place:

CERTIFIED THAT THE CONTENTS EXPLAINED TO THE DEPONENT EXECUTIVE WHO IS SEEMED PERFECT TO UNDERSTAND & AFFIRMED/DEPOSED BEFORE ME AT DELHI ON 17 SEP 2019 IDENTIFIED BY IDENTIFY THE EXECUTIVE DEPONENT WHO HAS SIGNED IN MY PRESENCE

IDENTIFIED

ATTESTED
RAJENDRA KUMAR
NOTARY, DELHI-R-5780
GOVERNMENT OF INDIA
SUPREME COURT OF INDIA
COMPOUND, NEW DELHI
Register Pg./Sl. No. 17 SEP 2019

9899446209

DEPONENT
SANJAY V. KUTE
General Manager/Legal
Delhi Metro Rail Corpn. Ltd.
Metro Bhawan, Fire Brigade Lane
Barakhamba Road, New Delhi.

RAJENDRA KUMAR, NOTARY Reg. No. 5780
F No.-5(466)
EMPOWERED TO ADMINISTER THE OATH
SECTION 139 OF CPC 1908
SECTION 297 OF CRPC 1973
DELHI HIGH COURT RULES 1967
PART-6, CHAPTER XVIII-227
EVIDENCE BY AFFIDAVIT BEFORE NOTARY
SUPREME COURT RULES, 2013
ORDER IX-7

16345

Annexure - A/2

BEFORE THE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

O.A No. 651/2019

In the matter of:

Residents of Delhi through Shobha Aggarwal ...Petitioner

Versus

Delhi Metro Rail Corporation ...Respondents

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ISHWAR SINGH
Pr. Chief Conservator of Forests
& HoD
Department of Forests & Wildlife
Govt. of NCT of Delhi

ISHWAR SINGH, IFS
Pr. Chief Conservator of Forests & HOD
Department of Forests & Wildlife
Govt. of NCT of Delhi
Vikas Bhawan, I.P. Estate, New Delhi-110002

(1)

BEFORE THE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

O.A No. 651/2019

In the matter of:

Residents of Delhi through Shobha Aggarwal ...Petitioner

Versus

Delhi Metro Rail Corporation ...Respondents

REPORT IN COMPLIANCE OF ORDER DATED 07.11.2019 OF HON'BLE NGT

1. THAT this Hon'ble Tribunal in the above referred matter vide its order dated 07.11.2019 in O.A. No. 651/2019 in the matter of Residents of Delhi through Shobha Aggarwal Vs. Delhi Metro Rail Corporation & Ors. had given the following directions:

" In view of the allegation that the area was an open land and the open area was to be redeveloped after completion of the construction by the DMRC, any permission for land-use has to be based on an expert study whether open area was required to be preserved as per master plan or in the interest of environment.

Let the PCCF Delhi furnish an expert opinion by email at judicial-ngt@gov.in before the next date. Since it is stated that the applicant has deposited an amount for

ISHWAR SINGH, IFS
Pr. Chief Conservator of Forests & HOD
Department of Forests & Wildlife
Govt. of NCT of Delhi
Vikas Bhawan, I.P. Estate, New Delhi-110002

(2)

plantation of 12,900 trees with the Delhi Government, PCCF may also furnish the status of such plantations. The land which was transferred only for barricading may not be taken over by the project proponent."

2. THAT Delhi Metro Rail Corporation (DMRC) has constructed Bhikaji Cama Place Under Ground (U/G) metro station along the Ring Road connecting Mukundpur-Yamuna Vihar corridor during 2013 on the land allotted by L&DO.

3. THAT DMRC had obtained tree felling permission for 1290 nos. of trees for metro corridor from Bhikaji Cama Place to Hazrat Nizammudin station. Department of Forests & Wildlife, Govt. Of NCT of Delhi issued notification dated 11.01.2013 allowing felling of 1290 trees (**Annexure-A**). Out of 1290 nos. of trees, 178 nos. of trees were involved at Bhikaji Cama Place metro station. DMRC deposited security amount with the Department of Forests & Wildlife, GNCTD for raising of Compensatory Plantation at Tilpath Valley land provided by DDA.

4. THAT a site inspection of the underground (U/G) metro station at Bhikaji Cama Place was conducted by the undersigned along with the officers of DMRC and DDA. During the site visit, DMRC presented report on Traffic Impact Assessment study for the proposed commercial development on the U/G metro station at Bhikaji Cama

ISHWAR SINGH, IFS
Pr. Chief Conservator of Forests & HOD
Department of Forests & Wildlife
Govt. of NCT of Delhi
Vikas Bhawan, I.P. Estate, New Delhi-110002

(3)

Place. This study was carried out by TPA Engineering Consultants (I) Pvt. Ltd. (**Annexure-B**).

5. THAT as per this study report, there will be increment in the traffic load on the roads around the U/G metro station and this additional Project Development (PD) complex will generate insignificant traffic during peak hours and the project site may not cause any significant impact on road network or land use in immediate surrounding (within 1 Km radius) or over area wide road network (approx. 5 Km around project site) due to traffic dispersal on adjacent intersections. As per this report, during most intense peak hour, the generated traffic from the project site is only 301 PCU's which is insignificant. The report also suggests some mitigation measures to counter existing traffic flow due to proposed Property Development above U/G metro station at Bhikaji Cama Place.

6. THAT DMRC had submitted a request to DDA for the change of land use for Property Development by DMRC on the U/G Bhikaji Cama Place metro station. This proposal for Project Development **comprises office space, retails and restaurant.** The project site is thus a commercial complex above U/G metro station. The total built up area involving Project Development on all floors (04 nos.), basement parking and the already existing built up area of the U/G metro station is more than

ISHWAR SINGH, IFS
Pr. Chief Conservator of Forests & HOD
Department of Forests & Wildlife
Govt. of NCT of Delhi
Vikas Bhawan, I.P. Estate, New Delhi-110002

(4)

20,000 sqm. and thus requires environmental clearance. This proposed Project Development proposal is extension of already existing U/G metro station.

7. THAT in addition to extra traffic load on Ring Road and Africa Avenue road; there will definitely be an increment in air pollution, water pollution & sound pollution due to addition in the traffic volume, population density and waste water generation.

8. THAT adjacent to this project site, on the Northern side the low density residential settlement for the Govt. Employees at 'Netaji Nagar' is being developed as high density residential colony under GPRA scheme of Ministry of Urban Development, which will also add to the vehicular and human population in this area.

9. THAT as per the report received from DCF (South), Department of Forests & Wildlife, Govt. Of NCT of Delhi in lieu of felling of 1290 trees which includes 178 nos. trees at the site of Bhikaji Cama Place metro station, planted 12900 trees as Compensatory Plantation at Tilpath Valley. As per the report 15,000 trees were planted during 2013-14 and 11,000 trees were planted during 2014-15 at Tilpath Valley including 12900 trees against Compensatory Plantation for this project. There were casualties in the plantation and by 2015 about 10,000 saplings were existing there. Subsequently, during July 2015 as per the directions of the Hon'ble Lt.

ISHWAR SINGH, IFS
Pr. Chief Conservator of Forests & HOD
Department of Forests & Wildlife
Govt. of NCT of Delhi
Vikas Bhawan, I.P. Estate, New Delhi-110002

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Governor, Delhi, Tilpath Valley was handed over to DDA for development of Biodiversity Park by Prof. C.R. Babu, In-Charge, Centre for Environmental Management of Degraded Ecosystems (CEMDE). As per the report received, some more plantations were carried out by CEMDE in the area during the course of development of Biodiversity Park. An enumeration of the trees/ saplings planted post 2013-14 was done by joint team of Forest Department and CEMDE during 01.01.2020 to 03.01.2020, according to which there are total 17,144 trees/ saplings present on the site. Letter from DCF (South) to this effect is attached as **Annexure-C**.

10. THAT During my site inspection, it has been observed that 1500 sq.m. area along ' Shaheed Sudhir Tyagi Marg' having already existing trees is available outside the carpet area of the project. This land is having scope of planting atleast 50 trees of pollution abating species in addition to shrubs in between the trees. DMRC has also proposed an area of 1100 sqm. as terrace garden for smaller plants on the built up areas as per the site plan attached as **Annexure-D**.

ISHWAR SINGH, IFS
Pr. Chief Conservator of Forests & HOD
Department of Forests & Wildlife
Govt. of NCT of Delhi
Vikas Bhawan, I.P. Estate, New Delhi-110002

11. THAT in view of the aforementioned facts/ observations, a proper Environment Impact Assessment (EIA) study is required to be conducted for the proposed construction/ structures for Project Development by DMRC to assess the actual quantum of impact on the

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traffic, air quality, water quality and the overall environment and ecology of the area around the proposed Project Development activities.

(Ishwar Singh)
Principal Chief Conservator of Forests & HoD
Govt. of NCT of Delhi

ISHWAR SINGH, IFS
Pr. Chief Conservator of Forests & HOD
Department of Forests & Wildlife
Govt. of NCT of Delhi
Vikas Bhawan, I.P. Estate, New Delhi-110002

COMPENSATORY AFFORESTATION IN HIMACHAL'S KINNAUR

Only 10% saplings planted on paper found at site, survival rate low: study

ESHA ROY
NEW DELHI, OCTOBER 4

A STUDY that looks at compensatory afforestation in lieu of forest diversion for development of projects in Himachal Pradesh's Kinnaur district has found that only 10 per cent of saplings said to be planted were actually found on the site.

The study also found that the survival rate of saplings in some plots was as low as 3.6 per cent.

The study, conducted between 2012 and 2016, has been carried out by Himdhara Environment Research and Action Collective and is based on government data and ground research.

As of March 31, 2014, the total area demarcated for compensatory afforestation was 1,930 ha in lieu of 984 ha of forest land diverted for non-forest activities, including roads, hydro-projects, transmission lines etc.

Between 2002 and 2014, of the Rs 162.82 crore collected under Catchment Area Treatment (CAT) plan funds of Kinnaur's projects, only 36 per cent had been spent till March 31, 2014, says the study. CAT plan funds are budgeted as mitigation measures for hydroelectric power projects.

Kinnaur Forest Division received another Rs 11.50 crore between 1980 and 2013 for compensatory afforestation after forest land was diverted for hydropower projects.

More than 90 per cent of the diversion of forest in Kinnaur takes place for the development of hydropower projects and transmission lines. Himachal Pradesh has the highest installed capacity of hydropower projects of 10,000 MW in the country, and located in Sutlej basin, Kinnaur is the state's hydropower hub with 53 planned hydropower projects.

Kinnaur is Himachal's hydropower hub. *Prerna Nair*

According to Compensatory Afforestation Management and Planning Authority (CAMPA) rules, for every hectare of forest land diverted, double the area of 'degraded' lands are used as sites for 'compensatory afforestation'.

In Kinnaur, a total of 984 ha of forest land has been diverted for development activities out of which 867 ha of forest land has been transferred for 10 big projects, 12 small hydroelectric power plants and 11 transmission lines, as of 2014.

The total diverted forest land in Kinnaur had 11,598 standing trees, belonging to 21 species, says the study. The majority of the trees felled were coniferous, dominated by cedar (3,612 felled) and rare and endangered chilgoza pines (2,743).

"One of the reasons why the forest department is unable to fulfil the target is because there's simply no land available... A large part of Kinnaur is rocky... Around 10 per cent of the district is already forests and the rest is either used for agriculture or are grasslands... many of the plots carved out for afforestation are actually grasslands. These grasslands are used by the villagers for grazing cattle... in many instances the villagers uproot the saplings because they don't want the grassland converted to a forest," says author Prakash Bhandari.

"The conceptualisation of CAMPA is faulty. The authorities only look at identifying plots of land... The socio-economic needs are not considered. There is also no monitoring of the afforestation whatsoever," says author Manshi Asher.

Rapidly running out of space for compensatory afforestation, the Forest Department has now decided to carry out plantations in other districts in lieu of forest land diverted in Kinnaur.

EXPLAINED

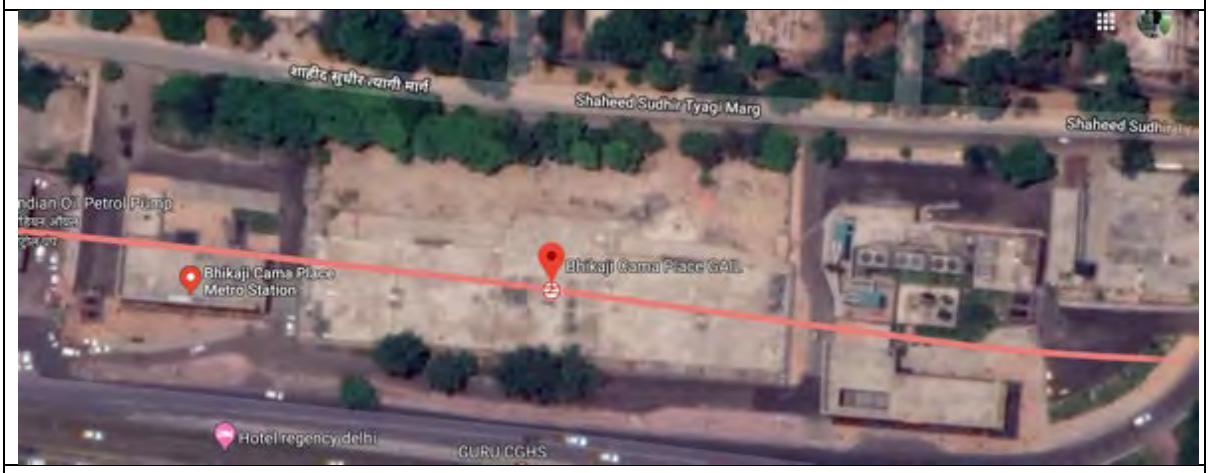
Implementation issues on ground

AS DIVERSION of forest land leads to a loss of biodiversity, it is mandated under law that compensatory afforestation be carried out in lieu of the forest that has been cleared in double the area. State governments have on several occasions been unable to utilise CAMPA funds or not made proper plans for afforestation. Union Environment Minister Prakash Javadekar earlier this year mandated that the CAMPA funds were to be used strictly for afforestation and not for salaries of forest staff, an issue the Ministry has been raising with states.

Annexure - A/3

Comparison & Depiction of the DMRC Bhikaji Cama Place Metro Station & Multi-storey Commercial building proposed at Netaji Nagar

Pic- 1- Before – Image of the District Park thickly green wooded site on 1-6-2011 as downloaded from Google Earth



Pic -2 -Now- Image of the DMRC Bhikaji Cama Metro station & Multi-storey Commercial Building on 1-2-19 – all bare & concreted -as downloaded from Google earth

(1)

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH AT NEW DELHI

ORIGINAL APPLICATION NO. /2019

Under Section 14 read with Sections 15 and 18(1) of the National Green Tribunal Act, 2010)

IN THE MATTER OF:

Residents of Delhi

Through Shobha Aggarwal Applicant

versus

Delhi Metro Rail Corporation &Ors ...Respondents

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DATE: 05.08.2019 **PLACE: New Delhi**

DRAWN & FILED BY:

Salik

Salik Shafique
Advocate for the Original Applicant
29, LGF, Presidential Estate, Nizamuddin East
New Delhi – 110013
salikshaif@gmail.com; +918527929297

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SYNOPSIS

That the State must endeavor to protect and improve the environment safeguard environmental resources is a constitutional obligation under Article 48-A of the Constitution of India, which would include preservation of environmental and ecological purity as a paramount duty of the State, as well as defending people's healthy survival and preventing atmospheric pollution. It is also the duty of the Citizens under Article 51-A (g) of the Constitution of India to protect and improve the natural environment among others and protect its citizens from environmental pollution.

That the Applicant a senior citizenon behalf of the concerned Residents of Delhi are raising substantial question of environment arising out of the proposed illegal construction of a commercial complex above the underground Bhikaji Cama Place Metro Station by the Delhi Metro Rail Corporation (hereinafter DMRC) which is designated as District Park/ Green Belt as per the Delhi Master Plan, 2021.

That an area exists of approximately a hectare, depicted as District Park/Green Belt located on Sudhir Tyagi Marg, Nataji Nagar, New Delhi (at the corner of Ring road and Africa avenue) as per the Delhi Master Plan, 2021. The District Park consisted of many old growth fully-grown invaluable trees and all these years the trees have provided shade and protection to park visitors, a place for children to play , pedestrians and animals and acted as green barrier and natural air filter against the deadly air pollution of Delhi & NCR.

That in the year 2012, DMRC proposed construction of a Underground Metro Station at Bhikaji Kama Place Metro Station for expansion of the DMRC Phase III of MRTS Project (Majhlis Park to Shiv Vihar). The Metro Station was proposed to be built as anunderground Metro Station was designed to be constructed under the

District Park. The L & DO Department of Ministry of Urban Development on the request of the DMRC made two land transfer vide letters dated 11.07.2012. The first parcel of the land which is part of the District Park (Green Belt) was transferred on temporary basis for easing the construction of the underground Metro Station and Metro lines. The second parcel of the land which is adjacent to the District Park (green belt) was transferred on permanent basis for Entry, Exit and Ventilation Shaft of the Metro Station.It is pertinent to mention that the EIA Report dated August, 2011 in Para 4.2.2 of the DMRC also records that some portion of land for the Phase -III of the project will be acquired in temporary basis and will be returned back once the construction of project will be completed.

The construction at the Bhikaji Kama Place Metro Station begun in July, 2012 and workers started uprooting the trees with the help of the excavators and it was assured to the local people that the park/green belt will be redeveloped and more trees will be planted once the construction work of the Metro Station will be completed. That on the false assurance given by the DMRC the local residents and public did not protest the removal of trees considering the fact that development of metro station will benefit the people at large.

The DMRC, instead of redeveloping the park after completion of the construction work and operation of the Underground Bhikaji Cama Metro Station in July, 2019 published notice inviting booking of the commercial complex comprising of four floors at the same location where the green District park was earlier located. The construction of a commercial complex in a green belt has not only violated the provisions of Environment Protection Act, 1986, Biodiversity Act, 2002, Delhi Protection of Trees Act, 1994 and Delhi Master Plan, 2021 but also ignored the seriousness shown by this Hon'ble Tribunal regarding issue of illegal felling of trees and protection of parks & green belts adjudicated in various cases mentioned in the present original application.

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It is pertinent to mention that in the recent years the environment of our country is drastically deteriorating. In fact, it has been reported in the year 2018 that 22 out of 30 most polluted cities of the world are located in India and out of that 22 most polluted cities six are located in Delhi & NCR i.e. Delhi, Faridabad, Ghaziabad, Noida, Gurugram and Bhiwadi. Furthermore, India's rank in the year 2018 slipped to the 177th position out of 180 countries in Environment Performance Index from 141 position in the year 2016 and therefore, the Government of India along with regulatory authorities are required to increase the green cover and not to turn the existing Green Belts into concrete jungles.

In these circumstances, the Applicant has filed the present Original Application

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LIST OF DATE & EVENTS

DATE	EVENTS
07.02.2007	The Delhi Master Plan, 2021 was notified. In the Master Plan 2021 an area of approximately of one hectare was depicted as part of the District Park located on Sudhir Tyagi Marg, Netaji Nagar, New Delhi (at the corner of Ring road and Africa avenue). The District Park consists of many old growth fully-grown invaluable trees and all these years the trees have provided shade to park visitors, a place for children to play and protection to pedestrians and animals and acted as green barrier and natural air filter against the deadly air pollution of Delhi & NCR.
August, 2011	Delhi Metro Rail Corporation prepared the Environment Impact Assessment for Phase III Corridor. The phase III of the project includes the metro network between Mukundpur to Yamuna Vihar and Bhikaji Cama Place was proposed as one of metro station. In the Para 4.3.2 of the EIA Report it was stated that about 3.019 ha of private land, 6.421 of railway land and 180.982 ha of Government land have to be acquired for the project. In addition to this, another 91.715 ha of Government land is required, albeit temporarily, for casting yards and for meeting the requirements of construction working space. Temporary land acquisition will only be from Government Department and will be transferred back on completion of construction works.
11.07.2012	Two parcel of land was transferred by the Land & Development

	Office of the Ministry of Urban Development to the DMRC vide letters dated 11.07.2012 for construction of Bhikaji Cama Place Metro Station under the DMRC Phase III of MRTS Project. The first parcel of the land which is the District Park (Green Belt) was transferred on temporary basisfor easing the construction of the underground Bhikaji Kama Metro Station and metro lines. The second parcel of the land which is adjacent to the District Park (green belt)was transferred on permanent basis for Entry, Exit and Ventilation Shaft of the Metro Station. Both the land were transferred without making any change in the land use as per the Master Plan.
July, 2012	The Construction at the Bhikaji Kama Metro Station begun and the construction workers started uprooting the trees with the help of the excavators. It was assured to the local people that the park/green belt will be redeveloped and more trees will be planted once the construction work of the Metro Station will be completed as the transfer of land is temporary. That on the false assurance given by the DMRC the local residents and public not protested the removal of trees considering the fact that development of metro station will benefit the people at large.
12.01.2017	The Air Quality of the Delhi & NCR deteriorated at an extreme level. This has promoted the Hon'ble Supreme Court of India to pass directions for preparation of a Graded Action Plan. In pursuance to the direction of the Hon'ble Supreme of India, the

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	Ministry of Environment Forest [illegible] Change notified the Graded Action Plan.
24.01.2018	India ranked 177th out of 180 countries of the World on Environment Performance Index (EPI) which imply that India has poorly performed in protection of environment and green cover.
10.12.2018	The Centre for Science & Environment published article stating that a new study has revealed that that air pollution in Delhi is responsible for approximately 10,000 to 30,000 annual deaths in the city. This means the capital city loses 80 lives every day to pollution from PM2.5.
05.03.2019	The Guardian reported that twenty-two of the world's 30 worst cities for air pollution are in India, according to a new report, with Delhi again ranked the world's most polluted capital.
July, 2019	The DMRC instead of redeveloping the park after completion of the construction work and operation of Bhikaji Cama Metro Station published notice inviting booking of commercial complex comprising of four floors at the same location where the park was earlier located. That construction of high intensity commercial complex at the area which is designated as District Park as per the Delhi Master Plan, 2021 is utter violations of the environment laws and orders of this Hon'ble tribunal.
August, 2019	Hence the Present Original Application.

(10)

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL,

PRINCIPAL BENCH, AT NEW DELHI

MEMORANDUM OF APPLICATION

ORIGINAL APPLICATION NO. OF 2017

(Under Section 14 read with Sections 15 and 18(1) of the National Green Tribunal Act, 2010)

IN THE MATTER OF:

1. **Residents of Delhi**

   Through Shobha Agarwal

   Age 72 years old

   Daughter of late Shri B.K Dilwali

   61, Babar Road, New Delhi - 110001

..... Applicant

Versus

1. **Delhi Metro Rail Corporation**

   Through Chairman

   Metro Bhawan, Fire Brigade Lane

   Barakhamba Road, New Delhi – 110001

2. **Union of India**

   Through Secretary, Government of India

   Ministry of Environment , Forests and Climate Change

   Indira Paryavaran Bhavan, Jor Bagh Road

   New Delhi - 110 003

3. **Ministry of Urban Development**

   Through Secretary

   A-Wing, Nirman Bhawan, New Delhi

(14)

Delhi 110108

4. **Government. of NCT Of Delhi**
Through The Chief Secretary
A-Wing, 5th Floor, Delhi Secretariat
New Delhi-110113Respondents

I. The addresses of the Applicants given above for the service of notices of this application.

II. The addresses of the Respondents are given above for the service of notices of this application

III. The present Application seeks to raise substantial question of environment before this Hon'ble Tribunal by bringing to it's notice the blatant violations of the environmental laws more particularly the illegal construction of commercial complex in Green Belt / Park which is violation of letter and spirit of the Environment Protection Act, 1986 (EPA), the Biodiversity Act, 2002 and the Orders of this Hon'ble Tribunal. The EPA defines environment to include water, air, land and the interrelationship that exists among and between water, air and land, and human beings and other living creatures, plants, micro-organisms and property. The definition of environment can be interpreted to indicate the inter-relationship that exists in and around the Applicants' residence and the natural environment. Similarly, the ecosystem diversity and species diversity that exists in the existing forest ecosystem is being totally destroyed by the act of the Respondents. The Respondents have totally failed in their duty of preservation of environment and ecology as defined in the Act by allowing such illegal activity. It is the duty of the State under Article 48-A of the Constitution of India that the "State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country."

(12)

MOST RESPECTFULLY SHOWETH:

1. That the Applicant is raising substantial question of environment on behalf of the Concerned Residents of Delhi arising out of the proposed illegal construction of commercial complex above underground Bhikaji Cama Place Metro Station of Delhi Metro Rail Corporation (hereinafter DMRC) Phase -III Corridor which is designated as District Park/ Green Belt as per the Delhi Master Plan, 2021.
2. The Applicant is a senior and public spirited citizen of Delhi who is representing the concerned residents of Delhi. The Applicant in particular being a senior citizen is more vulnerable to breathing problem and lung diseases due to deteriorating air quality of Delhi & NCR and construction of a commercial complex in a green belt will further affect the health of the applicant and residents of Delhi whom the applicant is representing in the present original application.

FACTS

3. That the Delhi Development Authority (DDA) on 07.02.2007 notified the Delhi Master Plan 2021. In the Master Plan an area approximately of one hectare waspart of the area depicted as a District Park situated on Sudhir Tyagi Marg, Netaji Nagar, New Delhi (at the corner of ring road and Africa avenue). The District Park consist of many old growth invaluable trees and all these years the trees have provided shade to park visitors, a place for children to play and protection to pedestrians and animals and acted as green barrier and natural air filter against the deadly air pollution of Delhi & NCR. The copy of the land use plan as per the Delhi Master Plan 2021 depicting the area as District Park is marked and appended as **ANNEXURE A/1. (**

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Page No.)

4. The Respondent No. 1 DMRC conducted a Environment Impact Assessment (hereninafter EIA) as per the Japan International Cooperation Agency (hereinafter JICA) guidelines for Environmental and Social considerations on August, 2011 for development and construction of Phase III of the Delhi Metro. The EIA report also provided details about various types of impacts which includes removal of green belt and trees during construction and operation phase. In the Para 4.3.2 of the EIA Report it was stated that about 3.019 ha of private land, 6.421 of railway land and 180.982 ha of Government land have to be acquired for the project. In addition to this, another 91.715 ha of Government land is required, albeit temporarily, for casting yards and for meeting the requirements of construction working space. Temporary land acquisition will only be from Government Department and will be transferred back on completion of construction works. The relevant excerpts from the EIA report regarding the noise pollution is marked and appended as **ANNEXURE A/2.(Pages. to)**

5. That on the request of the Respondent No.1 DMRC, the Respondent No.3 the Ministry of Urban Development (MoUD) Land & Development Office transferred two parcels of land vide letters dated 11.07.2012 for construction of an Underground Bhikaji Cama Place Metro Station under the DMRC Phase III of MRTS Project. The first parcel of the land which is part of the District Park (Green Belt) was transferred on temporary basis for easing the construction of the underground Bhikaji Cama Metro Station and metro lines. The second parcel of the land which is adjacent to the District Park (green belt) was transferred on permanent basis for Entry, Exit and Ventilation Shaft of the Metro Station. Both the land were transferred

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without making any change in the land use as per the Master Plan.

It is pertinent to mention that transfer of the land belonging to District Park was made on temporary basis and it was supposed to be returned & redeveloped after the construction of the project was completed. Moreover, the EIA Report of August 2011 in Para 4.3.2 also records that land will be transferred back on completion of construction works. The copies of the letters dated 11.07.2012 is marked and appended as **ANNEXURE A/3 (Colly) (pages. to.)**

6. That soon after the transfer of the land the construction at the underground Bhikaji Cama Place Metro Station begun and the construction workers started uprooting the trees & shrubs with the help of the excavators. That it was assured to the local people that the park/green belt will be redeveloped and more trees will be planted once the construction work of the Underground Metro Station will be completed as the transfer of land is temporary. That on the false assurance given by the Respondent No.1 DMRC and authorities the local residents and public did not protest on the removal of trees considering the fact that development of an underground metro station will benefit the people at large and the park will be redeveloped once the construction work of underground metro station will be completed.

7. In the meantime the environment of the entire country continued to further deteriorate especially the ambient air quality of Delhi & NCR. In fact in 2018 rank of India in the Environment Performance Index slipped to the 177th position as compare to 141th position in the year 2016. That this unprecedented situation caused by many factors including removal of trees & green belt. Further, the Guardian on 05.03.2019 reported that in the year 2018 22 out of 30 most polluted cities of the world are located in India and

(18)

out of that 22 most polluted cities six are located in Delhi & NCR i.e. Delhi, Faridabad, Ghaziabad, Noida, Gurugram and Bhiwadi.The copy of the Environment Performance Index, 2018 is annexed as **ANNEXURE A/4 (Pages to)** and copy of the Guardian report dated 05.03.2019 as **ANNEXURE A/5. (Pages. to)**

8. The Centre for Science of Environment also published in an article dated 10.12.2018 wherein it has been stated that a new study has revealed that that air pollution in Delhi is responsible for approximately 10,000 to 30,000 annual deaths in the city. This means the capital city loses 80 lives every day to pollution from PM2.5. The copy of the article dated 10.12.2018 is marked and appended as **ANNEXURE A/6. (Pages. to.)**

9. In July, 2019 the Respondent No.1 DMRC instead transferring back the District park land and redeveloping the park after completion of the underground metro station construction work to counter the rising air pollution, published a notice inviting booking of commercial complex comprising of four floors at the same location where the park was earlier located. That the Respondent No. 1 DMRC by proposing to construct commercial complex in a green belt has not only violated the provisions of Environment Protection Act, 1986, Biodiversity Act, 2002, Delhi Protection of Trees Act, 1994 and Delhi Master Plan, 2021 but also ignored the seriousness shown by this Hon'ble Tribunal regarding issue of illegal felling of trees and protection of parks & green belts adjudicated in various cases mentioned below. The notice inviting application for allotment in the commercial complex is marked and appended as **ANNEXURE A/7. (Pages. to.)**

(16)

10. It is humbly submitted before this Hon'ble Tribunal that the trees, which were felled, were old growth fully grown invaluable trees and all these years the trees have provided shade and protection to birds and wildlife. These trees have been the nesting ground and home for the local bird species like yellow footed green pigeon, long tailed shriek and house sparrows among others. More importantly the trees acted as green barrier and natural air filter against the deadly air pollution of Delhi & NCR. But unfortunately the illegal action of Respondents has exposed the people of the area to obnoxious air and has also left the various bird species and wildlife homeless. The photograph showing topography of areas before and after removal of trees is marked and appended as **ANNEXURE A/8. (Pages. to)**

11. That this Hon'ble Tribunal time and again dealt with the issue of encroachment in the green belt and parks with utter seriousness and passed strict orders for removal of encroachment and rehabilitation of the green belt. That in Original Application No. 821 of 2018, Vinay Dhaka vs Government of Uttar Pradesh vide order dated 01.07.2019 this Hon'ble Tribunal had issued show cause to the District Magistrate as to why action be not taken for violating the order of this Hon'ble Tribunal regarding removal of encroachment in the park. Similar order were passed by this Hon'ble tribunal in Original Application No. 847/2018 , *Letter received with the subject - Save Forest land of Green Belt on Molarbad-Faridabad Bye-pass Road* regarding construction of petrol pump in green belt.

12. Further, this Hon'ble tribunal in Original Application No. 93 of 2017, R.L Sharma & Ors vs NOIDA & Ors directed removal of illegal structure and restoration of the Park as per the Layout Plan given in NOIDA Master Plan 2021 as well as 2031. That in the present case the Respondent No. 1 is

(17)

proposing to construct a high rise commercial complex in a District park and therefore, similar order may be passed by this Hon'ble tribunal.

13. It is pertinent to mention that the National Capital Region Planning Board in their affidavit submitted before this Hon'ble Tribunal in O.A. 147 of 2014 titled as Legal Aid Committee, National Green Tribunal Bar Association versus Union of India & Ors mentioned satellite imageries and maps prepared and analysed by the National Remote Sensing Centre (NRSC) on shrinking of green area in Delhi and NCR. That according to NCRPB, the shrinkage of the conservation zones is 25.97 per cent in Haryana sub-region, 15.43 per cent in Delhi, 43.88 per cent in Uttar Pradesh sub-region and 11.18 per cent in Rajasthan. It is pertinent to note that the arbitrary action of the Respondents in the present Application has only further damaged the already depleting tree cover in Delhi thus disrupting the natural environment of Delhi & NCR.

14. That this Hon'ble Tribunal in Aditya N. Prasad v Union of India & Ors O.A. 82 of 2013 recognizing the importance of protecting the trees particularly for a city like Delhi, where emissions are so high and existence of violation of all the parameters pertaining to ambient air quality had passed various orders for de-concretization of trees which included an order dated 26.08.2014 vide which the Hon'ble Tribunal had directed de-concretization of trees in 4 colonies of Delhi as a pilot project. This Hon'ble Tribunal had further constituted 5 Committees with the Chief Engineer as its Chairman to submit quarterly report to the Hon'ble Tribunal on de-concretization of the trees. This Hon'ble Tribunal further observing irregularities by the authorities vide order dated 5.03.2015 had imposed personal responsibility on the HoD of all the authorities concerned for the de-concretization of the trees being carried so that the trees are not damaged in the whole process.

(18)

15. That time and again this Hon'ble Tribunal has expressed its opinion on tree felling and non-compliance of the State Tree Protection Act including Delhi Preservation of Trees Act, 1994 and vide Order dated 29.08.2014 passed in O.A. No. 60/2013 in the matter of Sonya Ghosh vs NCT of Delhi the Hon'ble Tribunal categorically stated that, "there *shall be no tree felling....without permission under Section 29 of the Delhi Preservation of Trees Act, 1994.*" It is respectfully submitted that this Hon'ble Tribunal vide order dated 13.10.2014 passed in Original Application No. 132 of 2014 in the matter of Greater Kailash –II vs. South Delhi Municipal Corporation prohibited any further cutting of trees without taking the requisite permission from the concerned competent authority.

Further, it is respectfully submitted that the concern of this Hon'ble Tribunal over felling of trees is also evident in the order passed by this Hon'ble Tribunal in the matter of Mrs. Ranjana Jetley & Ors vs. Union of India & Ors.[2014 ALL (I) NGT REPORTER (1) (DELHI) 165], where even though proper permission was taken under Section 4 Punjab Land Preservation Act, 1900 this Hon'ble Tribunal directed the Respondents to carry out planned afforestation work.

16. That the Respondents in the present Application has not only violated the provisions of Environment Protection Act, 1986, Biodiversity Act, 2002, Delhi Protection of Trees Act, 1994 and Delhi Master Plan, 2021 but also ignored the seriousness shown by this Hon'ble Tribunal regarding issue of illegal felling of trees and protection of parks & green belts adjudicated in various cases mentioned hereinabove. The damage done by the Respondents is irreparable due to the reasons it almost takes one generation of human to see the trees attaining its ideal growth and coercive action against the

(19)

Respondents will restrict them from engaging in such illegal actions which causes damage to the environment.

That this Hon'ble Tribunal had also given elaborate directions to the State Government and other concerned officials with regard to reforestation of the area of Kothi, Gulaba and Marhi in the case titled Court on its own Motion Vs. State of Himachal Pradesh & Ors. 2014 ALL (I) NGT REPORTER (1) (DELHI) 66 which shows the concern of this Hon'ble Tribunal regarding saving the green cover of our country.

17. Moreover the development of premium commercial complex by removing a Green Belt is unscientific and at best laughable. The harmful effects of construction of commercial complex would increase in air pollution, depletion of ground water, loss of habitat of birds and wildlife.

GROUNDS

That the Applicant is filing the present Application on the following, among other grounds which the Applicant may take at the time of hearing of the matter:

A. BECAUSE the Environment (Protection) Act, 1986 defines environment to include water, air, land and the interrelationship that exists among and between water, air and land, and human beings and other living creatures, plants, micro-organisms and property. The definition of environment can be interpreted to indicate the inter-relationship that exists in and around the citizens of Delhi & NCR and natural environment including trees.

B. BECAUSE the area where the Respondent No.1 DMRC is proposing to construct a four floor commercial complex is District Park as per the Delhi Master Plan 2021.

(20)

C. BECAUSE this Hon'ble Tribunal cases Original Application No. 821 of 2018, Vinay Dhaka vs Government of Uttar Pradesh, Original Application No. 847/2018 , Letter received with the subject - Save Forest land of Green Belt on Molarbad-Faridabad Bye-pass Road, Original Application No. 93 of 2017, R.L Sharma & Ors vs NOIDA and many others dealt with the issue of encroachment in the green belts & parks.

D. BECAUSE the Respondent No.1 DMRC removed the trees from the District Park/ Green Belt for easing the construction work of Metro Station and after the completion of the construction work, the trees is required to be planted and the park to be redeveloped.

E. BECAUSE the L& DO had temporary transferred the Green Belt land vide letter dated 11.07.2012 and hence construction of commercial complex in the land is illegal.

F. BECAUSE the Centre for Science of Environment in its article dated 10.12.2018 stated that a new study has revealed that that air pollution in Delhi is responsible for approximately 10,000 to 30,000 annual deaths in the city. And removal of green belt for construction of commercial complex will further increase the cases of death due to air pollution.

G. BECAUSEIndia ranked 177th out 180 countries of the world on Environment Performance Index, 2018 and therefore, removal of green belt will further affect the India's Environment Performance Index.

H. BECAUSE such an action by the respondents clearly violates the letter and spirit of the Biodiversity Act, 2002 as both species and ecosystem diversity is being destroyed.

I. BECAUSE It is the duty of the State under Article 48-A of the Constitution of India that the "State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country."

(21)

J. BECAUSE under Article 51-A (g) of the Constitution, every citizen of India has a duty to "protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures."

K. BECAUSE this Hon'ble Tribunal in Original Application No. 16/2013 (CZ)*Tribunal at its Own Motion Vs. The Secretary Ministry of Environment & Forests and Others* vide Judgment dated 04.04.2014 held that Wildlife is a part of environment and any action that is causing damage to the wildlife or that may likely lead to damage to the cause of wildlife, cannot be excluded from the purview of this Tribunal.

L. BECAUSE the Hon'ble Supreme Court in *Vellore Citizens Welfare Forum vs. Union of India & Ors* (1996) held that the Precautionary Principle and Polluter Pays Principle are part of the environmental law of India. Further the Hon'ble Supreme Court held that where there are threats of serious and irreversible damage, lack of scientific study certainly should not be used as the reason for postponing, measures to prevent environmental depredation. It is respectfully submitted that this Hon'ble Tribunal may, while applying the mandate of principles of Sustainable Development, the Precautionary Principle and the Polluter Pays Principle, consider the present matter of mindless felling of trees at the behest of development.

M. BECAUSE this Hon'ble Tribunal in the case of Court on its own Motion Vs. State of Himachal Pradesh & Ors. 2014 ALL (I) NGT REPORTER (1) (DELHI) 66 has observed that:

"*The risk of potential harm to the environment and human health resulting from development should be considered by somewhat tilting the balance in favour of the environment and in the larger public interest. According to "a reasonable person's test", life, public health and ecology have priority over unemployment and loss of revenue. Development and protection of environment are not enemies. Right to a clean and decent*

(22)

environment has been held to be a fundamental right, coupled with an obligation on the part of the State and the citizens."

N. Because such illicit felling of trees without replanting trees is not only illegal in terms of statutory process but also in total violation of the letter and spirit of the Environment Protection Act, 1986 and the Respondents have therefore failed to preserve the ecology and environment as defined in the Act.

LIMITATION

That the present Application is being filed within six months from the date on which the cause of action arose, which July, 2019 when the Respondent No.1 instead of transferring back the Green Belt land they published notice inviting booking of property in a commercial complex on the same land. The copy of notice is annexed along with the Application, and the Application is therefore in accordance with Section 14(3) and Section 15 (3) of the National Green Tribunal Act, 2010.

INTERIM PRAYER

That in the light of the facts and circumstances of the present case, the Hon'ble Tribunal may be pleased to stay the construction work of proposed illegal commercial complex at the green belt/district park.

PRAYER

In view of the above said facts and circumstances it is therefore most respectfully prayed by the Applicant that this Hon'ble Tribunal may be pleased to:

(i) Prohibit the construction of a commercial complex by the Respondent No.1 in the District Park ;

(23)

(ii) Direct the Respondent No.1 to redevelop the District Park at the proposed site of commercial complex

(iii) Direct plantation of ten times the number of trees felled by the Respondents in and around the proposed construction site of the District Park .

(iv) Impose penalty on the Respondent No. 1 to 4 invoking the Polluters Pay Principle under the NGT Act and Environment Protection Act, 1986.

(v) Direct the Respondent to take effective measures to protect the natural habitat of birds and wildlife.

(vi) Direct the Respondents to construct non concretize road inside the District Park

(vii) Direct respondents to compensate, rehabilitate and restitute under Section 15 of the NGT Act, 2010 for damage done to natural environment and trees.

(viii) pass any other such order(s)/direction(s) as this Hon'ble Tribunal deem fit and proper in the facts and circumstances of the present matter.

DATE: 03.08.2019
PLACE: New Delhi

DRAWN & FILED BY:

Salik

Salik Shafique
Advocates for the Original Applicant
29, LGF, Presidential Estate, Nizamuddin East
New Delhi – 110013

(24)

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH AT NEW DELHI

ORIGINAL APPLICATION NO. /2019

IN THE MATTER OF:

Residents of Delhi

Through Shobha Aggarwal Applicant

versus

Delhi Metro Rail Corporation & Ors ...Respondents

AFFIDAVIT

I Shobha Aggarwal, D/o late Shri B.K Dilwali, age about 72 years old and R/o 61, Babar Road, New Delhi - 110001 presently at New Delhi, do hereby solemnly affirms and declares as under:

1. That I am the authorized signatory for the applicant and represent concerned citizens of Delhi whose names are mentioned in the resolution and am fully aware of the facts in the matter and am duly authorized to swear this affidavit.

2. The contents of the accompanying Original Applications and its annexures are true and correct to the best of my knowledge and have been drafted by the counsel on my instructions and nothing material has been concealed therefrom.

NOTARY Abha Tomar Advocate New Delhi Regn. No. 8513 GOVT. OF INDIA

Shobha Aggarwal

DEPONENT

Verification:

I, the abovenamed deponent do hereby verify that all the facts mentioned in the affidavit are true to my knowledge and that no part thereof is false and nothing material has been concealed therefrom.

- 7 AUG 2019

Verified at New Delhi on this ..... day of August 2019.

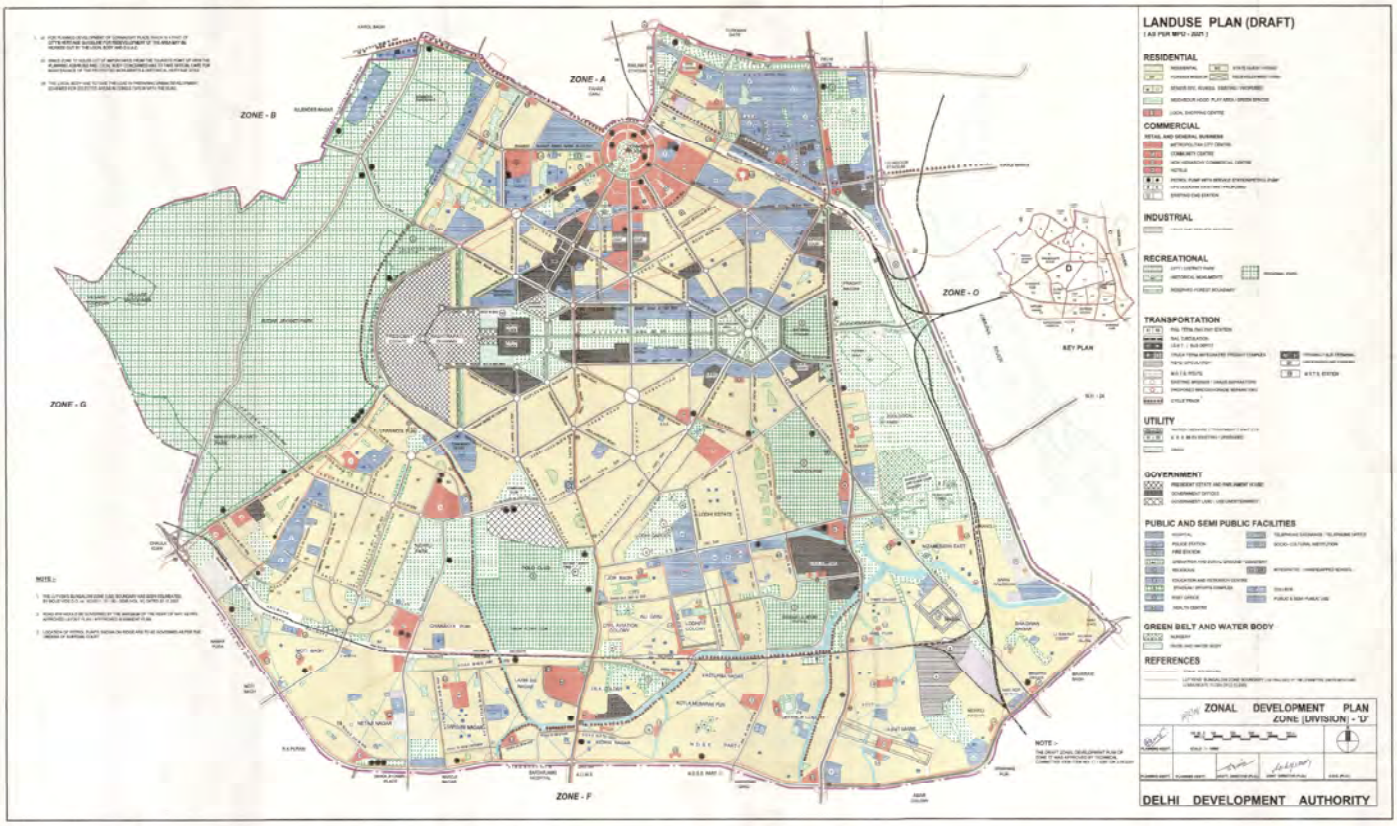
Shobha Aggarwal

DEPONENT

Certified that the foregoing statement was declared on solemn affirmation before me which has been read over to the deponent who has admitted it as correct

Notary, DELHI

- 7 AUG 2019

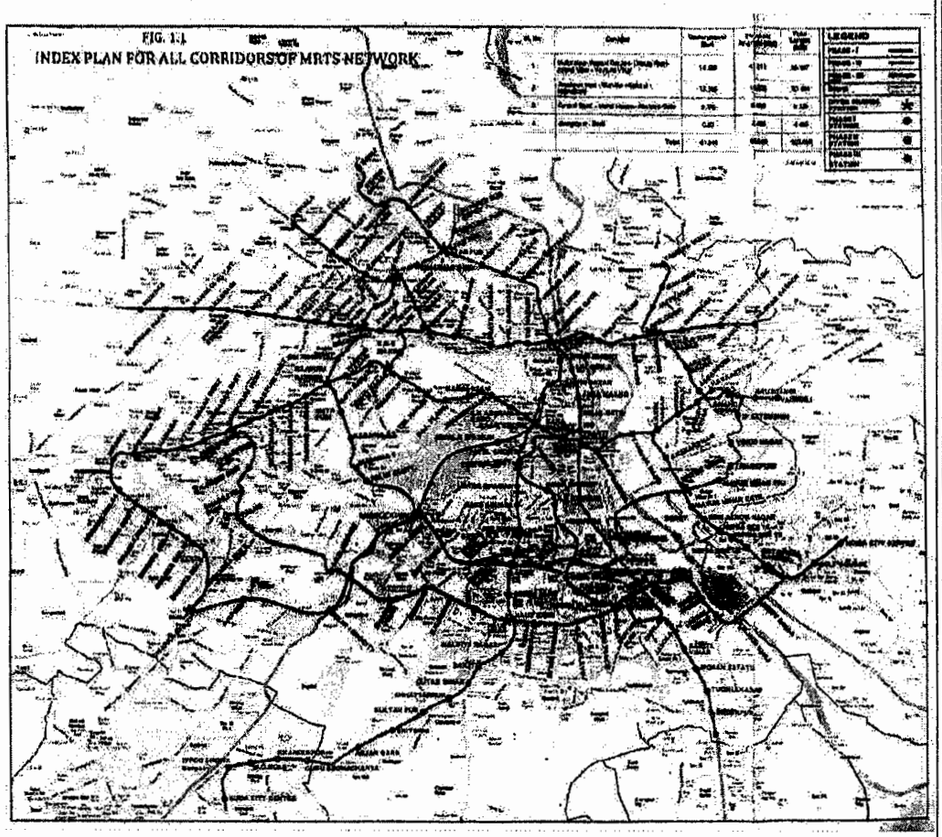

ZONE - A
ZONE - B
ZONE - C
ZONE - D
ZONE - E
ZONE - F
ZONE - G
KEY PLAN
NOTE :-
LANDUSE PLAN (DRAFT)
(AS PER MPD - 2021)
RESIDENTIAL
COMMERCIAL
INDUSTRIAL
RECREATIONAL
TRANSPORTATION
UTILITY
GOVERNMENT
PUBLIC AND SEMI PUBLIC FACILITIES
GREEN BELT AND WATER BODY
REFERENCES
ZONAL DEVELOPMENT PLAN
ZONE 'D'(YAMUNA PUSHTA)
DELHI DEVELOPMENT AUTHORITY

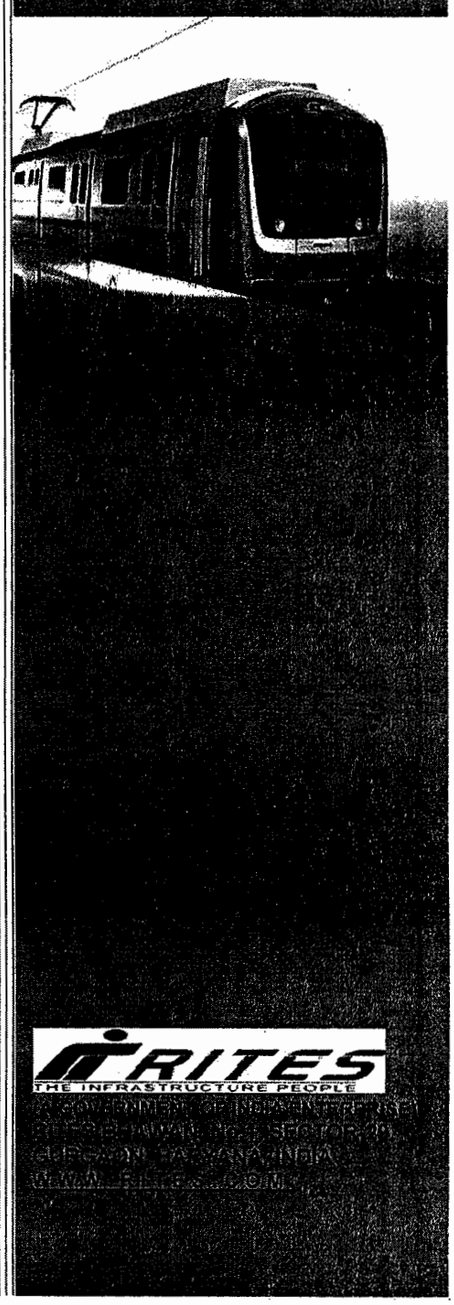
Annexure A/2

(26)

दिल्ली मेट्रो रेल कॉर्पोरेशन लिमिटेड
DELHI METRO RAIL CORPORATION LTD.

EIA FOR PHASE III CORRIDORS OF DELHI METRO





AUGUST 2011

DELHI METRO RAIL CORPORATION
Metro Bhawan, Fire Brigade Lane,
Barakhamba Road, New Delhi-110001

RITES
THE INFRASTRUCTURE PEOPLE

(27)

4.3.2 Change of Land Use

Under the present study, project layout maps were superimposed on land use maps to find out the change in land use. It is estimated that about 3.019 ha of private land, 6.421 of railway land and 180.982 ha of Government land have to be acquired for the project. In addition to this, another 91.715 ha of Government land is required, albeit temporarily, for casting yards and for meeting the requirements of construction working space. Temporary land acquisition will only be from Government Department and will be transferred back on completion of construction works. The change of land use is presented in **Table 4.1.** More details are available in Chapter-4 of DPR for MRTS Phase-III report. From the data it could be concluded that out of total permanent land requirement about 1.59% land to be acquired is from private sector, 95.04% from Government and 3.37% from railways. It may be mentioned here that railways are also a government department. Like most other rail based mass urban transport systems, this system, now in its third phase of construction, also needs to undertake property development to make it financially viable and economically attractive. The compensation for land is included in **Volume II** of this study.

TABLE 4.1
CHANGE IN LAND USE

S.No.	Corridor	Land Requirement (ha)			
		Permanent			Temporary
		Government	Railway	Private	Government
1	Mukundpur to Yamuna Vihar	112.2.13	4.401	0.613	58.281
2	Janakpuri West to Botanical Garden	64.062	0.584	2.302	21.771
3	Central Sect. To Kashmiri Gate	1.750		0.104	7.518
4	Jahangir Puri to Badli	2.841	1.436		4.145
Total		180.983	6.421	**3.019**	91.715

source: DPR 2011

4.3.3 Loss of Forests/Trees

The proposed metro lines are in urban/ city area and will not pass through any forests. Hence no loss to forest is anticipated due to the project. However, planted trees do exist throughout the corridors selected for the project. There are 16,609 trees along the alignment (**Refer Table 3.14**). These trees are likely to be cut during construction. These trees may be equivalent to 5537 mature trees. Trees are major assets in purifications of urban air, which by utilizing CO_2 from atmosphere, release

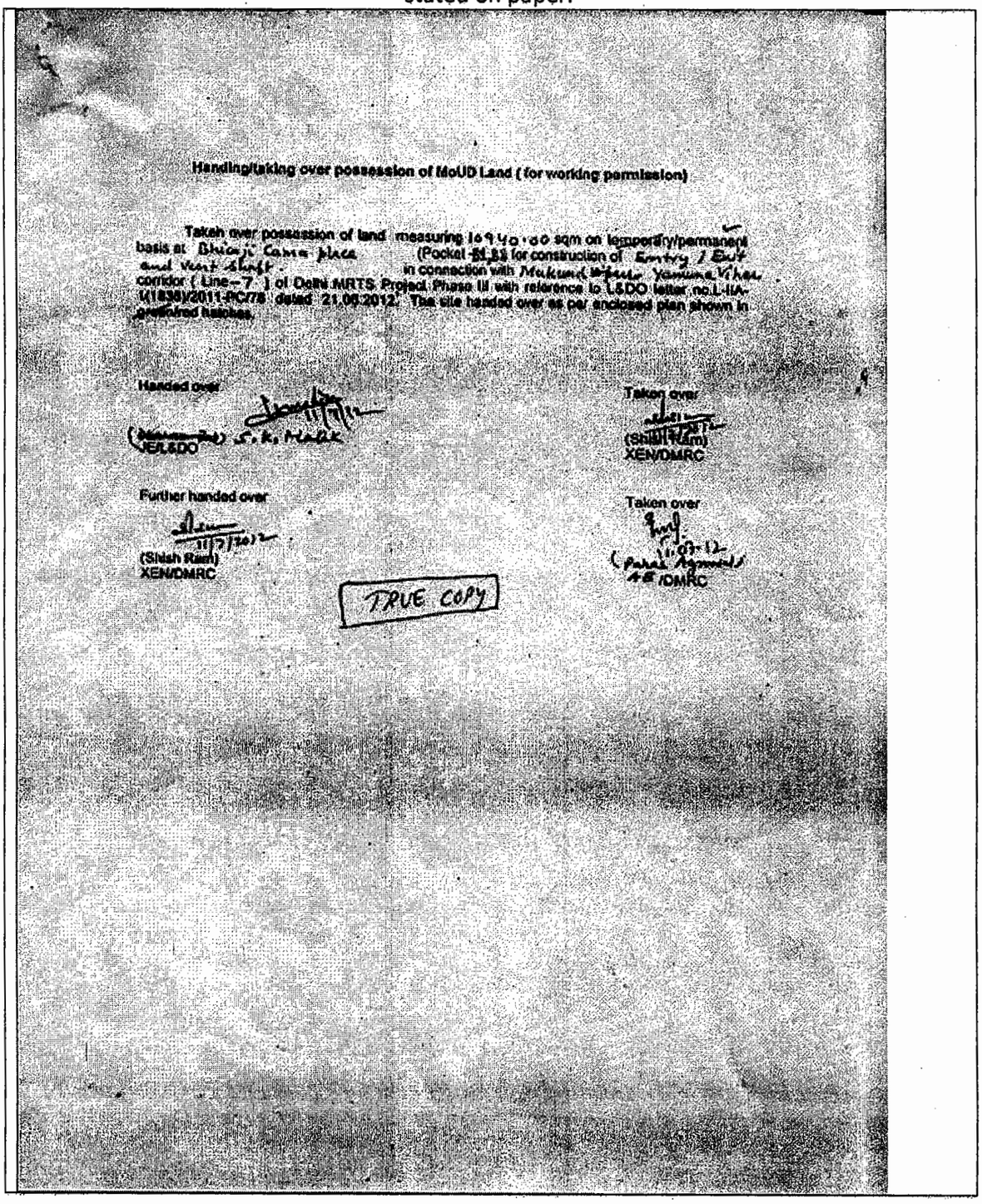
T.C.

(28)
Annexure A/3

Musical Fountain at Netaji Nagar, Sudhir Tyagi Marg, New Delhi

Land was taken on 11-7-12 for **Entry/Exit/Ventilation Shaft** for the BhikajiCama Place Metro Underground Station.

It's clear that from the very beginning the Plans of DMRC were different than what was stated on paper.



Handing/taking over possession of MoUD Land (for working permission)

Taken over possession of land measuring 1690.00 sqm on temporary/permanent basis at Bhikaji Cama place (Packet-31,33 for construction of Entry / Exit and Vent Shaft. in connection with Mukund[illegible] Yamuna Vihar corridor (Line–7) of Delhi MRTS Project Phase III with reference to L&DO letter no.L-IIA-1(1838)/2011-PC/78 dated 21.06.2012. The site handed over as per enclosed plan shown in greenish hatches.

Handed over
(Name illegible) S.K. Malik
JE/L&DO

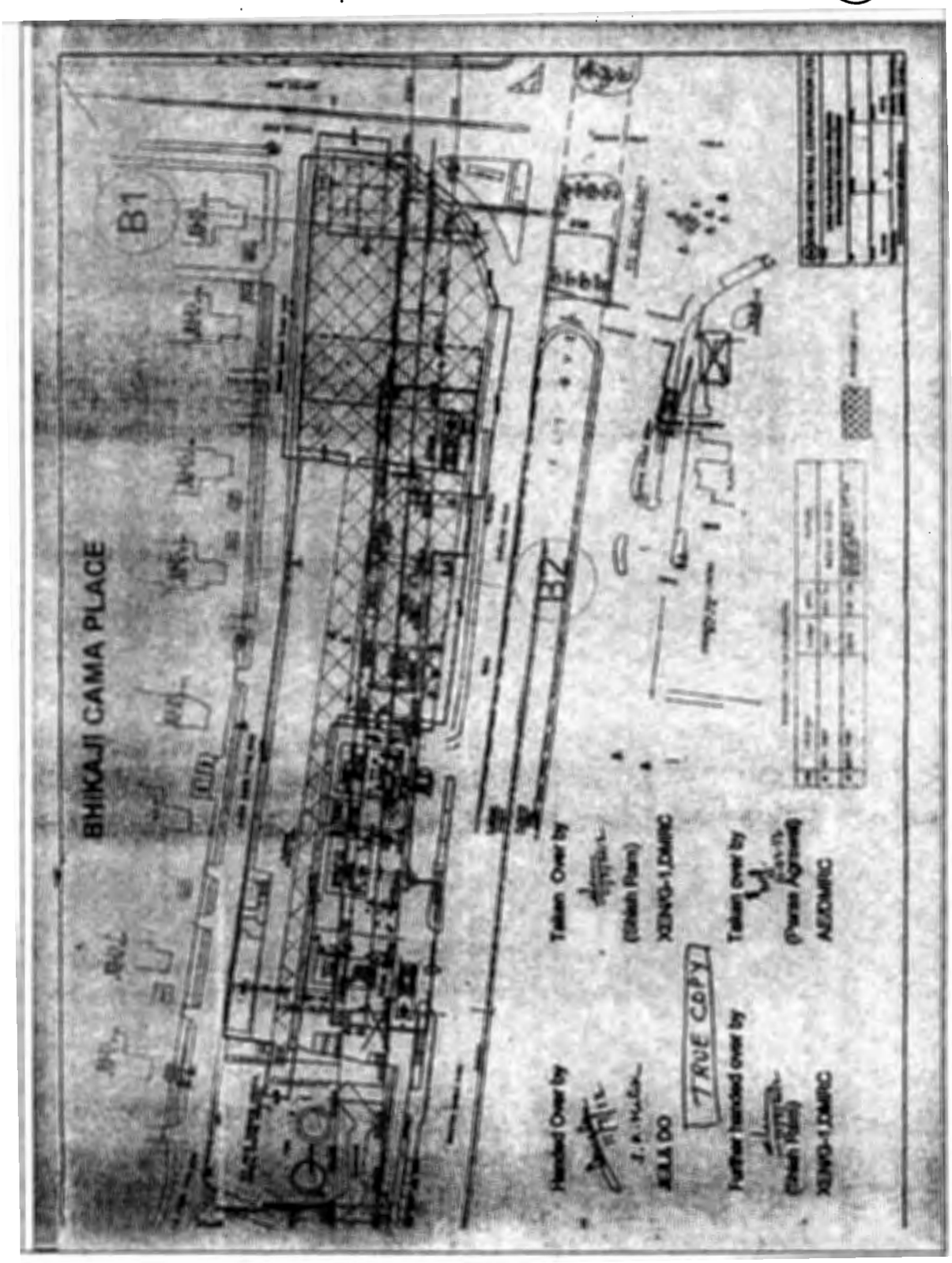
Taken over
(Shish Ram)
XEN/DMRC

Further handed over
11/7/2012
(Shish Ram)
XEN/DMRC

Taken over
11.07.12
(Pahal Agrawal)
AE/DMRC

TRUE COPY

(29)


BHIKAJI CAMA PLACE
B1
B2
TRUE COPY
Taken Over by
XENYO-1,DMRC
Taken Over by
XENYO-1,DMRC

(30)

Handing/taking over possession of MoUD Land (for working permission)

Taken over possession of land measuring 100 x 60 sqm on temporary/permanent basis at Bhicaji Cama Place (Pkt-1) (Pocket ~~1~~) for construction and barricading in connection with Mukarrel pur - yamuna Vihar corridor (Line – 7) of Delhi MRTS Project Phase III with reference to L&DO letter no.L-IIA-1(1636)/2011-PC/78 dated 21.06.2012. The site handed over as per enclosed plan shown in green/red hatches.

Handed over :

(Name of JE) S.K. Malik
JEN/L&DO

Taken over

11/7/2012
(Shish Ram)
XEN/DMRC

Further handed over

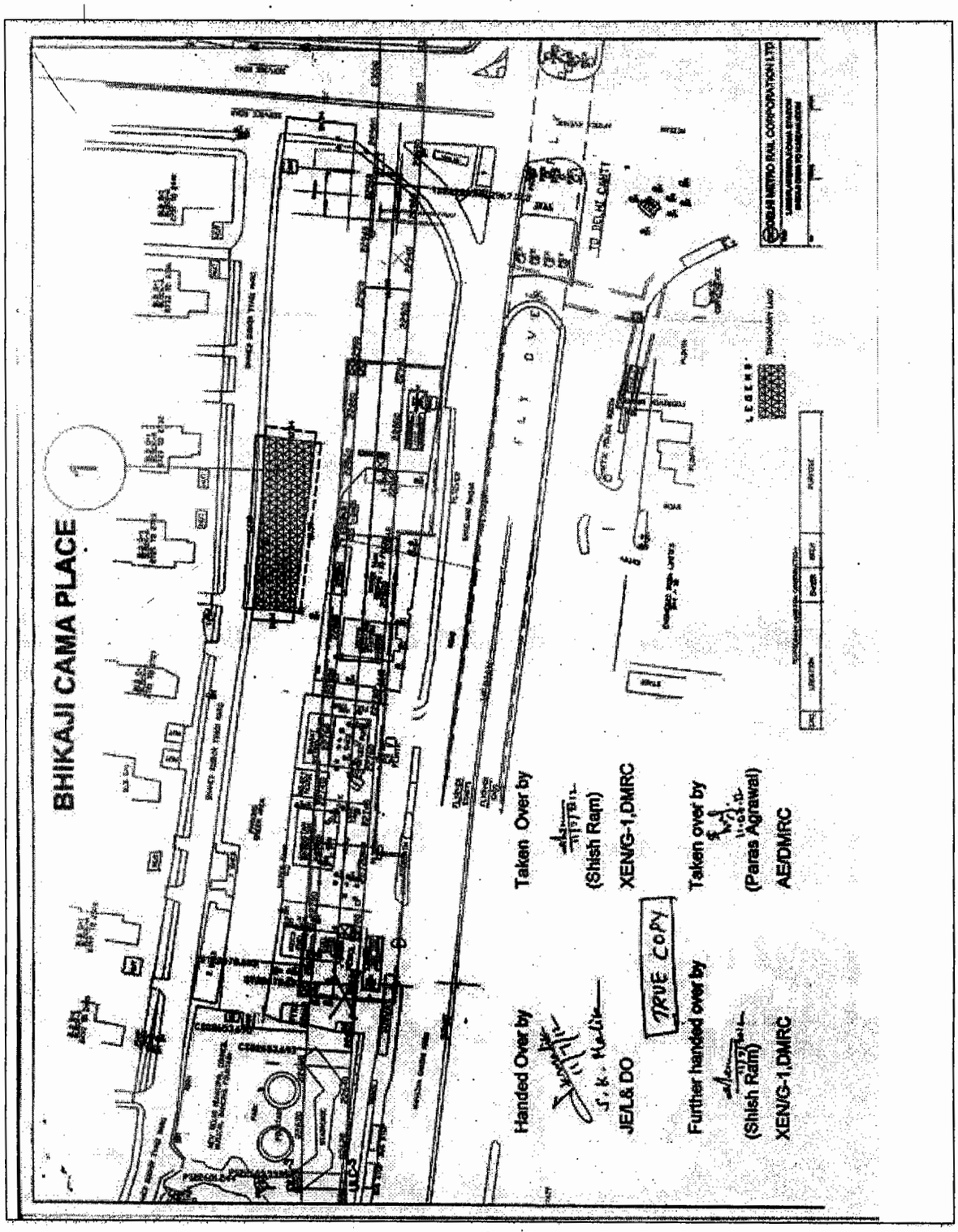
11/7/2012
(Shish Ram)
XEN/DMRC

TRUE COPY

Taken over

11.07.12
(Pawan Agarwal)
AE /DMRC

(31)


BHIKAJI CAMA PLACE
1
Taken Over by
(Shish Ram)
XEN/G-1,DMRC
Handed Over by
JE/L& DO
TRUE COPY
Taken over by
(Paras Agrawal)
AE/DMRC
Further handed over by
(Shish Ram)
XEN/G-1,DMRC

T.O

Annexure A/4 (82)

Country Profile
INDIA

Environmental Performance Index

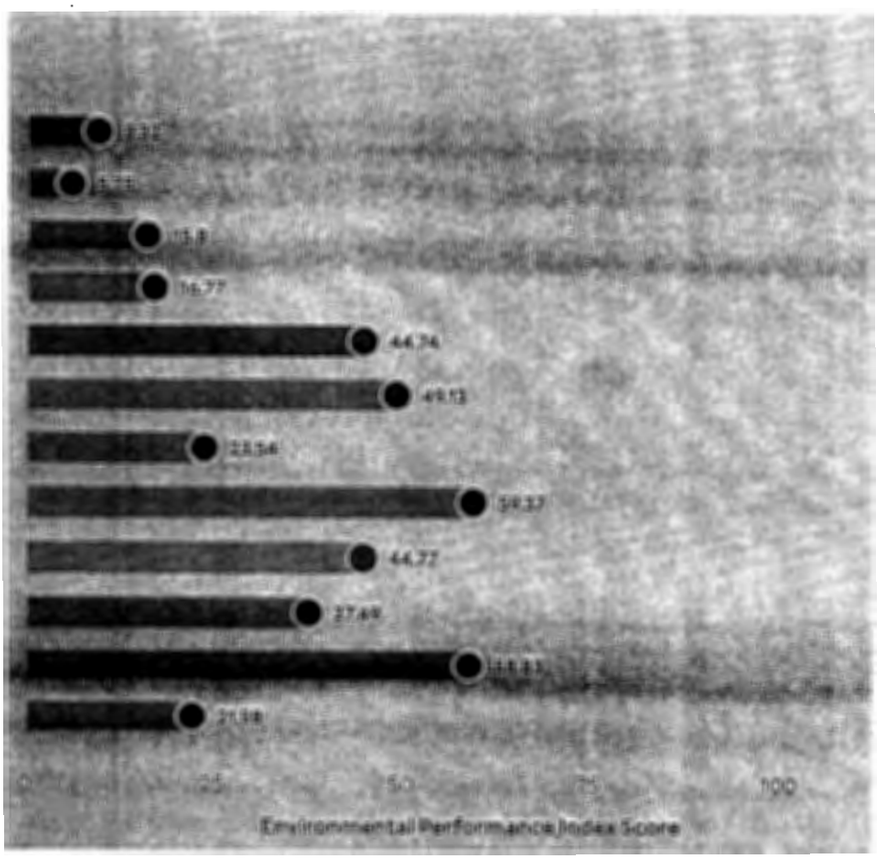
2018 EPI Country Rank (out of 180)
177

EPI Score [0=worst, 100=best]
30.57

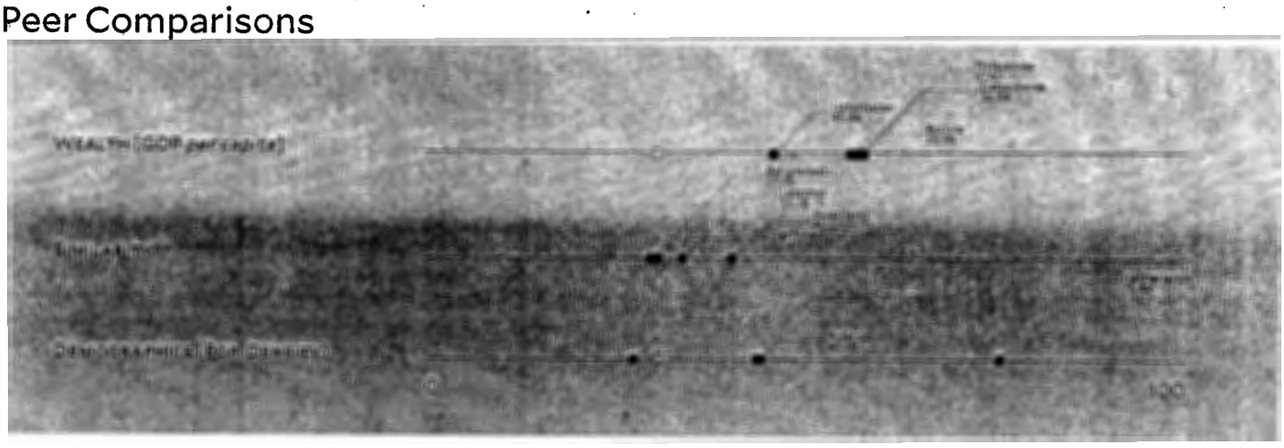
Population (millions)	1324.2
Land Area (sq. km)	2,973,190
GDP (PPP 2011$ billions)	8,067.7
GDP *per capita*	6,093
SDG Index*	58.1

Country Scorecard

Issue Categories	Rank
Environmental Health	**180**
Air Quality	178
Water & Sanitation	145
Heavy Metals	175
Ecosystem Vitality	**140**
Biodiversity & Habitat	139
Forests	68
Fisheries	53
Climate & Energy	120
Air Pollution	131
Water Resources	**107**
Agriculture	125



Peer Comparisons



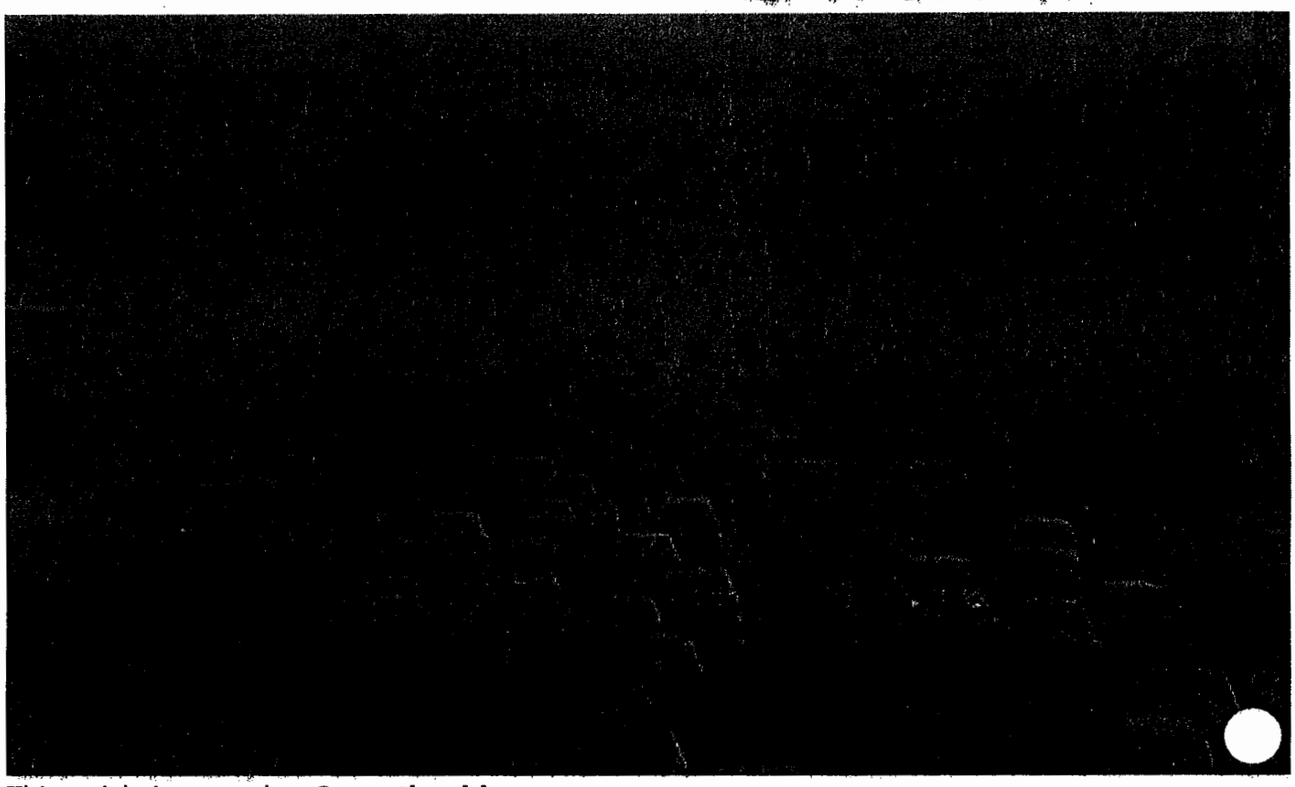
* Sustainable Development Goals Index. ** Based on k-nearest neighbors algorithm

T.V.

Annexure A/5

(33)

The Guardian



This article is more than **2 months old**

22 of world's 30 most polluted cities are in India, Greenpeace says

Analysis of air pollution data finds that 64% of cities globally exceed WHO guidelines

Cities is supported by

About this content

Nick Van Mead

Tue 5 Mar 2019 15.43 GMT

Twenty-two of the world's 30 worst cities for air pollution are in India, according to a new report, with Delhi again ranked the world's most polluted capital.

The Greenpeace and AirVisual analysis of air pollution readings from 3,000 cities around the world found that 64% exceed the World Health Organization's annual exposure guideline for PM2.5 fine particulate matter - tiny airborne particles, about a 40th of the width of a human hair, that are linked to a wide range of health problems.

Every single measured city in the Middle East and Africa exceeds the WHO guidelines, as well as 99% of cities in south Asia and 89% in east Asia. Since many cities, particularly in Africa, do not have up-to-date public air quality information, the actual number of cities exceeding PM2.5 thresholds is expected to be much higher, the report authors said.

(34)

The report is based on 2018 air quality data from public monitoring sources, such as government monitoring networks, supplemented with validated data from outdoor IQAir AirVisual monitors operated by private individuals and organisations.

India dominates the top of the list. The tech hub of Gurugram, a city just to the south-west of Delhi which was previously known as Gurgaon, and where international firms including Uber and TripAdvisor have headquarters, ranked the most polluted in the world with an average of more than 135 micrograms of PM2.5 per cubic metre (μg/m3) throughout the year. Delhi is ranked 11th.

Faisalabad in Pakistan is ranked third with 130 (μg/m3), with Lahore 10th. Dhaka in Bangladesh is ranked 17th. The only other country to feature in the top 30 is China, which appears five times, including Hotan in the western Xinjiang province (eighth) and the ancient Silk Road city of Kashgar (19th).

The highest-ranking capital cities are Delhi, Dhaka and Kabul in Afghanistan (52nd). The Bosnian capital, Sarajevo, is the most polluted European city with an annual average of 38.4 μg/m3. London is the 48th most polluted capital with 12.0 μg/m3 and Washington DC 56th with 9.2 μg/m3.

"Air pollution steals our livelihoods and our futures, but we can change that," said Yeb Saño, executive director of Greenpeace Southeast Asia. "We want this report to make people think about the air we breathe, because when we understand the impacts of air quality on our lives, we will act to protect what's most important."

The WHO estimates that 7 million people a year die prematurely from exposure to air pollution globally, with the World Bank calculating the cost to the world economy in lost labour as $225bn.

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At this critical time...

...we can't turn away from the climate crisis. For The Guardian, reporting on the environment is a priority. We give reporting on climate, nature and pollution the prominence it deserves, stories which often go unreported by others in the media. At this pivotal time for our species and our planet, we are determined to inform readers about threats, consequences and solutions based on scientific facts, not political prejudice or business interests. But we need your support to grow our coverage, to travel to the remote frontlines of change and to cover vital conferences that affect us all.

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35

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- South and Central Asia
- Greenpeace
- World Health Organization
- Bangladesh
- news

T.C.

Annexure A/6

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Delhi loses 80 lives to air pollution every day, says study

Outdoor air pollution is the fifth largest killer in India

(https://api.whatsapp.com/send?text=Delhi loses 80 lives to air pollution every day, says study https://www.downtoearth.org.in/news/delhi-loses-80-lives-to-air-pollution-every-day-says-study-50222)

NEXT NEWS ›

By Shirin Bithal (https://www.downtoearth.org.in/author/shirin-bithal-2403)
Last Updated: Monday 10 December 2018

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A new study has revealed that that air pollution in Delhi is responsible for approximately 10,000 to 30,000 annual deaths (http://www.indiaenvironmentportal.org.in/feature-article/addressing-global-mortality-ambient-pm25) in the city. This means the capital city loses 80 lives every day to pollution from PM2.5.

The study also mentions that the deaths are mostly from heart attacks and strokes, rather than from respiratory disorders. Leading researchers of the study include Joshua Apte from University of Texas, Julian Marshall from University of Minnesota, Michael Brauer from University of British Columbia and Dr Aaron Cohen from Health Effects Institute.

According to a report published in 1997 (https://www.downtoearth.org.in/content/death-air), the Delhi-based non-profit Centre for Science and Environment had said that "a stupendous 51,779 people are estimated to have died prematurely in 36 Indian cities due to air pollution in 1995". The same CSE study had also said that Delhi was losing 10,000 people to air pollution annually. This data, according to another media report, translated to one death per hour. The numbers released by the non-profit were then also reported in other media publications across the country with the headline—Air pollution in Delhi has claimed more victims than the terrorists' guns in India.

Now, with the recent study, it can be inferred that the number of people who died every hour in Delhi because of air pollution has

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increased by three times in nearly 20 years. The current study also emphasises that if no action is taken, these numbers could rise by 20 to 30 per cent.

Outdoor air pollution is the fifth largest killer in India. Till now, various studies have highlighted the issue. Global Burden of Disease study in 2013 had estimated approximately 627,000 premature deaths in India for 2010 due to PM 2.5 with ischemic heart diseases claiming more lives than respiratory diseases (http://www.cseindia.org/userfiles/global_burden_aaron.pdf). It also estimated that air pollution from PM2.5 in the world claims as many as 3.2 million deaths per annum. In 2014, the World Health Organization (WHO) had named Delhi as the most polluted city in the world, with 13 out of 20 most polluted cities in the world hailing from India. PM2.5 was again cited as the biggest source of air pollution in Delhi.

The recent study has mentioned that 45 per cent of Delhi's premature deaths could be controlled if the city took preventive measures to control its problem of air pollution and meet its national ambient air quality standards. The safe standard for PM2.5 in India is 40 microgram per cubic metre (annual average standard), four times higher than the World Health Organisation (WHO) guideline (10 microgram/cubic metre). If Delhi could meet the standard laid out by the WHO, then 85 per cent of premature deaths could be avoided. The study has also used a global model to estimate the number of deaths that can be avoided in future by controlling this air pollution. Across India, 400,000 premature deaths per year could be avoided if we managed to meet the WHO standards. Almost 1.4 million premature deaths from pollution could have been prevented in India and China alone if these countries had met the WHO standard for annual average.

According to Apte, one of the researchers of this study, the research did not explicitly consider Delhi. The estimates for Delhi are his own extrapolation from the pan-India study that was conducted and the inference for Delhi has been drawn considering the local conditions in the capital city. The probablity of uncertainity in the results for Delhi is therefore more than what could be expected in rest of the study, he says.

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Failed measures

In December 2014, CSE had classified the air in Delhi as "severely polluted" for over 65 per cent days. This would mean extreme health disorders for a healthy human being also. The release of national air quality index in India has not been very useful since the local air quality monitoring stations fail to generate data and there is little being done to monitor the situation. Due to insufficient air quality data, air quality index cannot be calculated in a number of cities for most of the days.

As per the Air Quality Index bulletin issued by the government, the air quality as of June 17, 2015 is "poor" in Delhi and Faridabad and "very poor" in Lucknow (http://cpcb.nic.in/AQI_Bulletin_16062015.pdf). However, there is no news or health advisory issued by the government on this. Moreover, in cities without an air quality index, there is even lesser awareness on the issue.

(This is an updated version of the story)

Study: Addressing global mortality from ambient PM2.5 (http://www.indiaenvironmentportal.org.in/feature-article/addressing-global-mortality-ambient-pm25)

CSE warns Delhi's air pollution and congestion crisis will worsen this decade if urgent action is not taken (http://www.indiaenvironmentportal.org.in/reports-documents/world-environment-day-cse-warns-delhi%E2%80%99s-air-pollution-and-congestion-crisis-will)

Concentrations of fine, ultrafine, and black carbon particles in auto-rickshaws in New Delhi, India (http://www.indiaenvironmentportal.org.in/feature-article/concentrations-fine-ultrafine-and-black-carbon-particles-auto-rickshaws-new-delhi)

Air Pollution (https://www.downtoearth.org.in/tag/air-pollution)

CSE (https://www.downtoearth.org.in/tag/cse)

India (https://www.downtoearth.org.in/tag/india)

T.U.

Annexure A/7

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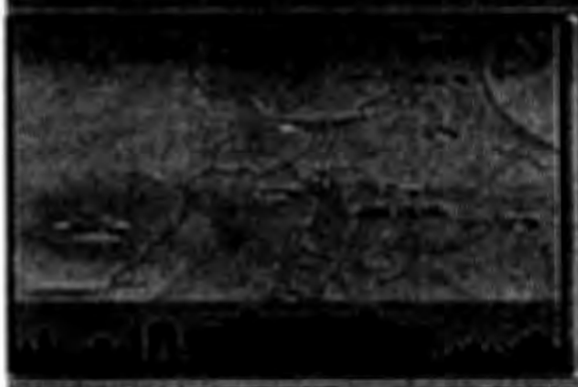
NOTICE INVITING APPLICATION

APPLICATION FORM FOR ADVANCE BOOKING OF PREMIU
BUILT-UP SPACE IN UPCOMING COMMERCIAL COMPLEX ABOV
UNDERGROUND BHIKAJI CAMA PLACE METRO STATION O
DMRC'S PHASE-III CORRIDOR



Location	Total Built Up Area	Lease Period	EMD
BHIKAJI CAMA PLACE METRO STATION OF DMRC'S PHASE-III CORRIDOR	13976 SQM In G+4 Floors	45 (Forty Five) years (From date of issue of Possession Letter)	Rs.5,00,000/- (Rs. Five Lakhs) per floor

- DMRC invites Application Form for allotment of premium commercial area and office floors above the footprints of Bhikaji Cama Place UG metro station.
- Cost of Application Form: Rs. 11800/-

- The Application Form can be purchased from t O/O CGM/Contracts, Fifth Floor, Metro Bhawa Fire Brigade Lane, Barakhamba Road, New Delh 110001
- Sale of Application Form: from 10.00 hrs. 10.06.2019 to 16.00 hrs. on 06.08.2019
- Conference of Prospective Applicants: 09.07.201 at 11.00 hrs. at 7th Floor Conference room, Met Bhawan, Fire Brigade Lane, Barakhamba Roa New Delhi-110001
- Date & Time of submission: 07.08.2019 till 17.3 hrs.

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CORRIGENDUM No. 1

Application Form For Advance Booking Of Premium Built-up Space In Upcoming Commercial Complex Above Underground Bhikaji Cama Place Metro Station Of DMRC's Phase-III Corridor.

DMRC invites Application for allotment of premium commercial area and office floors above footprints of Bhikaji Cama Place UG metro station from the following Organisations/ Agencies/ Companies:

Central Govt. / State Govt. / Central PSU / State PSU / PSU Banks / Insurance Companies / Tribunals / Quasi Judicial / Attached / Subordinate offices of GOI / Boards / Commissions / Pvt. Limited company / Registered Society / NGO / Other Organisation

Details of area(s) available for allotment are as below:

Area Details

Floor	Package	*Built-up Area	*Carpet Area (approx.)	Dedicated Parking		
				Basement	Open	Total
		(Sqm)	(Sqm)	Nos	Nos	Nos
Ground Floor	Food Court/ Restaurant/ Retail	2996	2460	21	16	37
First Floor	Office/ Retail	2840	2530	19	16	35
Second Floor	Office/ Retail	2852	2530	19	16	35
Third Floor	Office/ Retail	2852	2530	19	16	35
Fourth Floor	Office/ Retail	2436	2130	16	14	30

(1 sq.m. = 10.76 sq.ft.)

* Carpet areas exclude areas under services while built-up area includes it.

Tender Notice on DMRC Website in July 2019

T.C.

Annexure A/8

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Land taken over by DMRC for Underground Station at Netaji Nagar (Bhikaji Cama Place) – A Comparison

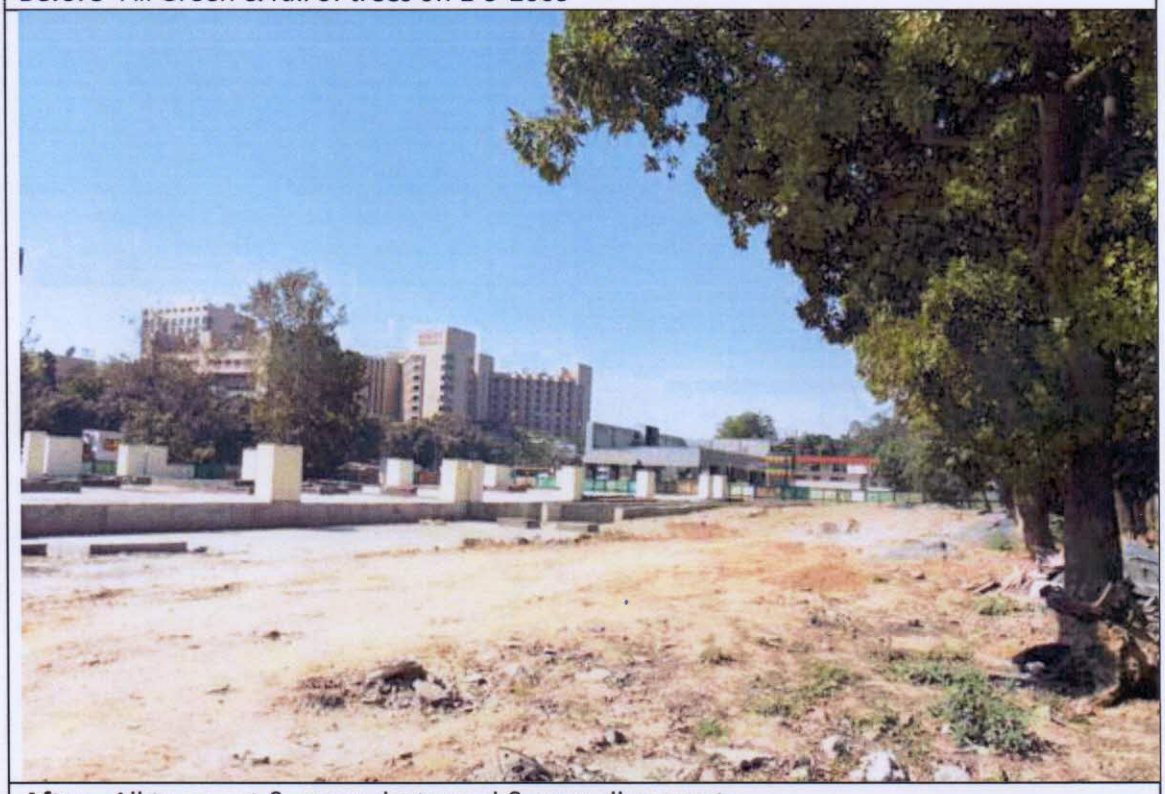
Before -All green status of Land on 1-5-2009

After -Concrete Jungle now after all trees cut & destroyed

43

73

Before -All Green & full of trees on 1-9-2009



After - All trees cut & green destroyed & now all concrete

(44)

RESOLUTION

It has been resolved in the meeting of us, the concerned citizens of Delhi, on 04.08.2019 that the issue of an encroachment in the District Park situated at Sudhir Tyagi Marg, Netaji Nagar, New Delhi & removal of trees shall be taken before the Hon'ble National Green Tribunal, New Delhi.

It has been further resolved that Mrs. Shoba Aggarwal be and is authorised to file petitions, applications, affidavit and vakalatnana etc on our behalf of the residents of Delhi whose names are mentioned with signature attached along with this resolution.

Signature attached

Shobha Aggarwal

(Name: Mrs. Shobha Aggarwal)

We, the Concerned Residents of Delhi

S. No.	Name & Address	Signature
	Shobha Aggarwal	Shobha Aggarwal
2	NAMRITA DIWAN D346 Defence Colony, N.D. 110024	Namrita Diwan
	Shobha Aggarwal	
	Sangeeta Rani A/639, Hauz Khas Village	Sangeeta

(49)

S. No.	Name & Address	Signature
	C.S. CHADHA D402, DEFENCE COLONY N.D.-24	
	Gurvinder Singh D-253 Defence Colony	
	SIMREN KOCHHAR C-438 Defence Colony.	Simren Kochhar
	Pushpa Prakash, M. Sarder, Uttam Nagar, New Delhi	
	Aarti R/O 157 Himayunpur, S.J. Enclave, New Delhi – 110029	Aarti
	Nitu Chawla R/o 2046, Kinari Bazar Chandni Chowk, Delhi-110006	
	Sarabjya [illegible] D-35/B-1 Dilshad Garden Delhi-95	Sarabjya
	Mani Ammal H. No. A-201, 2nd Floor, Apna Apartment, Kh. No. 534, Chand Road, Burari, Delhi-110084	Manikammal
	Rakha R/o H No-501 Gali No-23B, Narela N.D-40	Rakh
	Santosh Kathait B-36 Sagar Apartments 6 Tilak Marg New Delhi	
	ALOKE PODDAR M-99 Second Floor Greater Kailash I	
	Shakuntala Tiwari WB-11, TOP FLOOR, N. Delhi 110092	Shakuntala
	PRATAP SINGH BISHT 160 ICIDWAI NAGAR N'D	PSBisht
	Poonam [illegible] R/o F-130 IIIrd Floor Lado Sarai	Poonam
	Neeta Kanwar R/o 36/7, IInd Floor west Patel Nagar N.D. 08	Neeta

(96)

S. No.	Name & Address	Signature
	Seema Khanna R/o F 5/10 A Ground Floor Model Town III Delhi-009	Seema
	Roshni Chawla R/o 5053/4, Kucha Khan Chand Nai Sarak Delhi	Roshni
	Priyanka Verma C-536 Vikash Puri Delhi.	
	Beena Singh R/o G-99 Qutab Vihar Phase I Gala dairy Nasirpur-110071	
	Manpreet Singh, D-253 Defence Colony, New Delhi 110024	Manpreet Singh
	SARASWATI RAO C-2311 MADANGIR. N.D-110062	Saraswati Rao
	Ajit Kaur C-8, Nizamuddin East, N.Delhi-13	Ajit Kaur
	MANPREET CHADHA D-402, DEFENCE COLONY, G.F. NEW DELHI 110024	
	MEENAKSHI VERMA B-8/1010, Baba Colony, Burari, Delhi-84	Meenakshi
	Sonia Kaushal R/o D-11/1 Street No-1 Harijan Vihar near Park Colony Delhi-110093	Sonia Kaushal
	Idrishan Sain R/o. 39, Hauz Idhees Village N.D.-110016	
	Moti Ram Durgesh O-35/B-1 Dilshad Garden Delhi-95	
	Bijender Kuma Hous no 501 Gali no 23-B Swatantra Nagar Narela Delhi-110040	Bijender
	Shankar Rao C-2 311 MADANI GIR N.D-110062	Shankar Rao
	Venu Gopalan P.P. H.No. A-201, 2nd Floor, Ch. Abbey Burari Village, Chuk Road, Bur	
	Rajiv Kumar Dargeeha Hauz Idhees New Delhi	Rajiv Kumar

(47)

S. No.	Name & Address	Signature
	B. B. Mukhra. F-130 Lado Sarai N.D-110030	
	Rajat Dham F-156, Street No-5, Pandev Nagar Delhi	
	SHEENA SINGH D-253 DEFENCE COLONY	
	NISHA KAKUMANU NEW DELHI D-402 DEFENCE COLONY 110024	
	Manoj Kumar Deerya Kalha. Hauz Khas N.D	
	Anup Sing. F-320 Lado Sarai N.D.	
	Pardeep. Singh. F-321 Lado Sarai N.D.	
	Dinesh Sharma SIC 39 US Flour Sikahora Kalan Near Ashadvihar Delhi-52	
	RAMLESH PATIAL R/o - H.No - 828, Sector-8 R.K.Puram N.D - 22	
	Ritu Sharma R/o - H.No -828, Sector-8 R.K.Puram N.D - 22	
	Shivangi Mankotia R/o - D-84 Dinapark Sect-7	

IN THE NATIONAL GREEN TRIBUNAL

(48)

PRINCIPAL BENCH, NEW DELHI

ADVOCATES WELFARE FUND DELHI RS.10 TEN RUPEES 002188

O.A. No. ..... OF 2019

IN THE MATTER OF:

Residents of Delhi Through Shobha Aggarwal — Petitioner (s) / Appellant (s)

-VERSUS-

DMRC & Ors. — Respondent (s) / Defendant (s)

VAKALATNAMA

I ...Shobha Aggarwal..... DEFENDANT / RESPONDENT/ PETITIONER / OPPOSITE PARTY, in the above application/ suit/appeal/petition/ reference do hereby appoint and return **Salik Shafique**, Advocate of the National Green Tribunal, to act and appear for me/us in the above application/ suit/petition/appeal reference and on my/our behalf to conduct and prosecute or defend or with draw the same and all proceedings that may be taken in respect of any application connected with the same or any decree or order passed therein, including proceedings in taxation and application for Review to file and obtain return of documents and to deposit and receive money on my / our behalf in the Application/Suit/Petition/Appeal reference and application for Review, and to represent me/us and to take all necessary steps on my/our behalf in the above matter. I/We agree to ratify all act done by the aforesaid advocate, in pursuance of this authority.

Dated this the ...01st..... day of August, 2019

Accepted Identified By

Shobha Aggarwal

(Petitioner (s) / Appellant (s)
Respondent (s) / Defendant(s) / Opposite Party

Advocate,

MEMO OF APPEARANCE

To,

The Registrar,
National Green Tribunal
New Delhi – 110 001.

₹2 NCT OF DELHI COURT FEE DLCT1948380G1919K 18-JUL-2019

₹2 NCTOF DELHI COURT FEE DLCT1948377G1919K 19-JUL-2019

Sir,

Kindly enter my appearance in the above matter on behalf of the Petitioner / Appellant / Respondent.

Dated 01/08/19 2019

Salik Shafique

Advocate for the
Petitioner(s)/Appellant(s)/Respondent(s)

29, Nizamuddin East, Presidential Estate, (Lower Ground Floor), New Delhi–110 013
Tel.: +91-8527929297 E-mail: legal.salik@outlook.com

दिल्ली मेट्रो रेल कॉर्पोरेशन लिमिटेड
DELHI METRO RAIL CORPORATION LTD
(भारत सरकार एवं दिल्ली सरकार का एक संयुक्त उपक्रम(
(A JOINT VENTURE OF GOVERNMENT OF INDIA AND GOVT. OF DELHI)

DMRC/PD/Phase-III/BCP/Vol-05/2019-20 **01.10.2020**

Shri. N. K. Gupta
Additional Director & Head – UPC-I Division
Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi – 110032

Dear Sir,

Sub: **Official Documents in the matter of Hon'ble NGT OA No. 651/2019 titled as Residents of Delhi through Shobha Agarwal Vs. Delhi Metro Rail Corporation & Others.**
Ref: **CPCB letter No. B-31013/30/2020/UPC-I dated 30.09.2020**

As desired vide your above letter, following official documents are enclosed:

i. Land and Development Office (L&DO), MoHUA Letter no. L-II-A-1(1863)Bhikaji/2018-PC/169 dated 16.04.2019 for allotment of land measuring 13332 sqm to DMRC on permanent basis for construction of metro station and Property Development is enclosed at Annexure-I. The site falls in Zone-D of MPD-2021 and designated land use of the area is 'Recreational (District Park)'.

ii. Correspondence pertaining to land use etc is enclosed as below:

1. L&DO (MoHUA) NOC dated 13.12.2019 for the Change of Land use of the area from 'Recreational (District Park)' to 'Transportation' is enclosed at Annexure-II(1).

2. MoUD order dated 30.03.2009 permitting DMRC to undertake Property Development as a part of DMRC Project is enclosed at Annexure-II(2).

3. MoUD letter dated 27.09.2007 granting exemption to DMRC from obtaining prior building approval for structures above platform and over footprint of metro stations is enclosed at Annexure-II(3).

iii. Architectural DBR of the proposed structure including conceptual plans and elevations and landscaping plans are enclosed at Annexure-III.

iv. Traffic Impact Assessment study undertaken for the proposed development is enclosed at Annexure-IV.

v. Reply submitted by DMRC in the subject case before the Hon'ble NGT is enclosed at Annexure-V.

It is further submitted that DMRC vide letter dated 14.08.2020 had requested DDA for the change of land use of the subject area from 'Recreational (District Park)' to 'Transportation' and the same is under consideration of DDA. Copies of correspondence held between DMRC and DDA for the same are enclosed at Annexure-VI.

Hope the above meets the requirements, kindly inform if any further information or documents are required.

Thanking you,

Yours faithfully,

01.10.2020

(Anirudh Jain)
Advisor/PD

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RECEIVED
Office of PM-3A
Delhi Metro Rail Corporation Ltd.
Diary No. 1943
Date 24-4-19
Time 11:15 am

464
23/4/19

4628
18/4

No. L-II-A-1(1836)Bhikaji/2018-PC/164
Government of India
Ministry of Housing & Urban Affairs (MoHUA)
Land & Development Office (L&DO)

Allotment Letter

Nirman Bhawan, New Delhi-110011
Dated: 16th April, 2019

To

The Chief Engineer (General),
Delhi Metro Rail Corporation Ltd.,
Metro Bhawan, Fire Brigade Lane,
Barakhamba Road,
New Delhi-110 001.

Subject: Allotment of land measuring 13,332 Sqm. to the Delhi Metro Rail Corporation Ltd. on permanent basis (4816 Sqm. for Ancillary building and water boosting station, and Vent Shaft, 6109 Sqm. for Vent Shaft and proposed Property Development, and 2407 Sqm. for Entry and Vent Shaft and lift) at Bhikaji Cama Place, New Delhi

Sir,

KEN/BKCP
24/04/19

I am directed to convey the sanction of the President of India for allotment of land measuring **13,332 Sqm. (4816 Sqm.** at NDMC Park for Ancillary building and water boosting station and Vent Shaft, **6109 Sqm.** at NDMC Park for Vent Shaft and proposed Property Development, and **2407 Sqm.** at Petrol Pump for Entry and Vent Shaft and lift) to the Delhi Metro Rail Corporation Ltd. (DMRC), as per L.D.O Plan No.4202, on permanent basis at Bhikaji Cama Place, New Delhi, subject to the change of land use by the allottee itself.

2. The allotment will be subject to the usual terms and conditions to be given in the Memorandum of Agreement and Lease Deed which shall inter-alia also include the following:-

i. The allottee will pay the land cost @ Rs.475.32 lakh per acre and Re.1/- per annum as ground rent. This rate was valid upto 31.03.2016. The land rates are under revision and the DMRC shall also be required to pay the difference of premium in case the same are revised upward, with retrospective effect.

ii. The date of allotment will be the date of issue of this letter.

forwarded to CPM-3 for information & necessary action and information please.
18/11/19
CPM-3
22/4/19

Scanned by CamScanner

iii. The allottee will use the land for the purpose for which it has been allotted and is also authorized to lease/sub-lease/license/concession the land for raising revenue from the property development.

iv The allottee shall ensure that property development is undertaken only on lease/sub-lease/license/on concession basis and not on freehold basis. While undertaking property development, the allottee shall ensure that only those property development which will fetch maximum revenue on a sustainable basis is undertaken. Land may normally not be leased/sub-leased/licensed/given on concession basis for residential development. The allottee will also put in place an efficient lease management mechanism to regulate such lease/sub-lease/license/concession.

v. While undertaking property development by the allottee, the terms and conditions of lease/sub-lease/license/concession shall be suitably drafted by the allottee with the consultation of L&DO to ensure that the land with assets pertaining thereto shall revert to Government/allottee after the expiry of the term or period thereof.

vi. The allottee will have no power of sale/transfer/mortgage/alienation in any manner to third party.

vi. Environmental clearances, where required, shall be obtained by the allottee or by the developers with whom the allottee enters into lease/sub-lease/license/concession agreement for property development.

vii. While developing properties at or adjacent to Metro Rail Stations, due attention shall be given to security related aspect and building the necessary design features in the project in consultation with police and security agencies in a time bound manner.

viii. The allottee while undertaking property development shall comply with the provisions contained in the Order No. K-14011/8/2000-MRTS dated 30.03.2009 (MRTS Cell), Ministry of Urban Development, Government of India.

ix. The removal of the structures/encroachments, if any, on the allotted land will be the responsibility of the allottee.

x. The trees, if any, standing on the plot shall remain as Government property and shall not be removed or otherwise disposed of without obtaining the prior permission of this Office and the amount so realized by disposing the trees shall be remitted to this office. The tree cutting shall be subject to all required statutory clearances and compensatory forestation, etc.

Scanned by CamScanner

xi. The allottee will ensure that services lying under the requested land and nearly/close proximity should not be affected.

xiv. The allottee shall execute the Memorandum of Agreement and Lease Deed at their own cost.

xv. The allottee shall deposit Ground Rent on yearly basis in advance, whether it is demanded or not.

xvi. In event of dissolution of the DMRC, the land allotted and the assets created thereon will be transferred to an institution having similar aims and objectives with prior approval of the Government on payment of such compensation that may be determined by the Lessor in its absolute discretion.

xvii. The allottee shall be required to construct the said building in conforming with the architectural surroundings of the area.

xviii. The President of India or his nominee may at any time inspect the site on cause to be inspected the site and the premises thereon with or without any prior notice to allottee. Refusal to allow inspection of the premises shall amount to violation of terms calling for suitable action including re-entry of the property.

xix. Non-fulfillment, non-compliance and violation of any of the aforesaid terms and conditions and also the terms and conditions to be given in the Memorandum of Agreement and Lease Deed will amount to cancellation of the allotment of land.

xx. The attention of Delhi Metro Rail Corporation Ltd. (DMRC) is invited to the various directives under Swach Bharat Mission and to adhere to the same strictly. They are required to ensure through their agencies to keep the construction material properly sanitation/ hygiene arrangements for labourers residing/working at site ensuring that no open defecation is observed.

xxi. The land will be initially given on license basis by signing a Memorandum of Agreement (MoA) and the money deposited at the rate mentioned at 2(i) above, will be treated as security for due performance of the agreement and when the terms of Memorandum of Agreement are successfully completed within the stipulated times, the land will be given on lease and the security will become the premium and the license fee shall become the ground rent.

xxii. The allottee is required to pay the following amount on account of License Fee and Premium :-

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HANDING / TAKING OVER PROCEEDINGS

REF :- L&DO letter no. L-II-A-1(1836)/BHIKAJI/2018-PC/169 dt:-16.04-20

Handed / Taken over possession of land measuring 13332 sqmtr ~~is~~ (including part area of I.O.C.L Global Petrol Pump) is handed over ~~on~~ ~~basis~~ at Bhikaji Cama Place (Pocket measuring 4816 sqm (B1) + B2 (6109 sqm) + 2407 sqm (A)) for construction of Bhikaji Cama Place station in connection with Mukundpur-Yamuna Vihar corridor of Delhi MRTS Project, Phase-III. with reference L&DO letter No. L-II-A-1(1836)/BHIKAJI/2018-PC/169 dt: 16.04.2019. The site is Handed / Taken over as per enclosed plan, shown in drawing as and where basis.

HANDED OVER

JB Bhagwan
23/7/2019

JAI BHAGWAN

OVERSEAR / L&DO

TAKEN OVER

M.K. Srivastava
M.K. SRIVASTAVA
23.7.19

AEN / LAND / DMRC

FURTHER

HANDED OVER

M.K. Srivastava
M.K. SRIVASTAVA
23.7.19

AEN / LAND / DMRC

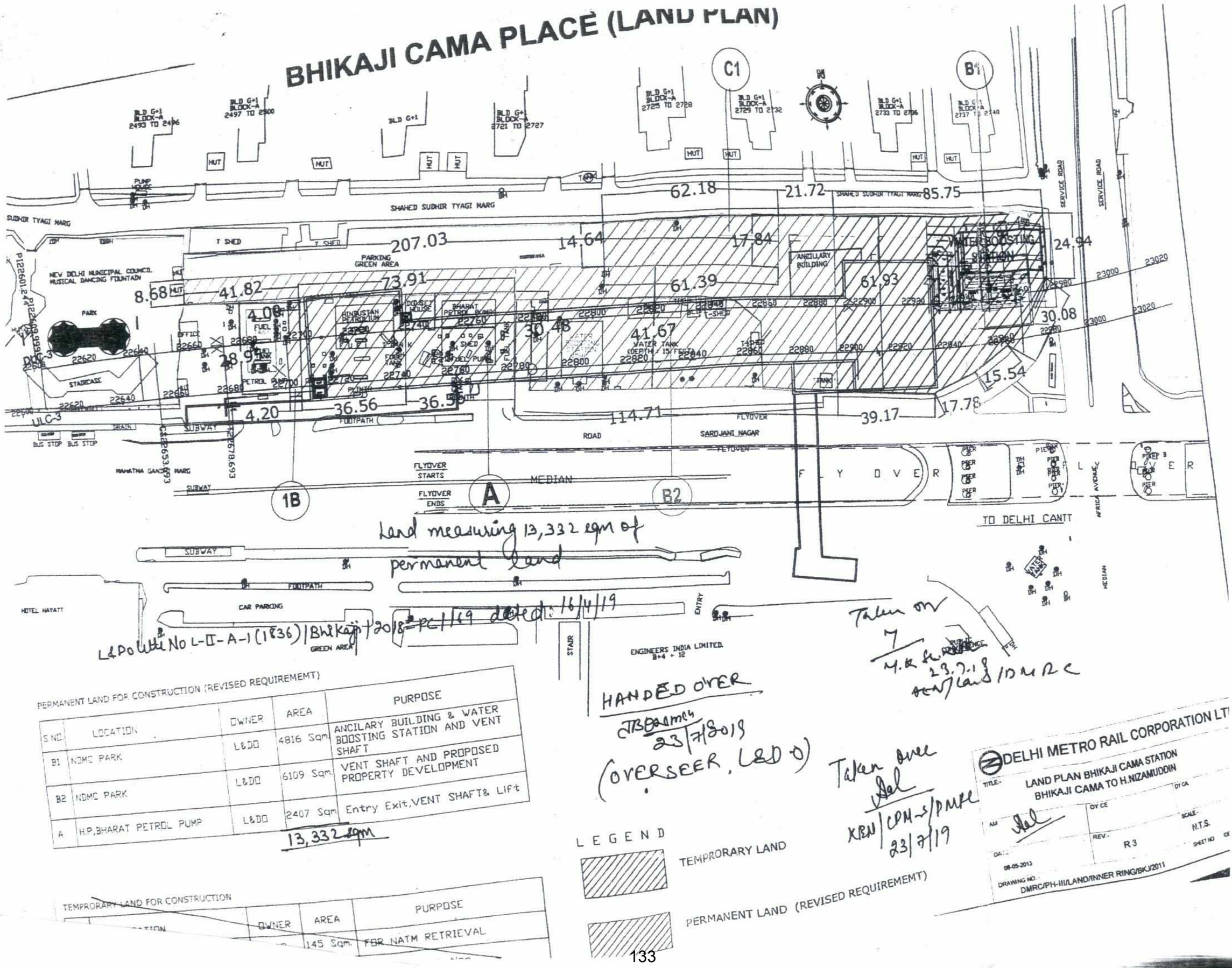
TAKEN OVER

23/7/19

AVINASH SAHU

XEN / CPM3 / DMRC

BHIKAJI CAMA PLACE (LAND PLAN)



Land measuring 13,332 sqm of permanent land

L&DO vide No L-II-A-1(1836)/Bhikaji/2018-PC/169 dated: 16/4/19

PERMANENT LAND FOR CONSTRUCTION (REVISED REQUIREMEMT)

S.NO.	LOCATION	OWNER	AREA	PURPOSE
B1	NDMC PARK	L&DO	4816 Sqm.	ANCILARY BUILDING & WATER BOOSTING STATION AND VENT SHAFT
B2	NDMC PARK	L&DO	6109 Sqm.	VENT SHAFT AND PROPOSED PROPERTY DEVELOPMENT
A	H.P,BHARAT PETROL PUMP	L&DO	2407 Sqm	Entry Exit,VENT SHAFT& Lift

13,332 sqm

TEMPRORARY LAND FOR CONSTRUCTION

	OWNER	AREA	PURPOSE
		145 Sqm.	FOR NATM RETRIEVAL

HANDED OVER
23/7/2019
(OVERSEER, L&DO)

Taken over
7
M.K.Sh. 23.7.19
AEN/Land/DMRC

Taken over
Sd
XEN/CPM-3/DMRC
23/7/19

LEGEND

TEMPRORARY LAND

PERMANENT LAND (REVISED REQUIREMEMT)

DELHI METRO RAIL CORPORATION LTD

TITLE:- LAND PLAN BHIKAJI CAMA STATION
BHIKAJI CAMA TO H.NIZAMUDDIN

DY CE | DY CA | AM Sd | SCALE:- N.T.S. | REV:- R3 | SHEET NO | DATE:- 08-05-2013

DRAWING NO. DMRC/PH-III/LAND/INNER RING/BKJ/2011

24207/GM(Land)
16/12

Government of India
Ministry of Housing and Urban Affairs
Land & Development Office
Nirman Bhawan, New Delhi

No.L&DO/ L-IIA/1(1836)/Bhikaji/2018-PC/584 Dated : 13/12/2019

To,

The Chief Engineer (General)
DMRC, Metro Bhawan,
Fire Brigade Lane,
Barakhamba Road,
New Delhi- 110001.

Sub: Change of land use for land measuring 13,332 Sqm. allotted for Bhikaji Cama Place Metro Station

Sir,

I am directed to refer to your letter dated 27-8-2019 on the above mentioned subject and to say that this office has no objection if the land use of the land measuring 13,332 Sqm. allotted to DMRC for Bhikaji Cama Place Metro Station is changed from "District Park" to "Transportation purpose".

Yours faithfully,

(Satish Kumar Singh)
Dy. Land and Developemnt-IV
Tel No. 011 - 23061296

Forwarded for further necessary action please.

Addl. Director (PD) 18.12.19 13/12/19.

Mgr/PD-III

(16)

No.K-14011/8/2000-MRTS
Government of India
Ministry of Urban Development
(M.R.T.S. Cell)

Nirman Bhawan, New Delhi.
Dated, the 30th March, 2009.

ORDER

Sanction of the President was earlier accorded for investment approval in Delhi Mass Rapid Transit System (MRTS) Phase I and subsequently in Delhi MRTS Phase II vide orders dated 12.11.1996 and 30.3.1996 respectively, which inter-alia provided for property development by Delhi Metro Rail Corporation (DMRC) Ltd. as one of the accepted modes of resource mobilization towards capital cost as well as sustainable operations.

2. Property Development by Metro projects is in line with the global examples as Metros are highly capital intensive projects and the only way they can remain financially healthy, without Government subsidies, is to increase the non-operational revenues i.e. revenues from advertisements, retailing, real estate at Metro stations and outside and parking lot revenues to the extent of 40-50% of the total revenues as in the case of Hong Kong Metro. These commercial activities apart from enhancing the appearance and ambience of the stations, attract more commuters to the metro system, improving ridership and assisting in traffic integration. However, because of restrictive conditions in the allotment letter, DMRC has not been able to pursue its property development initiatives at the required pace.

3. In order to facilitate the property development proposals of DMRC and to undertake certain safeguards to ensure that while maximising revenue generation, the land/property also reverts to Government/DMRC after a specified period, sanction of the President is hereby accorded for implementation of the following guidelines with immediate effect :-

i) Property development shall be undertaken only on lease/sub-lease/licence/concession basis and not on freehold basis.

ii) While notifying land acquisition, the aspect of property development would also be suitably taken care of;

Contd.....2/-

iii) The restrictive conditions of land allotment viz. the allottee will use the land only for the purpose for which it has been allotted and not for any other purpose shall be amended/modified to the effect that "DMRC is also authorized to lease/sub-lease/licence/concession the land for raising revenue from property development".

iv) Raising resources through property development is one of the ways of mobilizing resources for the project. Therefore, the word "project" would also include "property development".

v) Property development on acquired land shall also be considered as part of the "project".

vi) As such the land being utilized/proposed to be utilized for property development/allotted for property development will also be allotted at inter-departmental rate. In respect of rates for Railway Land, the earlier decision of Empowered Group of Ministers, in its meeting held on 18.1.2008, will hold good.

vii) Trees on the allotted land will be felled only with the approval of the competent authority and the amount so realized by disposing the trees shall be remitted to the land owning agency. The tree cutting shall be subject to all required statutory clearances and compensatory afforestation, etc.

viii) Environmental clearances, where required, shall be obtained by the DMRC/private builders/developers.

ix) Land may normally not be leased out for residential development.

x) Other requirements like change in land use, adherence to Master Plan, approval of the local bodies, etc. will continue to be applicable as per the provisions of existing laws.

xi) The terms and conditions of the lease will be suitably drafted to prevent loopholes and to ensure reversion of land to Government/DMRC after the lease/sub-lease/licence/concession period.

xii) DMRC will also ensure that an efficient lease management mechanism is put in place.

Contd.....3/-

xiii) While undertaking property development, DMRC shall ensure that only those property development which will fetch maximum revenue on a sustainable basis is undertaken.

xiv) NOC for property development shall be issued to DMRC and DMRC in turn will issue NOC to developers appointed by them. This NOC should be honoured by concerned agencies for e.g. : MCD, DDA, etc. while sanctioning building plans submitted by the developers.

xv) All allotment letters issued in the past by various agencies shall be modified to include provisions to enable property development by incorporating the above mentioned clauses suitably. All future allotment letters shall also include similar provisions. The format for amendment/modifications in the land allotment/transfer letters would be got legally vetted by Land and Development Officer (L&DO) from Ministry of Law and Justice and followed uniformly by land allotting agencies like L&DO and DDA.

xvi) Property development proposals should be deliberated in the Board of Directors of DMRC.

xvii) The payment of property tax would be governed by the extant laws.

xviii) While developing properties at or adjacent to Metro Rail Stations, due attention shall be given to security related aspect and building the necessary design features in the project in consultation with police and security agencies in a time-bound manner.

4. This issues after consultation with Internal Finance Division vide their Dy. No.243/D-2/FD/09 dated 20.3.2009.

(S.K. Lohia) 30/3/09
Officer on Special Duty (MRTS)

Copy forwarded to :-

i) Cabinet Secretariat, Rashtrapati Bhawan, New Delhi.
ii) Chairman, Railway Board, Ministry of Railways, Rail Bhawan, New Delhi.
iii) Secretary, Planning Commission, Yojana Bhawan, New Delhi.
iv) Secretary, Ministry of Finance, Deptt. of Economic Affairs, North Block, New Delhi

Contd.....4/-

v) Secretary, Ministry of Finance, Deptt. of Expenditure North Block, New Delhi.
vi) Secretary, Ministry of Finance, Deptt. of Revenue, North Block, New Delhi.
vii) Secretary, Ministry of Home Affairs, North Block, New Delhi.
viii) Secretary, M/o Road Transport & Highways, Parivahan Bhawan, New Delhi.
ix) Secretary, M/o Environment & Forests, Pariyavaran Bhawan, CGO Complex, New Delhi.
x) Secretary, Deptt. of Programme Implementation, Sardar Patel Bhawan, Sansad Marg, New Delhi.
xi) Chief Secretary, GNCTD, Delhi Sachivalaya, I.P. Estates, New Delhi.
xii) Managing Director, Delhi Metro Rail Corporation Ltd., Delhi Metro Rail Corporation Ltd., Metro Bhawan, 13, Fire Brigade Lane, Barakhamba Road, New Delhi.

Copy to :-

1. PS to UDM/PS to MoS(UD).
2. Secretary (UD), MoUD, Nirman Bhawan, New Delhi.
3. Joint Secretary (D&L), MoUD, Nirman Bhawan, New Delhi.
4. Joint Secretary &FA, MoUD, Nirman Bhawan, New Delhi.
5. Chief Controller of Accounts, MoUD, Nirman Bhawan, New Delhi.
6. Pay & Accounts Officer (Sectt), MoUD, Nirman Bhawan, New Delhi.
7. L&DO, MoUD, Nirman Bhawan, New Delhi.
8. Vice Chairman, Delhi Development Authority, Vikas Sadan, INA, New Delhi.
9. Commissioner, Municipal Corporation of Delhi, Town Hall, Delhi.
10. Guard file of Delhi MRTS Project.

(S.K. Lohia) 29/3/10
Officer on Special Duty (MRTS)

1. Rithala – 1.5
2. [illegible] – 1.5
3. Inderlok – 1.5
4. Sector 21, Dwarka → 1.5

No.K-20013/16/2004-DDIB
Government of India
Ministry of Urban Development
(Delhi Division)

Nirman Bhawan, New Delhi.
Dated : 27th September, 2007.

To

The Chief Secretary,
Govt. of National Capital Territory of Delhi,
Delhi Sachivalya,
New Delhi.

The Commissioner,
Municipal Corporation of Delhi,
Town Hall,
Delhi.

The Vice-Chairman,
Delhi Development Authority,
Vikas Sadan, INA,
New Delhi

The Chairman,
New Delhi Municipal Council,
Palika Kendra
New Delhi.

Sub : Exemption from granting prior building approval for Operational Construction of the Central Govt. agencies - Clarification regarding inclusion of structure above the platform and over footprint of the Metro Station to be treated as part of the Metro Station building.

Sir,

Kindly refer to this Ministry's letter of even number dated 27th September, 2006 on the subject of granting exemption of operational structures from the requirement of obtaining prior building plan approval from the State/Local Bodies. In this connection, it is stated that the issue of whether the structure above the platform over the footprint of the Metro Station is to be treated as an integral part of the Metro Station building and thus,

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be exempted from obtaining sanction of building plans by the Local Bodies was under consideration of this Ministry. The issue has since been examined in consultation with the MRTS Division of this Ministry and it has been decided with the approval of Competent Authority that construction of structure above the platform over the footprint of the Metro Station is an integral part of the Metro Station building, and is, therefore, to be treated as part of the operational structure of the Metro Station.

2. It may be reiterated that Metro Stations have already been included in the list of operational structures as per relevant provisions of the Master Plan for Delhi 2021.

Yours faithfully,

Encls : As stated above.

(P.K. Santra)
Under Secretary to the Govt. of India

Copy for information and necessary action to :

1. The Managing Director, Delhi Metro Rail Corporation, NBCC Place, Bhishma Pitamah Marg, Pragati Vihar, New Delhi - 110003.
2. Director (UT), MoUD, New Delhi.

(P.K. Santra)
Under Secretary to the Govt. of India

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PROPOSED PROPERTY DEVELOPMENT ABOVE
U/G STATION at

BHIKAJI CAMA PLACE,
NEW DELHI.

दिल्ली मेट्रो रेल कॉरपोरेशन लिमिटेड
Delhi Metro Rail Corporation Limited

DESIGN BASIS REPORT

R8-26-04-2017-ARCHITECTURAL

ARCHITECTURAL

DDC & ARCHITECTS

VISHWANNATH ASSOCIATES

ARCHITECTS, ENGINEERS & INTERIOR DESIGNERS

#31, 2nd Cross, 8th Main,Off Palace Road, Vasanthnagar, Bangalore - 560 052.INDIA

PH: 080-2228 4277 / 2228 0475

Sr.No.	Date	Revision No.	Revision Subject
01	03-06-15	R0	FIRST SUBMISSION
02	14-08-15	R1	Revised As Per DMRC Comments
03	31-08-15	R2	Revised As Per DMRC Comments
04	29-09-15	R3	Revised As Per DMRC Comments
05	30-10-15	R4	Revised As Per DMRC Comments
06	25-11-15	R5	Revised As Per DMRC Comments
07	04-03-16	R6	Pre Final Submission
08	17-02-17	R7	Final Submission by VA to DMRC
09	23-03-17		Approved By DMRC
10	26-04-17	R8	Signed Final Submission

Revision No.	Date		
R8	26-04-17	Written By	Signature
		Achyut Joshi	
		Checked By	
		Vithal P.Balakundi	
		Validated By	
		V.Vishwanath	

CERTIFICATION

We, M/s Vishwannath Associates, hereby certify that this has been checked and approved in accordance with DDC's approved Quality Assurance Plan.

DDC's Project Principal
V.Vishwanath

Signature

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1. INTRODUCTION:

Delhi Metro Rail Corporation (DMRC), a joint venture of the Government of India (GOI) and the Government of the National Capital Territory of Delhi (GNCTD) implementing the Delhi Metro Rail Projects, has been mandated by Ministry of Urban Development (MoUD) to undertake value capture from property development initiatives for sustainable revenue generation for the DMRC vide its Policy Circular No K-14011/8/2000-MRTS (Pt.) date: 30.3.2009.

In the third phase of Delhi Metro's construction, the DMRC is in the process of building another 140 kilometres of Metro lines which will weave a web of Metro corridors along the city's Ring Road besides connecting with many other localities.

The current office building "**The BCP Project**", is located on the Line-7 (Mukundpur to Yamuna Vihar corridor of Phase-III) of Delhi Metro Project on Bhikaji Cama Place underground Station on Ring road, opposite to Bhikaji Cama Place District Centre, near New Moti Bagh.

2. SITE STUDY:

2.1 EXISTING SITE FEATURES:

The site is located at the junction of two important Master Plan Roads, Mahatma Gandhi Marg also known as Inner ring road and Africa Avenue, the life lines of Delhi Transportation network. To the south of the site on opposite side of ring road is IEL building in the District Centre of Bhikaji Cama Place and Hayat Regency a prominent 5 star hotel of Delhi. Sarojini Nagar Commercial Market is located in the vicinity.

2.2 ORIENTATION:

The proposed building is oriented in EAST-WEST AXIS, below which underground metro station Bhikaji Cama Place is constructed, which is an ideal condition for natural light to be harvested as the building is naturally facing north & south direction. The orientation helps us in achieving green ratings for the building.

Cardinal Direction	Context
North	Netaji Nagar Residential
South	Bhikaji Cama Place District Centre
East	Currently Green space beyond Africa Avenue
West	Existing Petrol Pump

From above image it can be clearly inferred that BCP Project site is located at a very prominent location in the heart of Delhi, with connectivity to the Airport and other Central Business Districts. The environment is very dynamic where prominent buildings include Somdutt Chambers, Ansal Chambers, and Mahindra towers in near vicinity and surrounded by prominent residential area like Chanakyapuri Embassy area, GPRA New Moti Bagh, Netaji Nagar, RK Puram and markets like Sarojini Nagar, RK Puram, Social infrastructures like Safdurjung hospitals and Hyatt Regency.

DMRC is proposing to develop a Modern office building on this site with restaurant in ground floor & office space in next four floors above and have appointed Vishwannath Associates (VA) as architects to complete the design of the building in harmony with the context of the site.

2.3 VEGETATION:

The site has minimal vegetation as it is excavated for underground station construction work. Architects VA /DDC is retaining existing trees wherever possible.

2.4 ACCESS TO SITE:

The access to site is through Ring Road, Africa Avenue and internal road on the north side. The station below is also accessed from opposite side of ring road through two underground pedestrian passages on east and

west corners of the site leaving only the middle portion of the site unrestricted for property development which is on the station box.

2.5 CONTOUR /TERRAIN:

The site is almost flat with no major terrain.

3. DESIGN BRIEF:

An opportunity to Design the Property Development over the Under Ground Metro Station at Bhikaji Cama Place is both exciting and challenging.

1. **It is *Exciting,*** as we are creating a **landmark for the Metro** in the vicinity of the busy BCP with important landmarks surrounding the place.

2. **It is *challenging***, as the work of the U/G is progressing quickly and our Designs in terms of Architectural, structural and MEP have to merge and have to be built in conjunction with the construction of the U/G Metro Station.

3. As **DDC / Architects / Designers** our first job was to understand the traffic movement around the proposed Metro Station and PD (Property Development). We have four roads abutting our site which is a great advantage for the movement of the inbound and outbound vehicles from our proposed building.

4. We have looked at changing the entry and exit points to the basement parking. It has been made to the Northern side as against the Southern side facing the flyover.

5. The Design has been incorporated with inputs from UTTIPEC drawings. UTTIPEC proposal was taken into consideration and suitably modified to sync with the site. This may need co-ordination with UTTIPEC.

6. The PD from the Ground and above has been designed for 113.75 m x 23.5 m as given by DMRC, while for the parking we have taken Basement over the concourse to achieve the required car parking norms for PD. Stack Parking is considered in the Basement. Metro Passengers to use parking proposed by UTTIPEC.

7. As mentioned in our Preliminary report, the plot area sums up to 13,112 Sq.m and hence FAR of one gives us a total Built-up area of 13,112 Sq.m excluding the Basement area of 3,292 Sq.m Area statement of CA (Chief Architect) of DMRC is enclosed as Annexure-01.

8. We have achieved an **additional 804 Sq. m** for DMRC as against the RFP for a total Built-up area of 12,308 Sq.m

9. To accommodate 13,112 Sq.m of the Built-up space in the given space of 113.75 m x 23.5 m, we require Ground + 4 Storey structure. This was discussed with structure team of DMRC and contractor Pratibha Construction (Meeting Dated : 18th June 2015) ,and did not permit basement +G+6 building ,however they were quite comfortable with Basement+G+4 building which was conveyed mail dated: 24th June 2015 .(Enclosed as Annexure-02)

10. As per meeting on 5th, 6th & 7th August 2015 with DMRC Team & Architects Vishwannath Associates Team, DMRC decided to have only one office space on either side of the central service core for all upper floors except the ground floor. The ground floor will have a Retail Space on one side of the central service core and a Restaurant space on the other side.

11. We have finalised the design without disturbing the existing columns.

12. The Architecture and the Design is contemporary in nature which reflects the identity of the 21st century as against the buildings surrounding the BCP.

13. As the saying goes, every age has a charm of its own. Our building will retain the charm of the present century and decade for generations to come.

14. The building will be proposed with Solar PV panels over the building and external parking space which will auger well with the principals of Green building as envisaged by Delhi Metro.

15. Maximisation of Green Building concepts will be achieved and the same has been implemented in our Design.

4. CODES & BYE-LAWS:

- National Building Code (NBC)
- Delhi Building Bye-laws (DBBL) and Master Plan of Delhi 2021. (MPD 2021)
- UTTIPEC Guidelines -- **UNIFIED TRAFFIC AND TRANSPORTATION INFRASTRUCTURE (PLANNING & ENGINEERING) CENTRE.**

5. FLOOR ALLOCATIONS:

5.1 BASEMENT FLOOR:

- The basement floor is primarily used for parking facility with semi-automated stack car park for PD building and it accommodates building services like electrical HT panel room, LT ISO panel room, UPS room, transformer, and fan rooms for basement ventilation.
- One entry & one exit ramp is provided for vehicular movement.

- Car lift Provision has been made in the basement.
- Basement has 3 staircase access, 3 passenger lifts and one freight lift for goods.

Including the parking at the Basement and surface level, we are required to provide 262 ECS (2 ECS to be provided per 100 Sq.mts.) of PD Floor area. Achieved parking is 263 ECS. (Enclosed as Annexure-03)

5.2 GROUND FLOOR:

- Ground floor has been designed for retail and restaurant space (1002 sq.m & 984 sqm respectively) on either side of the central service core. (enclosed as Annexure-04)
- Two nos. of entries have been given from east and west side to the retail and restaurants spaces respectively. The central core has one entry each to retail and restaurants spaces.
- Toilet area for the office has been provided as per NBC and the end user can look at the final location along with grease trap and the kitchen area for which provision of shafts are made.
- Four nos. of pedestrian ramps have been provided from the north & south side near the central part of the building to reach the plinth of 1.2m.
- Provision of service shafts has been made in the central portion of the retail and restaurants spaces for future use.
- AHU rooms, electrical room, fire shafts, Telecom Shaft, fire control room, pantry and toilets are provided adjacent to staircase and lift block and the same repeat on all the floors above.
- Smoke Extraction shafts have been provided as per NBC amendments in the central service core along both sides.

5.3 FIRST FLOOR:

- First floor has been designed for office space (2684.65 sqm floor area) on either side of the central service core. (enclosed as Annexure-04)
- One fire escape staircase has been provided for each office space on either side of the central service core, while one common fire escape staircase has been provided in the central service core.
- This floor has been designed with add on feature of fire exits. Fire escape connecting passages & stairs are provided on either sides of the building, which lands on the entry & exit structures of underground metro station. The landing spaces are left open to sky and are designed as OAT (open Air Theatre), seating areas and landscape garden etc. This will make building livelier.
- Provision of service shafts has been made in the central portion of each office space for future use.
- The building design caters to non-infringement of seamless glare free north and south natural light to enter the building premises and helps in harnessing natural light and green building concept.
- Smoke Extraction shafts have been provided as per NBC amendments in the central service core along both sides.

5.4 TYPICAL SECOND & THIRD FLOOR:

- Typical floor has been designed for office space (2684.65 sq.m floor area) on either side of the central service core. (enclosed as Annexure-04)
- One fire escape staircase has been provided for each office space on either side of the central service core, while one common fire escape staircase has been provided in the central service core.
- Provision of service shafts has been made in the central portion of each office space for future use.
- The building design caters to non-infringement of seamless glare free north and south natural lighting to enter the building premises and helps in harnessing natural light and green building concept.
- Smoke Extraction shafts have been provided as per NBC amendments in the central service core along both sides.

5.5 FOURTH FLOOR:

- Fourth floor has been designed for office space (2390.07 sqm. floor area) on either side of the central service core. (enclosed as Annexure-04)
- One fire escape staircase has been provided for each office space on either side of the central service core, while one common fire escape staircase has been provided in the central service core.
- Provision of service shafts has been made in the central portion of each office space for future use.
- This Floor has open to sky garden areas at the east and west side of the building, which acts as a lung space.
- Smoke Extraction shafts have been provided as per NBC amendments in the central service core along both sides.

5.6 TERRACE FLOOR:

- Terrace floor caters to services & open terrace space for usable area.
- Half portion of the terrace on eastern side is kept open, while western half portion is kept for services like , Water cooled AC chillier plant, LT/DG Panel room & central service core.

5.7 AREA STATEMENT:

Sl. No.	Description	Details
1	Site Area	13,112 Sqm.
2	FAR - 1	13,112 Sqm.
3	Ground Coverage - 25%	3,278 Sqm.
4	Proposed Ground Coverage	3,098.78 Sqm. (23.59%)
5	Parking (ECS)	263 ECS.
6	Basement Area	3,292.15 Sqm.
7	Ground Floor Area	2,660.98 Sqm.
8	First Floor Area	2,684.65 Sqm.
9	Second Floor Area	2,684.65 Sqm.
10	Third Floor Area	2,684.65 Sqm.
11	Fourth Floor Area	2,397.07 Sqm.
12	Total Built-up Area for FAR (excluding Basement)	13,112.00 Sqm
13	Total Built-up Area (including Basement)	16,404.15 Sqm
14	Total Built-up Area (including shaft, staircase Headroom, Lift Headroom, etc.)	17,555.48 sqm
15	Height of the building - Plinth - Ground Floor - First Floor - Second Floor - Third Floor - Fourth Floor **Total height of the building**	 1.2 M 4.50 M 4.50 M 4.50 M 4.50 M 4.50 M ---------- **23.70 M**----------

6. DESIGN PARAMETERS: SITE

6.1 ENTRY & EXIT:

- Site has entry & exit from South & North sides. There are two exits and two entries from the northern and Southern side. (enclosed as Annexure-~~06~~ 07)
- Every entry has a clear 6m wide gate for fire brigade access as per fire norms.

6.2 SET BACK:

- 8 m set back is kept all around the building except the front side.
- No set back is kept in the front as per TOD (Transit Oriented Development) norms.

- As the underground station building is abutting the site boundary and UG station columns are to be raised for proposed PD building there is no provision for front set back. PD made within the station box and over UG station.
- An area of 9 sq.m. (Which falls in grid no 8, 8' & H) is not part of land area which belongs to DMRC. We were advised by Architectural wing of DMRC to go with TOD norms due to non-availability of front set back and the portion of the land not belonging to DMRC.

6.3 PD PARKING:

- Towards Eastern and western portion of site PD Parking is designed.
- PD parking is provided in Basement with Stack car parking provision.

6.4 E-RIKSHAW:

- E-Rickshaw path has been provided as per UTTIPEC, which crosses the site from south to North.
- Necessary Drop off point has been planned for E-Rickshaw near east side station entry structure.

6.5 Chartered Bus Stop:

- 2 Chartered bus stops have been designed towards southern side, with drop off bay.
- It gives seamless access to metro commuters as well as the PD.

6.6 Cycle Rental:

- Cycle rental has been planned towards eastern side of PD building near TVS Shaft 02.
- It is connected through the E-Rickshaw path for access.

6.7 Public Toilet:

- Public Toilet has been located towards the western portion of the site near the PD parking lot.
- Note: Tentative location of the public toilet is shown in drawing. However any change desired by DMRC architecture wing to be made in consultation with DMRC PD wing & VA (Architects)

6.8 PEDESTRIAN RAMP:

- Two pedestrian ramps have been planned near each entry towards south & north side.
- All the four ramps connect to central entrance foyer giving easy access to the disabled.

6.9 CAR LIFT PROVISION:

- Future Car Lift provision has been planned at North-West corner of the PD Building for Basement Parking, other than Vehicular ramps.

7. DESIGN PARAMETERS: BUILDING

7.1 ENTRY & EXIT:

- Four Door entries/exits have been designed for Ground floor, for each Retail & Restaurant Space.
- Automated Sliding or Revolving Doors are proposed for Retail & Restaurant Space.

7.2 TOILET CALCULATION:

- **Occupant load calculation**- as per table no.20 NBC (National Building Code) clause 4.3
- Building Type Considered:

  Category of Buildings -- Business Building (E) / Mercantile (F)
  Category as per NBC -- Group E1 / Mercantile F1

  Business Building (E) -- From first to fourth floor – 10 sqm. /person
  Mercantile (F1) -- Ground floor – 3 sqm. /person

- **Ground floor area** (excluding common area) --- Restaurant & Retail Space

  1002 sqm (Restaurant Space): Out of 1002 sqm 70 % area considered for restaurant space = 701.4 sqm & 30 % for Kitchen. **701.4 sqm**/ 3 sqm. /person = **233.8 or say 250 persons (Restaurant Space)**

  984 sqm. (Retail)= **984 sqm**/ 3 sqm. /person =**328 persons (Retail Space)**

  Total occupants in Ground Floor= **578 persons** (enclosed as Annexure-04)
- Total area first to fouth floor --- Office Space = **10451.02 sqm** /10 sqm /person = **1045 persons** (enclosed as Annexure-05)
- Male population is assumed as 2/3rd the population & female population as 1/3rd the population as per NBC to derive male & female count.

TOILET CALCULATIONS									
SR. NO	FLOOR LEVEL	FLOOR AREA (in sq. mt)	No. of occupants	TOILETS REQUIRED (as per NBC)			TOILETS PROVIDED		
				MEN(2/3)		WOMEN(1/3)	MEN		WOMEN
			Area/ No of occupants as per NBC table 20 (clause 4.3)						
			2/3 rd Male & 1/3 rd female (as per Table 18 & 9)	WC'S	URINALS	WC'S	WC'S	URINALS	WC'S
			(per Table 18 & 9)						
1	GROUND FLOOR								
	GROUND FLOOR	2660.98	887 (591 Male + 296 FEMALE)	8	12	9	7	8	7
		(Refer Annexure -05)	2660.98/3 sqm per person= 887				(Additional toilets to be provided as per end user requirement in retail & restaurant space.)		
2	TYPICAL FLOORS								
	(1st, 2nd, 3rd)								
	OFFICE	2684.65	268 (179 Male + 89 FEMALE)	7	7	6	7	8	7
		(Refer Annexure -05)	2684.65/10 sqm per person= 268						
3	FOURTH FLOOR								
	OFFICE	2397.07	240 (160 Male + 80 FEMALE)	6	6	6	7	8	7
		(Refer Annexure -05)	2397.07/10sqm per person= 240						
		TOTAL OCCUPANTS	1931 PERSONS (GROUND,1ST,2ND,3RD,4TH FLOORS)						

Refer Annexure -08 for Toilet Layout & for floor areas refer Annexure-05.

7.3 LIFT CALCULATION:

As per Delhi Building Bye-laws (DBBL) & Master Plan of Delhi 2021 (MPD 2021)

Total no. of occupants for lift calculation:

Ground floor occupants will not be considered.
First to fourth Floor –
Usable space 1052 sqm+1052 sqm= 2104 sqm/10sqm per person=
210 persons/floor x 4 floors =840 persons **(Refer Annexure-06-C)**
Total no. of occupants for lift calculation: 840 persons.

LIFT CALCULATIONS					
		(As per Table 22, Appendix 'L' , Delhi Building Bye-Laws , MPD 2021)			
		(The trafic cleared in 50 min. is considered adequate and is approved by authority)			
No. of lifts =		total number of occupants(excluding ground & first floor)/300			
		840 persons /300			
		2.80	3 lifts		
		3 + 1(for emergency)			
			(Refer Annexure -06)		

7.4 VEHICULAR RAMP:

- One entry and one exit ramp for vehicular access has been designed which is 3.5 m in width (1:10 Slope) for basement car park.

7.5 ECS CALCULATION FOR PARKING:. (Enclosed as Annexure-03)

PARKING CALCULATION (ECS) :

TOTAL B/UP AREA = 13112 SQMT

2 ECS FOR EVERY 100 SQMT FLOOR AREA (AS PER MPD2021)

2 ECS FOR EVERY 100 SQMT FLOOR AREA = 13112 X 2 /100 =262.24 ECS

TOTAL PARKING REQUIRED = 262 ECS

ECS PROVIDED :

AS PER MPD 2021 -PARKING STANDARDS

FOR OPEN /SURFACE PARKING = 23 SQMT /ECS
FOR BASEMENT PARKING = 32 SQMT /ECS
FOR STACK PARKING = 16 SQMT /ECS

SURFACE PARKING	= 2932 / 23	= 122 ECS
BASEMENT PARKING	= 1122 / 32	= 030 ECS
STACK PARKING	= 1781 / 16	= 111 ECS
TOTAL PARKING		= 263 ECS

TOTAL PARKING PROVIDED = 263 ECS

7.5 FIRE ESCAPE STAIRCASE:

- Three Fire escape staircases (1. 5m wide) are designed as per NBC norms.
- These are located at the eastern, western & central portion of the building.

8. BUILDING SERVICES /UTILITIES:

8.1 FIRE NORMS:

- Within 8m setback provided on 3 sides & 4th side service road, 6m allotted for fire driveway, which has been provided all around the building.
- Minimum width of staircase is kept 1.5 m as per NBC clause 4.9.6. (f)
- Travel distance between two staircases has been kept as per Table 22 of NBC business building, max. Travel distance is 30 m and as per the note 1 of table 22 the travel distance may be increased by 50 per cent of the value specified. (30 + 50 % of 30= 45 m)

8.2 DUCT SIZES:

- Duct sizes are kept as per service requirements for easy maintenance. Naming has been given to ducts. (Enclosed as Annexure-09)

8.3 AHU & ELECTRICAL ROOM SIZES:

- AHU & electrical room sizes are kept as per service requirements. (Part of HVAC & Electrical DBR.)

8.3 WATER COOLED AC CHILLER PLANT:

- Water Cooled AC chiller plant has been placed at western side of building to keep the terrace free towards the eastern side. (Part of HVAC & Electrical DBR.)

8.4 STATION DG EXHAUST:

- Routing of Station DG exhaust has been marked in our drawing and the same is taken along the building shaft which helps in concealing DG exhaust. RCC box kept under road for exhaust pipe travel.

8.5 BASEMENT VENTILATION:

- The basement to be ventilated by provision of fresh air / exhaust air ducting along with the tube axial fans to be located in the basement. This area shall be considered as a single zone as per NBC of India having 4 nos shafts (2 each for fresh air and exhaust air complete with fan rooms).

8.6 SMOKE EXTRCTION SHAFT:

- The smoke extraction system of typical floors shall be designed for post fire operation requirements as per codes. (as per the latest amendment to the NBC of India)
- 70 sqft / shaft x 4 nos shafts / floor (1 shaft for fresh air and 1 shaft for exhaust) have been provided smoke extraction post fire in along two sided of central service core.

8.7 DG FOR PD BUILDING:

- DG sets are provided at grade (ground) level near West side Station entry (near TVS 01)
- 3 nos of DG sets have been provided with exhaust pipes taken through fire escape staircase shaft. (Shown in drawing)

8.8 CONCESSIONAIRE SHAFT:

- Dedicated Concessionaire shaft have been provided from basement to terrace in the central service core for unhindered service activity for maintenance work.

9. GREEN BUILDING CONSIDERATIONS:

- IGBC norms will be followed.

10. Enclosed all area calculations: (Annexure-10)

As per record placed the permanent land for Bihaji Cama place station as under.

①	Pocket B1	= 4816 Sqm	(Refer page 20)
②	Pocket B2	= 6124 Sqm	(Refer Page 20)
③	BPCL plot	= 1114 Sqm	(Refer page 14)
④	HP Plot	= 1058 Sqm	(Refer page 10)

Total plot Area (1+2+3+4) = @ 13112 Sqm

But as per flag D the permanent land shown as:
4816 Sqm + 6124 Sqm + 2254 Sqm = 13194 Sqm.

There is anomalay of 13194 - 13112 = 82 Sqm.

Hence plot area may be taken as per record of handing over / Taking over sheet which is 13112 Sqm

Total covered area avilable for property development = 2650 X 4 (Cover GR + 3FL) = 10600 Sqm.

Area avelable for parking at basement = 2650 Sqm

placed for information and n.a. pl.

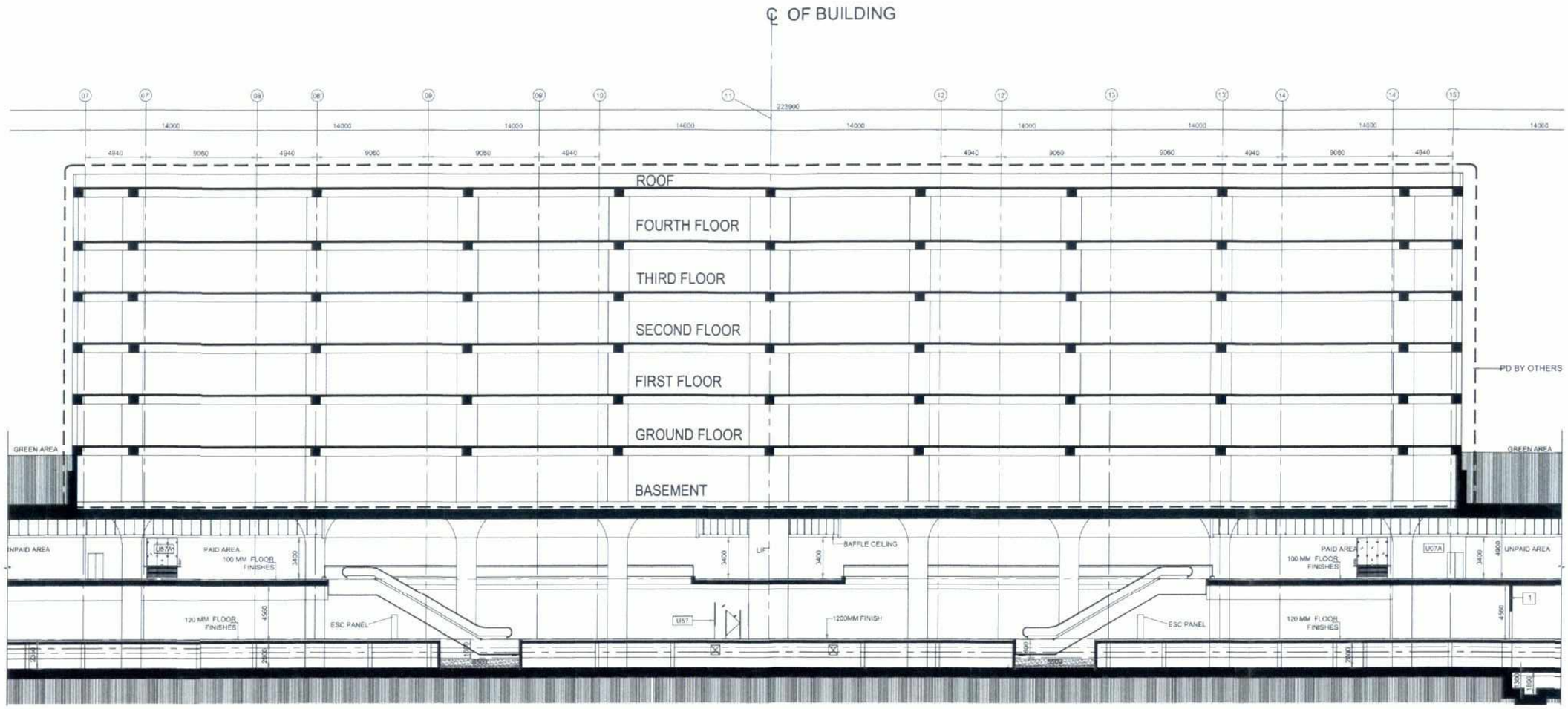
CA

5/3/15

Dy CA/PD

Regards

ANNEXURE-01



G+4 BUILDING (ALT-1 : POSSIBLE NOW WITH EXTRA FLOOR FROM TENDER DRAWING)

ANNEXURE-02

VISHWANNATH ASSOCIATES
ARCHITECTURE
INTERIORS
INFRASTRUCTURE
BANGALORE · CHENNAI

D:\LT-029-DMRC-CC-181\01-BHIKAJI CAMA PLACE STATION\From SOURCE\03-04-05\04.dwg

DELHI METRO RAIL CORPORATION LTD.

Metro Bhawan, Fire Brigade Lane,Barakhamba Road,New Delhi-110001

ANNEXURE -03

ECS CALCULATION

PROPOSED PROPERTY DEVELOPMENT
ABOVE U/G METRO STATION
AT BHIKAJI CAMA PLACE,NEW DELHI
FOR
DELHI METRO PROJECT LINE - 7

CONSULTING ARCHITECT:

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52 ,Ph. No. 91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

Email: admin@vishwannathassociates.net
Website : www.vishwannathassociates.com

PARKING CALCULATION (ECS) :

TOTAL B/UP AREA = 13112 SQMT.

2 ECS FOR EVERY 100 SQMT FLOOR AREA (AS PER MPD2021)

2 ECS FOR EVERY 100 SQMT FLOOR AREA = 13112 X 2 /100 =262.24 ECS

TOTAL PARKING REQUIRED = 262 ECS

ECS PROVIDED :

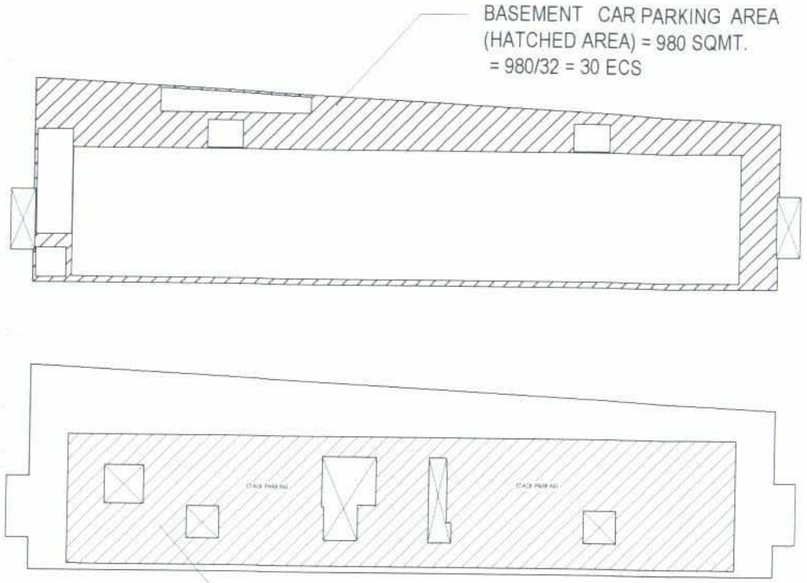
AS PER MPD 2021 -PARKING STANDARDS

FOR OPEN /SURFACE PARKING = 23 SQMT./ECS
FOR BASEMENT PARKING = 32 SQMT./ECS
FOR STACK PARKING = 16 SQMT./ECS

SURFACE PARKING	= 2980.5/ 23	= 129 ECS
BASEMENT PARKING	= 980/ 32	= 030 ECS
STACK PARKING	= 1806 / 16	= 112 ECS
TOTAL PARKING		= 271 ECS

TOTAL PARKING PROVIDED = 271 ECS

BASMENT FLOOR PLAN



ANNEXURE -03

GENERAL NOTES:

BRIEF SPECIFICATIONS

REVISIONS:

REV	PARTICULARS	DRN.	CHK'D.	VER.	DATE
R4	AS PER D.O.R.PLOT DRAWING	ACHYUT	VITHAL	VISH	13-02-17
R3	AS PER D.O.R (DMRC Meetings & Future shafts added)	ACHYUT	VITHAL	VISH	16.12.16
R2	Revised As per DMRC Meetings on 5.8 ,7th Aug 2015	ACHYUT	VITHAL	VISH	14.12.16
R1	AS PER D.O.R (DMRC COMMENTS FOR APPROVAL)	ACHYUT	VITHAL	VISH	28.08.15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	10.08.15

KEY PLAN

APPROVAL BY DMRC

ARCHITECTURE	AM / ARCH PD	JGM/ARCH /PD	CA	ED/PD
STRUCTURE	AM/DESIGN	ASM/DESIGN	ED/TECHNICAL	
ELECTRICAL & TELECOMM.	MGR /E & M	DY. CEE/ E & M	ED/ELECTRICAL - II	
CIVIL	AEN/BOP	PM- 3D	CPM- 3	
FIRE	FIRE OFFICER			

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,6 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254

DRAWN BY: ACHYUT
CHECKED BY: VITHAL
VERIFIED BY: VISH

NORTH

DELHI METRO RAIL CORPORATION LTD.

PROJECT: ECS CALCULATION

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: ECS CALCULATION

STATUS: FOR APPROVAL

DRAWING NO: VA/BLR/DMRC/BOP-R5/ECS/01

DATE: 13-02-17 **SCALE:** 1: 500 **REV NO:** R4

ECS CALCULATION

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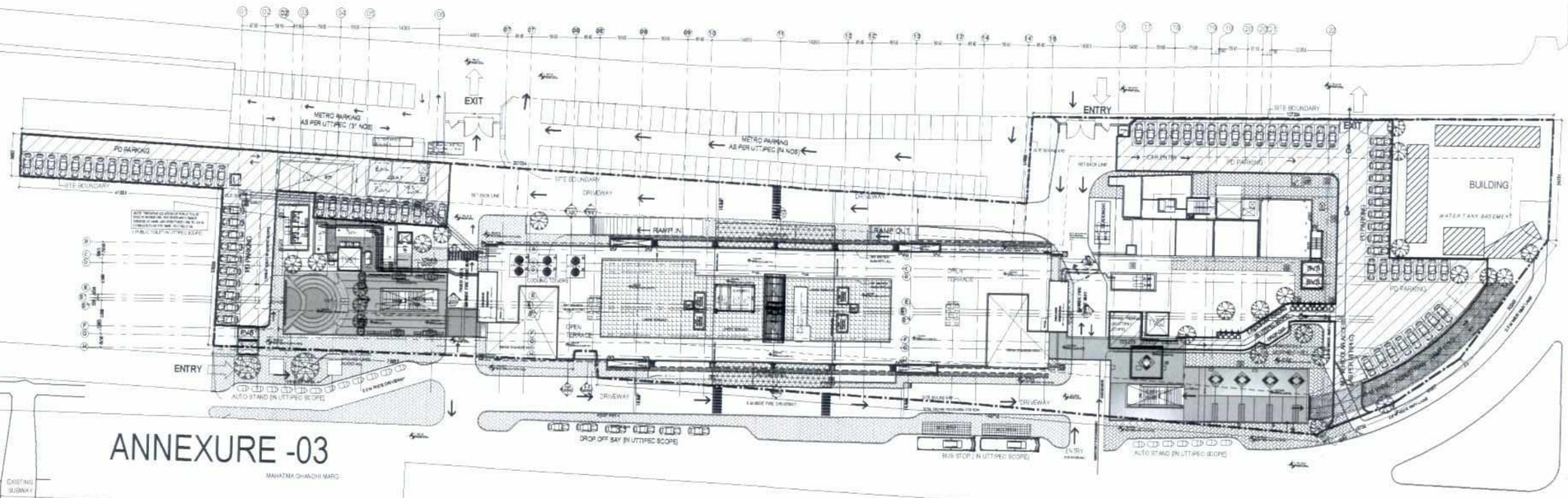

ANNEXURE -03

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER & LEVELS ARE IN METERS UNLESS OTHERWISE STATED.
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. ANY DISCREPANCIES MUST BE BROUGHT TO THE NOTICE OF THE EMRC ARCHITECTS BEFORE EXECUTION OF WORKS AT SITE.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL, PLUMBING & FIRE FIGHTING, ELECTRICAL & TRAFFIC MANAGEMENT DRAWINGS.
5. ALL DOOR, WINDOW CILL & LINTEL LEVELS ARE TO BE MEASURED FROM MAIN FLOOR FINISHED LEVELS.

BRIEF SPECIFICATIONS

- R.C.C. FRAMED STRUCTURE
- ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 230 MM/ 115 MM THK AS PER DRAWING OR AS PER SITE REQUIREMENT.
- ALL INTERNAL PLASTERING SPECIFIED BELOW:
- EXTERNAL PLASTERING SPECIFIED BELOW:
- EXTERNAL PAINTING TO BE AS PER COLOUR SCHEME GIVEN WITH COMPLEX
- INTERNAL PAINTING TO BE AS PER COLOUR SCHEME GIVEN WITH COMPLEX
- WATER & DRAINAGE AS PER NBC 2005
- FIRE FIGHTING AS PER NBC 2005
- WINDOWS, DOORS, STRUCTURAL GLAZING AS PER EQUATION
- INTERNAL CLADDING NOT ONLY CLADDING, STRUCTURAL GLAZING ETC. AS PER EQUATION.

REVISIONS:

REV.	PARTICULARS	DRN.	CHK'D.	VER.	DATE
R4	AS PER D.O. DATED 13.02.17	ACHYUT	VITHAL	VISH	13.02.17
R3	AS PER D.O. DATED 09.02.17	ACHYUT	VITHAL	VISH	09.02.17
R2	AS PER D.O. DATED 06.02.17	ACHYUT	VITHAL	VISH	06.02.17
R1	AS PER D.O. DATED 03.02.17	ACHYUT	VITHAL	VISH	03.02.17
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	01.02.17

KEY PLAN

APPROVAL BY DMRC:

ARCHITECTURE	AM / ARCH (PD)	JGM/ARCH (PD)	GA	ED/PD
STRUCTURE	AM/DESIGN	AGM/DESIGN	ED/TECHNICAL	
ELECTRICAL & TELECOME	MGR/E & M	DY. CEE/E & M	ED ELECTRICAL - II	
CIVIL	AEN/BOP	PM- 3B	CPM - 3	
FIRE	FIRE OFFICER			

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Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254

DRAWN BY: ACHYUT
CHECKED BY: VITHAL
VERIFIED BY: VISH
NORTH

DELHI METRO RAIL CORPORATION LTD.

PROJECT: ECS CALCULATION

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE, NEW DELHI FOR DELHI METRO PROJECT LINE – 7

DRAWING TILTLE: SITE PLAN

STATUS: FOR APPROVAL

DRAWING NO: VA/BLR/DMRC/BCP-PD/ECS/ R2

DATE: 13-02-17 **SCALE:** 1 500 **REV NO:** R4

ECS CALCULATION

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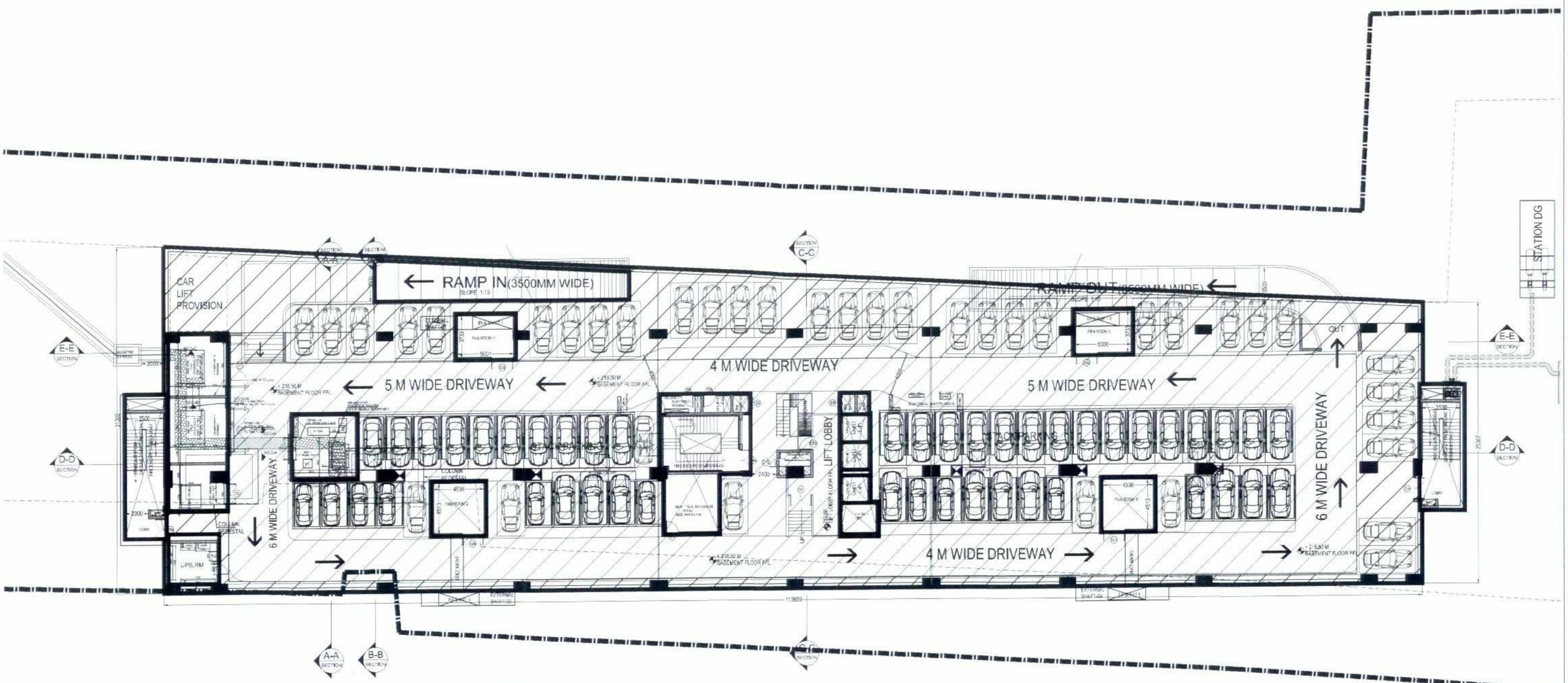

BASEMENT PARKING ACHIEVED

BASEMENT STACK PARKING- 45x2 = 90 nos

BASEMENT SURFACE PARKING = 39 nos

TOTAL NO. OF BASEMENT PARKING =129 nos

GENERAL NOTES:

BRIEF SPECIFICATIONS

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R4	RE VISED SUB PER DMRC Meetings & future shafts added	ALWYUT	VITHAL	VISH	13.02.17
R3	RE VISED SUB PER DMRC Meetings & future shafts added	ALWYUT	VITHAL	VISH	16.12.16
R2	Revised As per DMRC Meetings on 19 /7th Aug 2015	ALWYUT	VITHAL	VISH	14.12.16
R1	RE VISED SUB PER DMRC COMMENTS FOR APPROVAL	ALWYUT	VITHAL	VISH	30.09.15
R0	FIRST SUBMISSION FOR APPROVAL	ALWYUT	VITHAL	VISH	19.06.15

KEY PLAN

APPROVAL BY DMRC:

ARCHITECTURE	AM / ARCH PD	JGM/ARCH I/PD	DA	ED/PD
STRUCTURE	AM/DESIGN	AGM/DESIGN	ED/TECHNICAL	
ELECTRICAL & TELECOMM.	MGR./E & M	DY. CEE/E & M	ED/ELECTRICAL-I	
CIVIL	AEN/BCP	PM-3B	CPM-3	
FIRE	FIRE OFFICER			

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OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

DRAWN BY: ACHYUT
CHECKED BY: VITHAL
VERIFIED BY: VISH
NORTH

DELHI METRO RAIL CORPORATION LTD.

PROJECT: ECS CALCULATION

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: BASEMENT PLAN

STATUS: FOR APPROVAL

DRAWING NO: VABL/RDMRO/BCP-PD/ECS/ 03

DATE: 13-02-17 **SCALE:** 1: 175 **REV NO:** R4

ECS CALCULATION

VISHWANNATH ASSOCIATES ARCHITECTURE INTERIORS INFRASTRUCTURE BANGALORE · CHENNAI

DELHI METRO RAIL CORPORATION LTD.

Metro Bhawan, Fire Brigade Lane,Barakhamba Road,New Delhi-110001

ANNEXURE -03-A

PARKING AREA (WITH REF. TO NO. OF CAR PARKS)

PROPOSED PROPERTY DEVELOPMENT
ABOVE U/G METRO STATION
AT BHIKAJI CAMA PLACE,NEW DELHI
FOR
DELHI METRO PROJECT LINE - 7

CONSULTING ARCHITECT:

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52 ,Ph. No. 91-080-22284277

T.T.K ROAD, CHENNAI.
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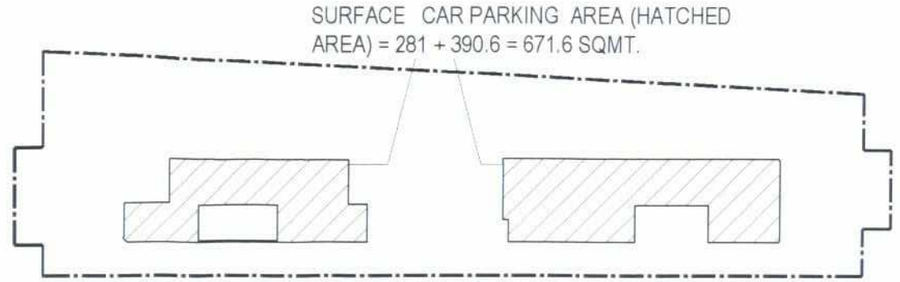
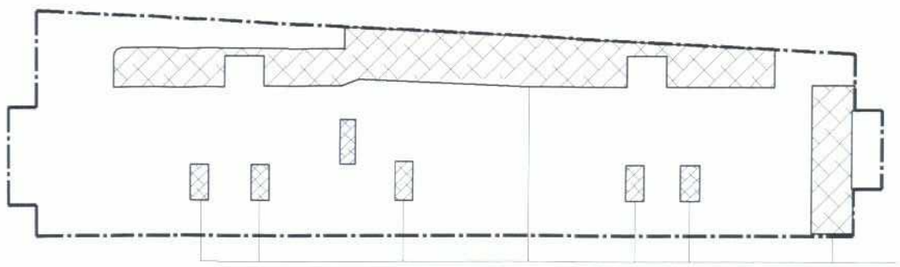
Email: admin@vishwannathassociates.net
Website : www.vishwannathassociates.com

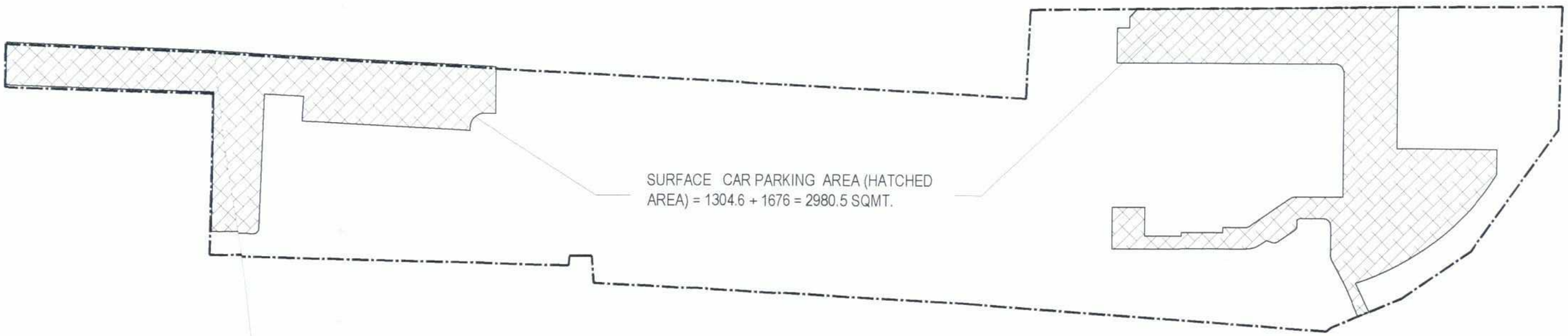




BASEMENT SINGLE PARKING AREA (HATCHED AREA) = 713.40 SQMT.

PARKING AREA STATEMENT (NO. OF CAR PARKS PROVIDED) WITH AREA

	COVERED AREA PARKING		SURFACE AREA PARKING	TOTAL NO. OF CAR PARKS
	BASEMENT STACK	BASEMENT SINGLE		
AREA	671.6 SQ MT	713.4 SQ MT	2980.5 SQ MT	4365.5 SQ MT
NO OF CAR PARK	90	38	80	208



ANNEXURE -03A

GENERAL NOTES:

BRIEF SPECIFICATIONS

REVISIONS:

REV.	PARTICULARS	DRN.	CHD.	VER.	DATE
00	FIRST SUBMISSION FOR APPROVAL			VISH	13-02-17

KEY PLAN

APPROVAL BY DMRC:

ARCHITECTURE	AM I ARCH. PD	JGM/ARCH (PD)	CA / EDP/D
STRUCTURE	AM/DESIGN	AGM/DESIGN	ED/TECHNICAL
ELECTRICAL & TELECOMM.	MGR /E & M	DY. CEE/E & M	ED ELECTRICAL - II
CIVIL	AEN/BCP	PM -38	CRN - 3
FIRE	FIRE OFFICER		

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan.

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS 8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254

DRAWN BY: ACHYUT
CHECKED BY: VITHAL
VERIFIED BY: VISH
NORTH

DELHI METRO RAIL CORPORATION LTD.

PROJECT: PARKING DETAILS (WITH REF. TO NO. OF CAR PARKS)

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: PARKING AREA STATEMENT

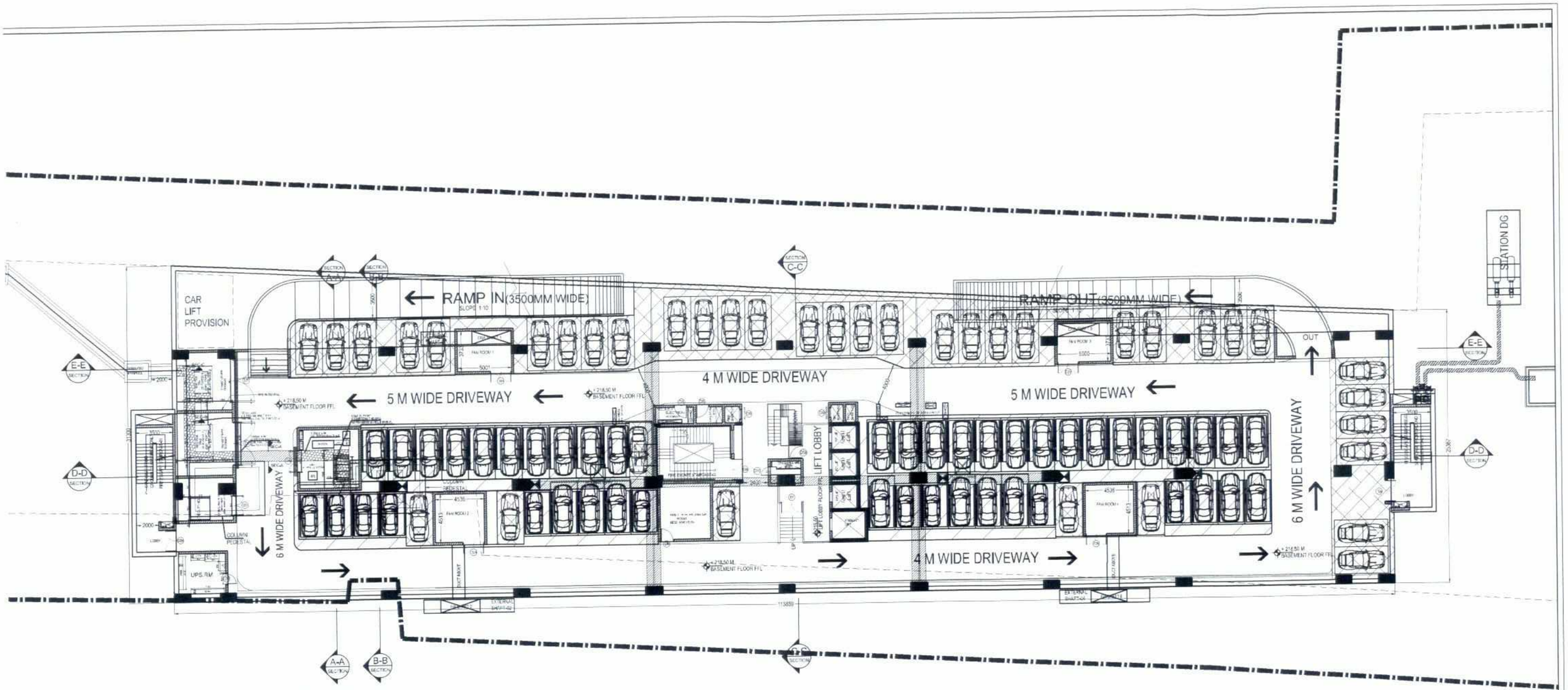
STATUS: FOR APPROVAL

DRAWING NO: VA/BLR/DMRC/BCP-PD/PARK/01

DATE: 13-02-2017 **SCALE:**

REV NO: R0

PARKING DETAILS



BASEMENT PARKING ACHIEVED

BASEMENT STACK PARKING- 45x2 = 90 nos

BASEMENT SURFACE PARKING = 38 nos

TOTAL NO. OF BASEMENT PARKING =128 nos

ANNEXURE -03-A

GENERAL NOTES:

BRIEF SPECIFICATIONS

REVISIONS:

REV.	PARTICULARS	DRN.	CHK'D.	VER.	DATE
1.0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	13.02.17

KEY PLAN

APPROVAL BY DMRC:

ARCHITECTURE	AM / ARCH. PD	JGM/ARCH.(P/D	CA / ED/PD
STRUCTURE	AM/DESIGN	AGM/DESIGN	ED/TECHN.CAL
ELECTRICAL & TELECOMM	MGR./E & M	DY. CED/E & M	ED/ELECTRICAL - II
CIVIL	AEN/BCP	PM- 38	CPM - 3
FIRE	FIRE OFFICER		

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan.

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OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

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DRAWN BY: ACHYUT
CHECKED BY: VITHAL
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DELHI METRO RAIL CORPORATION LTD.

PROJECT: PARKING DETAILS (WITH REF. TO NO. OF CAR PARKS)

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: BASEMENT PLAN

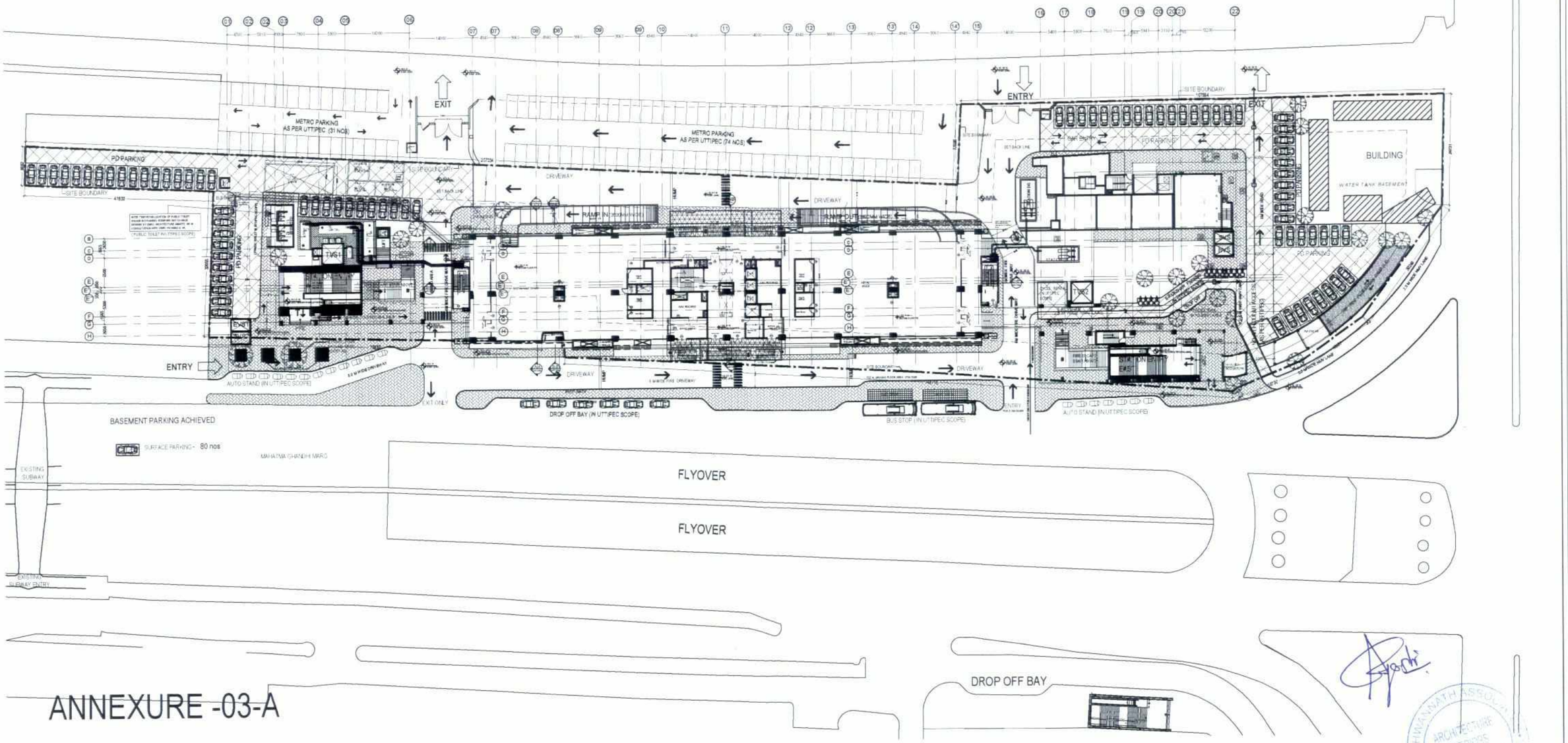
STATUS: FOR APPROVAL

DRAWING NO: VA/BLR/DMRC/BCP-PD/PARK/02

DATE: 13-02-2017 **SCALE:** **REV NO:** R0

PARKING DETAILS

ANNEXURE -03-A



ANNEXURE -03-A

GENERAL NOTES:

BRIEF SPECIFICATIONS

REVISIONS:

REV.	PARTICULARS	DRN.	CHK'D.	VER.	DATE
00	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	13.02.17

KEY PLAN

APPROVAL BY DMRC

ARCHITECTURE	AM / ARCH - PD	JGM/ARCH (PD	CA	ED/PD
STRUCTURE	AM/DESIGN	AGM/DESIGN	ED/TECHNICAL	
ELECTRICAL & TELECOMM	MGR/E & M	DY. CE/E & M	ED ELECTRICAL - II	
CIVIL	AEN/BCP	PM -38	CPM - 3	
FIRE	FIRE OFFICER			

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan.

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254

DRAWN BY: ACHYUT
CHECKED BY: VITHAL
VERIFIED BY: VISH
NORTH

DELHI METRO RAIL CORPORATION LTD.

PROJECT: PARKING DETAILS (WITH REF. TO NO. OF CAR PARKS)

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: GROUND FLOOR PLAN

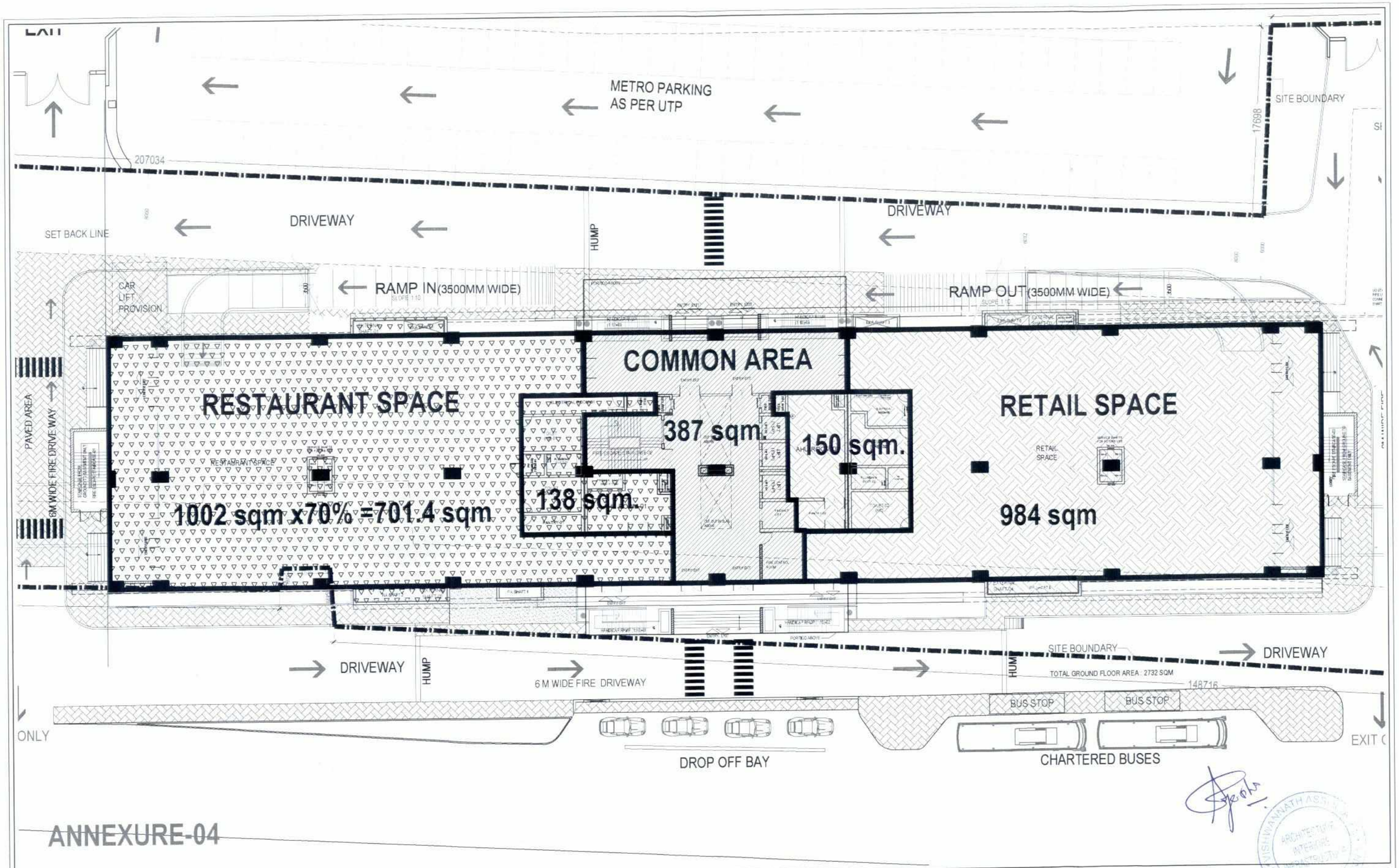
STATUS: FOR APPROVAL

DRAWING NO: VA/BLR/DMRC/BCP-PD/PARK/03

DATE: 13-02-2017 **SCALE:**

REV NO: R0

PARKING DETAILS



ANNEXURE-04

GENERAL NOTES:

BRIEF SPECIFICATIONS

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R0	RE VISED FOR TENDER DRAWINGS	ACHYUT	VITHAL	VISH	13-10-15
R1	RE VISED AS PER METTING ON 23RD SEPT 2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	RE VISED AS PER UTILITIES AVAILABLE RE GIONS WITH	ACHYUT	VITHAL	VISH	31-09-15
R2	RE VISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	30-09-15
R3	Revised As per DMRC Meetings on 5.10.15 & 7th Aug 2015	ACHYUT	VITHAL	VISH	07-09-15
R4	RE VISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	16-07-15

KEY PLAN

APPROVAL BY DMRC:

ARCHITECTURE	AM/MG	DY.CA/II	CA
STRUCTURE	AM/DESIGN	DY. CE/DESIGN	EDITECHNICAL
ELECTRICAL	AE/ME & M	DGM/E	CE/E/UD
CIVIL	AGM/CIVIL	CE/GENERAL	
TELECOMM	AGM/TELE	CSTE	
FIRE	FIRE OFFICER		

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan.

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS 8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254

DRAWN BY: ACHYUT
CHECKED BY: VITHAL
VERIFIED BY: VISH
NORTH

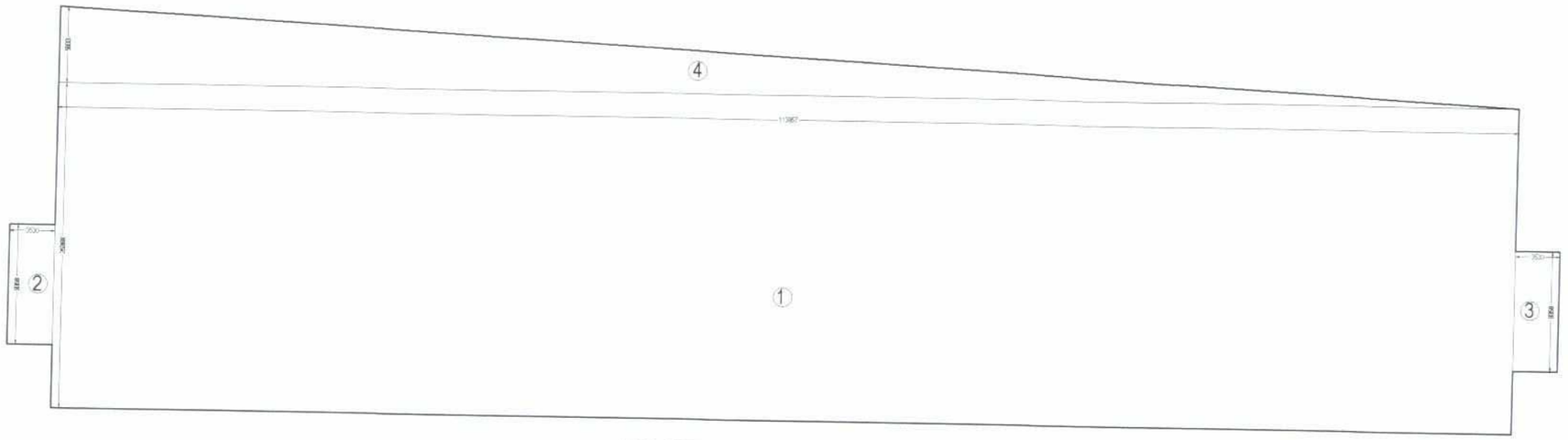
DELHI METRO RAIL CORPORATION LTD.

PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: GROUND FLOOR PLAN
STATUS: FOR TENDER
DRAWING NO: VAB/LRDMRC/BCP/PDT/DY/03
DATE: 13-10-2015
SCALE: 1:225
REV NO: R6

TENDER DRAWING (ARCHITECTURAL)

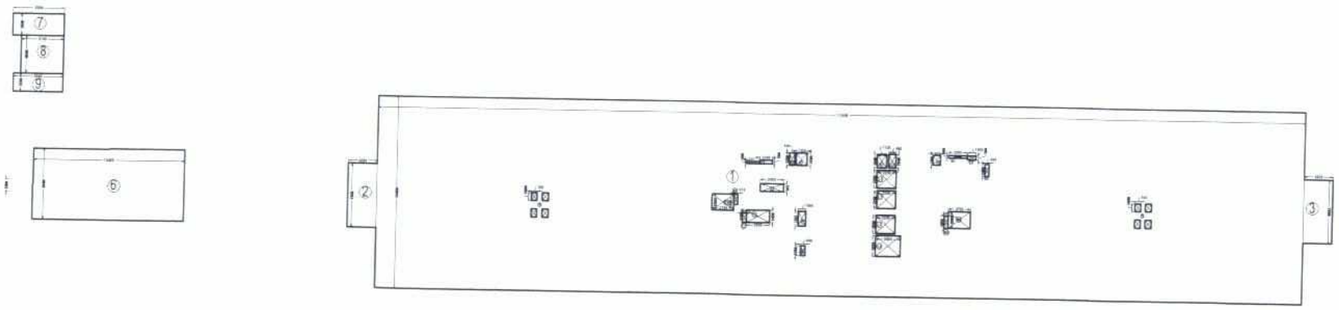
THIS DRAWING IS THE PROPERTY OF DELHI METRO RAIL CORPORATION LTD



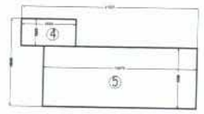
BASEMENT PLAN (AREA DIAGRAM)

BASEMENT PLAN

SL.NO.	DESCRIPTION	NO	LENGTH (In Mts.)	BREADTH (In Mts.)	AREA (In Sqmt.)		UNITS
1	1	1	113.857	25.368	2,888.32		SQ.M
2	2	1	3.53	9.358	33.03		SQ.M
3	3	1	3.53	9.358	33.03		SQ.M
4	4	0.5	113.857	5.933	337.76		SQM
					3,292.15	**3,292.15**	SQM
	Total area				3,292.15	**3,292.15**	SQM



GROUND FLOOR PLAN (AREA DIAGRAM)



GROUND FLOOR LEVEL

SL.NO.	DESCRIPTION	NO	LENGTH (In Mts.)	BREADTH (In Mts.)	AREA (In Sqmt.)		UNITS
1	1	1	113.859	23.430	2,667.72		SQ.M
2	2	1	3.53	7.760	27.39		SQ.M
3	3	1	3.53	7.760	27.39		SQ.M
4	4	1	6.65	3.329	22.14		SQ.M
5	5	1	18.875	7.370	139.11		SQ.M
6	6	1	18.4	8.640	158.98		SQ.M
7	7	1	6.256	2.630	16.45		SQ.M
8	8	1	5.185	4.640	24.06		SQ.M
9	9	1	6.086	2.230	13.57		SQ.M
			(GROUND COVERAGE 23.59%)		3,096.81	**3,096.81**	SQ.M
	LIFTS						
1	L1	3	2.296	2.200	15.15		SQM
2	L2	1	3.05	2.515	7.67		SQM
					22.82	**22.82**	SQM
	DUCTS						
1	A1	1	1.617	0.300	0.49		SQM
2	A2	1	1.500	0.500	0.75		SQM
3	B1	1	2.720	1.994	5.42		SQM
4	B2	1	0.518	1.236	0.64		SQM
5	C1	1	2.800	1.470	4.12		SQM
6	C2	1	0.534	1.100	0.59		SQM
7	D	1	0.600	1.500	0.90		SQM
8	E	1	1.350	1.500	2.03		SQM
9	F	1	1.000	1.767	1.77		SQM
10	G	1	0.600	1.200	0.72		SQM
11	H	1	1.125	1.640	1.85		SQM
12	I	1	0.895	1.640	1.47		SQM
13	J	1	0.969	1.200	1.16		SQM
14	K1	1	2.300	0.300	0.69		SQM
15	K2	1	1.000	0.500	0.50		SQM
16	K3	1	0.500	1.400	0.70		SQM
17	M1	1	2.733	2.000	5.47		SQM
18	M2	1	0.500	1.424	0.71		SQM
19	Q	1	2.850	0.961	2.74		SQM
20	R	8	0.750	1.000	6.00		SQM
					38.70		SQM
	OPERATIONAL STRUCTURE						
1	4	1	6.65	3.329	22.14		SQM
2	5	1	18.875	7.370	139.11		SQM
3	6	1	18.4	8.640	158.98		SQM
4	7	1	6.256	2.630	16.45		SQM
5	8	1	5.185	4.640	24.06		SQM
6	9	1	6.086	2.230	13.57		SQM
					374.81		SQM
	DEDUCTIONS				**436.43**	**436.43**	SQM
	Total area after deductions				**2,660.98**	**2,660.98**	SQM

ANNEXURE-05-A

PROJECT:

PROPOSED PROPERTY DEVELOPMENT ABOVE

U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI

FOR

DELHI METRO PROJECT LINE - 7

1) SITE AREA 13,112.00 Sqmt

2) PLOT COVERAGE:
Permissible upto : 25% (3278 sqmt)
Achieved plot coverage :23.59% (3093.78 sqmt)

3) F.A.R.:
Permissible F.A.R. = 1 (13112sqmt)
Achieved F.A.R. = 1(13112sqmt)

4) AREA STATEMENT FOR F.A.R:

Sl. No	Description	Buitup Area (Sqmt)	Deductions For F.A.R. (Sqmt)		Buitup Area For F.A.R. (Sqmt)
			LIFT	DUCTS	
01	Basement Floor	3,292.15			Nil
02	Ground Floor	3,096.81	22.82	413.00	2660.98
03	First Floor	2,924.40	22.82	38.70	2862.88
04	Second Floor	2,783.46	22.82	38.70	2721.94
05	Third Floor	2,783.46	22.82	76.00	2684.64
06	Fourth Floor	2,397.07			2397.07
07	Mezzanin Floor	419.61		32.73	Nil
	TOTAL	17566.46	91.28	619.13	13,112.00

DATE 09-11-15
DRG. NO.: VISHWANNATH-P-75-BDA
SHEET NO. 01 REVISION R5

FOR APPROVAL

DRAWING NAME : AREA CHART

5) CAR PARKING CALCULATION:

PARKING REQUIREMENTS AS PER MPD-2021 = 2 EQUIVALENT CAR SPACE (ECS) PER 100 SQMT OF FLOOR AREA

= 2 X 3292

= 262 ECS

ECS PROVIDED:
1 BASEMENT PARKING = 31 ECS
2 BASEMENT STACK PARKING = 111 ECS
3 SURFACE PARKING = 120 ECS

TOTAL ECS PROVIDED = 262 ECS

TOTAL ECS = 262 ECS

REVISION:

R6	REVISED FOR HEADROOM AREA	ACHYUT	VITHAL	VISH	09-11-15
R4	REVISED AS PER BUILDING SERVICES INCORPORATION	ACHYUT	VITHAL	VISH	25-10-15
R3	REVISED AS PER DMRC MEETINGS & FUTURE SHAFTS ADDED	ACHYUT	VITHAL	VISH	10-08-15
R2	REVISED AS PER DMRC MEETINGS ON 6.& 7TH AUG.2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	15-07-15
SL. NO.	PARTICULARS	DRN.	CHKD.	VER.	DATE

6)BRIEF SPECIFICATIONS

1. R.C.C. FRAMED STRUCTURE
2. ALL EXTERNAL WALLS TO BE 230 MM FLY ASH BRICKS
3. ALL INTERNAL WALLS TO BE 115 MM FLY ASH BRICKS
4. ALL INTERNAL WALL PLASTERING ARE TO BE IN C.M 1:6
5. ALL EXTERNAL PLASTERING ARE TO BE OF CM 1:4
6. INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION
7. EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
8. METAL OR INSULATED FIRE RATED DOOR SHUTTER FIRE RATED DOOR SHUTTER GLASS DOORS
9. ALUMINUM WINDOWS / S DOOR STRUCTURAL GLAZING
10. EXTERNAL CLADDING M.P. ENC CLADDING STRUCTURAL GLAZING ETC.

SIGNATURE OF THE CLIENT

DELHI METRO RAIL CORPORATION

SIGNATURE OF THE ARCHITECT

CA/96/20722

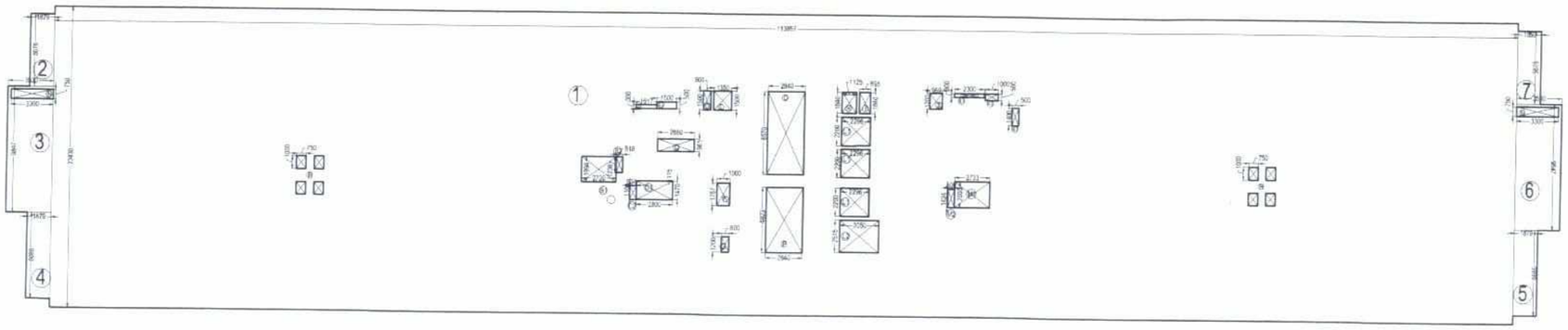
OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

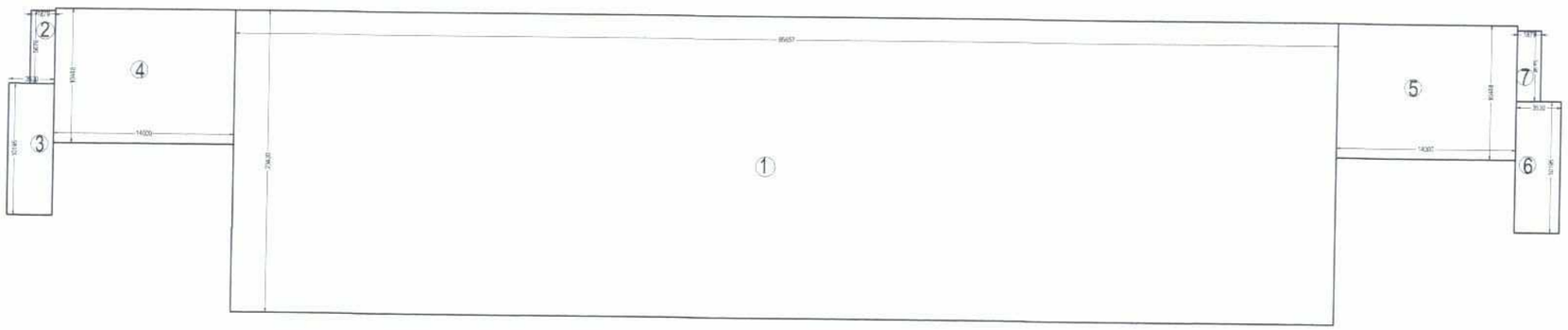
T.T.K ROAD, CHENNAI
Ph. No. +91-044-42088254

ARCHITECTURAL



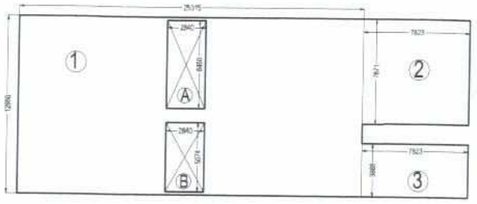
1ST,2ND,3RD FLOOR LEVEL

1ST,2ND,3RD FLOOR LEVEL						
SL.NO.	DESCRIPTION	NO	LENGTH (In Mts.)	BREADTH (In Mts.)	AREA (In Sqmt.)	UNITS
1	1	1	113.857	23.430	2,667.67	SQ.M
2	2	1	1.879	5.676	10.67	SQ.M
3	3	1	3.53	9.847	34.76	SQ.M
4	4	1	1.879	6.686	12.56	SQ.M
5	5	1	1.879	6.686	12.56	SQ.M
6	6	1	3.53	9.847	34.76	SQ.M
7	7	1	1.85	5.676	10.50	SQ.M
					2,783.48	2,783.48 SQM
	LIFTS					
1	L1	3	2.296	2.200	15.15	SQM
2	L2	1	3.05	2.515	7.67	
					22.82	22.82 SQM
	DUCTS					
1	A1	1	1.617	0.300	0.49	SQM
2	A2	1	1.500	0.500	0.75	SQM
3	B1	1	2.720	1.994	5.42	SQM
4	B2	1	0.518	1.236	0.64	SQM
5	C1	1	2.800	1.470	4.12	SQM
6	C2	1	0.534	1.100	0.59	SQM
7	D	1	0.600	1.500	0.90	SQM
8	E	1	1.350	1.500	2.03	SQM
9	F	1	1.000	1.767	1.77	SQM
10	G	1	0.600	1.200	0.72	SQM
11	H	1	1.125	1.640	1.85	SQM
12	I	1	0.895	1.640	1.47	SQM
13	J	1	0.969	1.200	1.16	SQM
14	K1	1	2.300	0.300	0.69	SQM
15	K2	1	1.000	0.500	0.50	SQM
16	K3	1	0.500	1.400	0.70	SQM
17	M1	1	2.733	2.000	5.47	SQM
18	M2	1	0.500	1.424	0.71	SQM
19	N	2	3.300	0.750	4.95	SQM
20	O	1	2.840	6.570	18.66	SQM
21	P	1	2.840	4.823	13.70	SQM
22	Q	1	2.850	0.961	2.74	SQM
23	R	8	0.750	1.000	6.00	SQM
					76.00	SQM
	DEDUCTIONS				98.83	98.83 SQM
	Total area after deductions				2,684.65	2,684.65 SQM



4TH FLOOR LEVEL

4TH FLOOR LEVEL						
SL.NO.	DESCRIPTION	NO	LENGTH (In Mts.)	BREADTH (In Mts.)	AREA (In Sqmt.)	UNITS
1	1	1	85.857	23.430	2,011.63	SQ.M
2	2	1	1.879	5.676	10.67	SQ.M
3	3	1	3.53	10.195	35.99	SQ.M
4	4	1	14	10.448	146.27	SQ.M
5	5	1	14	10.448	146.27	SQ.M
6	6	1	3.53	10.195	35.99	SQ.M
7	7	1	1.879	5.456	10.25	SQ.M
					2,397.07	2,397.07 SQM
	TOTAL AREA				2,397.07	2,397.07 SQM



HEADROOM FLOOR LEVEL

HEAD ROOM FLOOR LEVEL						
SL.NO.	DESCRIPTION	NO	LENGTH (In Mts.)	BREADTH (In Mts.)	AREA (In Sqmt.)	UNITS
1	1	1	25.315	12.980	328.59	SQ.M
2	2	1	7.823	7.671	60.01	SQ.M
3	3	1	7.823	3.888	30.42	SQ.M
					419.01	419.01 SQM
	DEDUCTIONS					
1	A	1	2.84	6.450	18.32	
2	B	1	2.84	5.074	14.41	
					32.73	
	TOTAL AREA AFTER DEDUCTIONS				386.29	386.29 SQM

ANNEXURE-05-B

PROJECT:

PROPOSED PROPERTY DEVELOPMENT ABOVE

U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI

FOR

DELHI METRO PROJECT LINE - 7

1) SITE AREA: 13,112.00 Sqmt

2) PLOT COVERAGE:
Permissible upto : 25% (3278 sqmt)
Achieved plot coverage :23.59% (3093.78 sqmt)

3) F.A.R.:
Permissible F.A.R. = 1 (13112sqmt)
Achieved F.A.R. = 1(13112sqmt)

4) AREA STATEMENT FOR F.A.R:

S. No.	Description	Buitup Area (Sqmt)	Deductions for F.A.R (Sqmt)		Buitup Area for F.A.R (Sqmt)
			LIFTS	DUCTS	
(1)	Basement Floor	3,292.16			NIL
(2)	Ground Floor	3,206.01	22.82	413.01	2792.98
(3)	First Floor	2,783.48	22.82	76.00	2684.65
(4)	Second Floor	2,783.48	22.82	76.00	2684.65
(5)	Third Floor	2,783.48	22.82	76.00	2684.65
(6)	Fourth Floor	2,397.07			2397.07
(7)	Headroom Floor	419.01		32.73	NIL
	TOTAL	17660.40	91.28	673.74	13,112.00

DATE : 09-11-18
DRG. NO: (14)/B(14)/MS/2012-PS-05-10
SHEET NO: 11 REVISION : R8

FOR APPROVAL

DRAWING NAME : AREA CHART

5) CAR PARKING CALCULATION:

PARKING REQUIREMENTS AS PER MPD 2021 : 1 ECS EQUIVALENT CAR SPACE (ECS) PER 100 SQMT OF FLOOR AREA
= 2 HIGH
= 240 ECS

ECS PROVIDED
1 BASEMENT PARKING = 30 ECS
2 BASEMENT BACK PARKING= 111 ECS
3 SURFACE PARKING = 122 ECS

TOTAL ECS PROVIDED = 242 ECS

TOTAL ECS = 242 ECS

REVISION:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R8	REVISED FOR HEADROOMAREA	ACHYUT	VITHAL	VISH	09-11-18
R4	REVISED AS PER BUILDING SERVICES INCORPORATION	ACHYUT	VITHAL	VISH	29-10-18
R3	REVISED AS PER DMRC MEETINGS & FUTURE SHAFTS ADDED	ACHYUT	VITHAL	VISH	10-08-18
R2	REVISED AS PER DMRC MEETINGS ON 8.8.,7TH AUG,2018	ACHYUT	VITHAL	VISH	07-08-18
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-18
	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	10-07-18

6)BRIEF SPECIFICATIONS

1. R.C.C. FRAMED STRUCTURE
2. ALL EXTERNAL WALLS TO BE 230 MM THICK FLY ASH BRICKS
3. ALL INTERNAL WALLS TO BE 115 MM THICK FLY ASH BRICKS
4. ALL EXTERNAL PLASTERING ARE TO BE OF CM 1:5
5. INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION
6. EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7. METAL UN INSULATED FIRE RATED DOOR/SHOW FIRE RATED DOOR/STOREHEED GLASS DOORS
8. ALUMINUM WINDOWS / DOOR STRUCTURAL GLAZING
9. EXTERNAL CLADING ACP, ZINC CLADDING , STRUCTURAL GLAZING, ETC.

SIGNATURE OF THE CLIENT

DELHI METRO RAIL CORPORATION

SIGNATURE OF THE ARCHITECT

CA/96/20722

OFFICE OF ORIGIN:

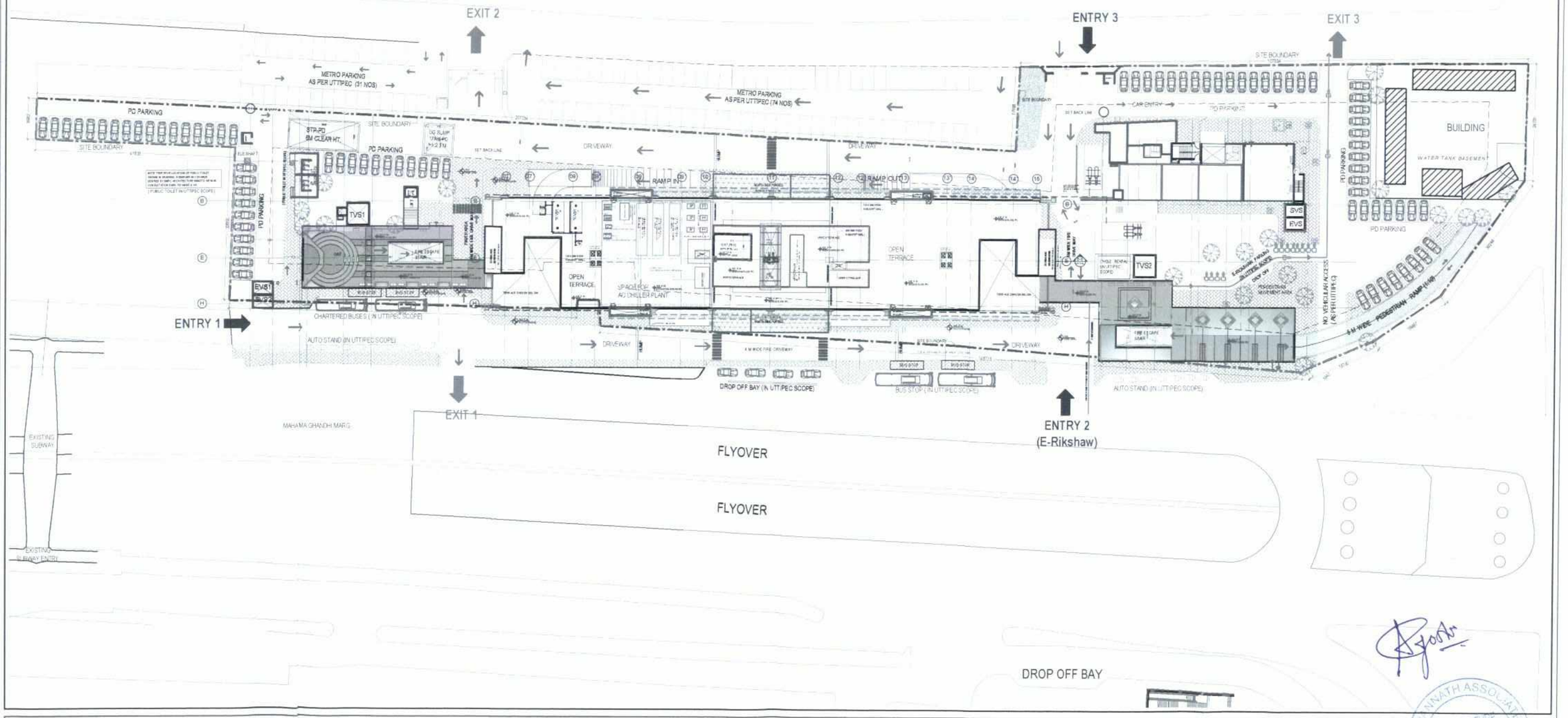
ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254

ARCHITECTURAL

ANNEXURE-07



THIS DRAWING IS THE PROPERTY OF DELHI METRO RAIL CORPORATION (LTD.)

GENERAL NOTES:

BRIEF SPECIFICATIONS

REVISIONS:

REV.	SUBMISSION FOR APPROVAL / PARTICULARS	DR.	CHKD.	VER.	DATE
			ACHYUT	VISH	23-11-2015

KEY PLAN

APPROVAL BY DMRC:

ARCHITECTURE	AM/M3	DY GM/	GM
STRUCTURE	AM/DESIGN	DY CE/DESIGN	ED/TECHNICAL
ELECTRICAL	AEM/E & M	DDM/E	CEE/UD
CIVIL	AGM/CIVIL	DD/GENERAL	
TELECOMM	AGM/TELE	CSTE	
FIRE	FIRE OFFICER		

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan.

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No.:+91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No.: +91-044-42088254

DRAWN BY: MEGANA
CHECKED BY: ACHYUT
VERIFIED BY: VISH
NORTH

DELHI METRO RAIL CORPORATION LTD.

PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: SITE PLAN (ENTRY EXIT LAYOUT)

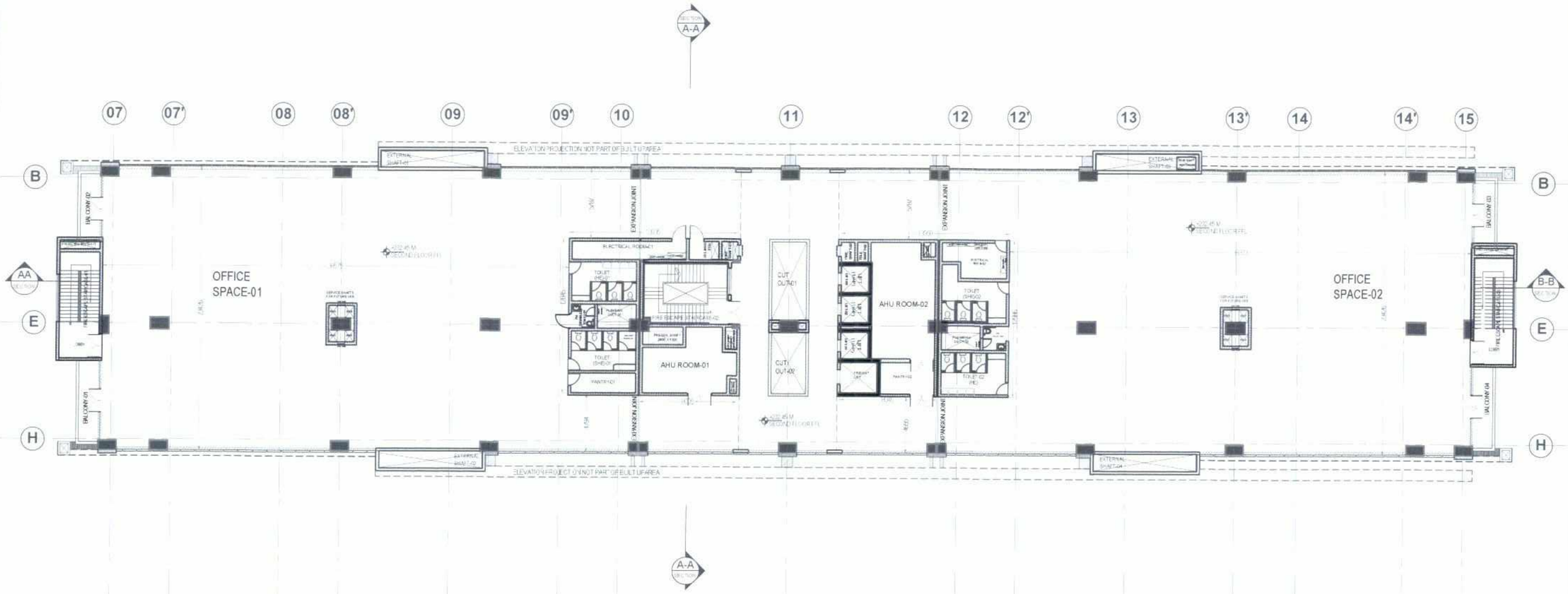
STATUS: FOR APPROVAL

DRAWING NO: VAB/R/DMRC/BCP/PD/AR/01

DATE: 23-11-2015 **SCALE:** 1: 500 **REV NO:** R0

ARCHITECTURAL

ANNEXUR-08



SECOND FLOOR PLAN

GENERAL NOTES:

BRIEF SPECIFICATIONS

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE

KEY PLAN

APPROVAL BY DMRC:

ARCHITECTURE	AM/MG	DY CA-III	CA
STRUCTURE	AM/DESIGN	DY CE/DESIGN	ROTECHNICAL
ELECTRICAL	AEM/E & M	DGM/E	CE/ADC
CIVIL	ADM/CIVIL	CE/GENERAL	
TELECOMM	ADM/TELE	CSTE	
FIRE	FIRE OFFICER		

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan.

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI
Ph. No. +91-044-42088254

DRAWN BY: MEGANA
CHECKED BY: ACH/TJT
VERIFIED BY: VISH
NORTH

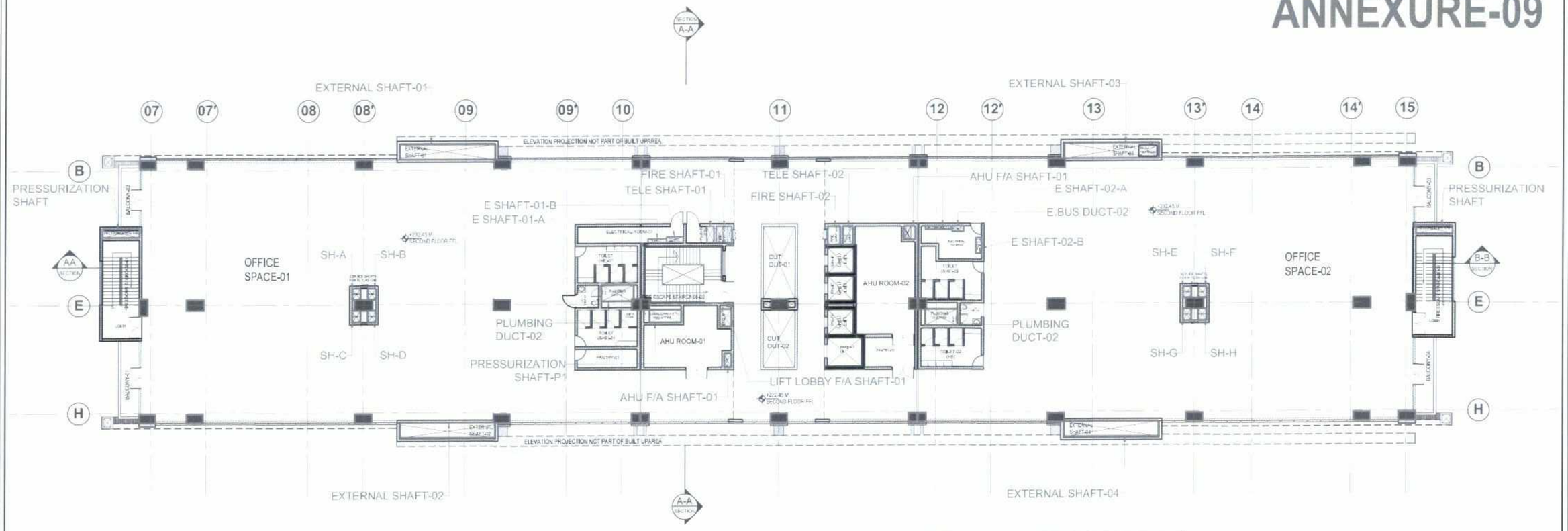
DELHI METRO RAIL CORPORATION LTD.

PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: TOILET LAYOUT (TYPICAL FLOOR)
STATUS: FOR APPROVAL
DRAWING NO: VA/DLRO/ARC/SCP/PDIA/05
DATE: 23-11-2015
SCALE: 1:225
REV NO: R0

ARCHITECTURAL

ANNEXURE-09



SECOND FLOOR PLAN

DUCTS SCHEDULE(SERVICES)

SL.NO	PARTICULARS	DIMENSIONS (mm)	SL.NO	PARTICULARS	DIMENSIONS (mm)
1	EXTERNAL SHAFT-01	8418 x 1351	16	EXTERNAL SHAFT-03	8418 x 1353
2	EXTERNAL SHAFT-02	8418 x 1353	17	EXTERNAL SHAFT-04	8418 x 1355
3	PRESSURIZATION SHAFT	3300 x 750	18	SH-E (PLUMBING)	750 x 1000
4	SH-A (PLUMBING)	750 x 1000	19	SH-F (PLUMBING)	750 x 1000
5	SH-B (PLUMBING)	750 x 1000	20	SH-G (PLUMBING)	750 x 1000
6	SH-C (PLUMBING)	750 x 1000	21	SH-H (PLUMBING)	750 x 1000
7	SH-D (PLUMBING)	750 x 1000	22	PLUMBING DUCT-02	2870 x 1430
8	PLUMBING DUCT-01	2870 x 1430	23	TELE SHAFT-02	895 x 1640
9	TELE SHAFT-01	1430 x 599	24	ELECTRICAL SHAFT-02-A	2300 x 300
10	ELECTRICAL SHAFT-01-A	1500 x 300	25	ELECTRICAL SHAFT-02-B	1400 x 500
11	ELECTRICAL SHAFT-01-B	1500 x 500	26	FIRE SHAFT-02	1125 x 1640
12	FIRE SHAFT-01	1347 x 1430	27	AHU F/A SHAFT-02	1200 x 600
13	AHU F/A SHAFT-01	1200 x 600	28	E.BUS DUCT-02	1000 x 500
14	PRESSURIZATION SHAFT-P1	2800 x 1100			
15	LIFT LOBBY F/A SHAFT-01	1500 x 1000			

GENERAL NOTES

BRIEF SPECIFICATIONS

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
02	FIRST SUBMISSION FOR APPROVAL	ABS/ANIL	ACHYUT	VISH	23.11.2015

KEY PLAN

APPROVAL BY DMRC

ARCHITECTURE	AM/MD	DY.CA-III	CA
STRUCTURE	AM/DESIGN	DY.CE/DESIGN	ED/TECHNICAL
ELECTRICAL	AE/M/E & M	DGM/E	CE/E&M
CIVIL	AGM/CIVIL	CE/GENERAL	
TELECOMM	AGM/TELE	CSTE	
FIRE	FIRE OFFICER		

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan

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ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI
Ph. No. +91-044-42088254.

DRAWN BY: MEGANA
CHECKED BY: ACHYUT
VERIFIED BY: VISH
NORTH

DELHI METRO RAIL CORPORATION LTD.

PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: DUCT SCHEDULE (SECOND FLOOR PLAN)
STATUS: FOR APPROVAL
DRAWING NO: VARIER/DMRC/BCP/PDAR/02
DATE: 23-11-2015
SCALE: 1:225
REV NO: R0

ARCHITECTURAL

126	-	210	-	252	-
144	-	240	-	288	-
156	-	260	-	312	-
180	-	300	-	360	-
100	126	170	210	204	252
120	145	200	240	240	280
138	180	230	300	276	360
150	198	250	330	300	356
108	132	180	220	216	264
126	156	210	250	252	312
138	168	230	280	276	336

Note 1 : (a) For all non-residential buildings, the traffic cleared in 50 min. is considered adequate and is approved by Authority. As such for calculating the No. of lifts required, the rate of the clearance of traffic in Col. 9 & 10 and the population may be taken into consideration,.

(b) In addition to total number of lifts required as above, provision of one lift of the same capacity may be considered to serve as standby.

Note 2 : The population may be worked out on the basis of the useful carpet area which the persons occupy (excluding area of verandah, lobbies, halls, passages, lavatory blocks etc.).

Note 3 : The population on ground and first floor may not be taken into consideration since these floors are not generally served by lifts.

Note 4 : 0.75 metre per sec. equivalent to 150 ft. per min.
1.00 metre per sec. equivalent to 200 ft. per min.
1.5 metre per sec. equivalent to 300 ft. per min.

Note 5 : The heights of building for lift installation *i.e.* the travel on the lift presumed in the above statements is as below -

(1) 7 Floors 21.0 m.
(2) 11 Floors 33.0 m.
(3) 16 Floors 48.0 m.
(4) 21 Floors 64.0 m.

APPENDIX 'L'

NUMBER AND TYPE OF LIFTS FOR DIFFERENT OCCUPANCIES AND SPACES FOR ELECTRICAL INSTALLATIONS

(Bye-laws No. 21.1 and 21.2)

L-I. The number and type of lifts required depending on the capacity of lift, desired speed, nature of operation are as given in Tables 22 and 23

TABLE 22

NUMBER AND TYPE OF LIFTS FOR NON-RESIDENTIAL MULTISTOREYED BUILDING

S. No.	No. of floors	Capacity of lifts in persons	Speed in mls	No. of persons that can be carried by a lift in 6 Min	
				Manually Operated	Automatic
1.	7	6	0.6-.75	17	-
2.	7	8	0.6-.75	22	-
3.	7	10	0.6-.75	26	-
4.	7	10	1	30	-
5.	7	13	1	37	-
6.	11	6	0.6-.75	11	-
7.	11	8	0.6-.75	15	-
8.	11	10	0.6-.75	18	-
9.	11	13	0.6-.75	22	-
10.	11	10	1	21	-
11.	11	10	1.5	24	-
12.	11	13	1.5	28	-
13.	11	13	1.5	32	-
14.	16	10	1	17	-
15.	16	13	1	20	24
16.	16	13	1.5	23	30
17.	16	16	1.5	25	33
18.	21	10	1.5	18	32
19.	21	13	1.5	21	26
20.	21	16	1.5	23	28

No. of persons that can be carried by a lift					
In 30 Min		In 50 Min		In 60 Min	
Manually operated	Automatic	Manually operated	Automatic	Manually operated	Automatic
102	-	170	-	204	-
132	-	220	-	264	-
156	-	260	-	312	-
180	-	300	-	360	-
122	-	370	-	444	-
70	-	115	-	140	-
90	-	150	-	180	-
108	-	180	-	216	-
132	-	220	-	264	-

ANNEXURE- 6B

CARPET AREA ,COMMON AREA & CIRCULATION AREA STATEMENT FOR BCP-PD

All areas are in Sqm (ANNEXURE-10)

[A] CARPET AREA (SQ MT.) (INCLUDING TOILET , PANTRY & AHU RM. AREAS & EXCLUDING BALCONY AREA)

Sl.No	FLOOR NAME	WEST SIDE						
		AREA - AR1	DEDUCTION(DUCT)	Total	AHU ROOM - AR3	DEDUCTION(DUCT)	Total	Total Area
2	GROUND FLOOR	1004.14	4.59	999.55	88.76	20.32	68.44	1067.99
3	FIRST FLOOR	961.91	4.59	957.32	88.76	20.32	68.44	1025.76
4	SECOND FLOOR	961.91	4.59	957.32	88.76	20.32	68.44	1025.76
4	THIRD FLOOR	961.91	4.59	957.32	88.76	20.32	68.44	1025.76
5	FOURTH FLOOR	765.63	4.59	761.04	88.76	20.32	68.44	829.48
							Total	4974.76

Sl.No.	FLOOR NAME	EAST SIDE						
		AREA - AR2	DEDUCTION(DUCT)	Total	AHU ROOM - AR4	DEDUCTION(DUCT)	Total	Total Area
1	GROUND FLOOR	990.92	4.59	986.33	87.77	17.39	70.38	1056.71
2	FIRST FLOOR	970.71	4.59	966.12	87.77	17.39	70.38	1036.50
3	SECOND FLOOR	970.71	4.59	966.12	87.77	17.39	70.38	1036.50
4	THIRD FLOOR	970.71	4.59	966.12	87.77	17.39	70.38	1036.50
5	FOURTH FLOOR	774.46	4.59	769.87	87.77	17.39	70.38	840.25
							Total	5006.45

SL.NO	FLOOR NAME	Total floor (East +West)
2	GROUND FLOOR	2124.70
3	FIRST FLOOR	2062.26
4	SECOND FLOOR	2062.26
5	THIRD FLOOR	2062.26
6	FOURTH FLOOR	1669.73
TOTAL CARPET AREA (SQ MT.)		9981.21

[B] COMMON AREA (SQ MT) (INCLUDES PASSAGES,STAIRCASE)

Sl.No	FLOOR NAME	AREA - AR 5	DEDUCTION(DUCT)	Total	STAIRCASE AREA	Total
1	BASEMENT AREA	139.52	1.86	137.66	117.12	254.78
2	GROUND FLOOR	302.14	1.86	300.28	36.76	337.04
3	FIRST FLOOR	389.53	31.37	358.16	107.68	465.84
4	SECOND FLOOR	389.53	31.37	358.16	107.68	465.84
5	THIRD FLOOR	389.53	31.37	358.16	107.68	465.84
6	FOURTH FLOOR	389.53	31.37	358.16	107.68	465.84
					Total	2455.18

SUMMARY

Sl.No	FLOOR NAME	TOTAL CARPET AREA (SQ MT.) [A]	TOTAL COMMON AREA (SQ MT.) [B]	TOTAL AREA UNDER SERVICES
1	BASEMENT FLOOR	0.00	254.78	244.64
2	GROUND FLOOR	2124.70	337.04	48.32
3	FIRST FLOOR	2062.26	465.84	31.33
4	SECOND FLOOR	2062.26	465.84	31.32
5	THIRD FLOOR	2062.26	465.84	31.32
6	FOURTH FLOOR	1669.73	465.84	31.32
7	TERRACE FLOOR	0.00	0.00	743.11
	GRAND TOTAL (SQ MT.)	9981.21	2455.18	1161.35

[C] SERVICES

Sl.No.	FLOOR NAME	AREA - sqm	DEDUCTION(DUCT)	Total
1	BASEMENT AREA	246.94	2.30	244.64
2	GROUND FLOOR	57.91	9.59	48.32
3	FIRST FLOOR	40.91	9.59	31.32
4	SECOND FLOOR	40.91	9.59	31.32
5	THIRD FLOOR	40.91	9.59	31.32
6	FOURTH FLOOR	40.91	9.59	31.32
7	TERRACE FLOOR	803.56	60.45	743.11
Total				1161.35

External Open DG Area : 139.60Sqm

DELHI METRO RAIL CORPORATION LTD.

Metro Bhawan, Fire Brigade Lane,Barakhamba Road,New Delhi-110001

(1). ARCHITECTURAL DRAWINGS(30-08-2018)

PROPOSED PROPERTY DEVELOPMENT
ABOVE U/G METRO STATION
AT BHIKAJI CAMA PLACE,NEW DELHI
FOR
DELHI METRO PROJECT LINE - 7

CONSULTING ARCHITECT:

VISHWANNATH ASSOCIATES

#31,2ND CROSS,8 TH MAIN,OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52 ,Ph. No. 91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

Email: admin@vishwannathassociates.net
Website : www.vishwannathassociates.com

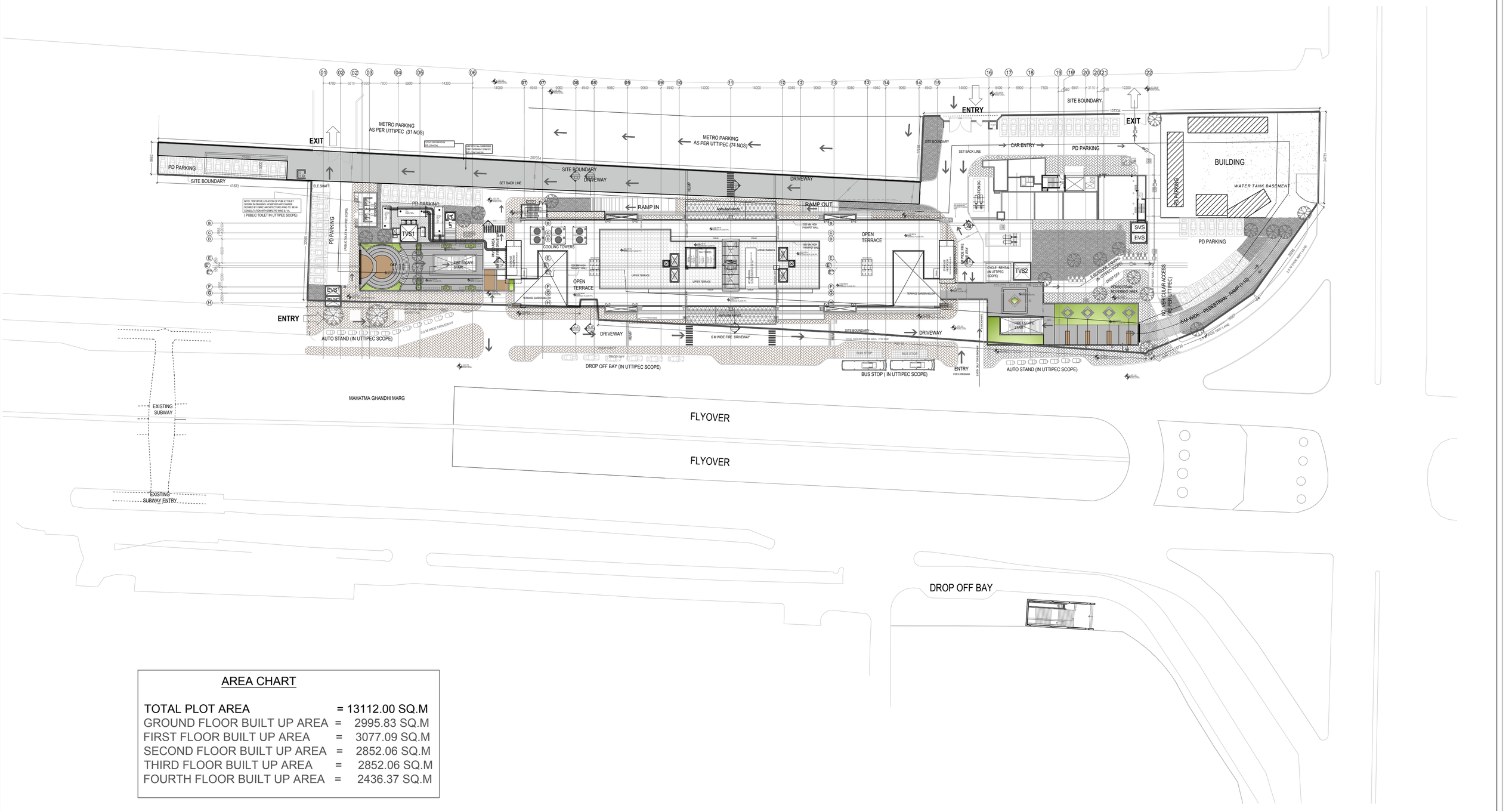
DELHI METRO RAIL CORPORATION LTD.

Metro Bhawan, Fire Brigade Lane,Barakhamba Road,New Delhi-110001

LIST OF DRAWINGS

SR.NO.	DRAWING TITLE	DRAWING NO.
01.	SITE PLAN	VA/BLR/DMRC/BCP-PD/AR-01
02.	BASEMENT FLOOR PLAN	VA/BLR/DMRC/BCP-PD/AR-02
03.	GROUND FLOOR PLAN	VA/BLR/DMRC/BCP-PD/AR-03
04.	FIRST FLOOR PLAN	VA/BLR/DMRC/BCP-PD/AR-04
05.	SECOND FLOOR PLAN	VA/BLR/DMRC/BCP-PD/AR-05
06.	THIRD FLOOR PLAN	VA/BLR/DMRC/BCP-PD/AR-06
07.	FOURTH FLOOR PLAN	VA/BLR/DMRC/BCP-PD/AR-07
08.	TERRACE FLOOR PLAN	VA/BLR/DMRC/BCP-PD/AR-08
09.	SECTION -AA	VA/BLR/DMRC/BCP-PD/AR-09
10.	SECTION -EE	VA/BLR/DMRC/BCP-PD/AR-13
11.	ELEVATION (NORTH SIDE)	VA/BLR/DMRC/BCP-PD/AR-14
12.	SIDE ELEVATION (EASTSIDE)	VA/BLR/DMRC/BCP-PD/AR-15

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION
AT BHIKAJI CAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7



AREA CHART

TOTAL PLOT AREA	=	13112.00 SQ.M
GROUND FLOOR BUILT UP AREA	=	2995.83 SQ.M
FIRST FLOOR BUILT UP AREA	=	3077.09 SQ.M
SECOND FLOOR BUILT UP AREA	=	2852.06 SQ.M
THIRD FLOOR BUILT UP AREA	=	2852.06 SQ.M
FOURTH FLOOR BUILT UP AREA	=	2436.37 SQ.M

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2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. ANY DISCREPANCIES MUST BE BROUGHT TO THE NOTICE OF THE DMRC & ARCHITECTS BEFORE EXECUTION OF WORK AT SITE.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL ,STRUCTURAL,PLUMBING & FIRE FIGHTING, ELECTRICAL & TRAFFIC MANAGEMENT DRAWING.
5. ALL DOOR ,WINDOW CILL & LINTEL LEVELS ARE TO BE MEASURED FROM MAIN FLOOR FINISHED LEVELS.

BRIEF SPECIFICATIONS

1.R.C.C. FRAMED STRUCTURE
2.ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 230 MM & 115 MM THK AS PER DRAWING OF FLY ASH BRICK.
3. ALL INTERNAL WALL PLASTERING ARE TO BE IN CM:1:6
4.ALL EXTERNAL WALLS PLASTERING TO BE IN CM:1:4
5.INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC .
6.EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7.METAL LIN INSULATED FIRE RATED DOORS/NON FIRE RATED DOORS/TOUGHNED GLASS DOORS.
8.ALUMINIUM CURTAIN WALLING FOR STRUCTURAL GLAZING AS PER ELEVATION.
11.EXTERNAL CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC.,AS PER ELEVATION.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FIRE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRAWINGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP 2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	REVISED AS PER UTILITYSERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	19-08-15
R2	Revised As per DMRC Meetings on 5,6 ,7th Aug.2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	29-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	10-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	D5	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	D6a	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D6	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

Authorized Signatory for DMRC

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS
VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
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DRAWN BY : ACHYUT
CHECKED BY : VITHAL
VERIFIED BY : VISH
NORTH :

DELHI METRO RAIL CORPORATION LTD.

PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

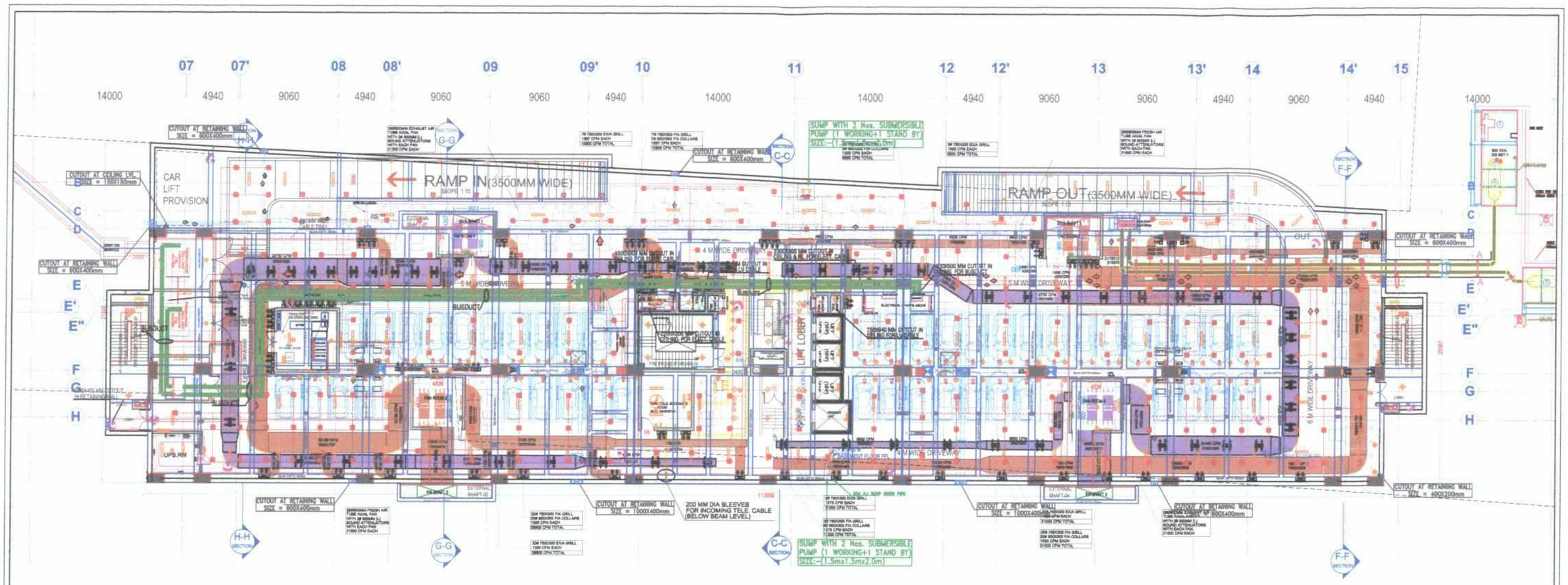
DRAWING TILTLE: SITE PLAN

STATUS: TENDER DRAWING

DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/01

DATE: 30-08-2018 **SCALE:** 1: 500 **REV NO:** R15

ARCHITECTURAL



BASEMENT PARKING

BASEMENT STACK PARKING- 45x2 = 90 nos

BASEMENT SURFACE PARKING = 38 nos

TOTAL NO. OF BASEMENT PARKING =128 nos

INDEX		
SR.NO	DESCRIPTION	COLOUR CODE
1	FIRE FIGHTING LAYOUT	
2	HVAC (FRESH AIR DUCT)	
3	HVAC (EXHAUST AIR DUCT)	
4	ELECTRICAL LAYOUT	
5	PLUMBING LAYOUT	
6	STRUCTURAL (BEAM LAYOUT)	
7	BUS DUCT (ELECTRICAL)	
8	ELE.TRENCH (IN BASEMENT FLR.LVL.)	
9	POWER CABLE TRAY	
10	TELEPHONE ,TV AND FIRE CABLE TRAY	

11	IP CCTV CAMERA LAYOUT	
9	STACK PARKING (MECHANICAL PARKING	
10	STATION DG EXHAUST PIPE	

11 ELECTRICAL SUPPLY REQUIREMENTS FOR 60 I/M MECHANICAL PARKING (CLIENT'S SCOPE)

INCOMING SUPPLY :-
3Ph 415VAC (± 10%), 50Hz (± 2%), WITH NEUTRAL & EARTH (3PH+N+E) PER UNIT

CONTROL SWITCHGEAR :-
4 POLE RCBO (OR ELCB+MCB) 16 AMP, (SENSITIVITY/LEAKAGE CURRENT) 100mA PER UNIT

INCOMING CABLE SIZE :-
5 CORE X 2.5 SQ. mm FLEXIBLE COPPER MULTI CORE CABLE (3PH+N+E) FROM MAIN SWITCH TO CONTROL PANEL UNIT. (PER UNIT.)
OR 4 CORE X 2.5 Sq. mm FLEXIBLE COPPER MULTI CORE CABLE (3PH+N) FROM MAIN SWITCH TO CONTROL PANEL UNIT & SEPARATE EARTH WIRE HAS TO BE PROVIDED (PER UNIT OR AS PER THE LOCAL REGULATIONS.)

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BRIEF SPECIFICATIONS

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE

KEY PLAN

APPROVAL BY DMRC:

Certified that this Document/Drawing has been designed & checked in accordance with DDC Quality Assurance Plan.

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

DRAWN BY : MADHUPRIYA
CHECKED BY : ACHYUT
VERIFIED BY : VISH
NORTH

DELHI METRO RAIL CORPORATION LTD.

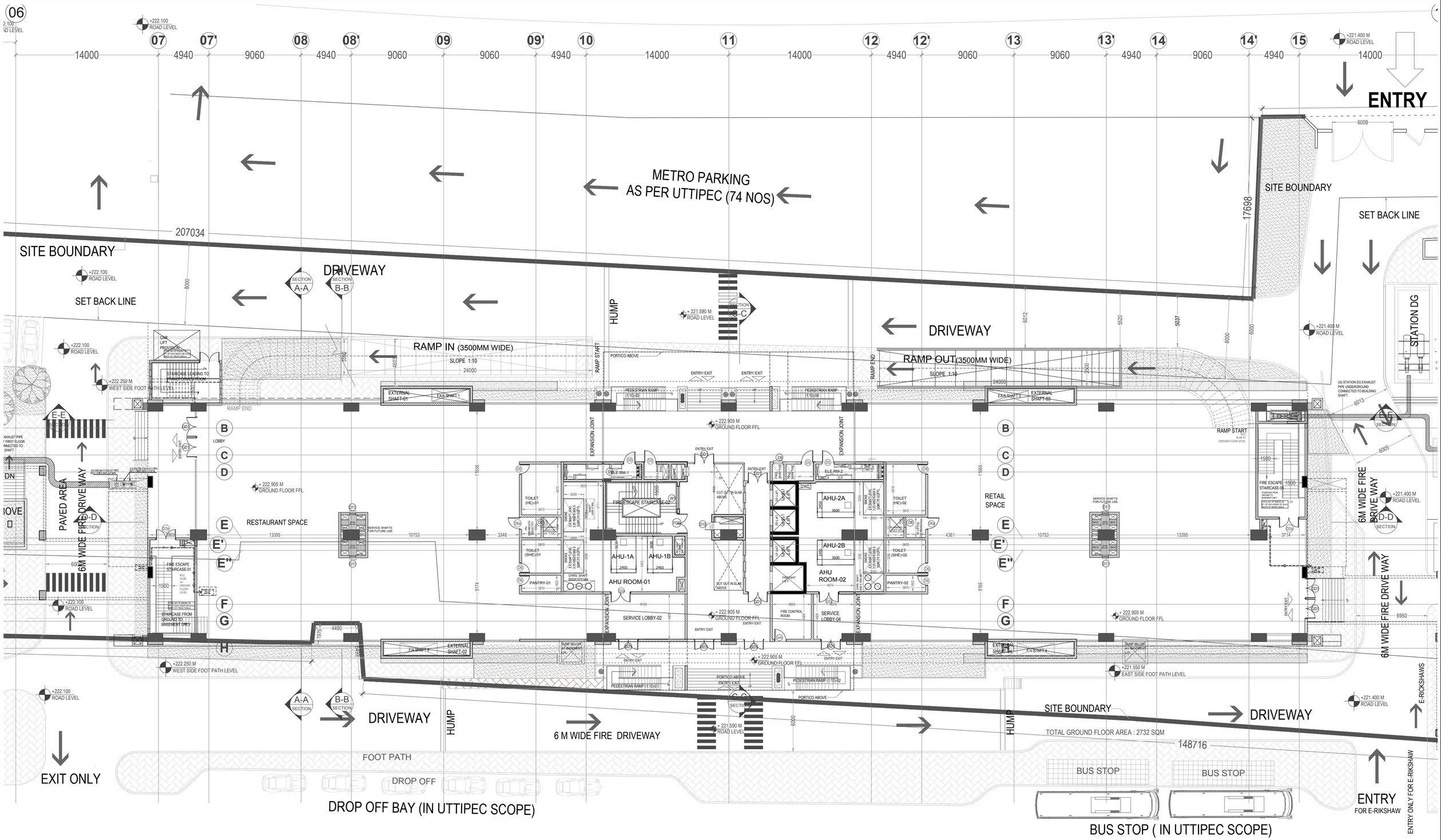
PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TITLE: CROSS SECTIONS(CC,FF,GG,HH) STATUS:

DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/CSD/B/02

DATE: 25-08-2016 SCALE: 1:175 REV NO: R0

ARCHITECTURAL



GROUND FLOOR BUILT UP AREA=2995.83 SQ.M

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER & LEVELS ARE IN METERS UNLESS OTHERWISE STATED.
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. ANY DISCREPANCIES MUST BE BROUGHT TO THE NOTICE OF THE DMRC & ARCHITECTS BEFORE EXECUTION OF WORK AT SITE.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL ,STRUCTURAL,PLUMBING & FIRE FIGHTING, ELECTRICAL & TRAFFIC MANAGEMENT DRAWING.
5. ALL DOOR ,WINDOW CILL & LINTEL LEVELS ARE TO BE MEASURED FROM MAIN FLOOR FINISHED LEVELS.

BRIEF SPECIFICATIONS

1. R.C.C. FRAMED STRUCTURE
2. ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 200 MM & 115 MM THK AS PER DRAWING OF FLY ASH BRICK.
3. ALL INTERNAL WALL PLASTERING ARE TO BE IN CM 1:6
4. ALL EXTERNAL WALL PLASTERING IN CM 1:4
5. INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC .
6. EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7. METAL UN INSULATED FIRE RATED DOORS/NON FIRE RATED
8. DOORS:TOUGHNED GLASS DOORS
10. WINDOWS : DOOR STRUCTURAL GLAZING AS PER ELEVATION.
11. EXTERNAL CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC.,AS PER ELEVATION.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FIRE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRWINGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP.2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	REVISED AS PER UTILITY/SERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	10-08-15
R2	Revised As per DMRC Meetings on 5.6 ,7th Aug.2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	10-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	DG	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	D6a	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D6	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

THIS DRAWING IS THE PROPERTY OF DELHI METRO RAIL CORPORATION LTD.

Authorized Signatory for DMRC 180 Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS
VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

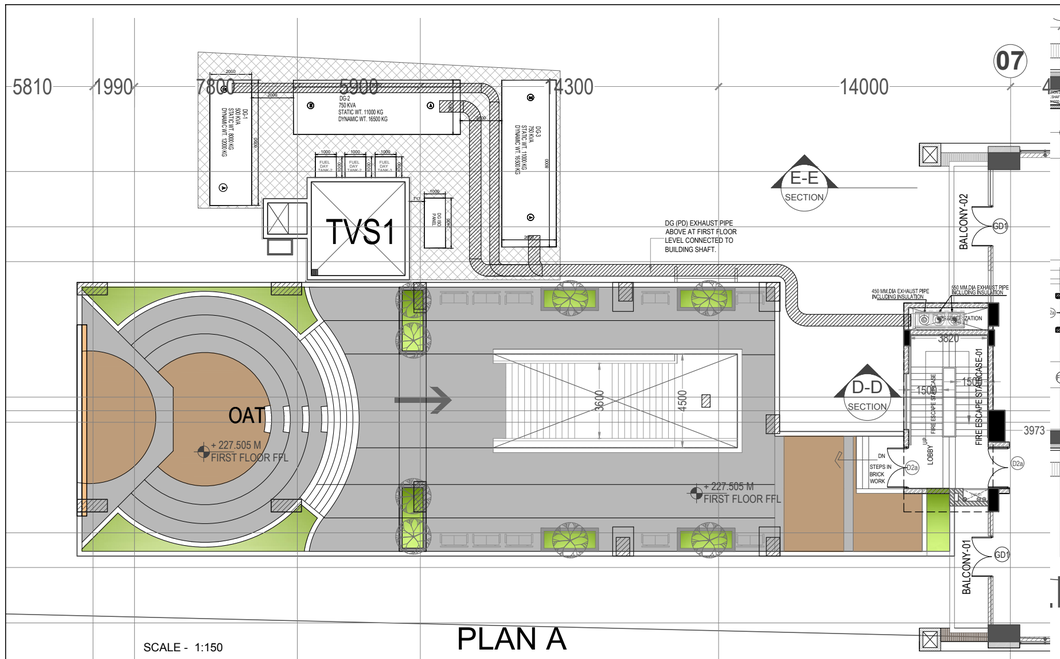
DRAWN BY : ACHYUT
CHECKED BY : VITHAL
VERIFIED BY : VISH
NORTH : N W E S

DELHI METRO RAIL CORPORATION LTD.

PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

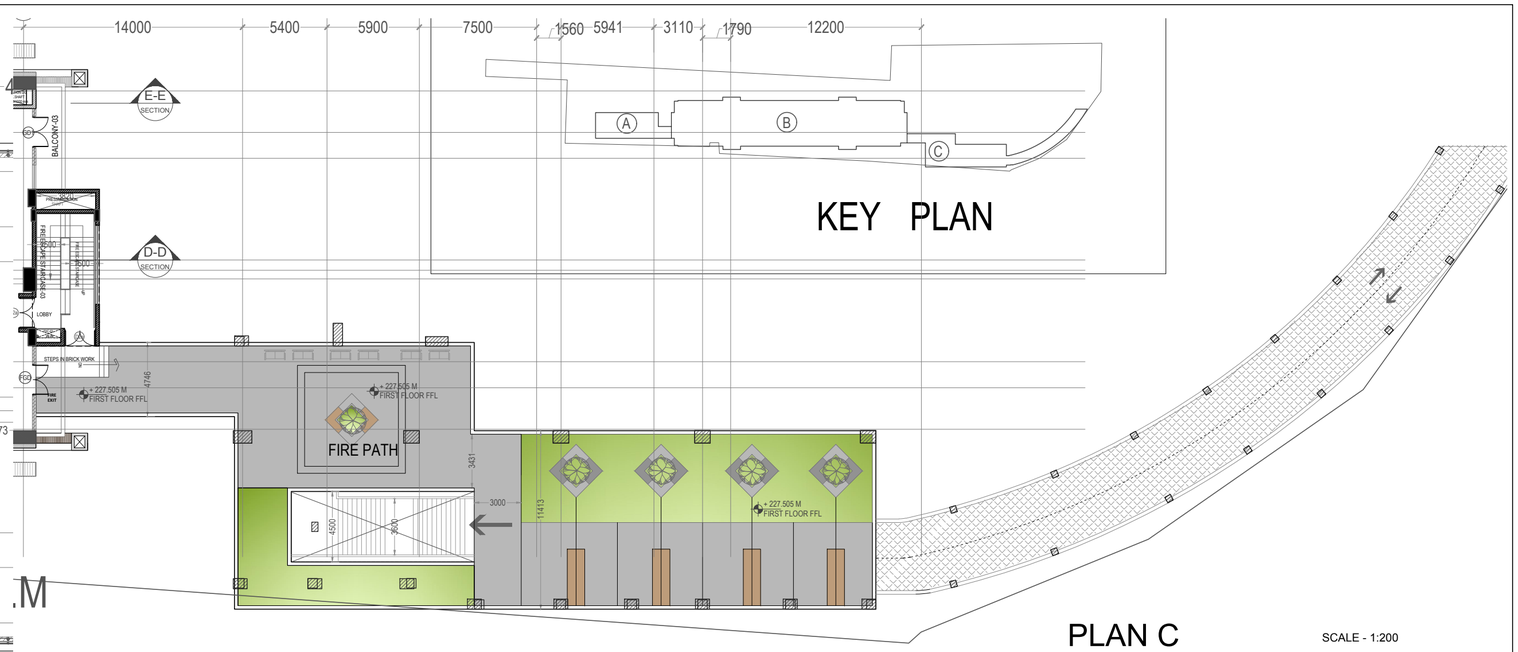
DRAWING TILTLE: GROUND FLOOR PLAN
DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/03
DATE: 30-08-2018 **SCALE:** 1:175
STATUS: TENDER DRAWING
REV NO: R15

ARCHITECTURAL

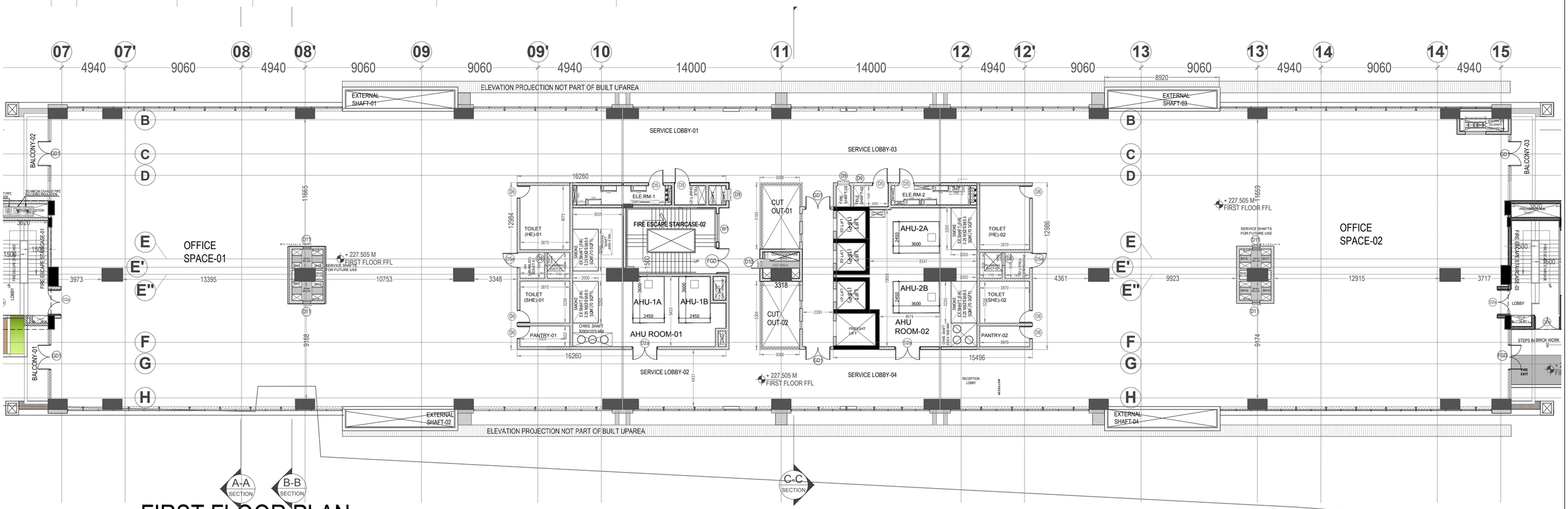


SCALE - 1:150

PLAN A



SCALE - 1:200



FIRST FLOOR PLAN

SCALE -1:150

PLAN B

FIRST FLOOR BUILT UP AREA=3077.09 SQ.M

THIS DRAWING IS THE PROPERTY OF DELHI METRO RAIL CORPORATION LTD.

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER & LEVELS ARE IN METERS UNLESS OTHERWISE STATED.
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. ANY DISCREPANCIES MUST BE BROUGHT TO THE NOTICE OF THE DMRC & ARCHITECTS BEFORE EXECUTION OF WORK AT SITE.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL ,STRUCTURAL,PLUMBING & FIRE FIGHTING, ELECTRICAL & TRAFFIC MANAGEMENT DRAWING.
5. ALL DOOR ,WINDOW CILL & LINTEL LEVELS ARE TO BE MEASURED FROM MAIN FLOOR FINISHED LEVELS.

BRIEF SPECIFICATIONS

1.R.C.C. FRAMED STRUCTURE
2.ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 230 MM & 115 MM THK AS PER DRAWING OF FLY ASH BRICK.
3. ALL INTERNAL WALL PLASTERING ARE TO BE IN C/M 1:6
4.ALL EXTERNAL WALL PLASTERING ARE IN C/M 1:4
5.INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC .
6.EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7.METAL UN INSULATED FIRE RATED DOORSNON FIRE RATED
8.DOORS:TOUGHNED GLASS DOORS
10.WINDOWS / DOOR STRUCTURAL GLAZING AS PER ELEVATION.
11.EXTERNAL CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC. AS PER ELEVATION.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FIRE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRAWGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP.2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	REVISED AS PER UTILITY/SERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	19-08-15
R2	Revised As per DMRC Meetings on 5.8 .7th Aug.2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISION FOR APPROVAL	ACHYUT	VITHAL	VISH	16-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	D5	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	D5a	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D6	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

Authorized Signatory for DMRC

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

DRAWN BY : ACHYUT

CHECKED BY : VITHAL

VERIFIED BY : VISH

NORTH :

DELHI METRO RAIL CORPORATION LTD.

PROJECT:

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: FIRST FLOOR PLAN

DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/04

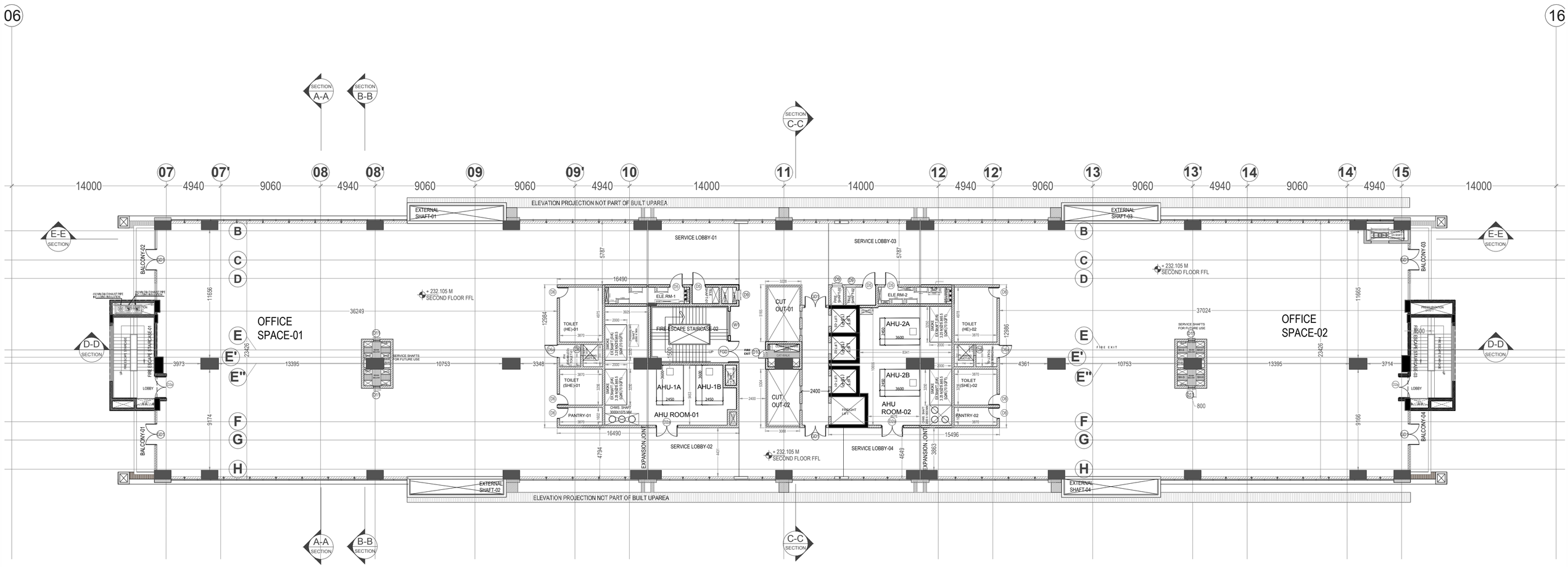
DATE: 30-08-2018

SCALE: 1:150, 1:200, 1:150

STATUS: TENDER DRAWING

REV NO: R15

ARCHITECTURAL



SECOND FLOOR PLAN

SECOND FLOOR BUILT UP AREA=2852.06 SQ.M

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER & LEVELS ARE IN METERS UNLESS OTHERWISE STATED.
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. ANY DISCREPANCIES MUST BE BROUGHT TO THE NOTICE OF THE DMRC & ARCHITECTS BEFORE EXECUTION OF WORK AT SITE.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL ,STRUCTURAL,PLUMBING & FIRE FIGHTING, ELECTRICAL & TRAFFIC MANAGEMENT DRAWING.
5. ALL DOOR ,WINDOW CILL & LINTEL LEVELS ARE TO BE MEASURED FROM MAIN FLOOR FINISHED LEVELS.

BRIEF SPECIFICATIONS

1.R.C.C. FRAMED STRUCTURE
2.ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 230 MM & 115 MM THK AS PER ARCHITECTURAL DRAWINGS.
3. ALL INTERNAL WALL PLASTERING ARE TO BE IN CM 1:6
4. ALL EXTERNAL PLASTERING ARE TO BE OF CM 1:5
5.INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC.
6.EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7.METAL/ALUMINIUM FIRE RATED DOORS/NON FIRE RATED DOORS AS PER ARCHITECTURAL DRAWINGS.
10.WINDOWS / DOOR STRUCTURAL GLAZING AS PER ELEVATION.
11.EXTERNAL CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC. AS PER ELEVATION.

THIS DRAWING IS THE PROPERTY OF DELHI METRO RAIL CORPORATION LTD.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FREE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRAWINGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP.2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	REVISED AS PER UTILITY/SERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	10-08-15
R2	Revised As per DMRC Meetings on 5.6 ,7th Aug.2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	10-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	D5	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	D8a	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D8	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

Authorized Signatory for DMRC 182

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

DRAWN BY : ACHYUT

CHECKED BY : VITHAL

VERIFIED BY : VISH

NORTH :

DELHI METRO RAIL CORPORATION LTD.

PROJECT:

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

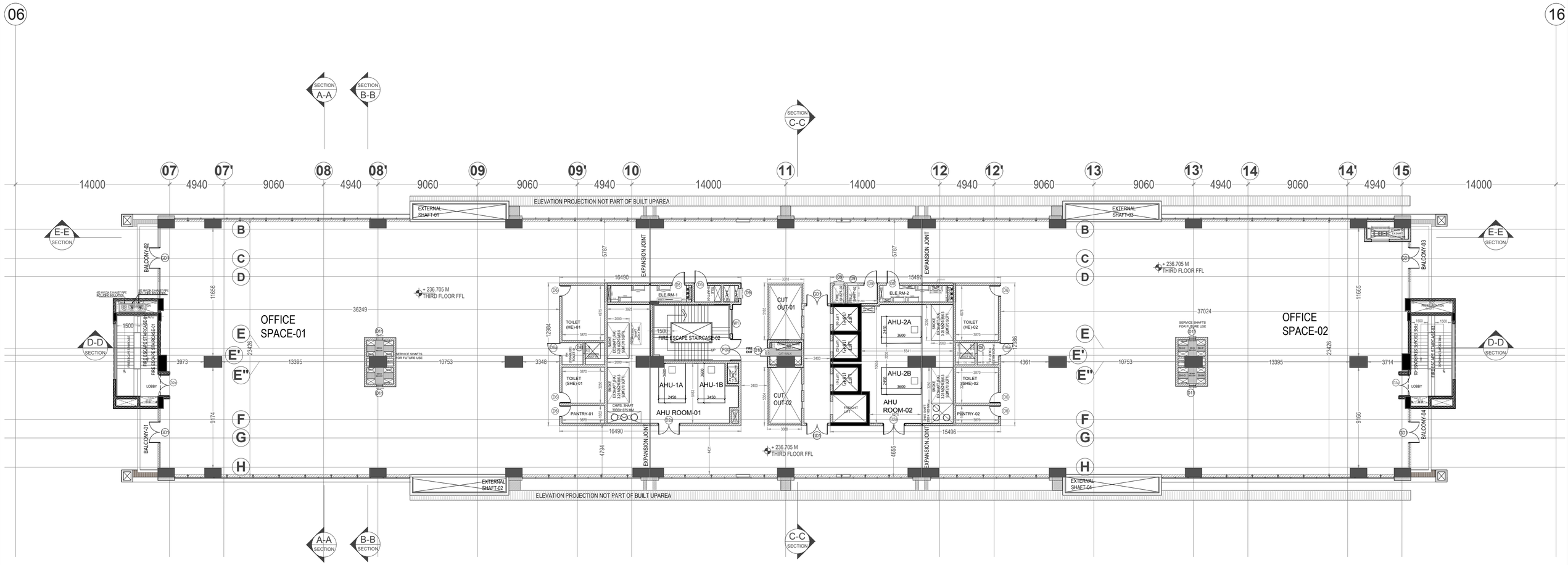
DRAWING TILTLE: SECOND FLOOR PLAN

STATUS: TENDER DRAWING

DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/05

DATE: 30-08-2018 **SCALE:** 1:175 **REV NO:** R15

ARCHITECTURAL


06
16
07
07'
08
08'
09
09'
10
11
12
12'
13
13'
14
14'
15
14000
4940
9060
9060
4940
9060
9060
4940
14000
14000
4940
9060
9060
4940
14000
SECTION A-A
SECTION B-B
SECTION C-C
ELEVATION PROJECTION NOT PART OF BUILT UPAREA
EXTERNAL SHAFT-01
EXTERNAL SHAFT-03
EXTERNAL SHAFT-02
EXTERNAL SHAFT-04
E-E SECTION
D-D SECTION
A-A SECTION
B-B SECTION
C-C SECTION
BALCONY-02
BALCONY-01
BALCONY-03
BALCONY-04
OFFICE SPACE-01
OFFICE SPACE-02
+ 236.705 M THIRD FLOOR FFL
EXPANSION JOINT
ELE RM-1
ELE RM-2
FIRE ESCAPE STAIRCASE-01
FIRE ESCAPE STAIRCASE-02
FIRE ESCAPE STAIRCASE-03
FIRE ESCAPE STAIRCASE-04
LOBBY
TOILET (HE)-01
TOILET (SHE)-01
TOILET (HE)-02
TOILET (SHE)-02
PANTRY-01
PANTRY-02
AHU ROOM-01
AHU ROOM-02
AHU-1A
AHU-1B
AHU-2A
AHU-2B
CUT OUT-01
CUT OUT-02
FREIGHT LIFT
SERVICE SHAFTS FOR FUTURE USE
OHWS SHAFT 3000X1375 MM
SMOKE EXHAUST (4+1) 13.5X0.65X1.5 3.5M/S(150PA)
FIRE DOOR(2 HOUR FIRE RATED)
FIRE DOOR(4 HOUR FIRE RATED)
GLAZED FIRE DOOR(2 HOUR FIRE RATED)
FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)
11656
11665
9174
9166
23426
12384
5787
4794
4431
4555
36249
37024
16490
15497
16490
15496
3973
13395
10753
3348
4361
10753
13395
3714
1500
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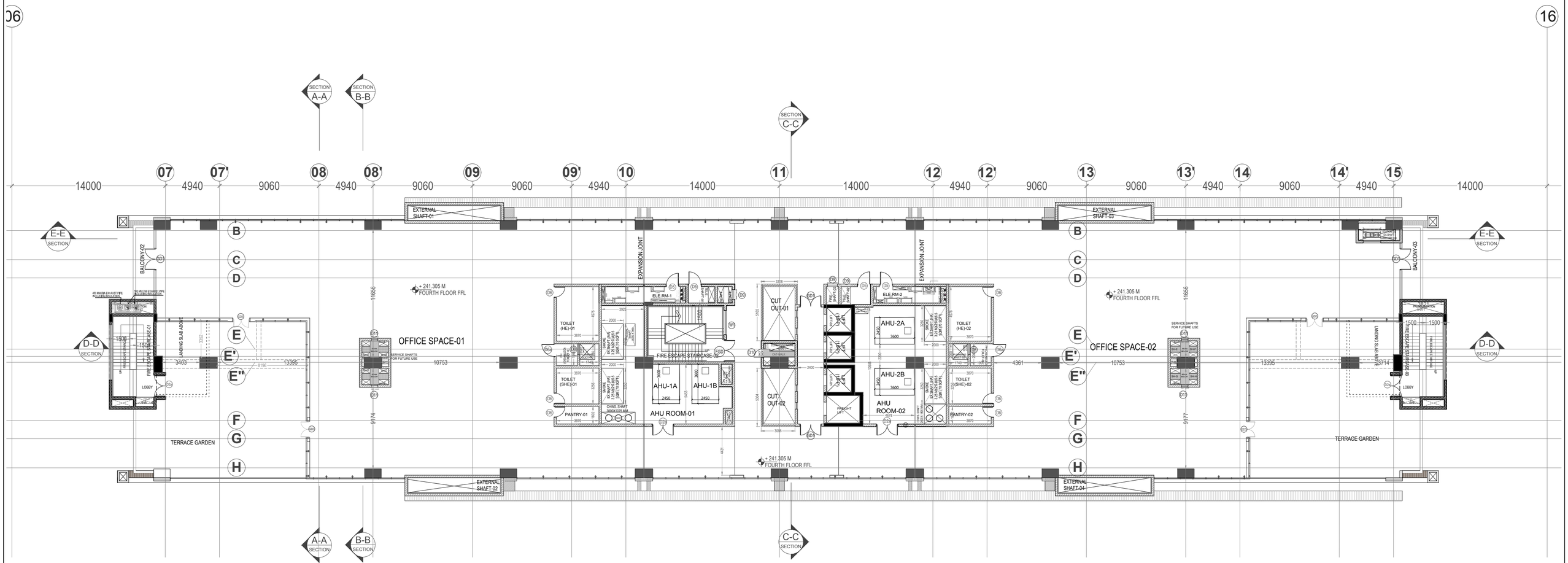
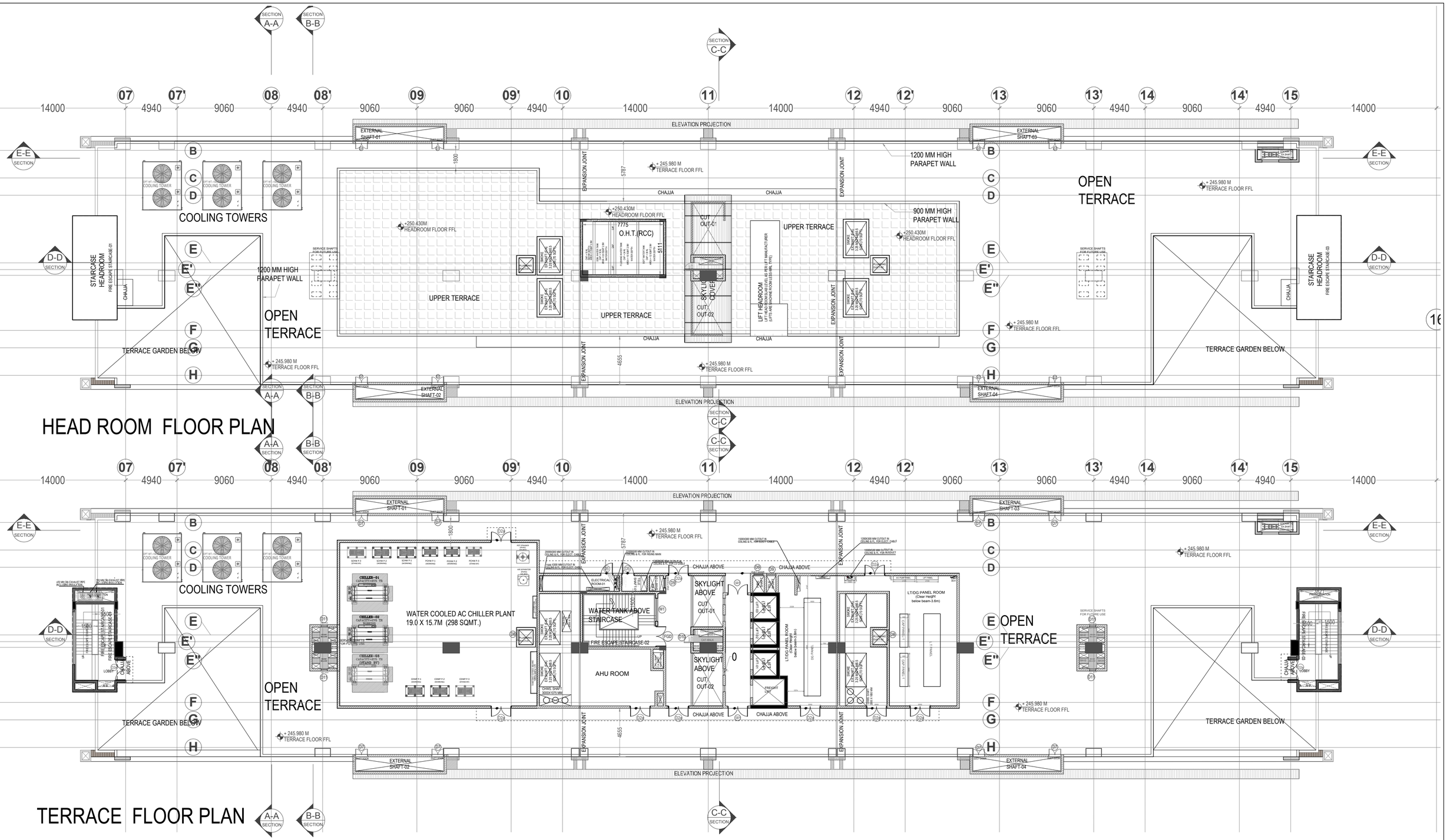

06
16
07
07'
08
08'
09
09'
10
11
12
12'
13
13'
14
14'
15
14000
4940
9060
9060
4940
14000
14000
4940
9060
9060
4940
14000
SECTION A-A
SECTION B-B
SECTION C-C
E-E SECTION
D-D SECTION
EXTERNAL SHAFT-01
EXTERNAL SHAFT-03
EXTERNAL SHAFT-02
EXTERNAL SHAFT-04
EXPANSION JOINT
EXPANSION JOINT
+ 241.305 M FOURTH FLOOR FFL
OFFICE SPACE-01
OFFICE SPACE-02
AHU ROOM-01
AHU ROOM-02
AHU-1A
AHU-1B
AHU-2A
AHU-2B
ELE RM-1
ELE RM-2
FIRE ESCAPE STAIRCASE-01
FIRE ESCAPE STAIRCASE-02
FIRE ESCAPE STAIRCASE-03
FIRE ESCAPE STAIRCASE-04
LANDING SLAB ABOVE
SERVICE SHAFTS FOR FUTURE USE
TOILET (HE)-01
TOILET (SHE)-01
TOILET (HE)-02
TOILET (SHE)-02
PANTRY-01
PANTRY-02
LOBBY
FREIGHT LIFT
CUT OUT-01
CUT OUT-02
TERRACE GARDEN
BALCONY-02
BALCONY-03
A
B
C
D
E
E'
E''
F
G
H
11656
9174
9777
10753
4361
3403
9196
13395
3714
1500
1500
2400
2000
3600
3870
4870
3925
3088
3354
1565
2220
1742
1370
1200
1000
900
2450
3600
3403
5463
1500
1500
1500



HEAD ROOM FLOOR PLAN

TERRACE FLOOR PLAN

TERRACE FLOOR BUILT UP AREA=931.28 SQ.M

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER & LEVELS ARE IN METERS UNLESS OTHERWISE STATED.
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3.ANY DISCREPANCIES MUST BE BROUGHT TO THE NOTICE OF THE DMRC & ARCHITECTS BEFORE EXECUTION OF WORK AT SITE.
4.THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL,PLUMBING & FIRE FIGHTING, ELECTRICAL & TRAFFIC MANAGEMENT DRAWING.
5.ALL DOOR, WINDOW CILL & LINTEL LEVELS ARE TO BE MEASURED FROM MAIN FLOOR FINISHED LEVELS.

BRIEF SPECIFICATIONS

1.R.C.C. FRAMED STRUCTURE.
2.ALL WALLS EXT. 230 MM, INTERNAL WALLS TO BE 230 MM & 115 MM THK AS PLANNED AND AS PER IS 1905.
3. ALL INTERNAL WALL PLASTERING ARE TO BE IN CM 1:6
4. ALL EXTERNAL PLASTERING ARE TO BE OF CM 1:5
5.INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC.
6.EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7.METAL/ALUMINIUM/S.S FIRE RATED DOORS/NON FIRE RATED DOORS/NON FIRE RATED WINDOWS.
10.WINDOWS / DOOR STRUCTURAL GLAZING AS PER ELEVATION.
11.EXTERNAL CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC. AS PER ELEVATION.

THIS DRAWING IS THE PROPERTY OF DELHI METRO RAIL CORPORATION LTD.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FIRE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRAWINGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP 2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	REVISED AS PER UTILITY/SERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	10-08-15
R2	Revised As per DMRC Meetings on 3.& .7th Aug.2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	19-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	D5	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	D5a	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D6	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

Authorized Signatory for DMRC

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS
VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

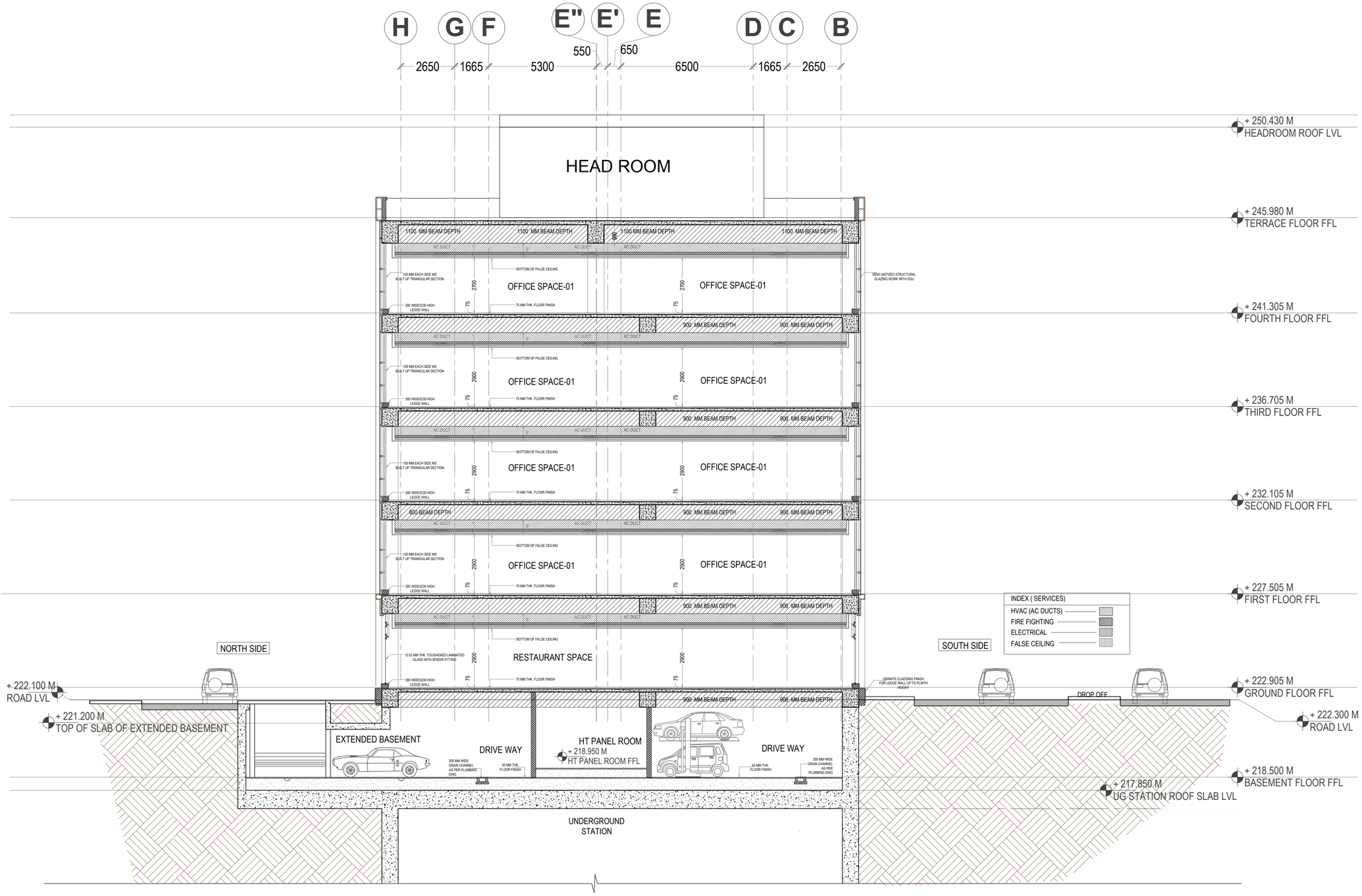
DRAWN BY : ACHYUT
CHECKED BY : VITHAL
VERIFIED BY : VISH
NORTH :

DELHI METRO RAIL CORPORATION LTD.

PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: TERRACE FLOOR PLAN
STATUS: TENDER DRAWING
DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/08
DATE: 30-08-2018
SCALE: 1:175
REV NO: R15

ARCHITECTURAL



SECTION AA

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER & LEVELS ARE IN METERS UNLESS OTHERWISE STATED.
2. ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3. ANY DISCREPANCIES MUST BE BROUGHT TO THE NOTICE OF THE DMRC & ARCHITECTS BEFORE EXECUTION OF WORK AT SITE.
4. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL,PLUMBING & FIRE FIGHTING, ELECTRICAL & TRAFFIC MANAGEMENT DRAWING.
5. ALL DOOR ,WINDOW CILL & LINTEL LEVELS ARE TO BE MEASURED FROM MAIN FLOOR FINISHED LEVELS.

BRIEF SPECIFICATIONS

1.R.C.C. FRAMED STRUCTURE
2.ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 230 MM & 115 MM THK AS PER DRAWING OF FLY ASH BRICK.
3. ALL INTERNAL WALL PLASTERING ARE TO BE IN CM 1:6
4.ALL CEILING TO BE PLASTER OF PARIS FINISH.
5.INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC .
6.EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7.METAL UN INSULATED FIRE RATED DOORS/NON FIRE RATED
8.DOORS/TOUGHNED GLASS DOORS.
10.WINDOWS / DOOR STRUCTURAL GLAZING AS PER ELEVATION.
11.EXTERNAL CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC.,AS PER ELEVATION.

THIS DRAWING IS THE PROPERTY OF DELHI METRO RAIL CORPORATION LTD.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FIRE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRAWINGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP 2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	REVISED AS PER UTILITY/SERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	19-08-15
R2	Revised As per DMRC Meetings on 3,6 ,7th Aug.2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	16-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	DS	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	Dda	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D6	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

Authorized Signatory for DMRC 186 Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52.
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

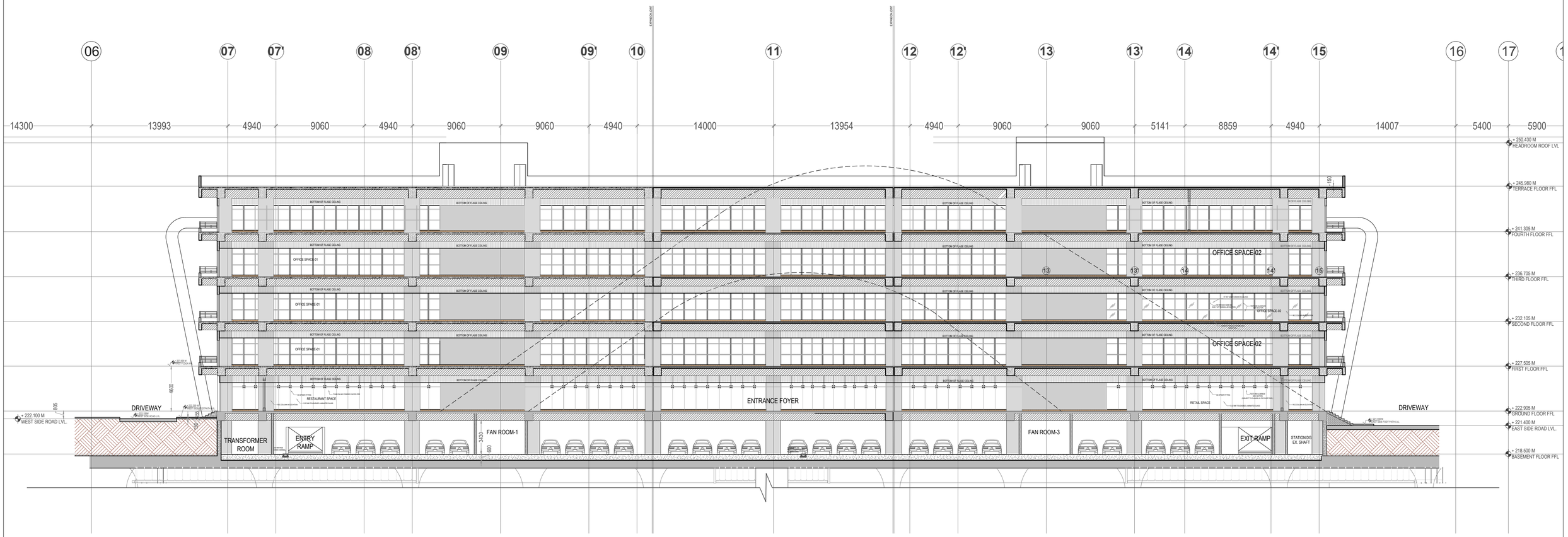
DRAWN BY : ACHYUT
CHECKED BY : VITHAL
VERIFIED BY : VISH
NORTH :

DELHI METRO RAIL CORPORATION LTD.

PROJECT:
PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: SECTION-AA
DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/09
DATE: 30-08-2018
SCALE: 1:100
STATUS: TENDER DRAWING
REV NO: R15

ARCHITECTURAL



SECTION EE

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER & LEVELS ARE IN METERS UNLESS OTHERWISE STATED.
2.ALL DIMENSIONS ARE TO BE READ AND NOT MEASURED.
3.ANY DISCREPANCIES MUST BE BROUGHT TO THE NOTICE OF THE DMRC & ARCHITECTS BEFORE EXECUTION OF WORK AT SITE.
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BRIEF SPECIFICATIONS

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2.ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 230 MM & 115 MM THK AS PER DRAWING OF FLY ASH BRICK.
3. ALL INTERNAL WALL PLASTERING ARE TO BE IN CM 1:6
4.ALL EXTERNAL WALL PLASTERING ARE TO BE IN CM 1:4
5.INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC.
6.EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7.METAL t/h INSULATED FIRE RATED DOOR/NON FIRE RATED
8.DOORS/TOUGHNED GLASS DOORS
9.GLAZING - CURTAIN WALL/DOOR STRUCTURAL GLAZING AS PER ELEVATION.
11.EXTERNAL CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC..AS PER ELEVATION.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FIRE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRAWINGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP 2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	REVISED AS PER UTILITYSERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	19-08-15
R2	Revised As per DMRC Meetings on 5,6 ,7th Aug 2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	10-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	D5	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	D5a	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D6	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

Authorized Signatory for DMRC

Authorised Signatory for DDC

THIS DRAWING IS THE PROPERTY OF DELHI METRO RAIL CORPORATION LTD.

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

DRAWN BY : ACHYUT

CHECKED BY : VITHAL

VERIFIED BY : VISH

NORTH : N W E S

DELHI METRO RAIL CORPORATION LTD.

PROJECT:

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: SECTION -EE

STATUS: TENDER DRAWING

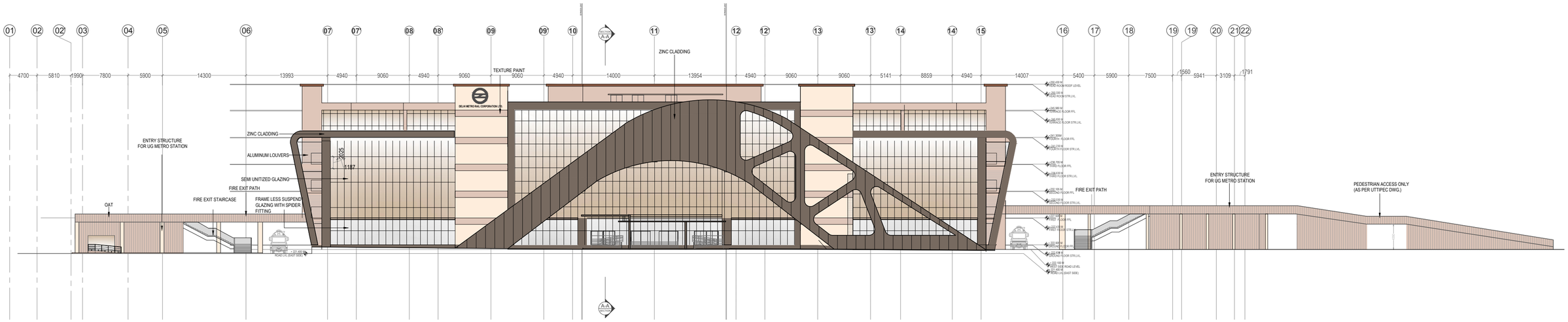
DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/13

DATE: 30-08-2018

SCALE: 1:200

REV NO: R15

ARCHITECTURAL



NORTH SIDE ELEVATION

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GENERAL NOTES:

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BRIEF SPECIFICATIONS

1.R.C.C. FRAMED STRUCTURE
2.ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 230 MM & 115 MM THK AS PER DRAWING OF FLY ASH BRICK.
3. ALL INTERNAL WALL PLASTERING ARE TO BE IN CM 1:6
4. ALL EXTERNAL WALL PLASTERING ARE TO BE IN CM 1:4
5.INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC .
6.EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7.METAL UN INSULATED FIRE RATED DOORSNON FIRE RATED
8.DOORS:TOUGHNED GLASS DOORS
10.WINDOWS / DOOR STRUCTURAL GLAZING AS PER ELEVATION.
11.EXTERNAL CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC. AS PER ELEVATION.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FIRE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRAWGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP.2015 WITH DMRC	ACHYUT	VITHAL	VISH	26-09-15
R4	REVISED AS PER UTILITY/SERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	19-08-15
R2	Revised As per DMRC Meetings on 5.8 ,7th Aug.2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISION FOR APPROVAL	ACHYUT	VITHAL	VISH	16-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	D5	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	D6a	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D6	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

Authorized Signatory for DMRC

188

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS

VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

DRAWN BY : ACHYUT

CHECKED BY : VITHAL

VERIFIED BY : VISH

NORTH :

DELHI METRO RAIL CORPORATION LTD.

PROJECT:

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: ELEVATION (NORTH SIDE)

STATUS: TENDER DRAWING

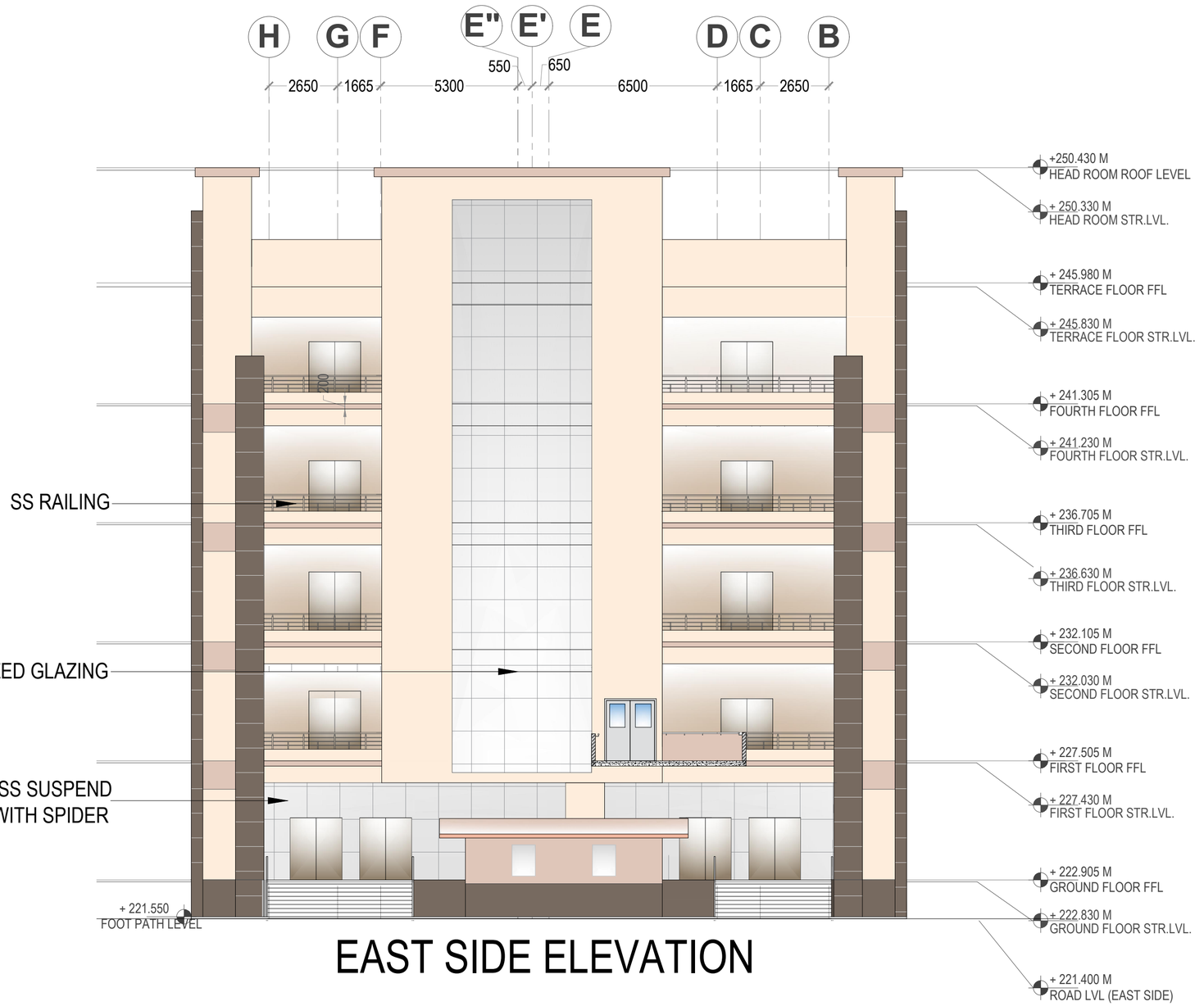
DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/14

DATE: 30-08-2018

SCALE: 1:350

REV NO: R15

ARCHITECTURAL



EAST SIDE ELEVATION

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5. ALL DOOR ,WINDOW CILL & LINTEL LEVELS ARE TO BE MEASURED FROM MAIN FLOOR FINISHED LEVELS.

BRIEF SPECIFICATIONS

1.R.C.C. FRAMED STRUCTURE
2.ALL WALLS EXTERNAL & INTERNAL WALLS TO BE 230 MM & 115 MM THK AS PER DRAWING OF FLY ASH BRICK.
3. ALL INTERNAL PLASTERING ARE TO BE IN CM 1:6
4. ALL EXTERNAL PLASTERING ARE TO BE OF CM 1:5
5.INTERNAL PAINTING IS TO BE IN 2 COATS OF EMULSION WITH LOW VOC.
6.EXTERNAL PAINTING IS TO BE IN 2 COATS OF APEX PAINTING
7.METAL UN INSULATED FIRE RATED DOORS/NON FIRE RATED
8.DOORS/TOUGHNED GLASS DOORS
10.WINDOWS / DOOR STRUCTURAL GLAZING AS PER ELEVATION.
11.ROOFING / CLADDING ACP, ZINC CLADDING, STRUCTURAL GLAZING, ETC, AS PER ELEVATION.

REVISIONS:

REV.	PARTICULARS	DRN.	CHKD.	VER.	DATE
R15	REVISED AS PER CHANGE IN FLOOR HEIGHT	ACHYUT	VITHAL	VISH	30-07-18
R14	REVISED FOR STAIRCASE COLUMNS	MADHU	ACHYUT	VISH	23-05-17
R13	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	28-04-17
R12	REVISED AS PER FIRE OFFICER'S COMMENTS	MADHU	ACHYUT	VISH	07-04-17
R11	REVISED FOR FIRE ESCAPE STAIRCASE	MADHU	ACHYUT	VISH	17-03-17
R10	SUBMITTED TO DMRC (EMAIL)	ACHYUT	VITHAL	VISH	21-04-16
R9	REVISED AS PER ENTRY STRUCTURE COLUMN LAYOUT	ACHYUT	VITHAL	VISH	06-04-16
R8	REVISED FOR AC PLANT & SMOKE SHAFT	ACHYUT	VITHAL	VISH	04-03-16
R7	REVISED FOR FLOOR HEIGHT CHANGE	ACHYUT	VITHAL	VISH	21-10-15
R6	REVISED FOR TENDER DRAWINGS	ACHYUT	VITHAL	VISH	13-10-15
R5	REVISED AS PER MEETING ON 22ND SEP 2015 WITH DMRC	ACHYUT	VITHAL	VISH	29-09-15
R4	REVISED AS PER UTILITY/SERVICES REQUIREMENTS	ACHYUT	VITHAL	VISH	31-08-15
R3	REVISED AS PER DMRC Meetings & future shafts added	ACHYUT	VITHAL	VISH	19-08-15
R2	Revised As per DMRC Meetings on 5,8 ,7th Aug 2015	ACHYUT	VITHAL	VISH	07-08-15
R1	REVISED AS PER DMRC COMMENTS FOR APPROVAL	ACHYUT	VITHAL	VISH	30-07-15
R0	FIRST SUBMISSION FOR APPROVAL	ACHYUT	VITHAL	VISH	10-07-15

DOOR WINDOW SCHEDULE

SL.NO	TYPES	SIZE IN MM	DESCRIPTION
1.	D1	4000 x 2400	MS DOOR(4 HOUR FIRE RATED)
2.	D2	2000 x 2400	DOOR (2 HOUR FIRE RATED)
3.	D2a	2000 x 2400	FIRE DOOR(2HOUR FIRE RATED)
4.	D2b	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
5.	GD1	2000 x 2400	GLASS DOOR
6.	GD2	1200 x 2400	GLASS DOOR
7.	FGD	2000 x 2400	GLAZED FIRE DOOR(2 HOUR FIRE RATED)
8.	D5	1200 x 2400	FIRE DOOR(2 HOUR FIRE RATED)
9.	D6a	1200 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
10.	D6	1000 x 2400	FLUSH DOOR (2 HOUR FIRE RATED)
11.	D7	1200 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
12.	D8	1000 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
13.	D9	900 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
14.	D10	750 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
15.	D11	600 x 2100	DUCT DOOR (2 HOUR FIRE RATED)
16.	W1	2211 x 2400	FIRE RESISTANCE GLASS PARTITION(2 HOUR FIRE RATED)

Authorized Signatory for DMRC

189

Authorised Signatory for DDC

OFFICE OF ORIGIN:

ARCHITECTS
VISHWANNATH ASSOCIATES
#31,2ND CROSS,8 TH MAIN,
OFF PALACE ROAD,
VASANTHNAGAR, BANGALORE - 52
Ph. No. +91-080-22284277

T.T.K ROAD, CHENNAI.
Ph. No. +91-044-42088254.

DRAWN BY : ACHYUT

CHECKED BY : VITHAL

VERIFIED BY : VISH

NORTH : N W E S

DELHI METRO RAIL CORPORATION LTD.

PROJECT:

PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJICAMA PLACE,NEW DELHI FOR DELHI METRO PROJECT LINE - 7

DRAWING TILTLE: SIDE ELEVATION (EAST SIDE)

STATUS: TENDER DRAWING

DRAWING NO: VA/BLR/DMRC/BCP-PD/AR/15

DATE: 30-08-2018

SCALE: 1:100

REV NO: R15

ARCHITECTURAL

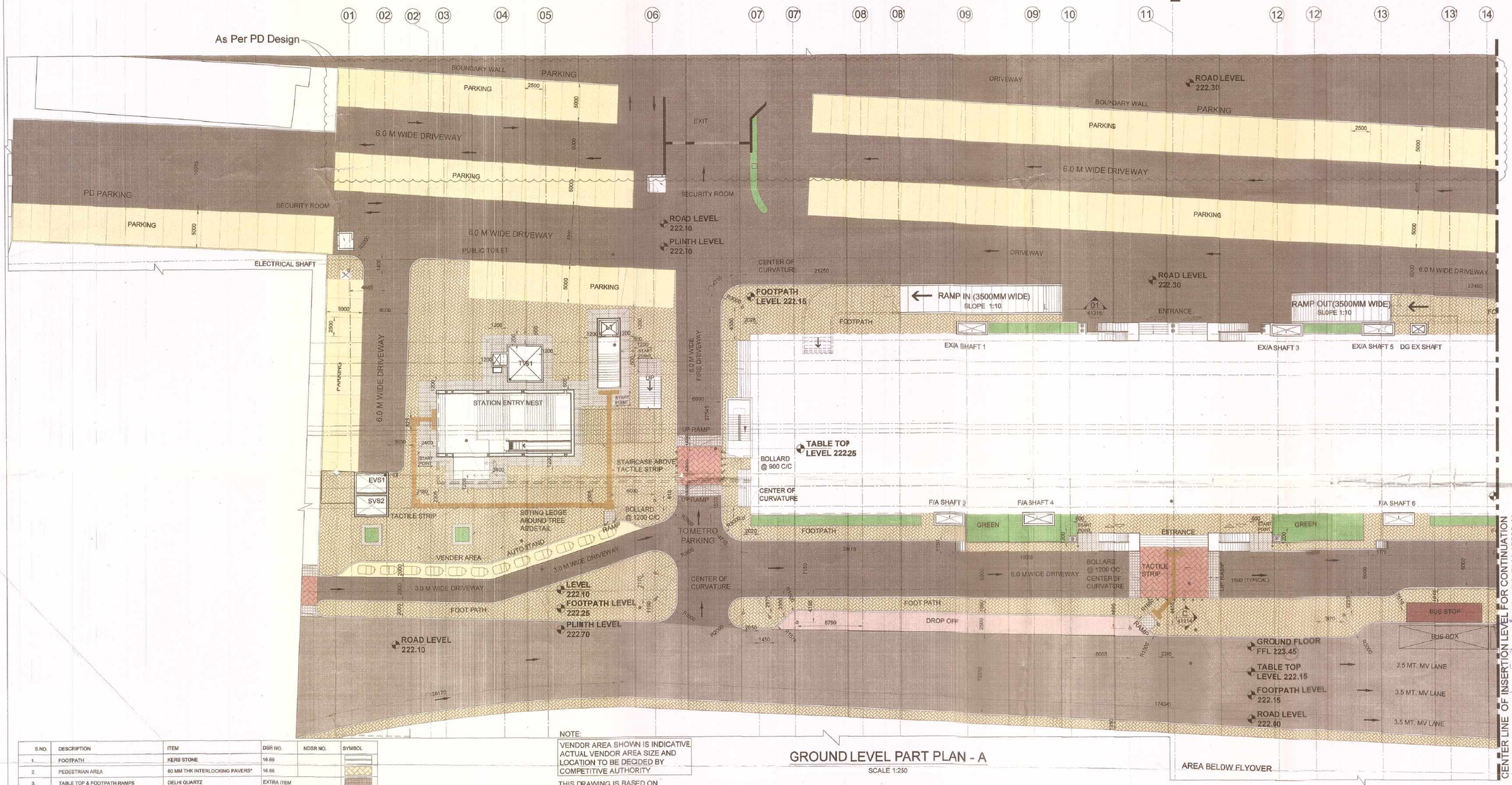
TOWARDS MOTI BAGH

BHIKAJI CAMA PLACE STATION

CH: 22820.083

(CENTRE LINE OF PLATFORM)

TOWARDS SAROJINI NAGAR



S.NO.	DESCRIPTION	ITEM	DSR NO.	NDSR NO.	SYMBOL
1.	FOOTPATH	KERB STONE	16.69		
2.	PEDESTRIAN AREA	60 MM THK INTERLOCKING PAVERS*	16.68		
3.	TABLE TOP & FOOTPATH RAMPS	DELHI QUARTZ	EXTRA ITEM		
4.	STATION ENTRY & SITTING AROUND TREES	FLAMMED GRANITE		2.3	
5.	BUS SHELTER	GRC PAVING TILES		2.17	
6.	CYCLE & RIKSHAW STAND ON NMV TRACK	CEMENT CONCRETE FLOORING	11.3		
7.	NMV TRACK	CEMENT CONCRETE FLOORING	11.3		
8.	GENERAL DROP OFF ON ROAD	METALLED ROAD			
9.	AUTO,CYCLE RICKSHAW & FEEDER STAND ON ROAD	DELHI QUARTZ	EXTRA ITEM		
10.	TABLE TOP	60 MM THK INTERLOCKING PAVERS*	16.68		
11.	LANDSCAPE AREA				
12.	GUIDING AND WARNING PATH	TACTILE FLOORING		3.2.1	

*COLOR OF INTERLOCKING PAVERS WILL BE AS PER DMRC APPROVAL

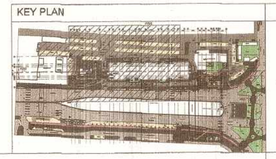
NOTE:
VENDOR AREA SHOWN IS INDICATIVE. ACTUAL VENDOR AREA SIZE AND LOCATION TO BE DECIDED BY COMPETITIVE AUTHORITY

THIS DRAWING IS BASED ON
1) UTTIPEC DRAWING No.- 28/MMI/15
2) ARCHITECTURAL DRAWING NO. CCDD-1R-DTD-BCP-ARC-GAD-15101_R5.dwg

GROUND LEVEL PART PLAN - A

SCALE 1:250

KEY PLAN



NORTH

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AM Arch	Dy.CA / Arch	CAF Arch		Dy GSTE/I	EDS&T - PI
	Dy CEE / VAC	ED/ Electrical		Dy GSTE/II	EDS&T - PII
MNGR/E/G	Dy CEE	CEE/G		Dy CEE/S&T	GM/ S&T
	Dy.CE/Design-I	CE/Design - I		PM	CRM
AGM / E-3	Dy.CE/Design-II	CE/Design - II	MNGR/FIRE		

REV.	PARTICULARS	DRN.	CHD.	VER.	DATE
R1	First Issue	N. Bhardwaj	A. Tyagi	JP. Bergoend	23/03/2016

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SYSTRA

SYSTRA
DETAILED DESIGN CONSULTANT
SYSTRA MVA CONSULTING (INDIA) PVT. LTD.
5TH FLOOR, GURU ANGAD BHAWAN,
71, NEHRU PLACE, NEW DELHI-110019
PH: 26422844, 26413310 FAX: 26224204
SUBSIDIARY OF:
SYSTRA S.A. - 5 AVENUE DJ COQ - PARIS 75009

DRAWN BY	N. Bhardwaj
CHECKED BY	A.Tyagi
VERIFIED BY	JP. Bergoend
DATE	22/12/2015

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DELHI METRO PROJECT LINE - 7

MUKUNDPUR TO YAMUNA VIHAR CORRIDOR

BHIKAJI CAMA PLACE STATION

LANDSCAPE PART PLAN A - 1\2

DRWG. NO. CCDD-1R-DTD-BCP-ARC-PLN-15932 | REV. R1 | SCALE 1:250 | A1 | STATUS FINAL

ARCHITECTURAL

CCDD-1R-DTD-BCP-ARC-PLN-15932_R1.dwg

TOWARDS MOTI BAGH

BHIKAJI CAMA PLACE STATION

CH: 22820.083

TOWARDS SAROJINI NAGAR

CENTER LINE OF INSERTION LEVEL FOR CONTINUATION REF. DRAWING NO. CCDD-1R-DTD-BCP-ARC-PLN-15932_X

CENTER LINE OF INSERTION LEVEL FOR CONTINUATION REF. GROUND LEVEL PLAN - A

CENTER LINE OF INSERTION LEVEL FOR CONTINUATION REF. GROUND LEVEL PLAN - B

GROUND LEVEL PART PLAN - B

SCALE 1:250

GROUND LEVEL PART PLAN - C

SCALE 1:250

S.NO	DESCRIPTION	ITEM	DSR NO.	HSR NO.	SYMBOL
1	FOOTPATH	KERB STONE	16.09		
2	PEDESTRIAN AREA	60 MM THK INTERLOCKING PAVERS	8.64		
3	TABLE TOP & FOOTPATH RAMPS	DELHI QUARTZ	EXTRA ITEM		
4	STATION ENTRY & SITTING AROUND TREES	FLAMMED GRANITE		2.3	
5	BUS SHELTER	GRC PAVING TILES		2.12	
6	CYCLE & RIKSHAW STAND ON NMV TRACK	CEMENT CONCRETE FLOORING	11.3		
7	NMV TRACK	CEMENT CONCRETE FLOORING	11.3		
8	GENERAL DROP OFF ON ROAD	METALLED ROAD			
9	AUTO CYCLE RICKSHAW & FEEDER STAND ON ROAD	DELHI QUARTZ	EXTRA ITEM		
10	TABLE TOP	60 MM THK INTERLOCKING PAVERS	16.68		
11	LANDSCAPE AREA				
12	GUIDING AND WARNING PATH	TACTILE FLOORING		3.2.5	

*COLOR OF INTERLOCKING PAVERS WILL BE AS PER DMRC APPROVAL

NOTE:
VENDOR AREA SHOWN IS INDICATIVE. ACTUAL VENDOR AREA SIZE AND LOCATION TO BE DECIDED BY COMPETENT AUTHORITY

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KEY PLAN

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REV	PARTICULARS	DRN.	VER.	DATE
R1	First Issue	N. Bhardwaj	J.P. Bergaand	23/03/2016

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SYSTRA

SYSTRA MVA CONSULTING INDIA PVT. LTD.
6TH FLOOR, GURU ANGAD BHAWAN
71, NEHRU PLACE, NEW DELHI-110019
PH: 26422844, 26413321 FAX: 26424304
SUBSIDIARY OF
SYSTRA S.A., 5 AVENUE LA ...

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DELHI METRO PROJECT LINE - 7

MUKUNDPUR TO YAMUNA VIHAR CORRIDOR

BHIKAJI CAMA PLACE STATION

LANDSCAPE PART PLAN B & D - 2/2

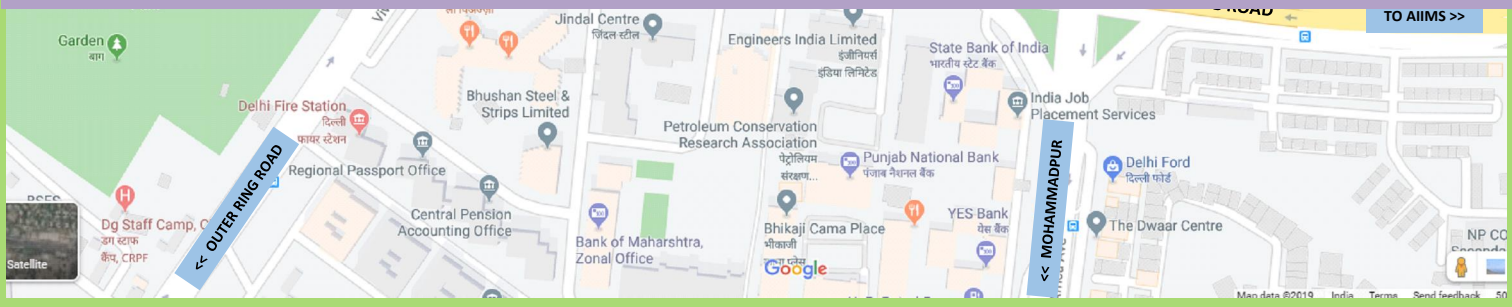
CCDD-1R-DTD-BCP-ARC-PLN-15933 REV R1 STATUS FINAL

ARCHITECTURAL

CCDD-1R-DTD-BCP-ARC-PLN-15933_R1.dwg

DELHI METRO RAIL CORPORATION

TRAFFIC IMPACT ASSESSEMNT FOR PROPOSED PROPERTY DEVELOPMENT ABOVE U/G METRO STATION AT BHIKAJI CAMA PLACE, NEW DELHI



Project Code : 19064
Report Code : 1929

M/S TPA ENGINEERING CONSULTANCY (I) PVT. LTD.
G-46, Basement, East of Kailash, New Delhi - 110065
PH: +91-41623940, 41624519
EMAIL: tpa1@rediffmail.com, tpaec92@gmail.com,
tpa1@tpaindia.com
Web : www.tpaindia.com

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Figure 6.1 Traffic Management Plan

CHAPTER 1.0 INTRODUCTION

1.1 BACKGROUND

The Delhi Metro Rail Corporation (DMRC) has engaged M/s TPA Engineering Consultancy (I) Pvt. Ltd. New Delhi to "**Preparation of Traffic Impact Assessment Report for Proposed Property Development above U/G Metro Station at Bhikaji Cama Place, New Delhi"**., hereafter called the **Project** .It comprises office space, retails and restaurant. The project site is a commercial complex above U/G Metro Station.

The total plot area is 13112 sqm is having Offices, Retail and Food Court/ Restaurant. The total carpet area for the project is 12180 Sqm. The proposed development will on four floors above ground floor. The car parking space is 280 ECS which includes basement stack parking of 164 ECS and 116 ECS at ground level stack parking within the plot area. The construction period is assumed to be 2 years and project is expected to become operational by year 2021. **This expansion is sought for clearance from authorities**.

The approach to the project is from Ring Road and Shaheed Sudhir Tyagi Marg. While the former is a 3 lane one way arterial road, the latter is a 2 Lane undivided collector street. The traffic density on the road network adjacent to project site is moderately high during peak hour as well as entire day. The land use around the project is existing low density residential area (Government quarters) on northern and eastern side which are proposed to be converted in to high density residential settlements. Towards the south of the site is the commercial district center (Bhikaji Cama Place) which is the main contributor to Ring Road Africa Avenue Intersection.

This study, to estimate the Traffic impact of the proposed project site on surrounding road network due to proposed development was awarded to M/s **TPA Engineering Consultancy (I) Pvt. Ltd.** The project site and road network characteristics including Right of Way, effective carriageway, Bus Stop etc. are presented in **Figure 1.1** and

Figure 1.2. The location of site Vis-a –Vis the master plan of Delhi 2021 is presented in **Figure 1.3**.

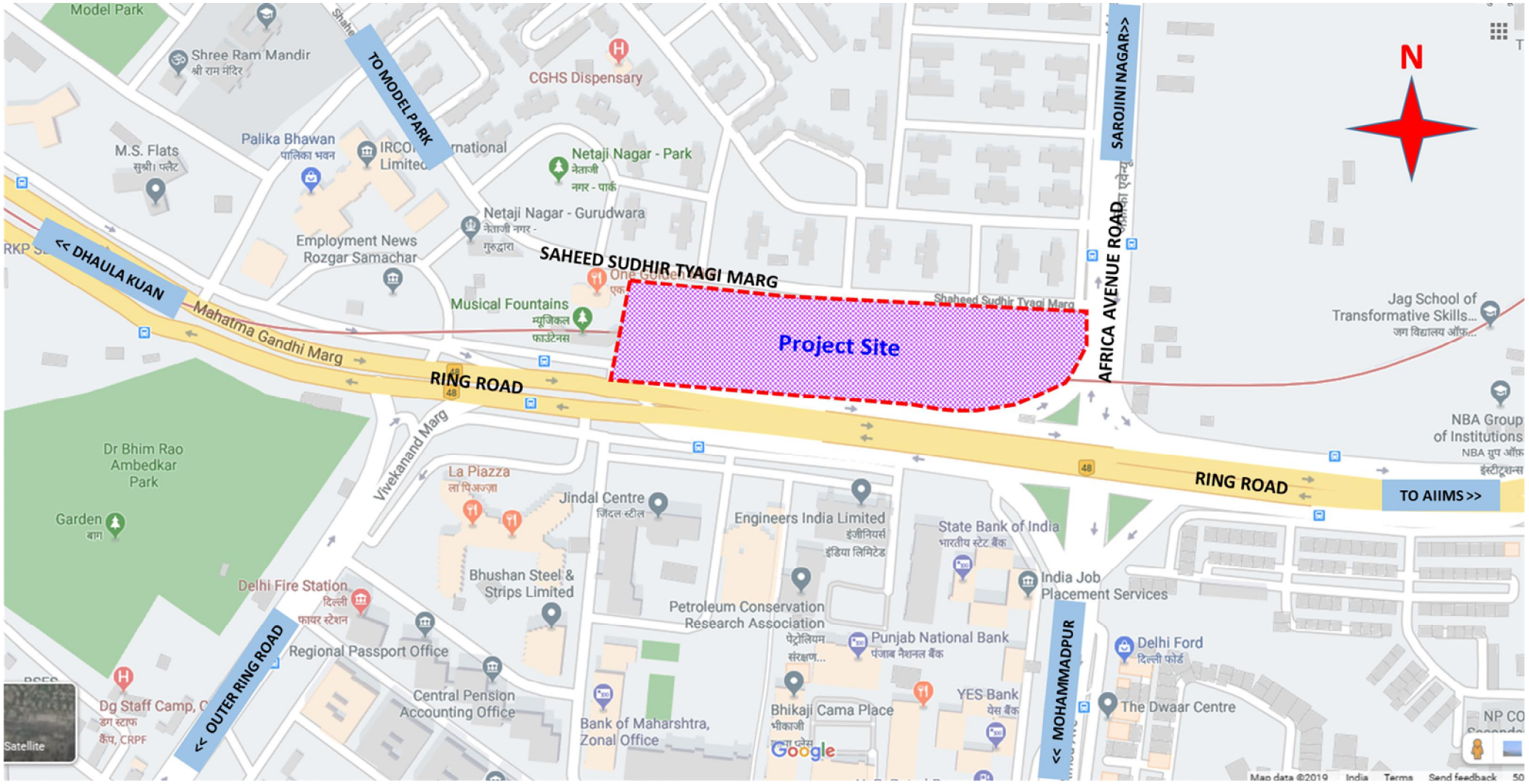


Figure 1.1 Project Site Location

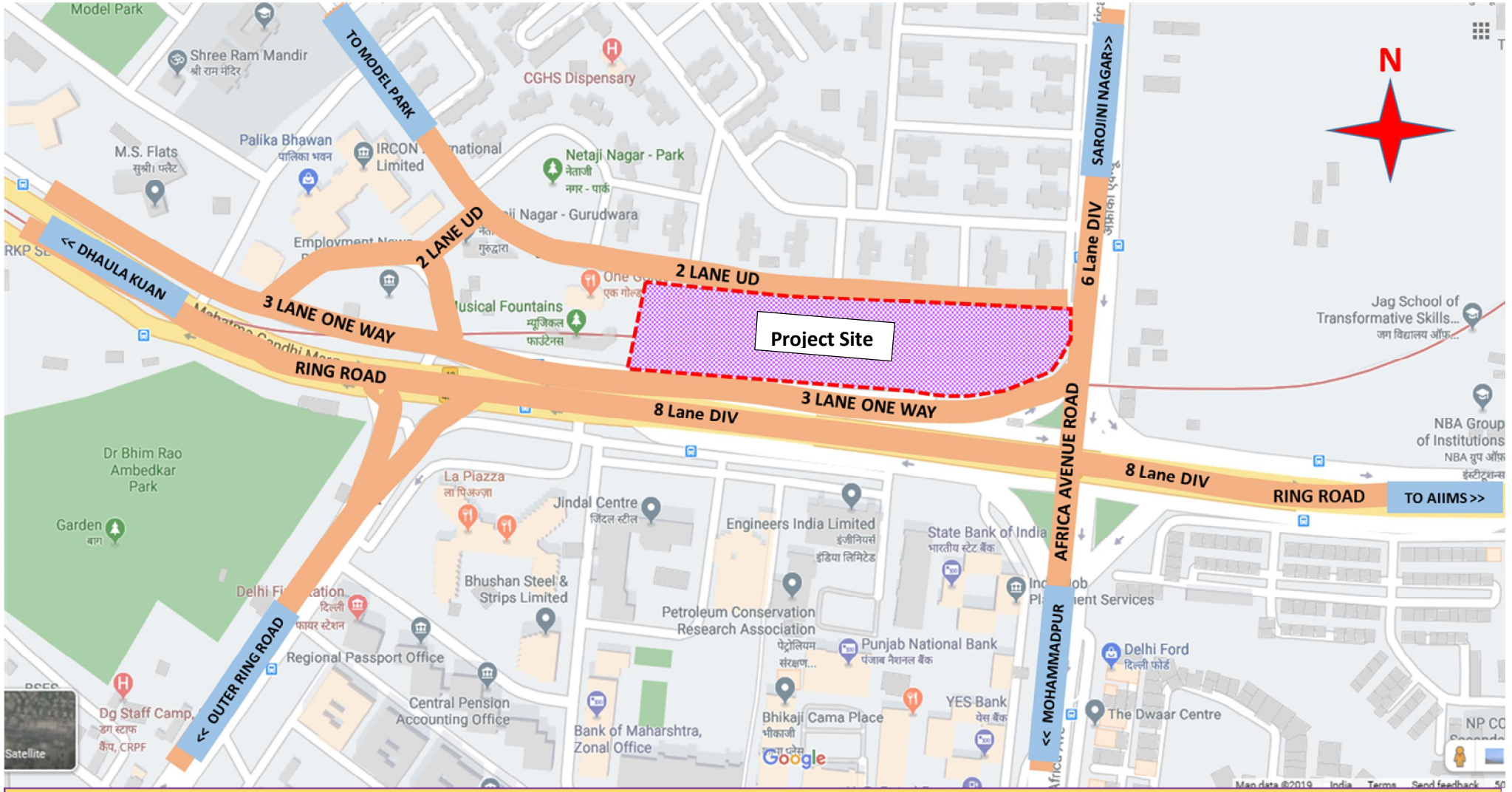
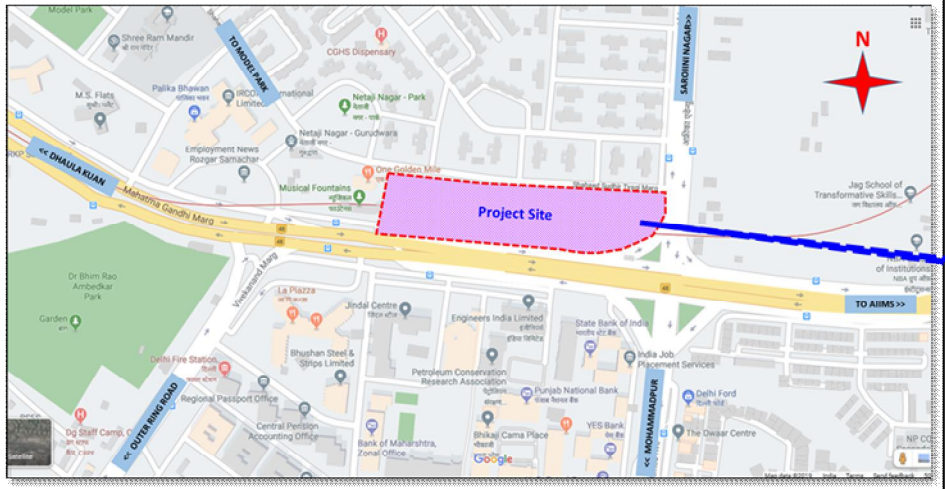


Figure 1.2 Road Network Characteristics



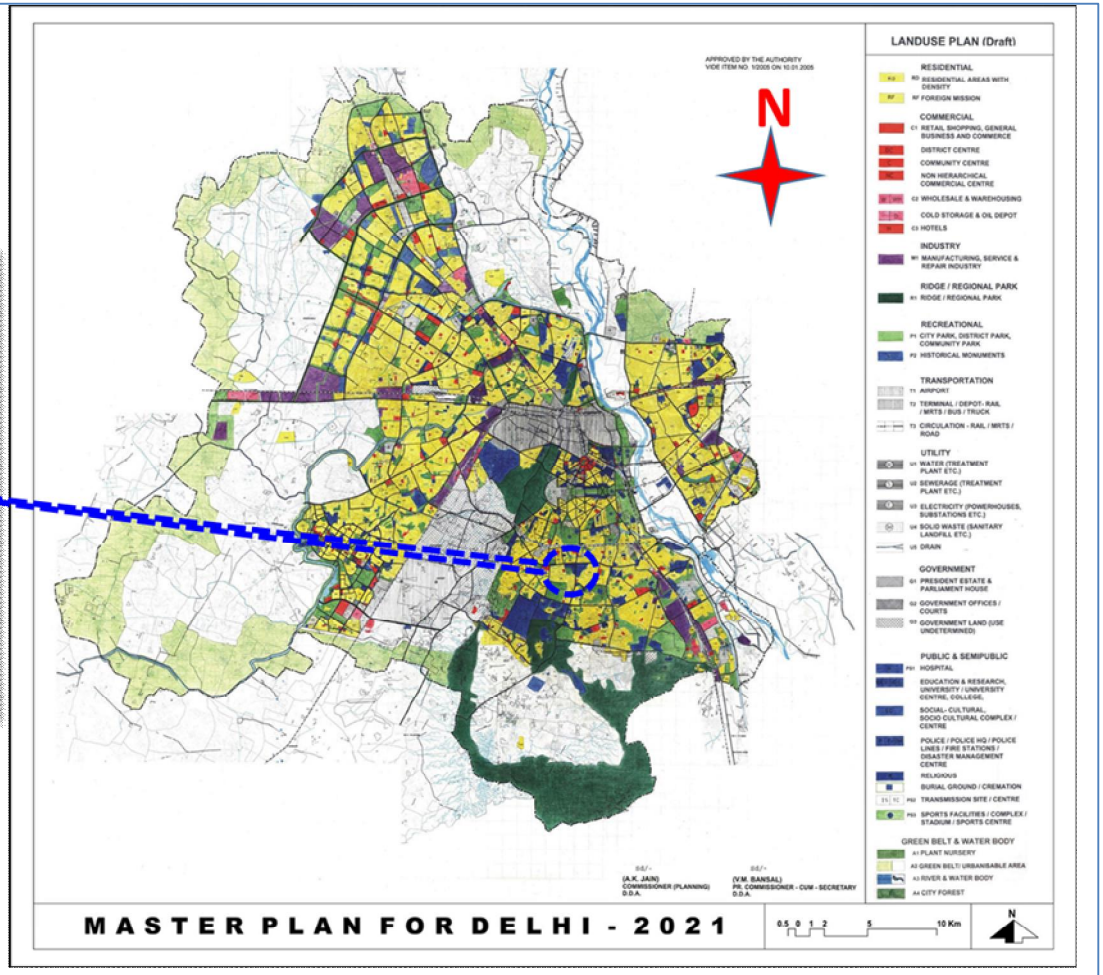


Figure 1.3 Master Plan

1.2 NEED FOR STUDY

The project site will contribute vehicular trips, especially more, during the peak hours. This will be in addition to the existing traffic along the road from the developmental traffic and normal traffic around the project site. The incremental traffic from site may lead to conflict at the access driveway outside the site, leading to congestion along the driveways of the site as well as affect the Up-Stream/Down-Stream Traffic along the Arterial roads around it. As the slowed/stopped traffic on the approach streets obstructs the access to the project site, it may cause delay to the road users, local as well as through, thereby lowering the attractiveness of properties around. The access to the project site through service road is critical factor for its success.

A need exists to examine the likely **Traffic Impact due to the traffic demand generated from proposed development** and to suggest low cost **Mitigating Measures** to improve the accessibility to and from site thereby increasing the attractiveness of site for users and for alleviating the traffic impact.

1.3 STUDY OBJECTIVES

- To estimate the traffic impact due to the project site within One Km of the project site or up to the major intersection, whichever is nearer, up to horizon Year 2036 AD.
- To quantify the impact of generated traffic from site on Level of Service of approach roads.
- To suggest mitigating measures to minimize the traffic impact.

1.4 SCOPE OF SERVICES

- Traffic Surveys on approaches closest to site.
- Use the secondary data (proposed land use) to estimate the trips generated from area within PIA.

- Estimate the trips generated from project site using Floor Area/ Parking metrics.
- Quantification of Traffic impact on the Level of Services outside the site.
- Quantification of Traffic impact due to project up to distance of 1 Km or the nearest major intersection from project site.
- Suggest Measures to mitigate the traffic impact due to project site.
- Carry out capacity analysis of approach roads adjacent to project site and suggest design interventions to minimize project impact.

1.5 DATA SOURCES

The consultant has carried out traffic survey along approach road including Mid-Block Traffic Counts within Influence Area on normal working day and also used the secondary data to carry out trip impact. Suitable assumptions have been made, wherever necessary, based on experience of consultant on similar projects elsewhere. The secondary data used by the consultant is listed in next chapter.

1.6 SITE PHOTOGRAPHS

The consultant has presented the current site conditions and traffic flow situation through actual site pictures for different roads within the project influence area as below:

BHIKAJI CAMA PLACE
PROJECT SITE
BHIKAJI CAMAPLACE METRO STATION
PALIKA BHAWAN
SHAHEED SUDHIR TYAGI MARG
AFRICA AVENUE

PALIKA BHAWAN
SAROJINI NAGAR
Africa Avenue Road
RING ROAD
INTERSECTION-01 AFRICA AVENUE

PALIKA BHAWAN
MODAL PARK
AFRICA AVENUE ROAD
INTERSECTION-02 PALIKA BHAWAN

CHAPTER 2.0 DATA COLLECTION

2.1 SOURCES OF DATA

- **PRIMARY DATA COLLECTION**

  The consultant has carried out classified traffic volume counts at mid-block locations for the period of 12 hours on a **normal working day** to assess the base year traffic volumes and existing operational conditions at the approach roads. The survey locations are presented in **Figure 2.1.**

- **SECONDARY DATA COLLECTION**
  - Total site Area, Built-up Area, Parking demand and Parking Supply within site.
  - Trip Generation Rate from ITE (Institute of Transportation Engineers of America) 8th edition manual.
  - Project Commissioning year and Master Plan of Delhi.

2.2 ASSUMPTIONS

- The compounded traffic growth is likely to be @ 5% per annum up to horizon year 2021 and thereafter it will be grew @3% per annum up to year 2036.
- The characteristics of trips at approach roads are likely to remain unchanged as the development is consolidating, even though their intensity will increase.

Figure 2.1 Traffic Survey Location

CHAPTER 3.0 DATA ANALYSIS

3.1 VOLUME DATA ANALYSIS

The consultant has carried out traffic survey at 3 locations around each approach of neighboring road network for the period of 12 hours on working day. Presently, the traffic density along approach road during peak hour is not much high along project site corridor. The detailed analysis of traffic is presented in subsequent text.

3.1.1 Traffic Characteristics

The total approach traffic at Palika Bhawan intersection is 5281 PCU's during entire day while the traffic along Ring Road slip road is 24183 PCUs. The straight movement traffic from Mohammadpur to Sarojini Nagar along Africa Avenue Road is 19800 PCU's over entire day while left in and left out traffic to Shaheed Sudhir Tyagi Marg is 1770 and 1747 PCU's respectively over entire day. The details are presented in **Table 3.1**.

Table 3.1 Traffic Characteristics at Study Locations

Location Name	Direction		Entire Day		Morning Peak			Evening Peak		
	From	To	Veh.	PCU	Veh.	PCU	%age	Veh.	PCU	%age
INT-01 (Palika Bhawan)	Ring Road	Modal Park	598	474	44	36	8%	46	36	8%
	Ring Road	Africa Avenue Road	510	419	43	35	8%	57	46	11%
	Inflow		**1108**	**893**	**87**	**71**	**8%**	**103**	**82**	**9%**
	Outflow		**1552**	**1285**	**143**	**118**	**9%**	**126**	**106**	**8%**
	Modal Park	Africa Avenue Road	1728	1447	159	132	9%	167	140	10%
	Modal Park	Ring Road	960	773	99	79	10%	76	61	8%
	Inflow		**2688**	**2219**	**258**	**211**	**9%**	**243**	**201**	**9%**
	Outflow		**2655**	**2131**	**258**	**217**	**10%**	**172**	**141**	**7%**
	Africa Avenue Road	Ring Road	592	513	44	39	8%	50	45	9%
	Africa Avenue Road	Modal Park	2057	1657	214	181	11%	126	105	6%
	Inflow		**2649**	**2169**	**258**	**219**	**10%**	**176**	**150**	**7%**
	Outflow		**2238**	**1865**	**202**	**166**	**9%**	**224**	**185**	**10%**
	Total Veh.		**6445**	**5281**	**603**	**500**	**9%**	**522**	**432**	**8%**
Location Name	**Direction**		**Entire Day**		**Morning Peak**			**Evening Peak**		
	From	**To**	**Veh.**	**PCU**	**Veh.**	**PCU**	**%age**	**Veh.**	**PCU**	**%age**
INT-02 (Africa Avenue Road)	Palika Bhawan	Sarojini Nagar	2107	1770	210	180	10%	170	145	8%
	Mohammadpur	Palika Bhawan	2208	1747	239	190	11%	144	118	7%
	Inflow		**2107**	**1770**	**210**	**180**	**10%**	**170**	**145**	**8%**
	Outflow		**2208**	**1747**	**239**	**190**	**11%**	**144**	**118**	**7%**

	Mohammadpur	Sarojini Nagar	20773	19800	1649	1566	8%	2259	2135	11%
	Inflow		**22981**	**21546**	**1888**	**1755**	**8%**	**2403**	**2253**	**10%**
	Total Veh.		**25088**	**23316**	**2098**	**1935**	**8%**	**2573**	**2398**	**10%**
Location Name	**Direction**		**Entire Day**		**Morning Peak**			**Evening Peak**		
	From	**To**	**Veh.**	**PCU**	**Veh.**	**PCU**	**%age**	**Veh.**	**PCU**	**%age**
MB-01 (Bhikaji Cama Place Ring Road Side Slip Road)	Dhaula Kuan	AIIMS	22956	24183	2135	2243	9%	2153	2318	10%
	Total		**22956**	**24183**	**2135**	**2243**	**9%**	**2153**	**2318**	**10%**

Source: Traffic Survey, October 2019

3.1.2 Traffic Composition

The traffic composition chart shows that the share of car is varying from 47% to 67% of total traffic followed by 2-wheelers and 3-wheelers. The share of 2 wheelers is varying from 17 to 35% of total traffic while the share of 3-wheelers is varying from 8 to 12% of total traffic. The share of buses is insignificant at Palika Bhawan Intersection while 6% along Ring Road and about 2% along Africa Avenue Road. The details are presented in **Figure 3.1.**

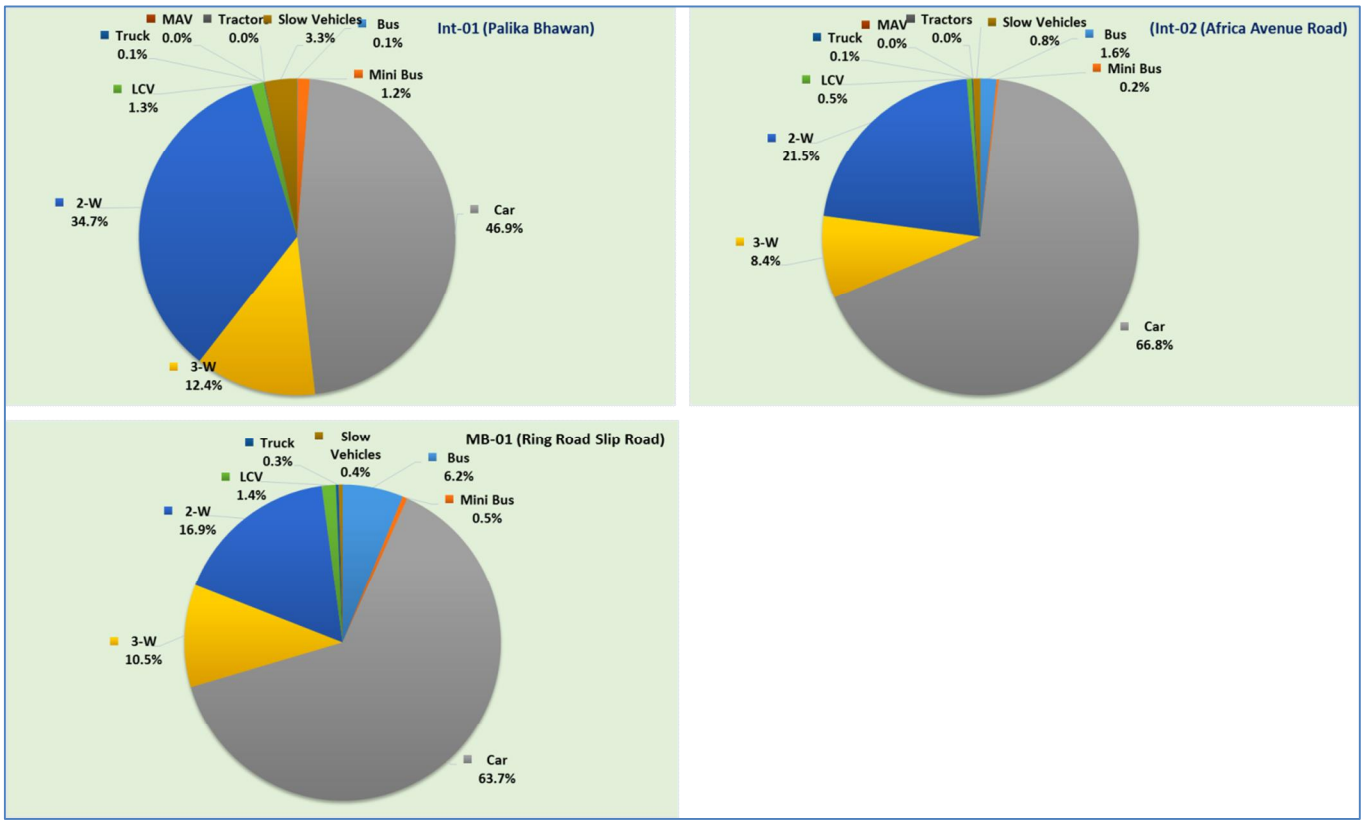


Figure 3.1 Traffic Composition at Mid-Block Locations

3.1.3 Hourly Variation

The overall share of peak hour traffic of total traffic (PCU) is about 9% during morning peak hour and 8% during evening peak hour. It could be observed from charts that the evening peak hour is more intense compared to morning peak which extends over longer period. The details are presented in **Figure 3.2.** The hourly variation chart showing the extent the volumes throughout the day.

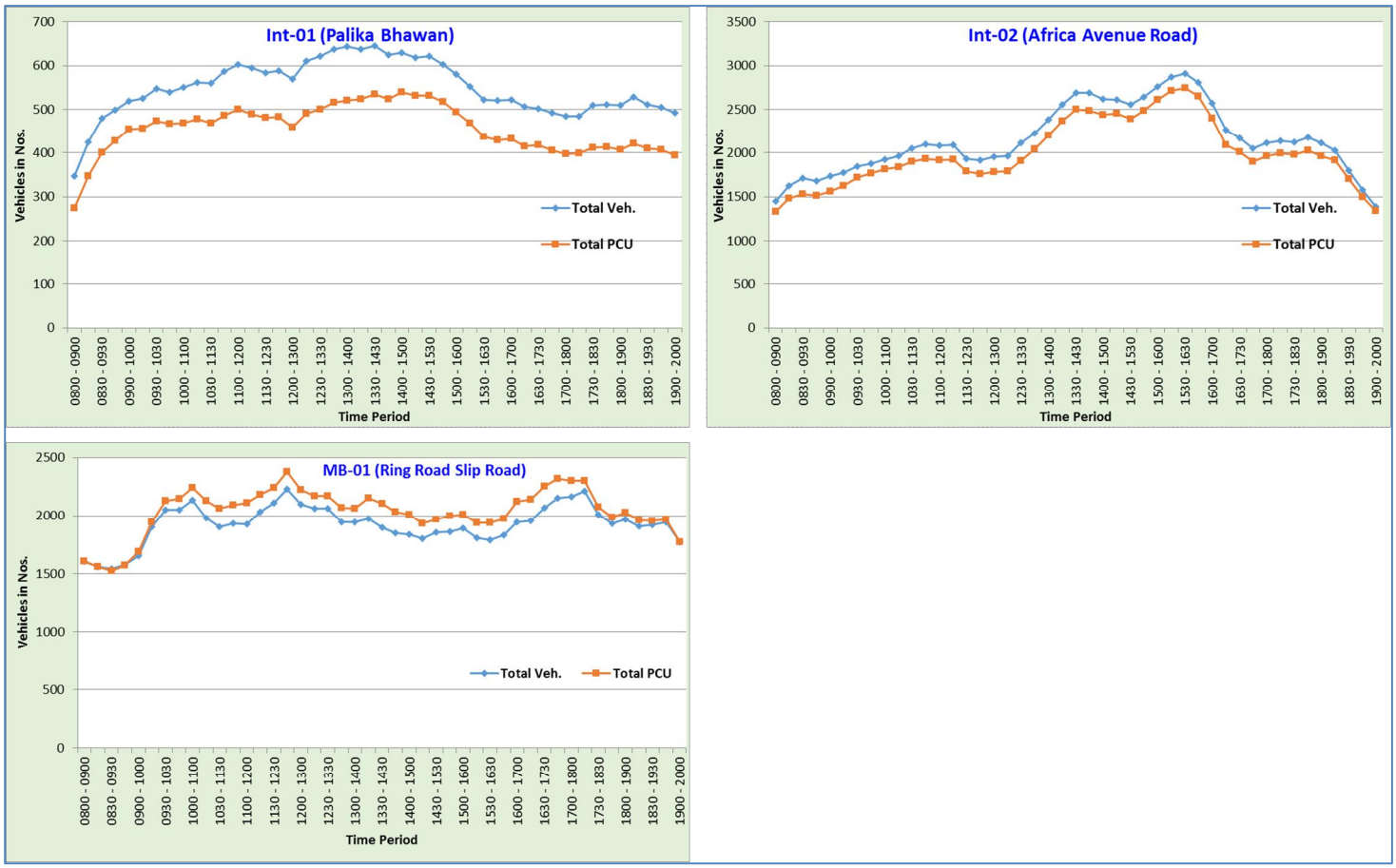


Figure 3.2 Hourly Variation of Traffic at Mid-Block Locations

CHAPTER 4.0 TRIP GENERATION

4.1 PROJECT HIGHLIGHTS

The information regarding site area and floor plans was collected from secondary sources and by applying the trip generation rate, the consultant estimated vehicular trip from project site during peak hour. The project highlights are presented in **Table 4.1.** The consultants have used floor area for estimation of generated traffic for the project and further apply it for ITE trip generation rate.

Table 4.1 Snapshot of Project

Item	Details
Total Plot Area	**13112.0 Sqm**
Total Floor Area	
Built-up Area (Sqm.)	**13976**
Carpet Area (Sqm.)	**12180**
Total Parking Provision	**280 ECS**
Basement Parking in Stacked	**164 ECS**
Open Ground Parking in Stacked	**116 ECS**

Source: Project Details supplied by contractor

4.2 ESTIMATION OF GENERATED TRIPS FROM PROJECT SITE

The consultant has estimated total trip generation from project site using trip generation rates (ITE, 8th edition) for different land uses using the equations in the 8th Edition of Institute of Traffic Engineers (hereafter called the manual).

The information regarding site area, floor plans, total parking provision etc. is collected from secondary sources and by applying the trip generation rates from the manual, the consultant has estimated likely vehicular trips from project site during peak hour. The consultant has used metric of square feet area to estimate the generated trips in peak hour. The project is likely to be commissioned by Year 2021. The area under land use and trip generation rates is presented in **Table 4.2.**

Table 4.2 Vehicular Trip Generation Rates

Type	Trip Generation Rates (ITE 8th Edition)								
	Units	Unit Value	Daily Trips / Unit	Morning Peak Trips/ Unit	Evening Trips/ Unit	*Incoming Trips in Morning Peak	*Outgoing Trips in Morning Peak	*Incoming Trips in Evening Peak	*Outgoing Trips in Evening Peak
Food Court/ Restaurant	KSF^2	26	89.95	0.81	7.49	51%	49%	52%	48%
Office	KSF^2	105	11.01	1.55	1.49	88%	12%	17%	83%

*** As percentage of Total Day Trips**

Source: Trip Generation Rates, 8th Edition Manual

After multiplying the unit value of type of floor uses with trip generation rates, the total trips generated during peak hour as well as entire day was obtained. It is estimated that **3534** trips will be generated during Entire day while during the morning peak hour and evening peak hour, 184 and 354 trips are generated respectively from the proposed land uses at the project.

Table 4.3 Generated Vehicular Trips from Project Site

Land Uses	Generated Trips from Project Site (Daily and Peak Hour)						
	Trips Per Day	Morning Peak Trips/ Unit	Evening Trips/ Unit	*Incoming Trips in Morning Peak	*Outgoing Trips in Morning Peak	*Incoming Trips in Evening Peak	*Outgoing Trips in Evening Peak
Food Court/ Restaurant	2382	21	198	11	11	103	95
Office	1152	162	156	143	19	27	129
Total Trips	**3534**	**184**	**354**	**154**	**30**	**130**	**225**

Source: Consultant Estimate

The consultant has assumed Modal split for the project site and presented in **Table 4.4** and estimated vehicular trips are presented in **Table 4.5.**

Table 4.4 Assumptions of Modal Split

Mode	Modal Split (% age)
Car	60
Two Wheeler	30
Auto/ Taxi	10
Total	**100**

Source: Consultant Assumption

After applying the modal share, 156 and 301 PCU's will be generated during morning and evening peak hour respectively. Details are presented in **Table 4.5(a) and (b).**

Table 4.5 (a) Generated Vehicular Trip from Project Site during Morning Peak Hour

Mode	Modal Split (% age)	Trip Generation in Morning Peak		PCU Factor	Traffic Volume in Morning Peak in PCU's	
		AM (In)	AM (Out)		AM (In)	AM (Out)
Car	60	92	18	1.0	92	18
Two Wheeler	30	46	9	0.5	23	4
Auto/ Taxi	10	15	3	1.0	15	3
Total	**100**	**154**	**30**		**131**	**25**

Source: Consultant Estimate

Table 4.5 (a) Generated Vehicular Trips from Project Site during Evening Peak Hour

Mode	Modal Split (% age)	Trip Generation in Evening Peak		PCU Factor	Traffic Volume in Evening Peak in PCU's	
		PM (In)	PM (Out)		PM (In)	PM (Out)
Car	60	78	135	1.0	78	135
Two Wheeler	30	39	67	0.5	19	34
Auto/ Taxi	10	13	22	1.0	13	22
Total	**100**	**130**	**225**		**110**	**191**

Source: Consultant Estimate

Trip Distribution

After estimation of generated vehicular trips from the project site, the consultant has distributed the vehicular trips on surrounding networks using few assumptions.

Assumptions:

- Primarily, the total generated traffic from project site is likely to be assigned on Shaheed Sudhir Tyagi Marg. The generated traffic is assumed to be distributed equally among Ring Road and Africa Avenue Road. The total generated trips on approach roads in base year 2019 during peak hours are presented in **Table 4.6.**

Table 4.6 Assigned peak hour trips on approach roads in PCU's (Year 2019)

Approach	Morning Peak	Evening Peak
Shaheed Sudhir Tyagi Marg	**156**	**301**
Africa Avenue Marg	**117**	**226**
Ring Road Slip Road	**78**	**151**

Source: Consultant Estimate

It could be observed that the traffic generated due to the Project is insignificant even during peak hour. The consultant has carried out traffic surveys, and collated traffic in base year and then carried out a comparison between existing traffic and Generated Traffic from the project site. The traffic volumes are superimposed on the Project network. Details are presented in **Figure 4.1(a).**

The ratio of generated traffic from the project site to the capacity of road network is presented in **Figure 4.1(b).**

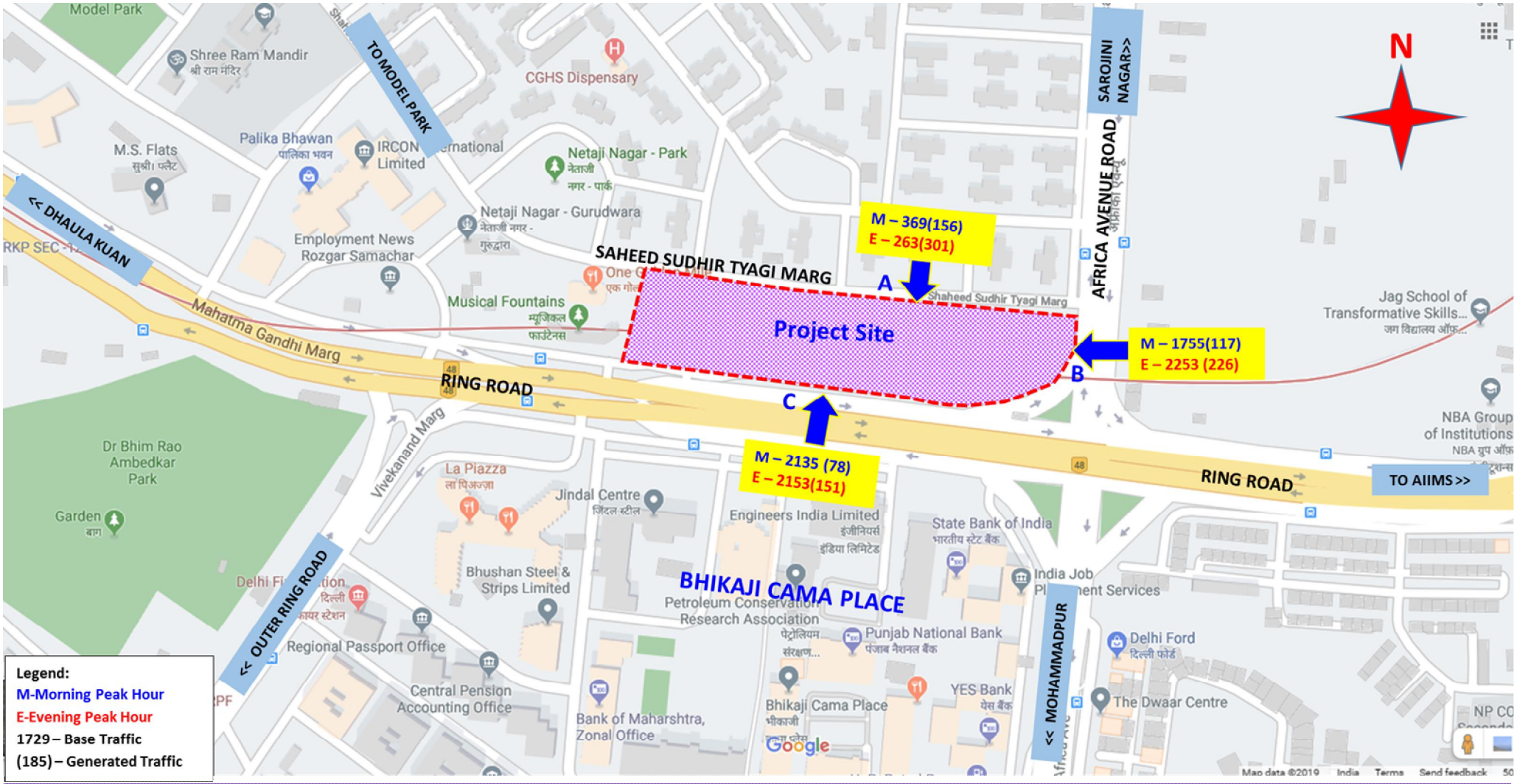


Figure 4.1(a) Base Traffic and Generated Traffic from Project Site during Peak Hours

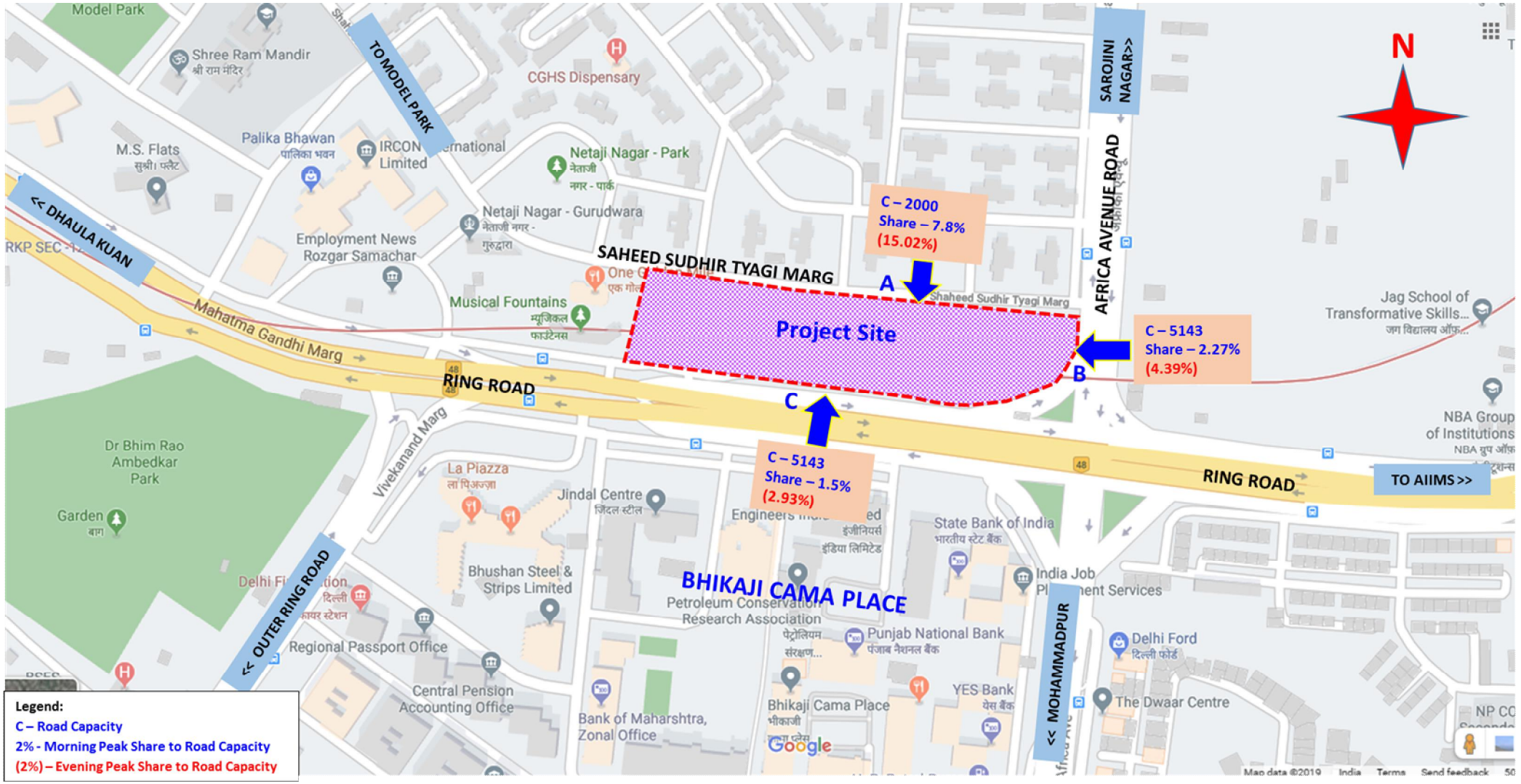


Figure 4.1(b) Road Capacity (LOS "C") and Share of Generated Traffic from Project Site

CHAPTER 5.0 TRAFFIC PROJECTION

5.1 BASE TRAFFIC PROJECTION

The consultant has carried out base year traffic projection using growth rate @ 5% per annum up to year 2021 and thereafter @3% per annum up to horizon year (2036 AD) which is 15 years beyond the commission year 2021 AD. The consultant has projected traffic on individual approach roads and carried out capacity analysis followed by determination of the Level of Service (LOS). As the existing traffic is moderate on Shaheed Sudhir Tyagi Marg and moderately heavy on Slip Road along Ring Road, the consultant has carried out capacity analysis of road network with the combination of existing projected traffic and generated traffic from the project site.

The consultant has considered the Ultimate capacity figures for a 2 Lane collector road and a 3 Lane one way Arterial Roads (IRC: 106-1990 – "Guidelines for Capacity for Urban Roads in Plain Areas") to carry out capacity analysis. The capacity figures and LOS indicators are presented in **Table 5.1.** The Level of Service is a qualitative indicator having values ranging from A to F. While LOS A representing best operating condition and LOS F is worst.

Table 5.1 Capacity Figure and LOS Determination

LOS (Level of Service)	Ultimate hourly Road Capacity		Volume Capacity Ratio (V/C)
	2 Lane Road (Un-Divided)-Sub-Arterial	3 Lane Road (One Way) Arterial	
LOS A	700	1800	0.35
LOS B	1000	2571	0.55
LOS C	1400	3600	0.77
LOS D	1840	4731	0.92
LOS E	2000	5143	1.00
LOS F	-	-	> 1.0

Source: (IRC: 106-1990 – "Guidelines for Capacity for Urban Roads in Plain Areas")

The capacity analysis of forecasted traffic along road and generated traffic from the project site is presented in **Table 5.2** and graphically presented in **Figure 5.1 (a)** and **Figure 5.2 (b)** for morning and evening peak hour respectively.

Table 5.2 Base Year Traffic and Generated Traffic Projections and Capacity Analysis

Year	Location	Approach	Base Year Volume	Generated Traffic from Project Site	Total Traffic	Volume/ Capacity Ratio	Level of Service "LOS"
2019	**Morning Peak Hour**						
	A	Shaheed Sudhir Tyagi Marg	369	NA	369	0.18	LOS A
	B	Africa Avenue Marg	1755		1755	0.34	LOS A
	C	Ring Road Slip Road	2135		2135	0.42	LOS B
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	263	NA	263	0.13	LOS A
	B	Africa Avenue Marg	2253		2253	0.44	LOS B
	C	Ring Road Slip Road	2153		2153	0.42	LOS B
2021	**Morning Peak Hour**						
	A	Shaheed Sudhir Tyagi Marg	407	156	563	0.28	LOS A
	B	Africa Avenue Marg	1935	117	2052	0.40	LOS B
	C	Ring Road Slip Road	2354	78	2432	0.47	LOS B
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	290	301	591	0.30	LOS A
	B	Africa Avenue Marg	2484	226	2710	0.53	LOS B
	C	Ring Road Slip Road	2374	151	2524	0.49	LOS B
2026	**Morning Peak Hour**						
	A	Shaheed Sudhir Tyagi Marg	472	156	628	0.31	LOS A
	B	Africa Avenue Marg	2243	117	2360	0.46	LOS B
	C	Ring Road Slip Road	2729	78	2807	0.55	LOS B
	Evening Peak Hour						

Year	Location	Approach	Base Year Volume	Generated Traffic from Project Site	Total Traffic	Volume/ Capacity Ratio	Level of Service "LOS"
	A	Shaheed Sudhir Tyagi Marg	336	301	637	0.32	LOS A
	B	Africa Avenue Marg	2880	226	3105	0.60	LOS C
	C	Ring Road Slip Road	2752	151	2902	0.56	LOS C
2031	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	547	156	703	0.35	LOS B
	B	Africa Avenue Marg	2600	117	2717	0.53	LOS B
	C	Ring Road Slip Road	3163	78	3241	0.63	LOS C
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	390	301	691	0.35	LOS A
	B	Africa Avenue Marg	3338	226	3564	0.69	LOS C
	C	Ring Road Slip Road	3190	151	3341	0.65	LOS C
2036	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	634	156	790	0.39	LOS B
	B	Africa Avenue Marg	3014	117	3132	0.61	LOS C
	C	Ring Road Slip Road	3667	78	3745	0.73	LOS C
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	452	301	753	0.38	LOS B
	B	Africa Avenue Marg	3870	226	4096	0.80	LOS D
	C	Ring Road Slip Road	3698	151	3849	0.75	LOS C

Source: Consultant Estimates

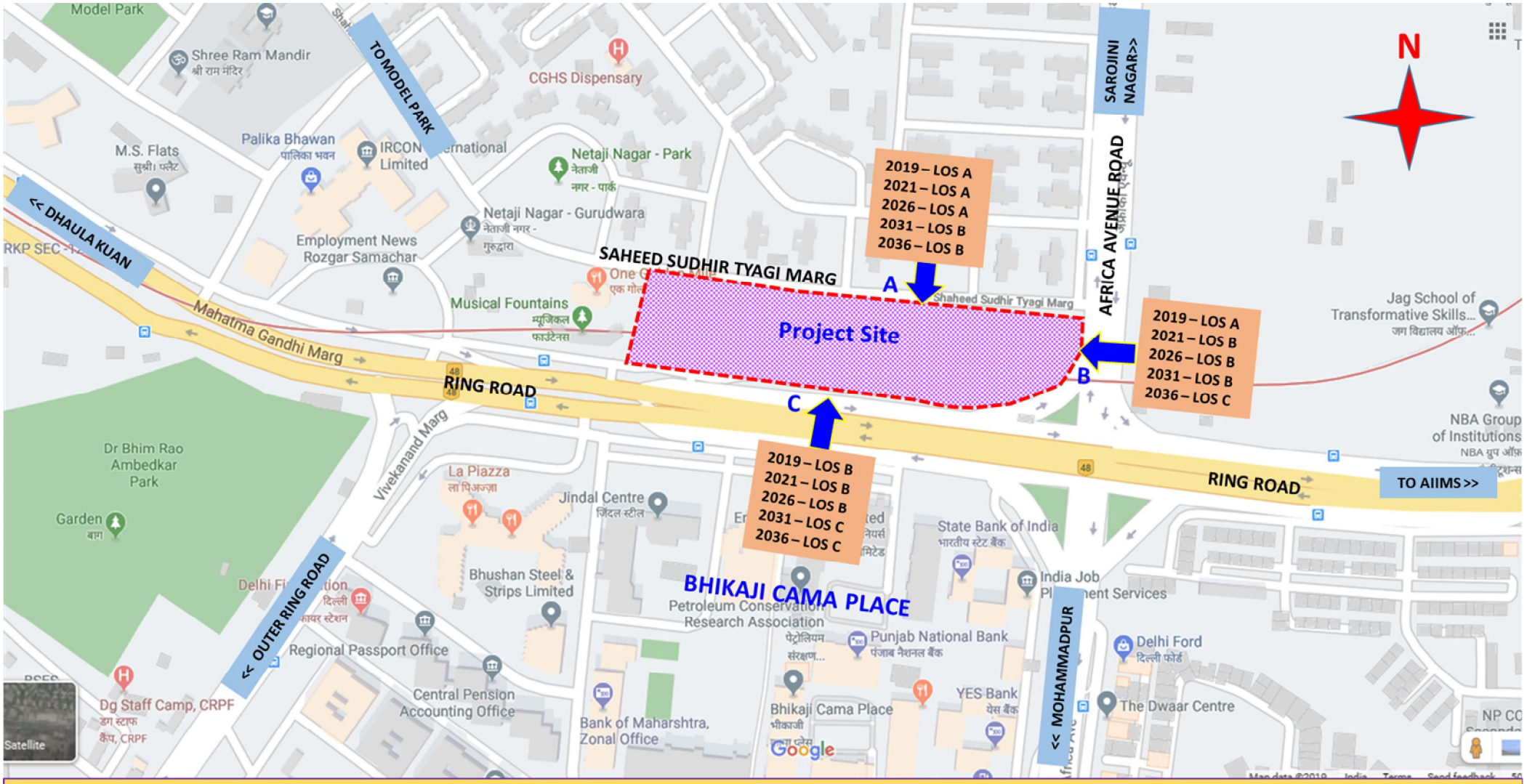


Figure 5.1 (a) Capacity Analysis of Base + Generated Traffic from Project Site during Morning Peak Hour

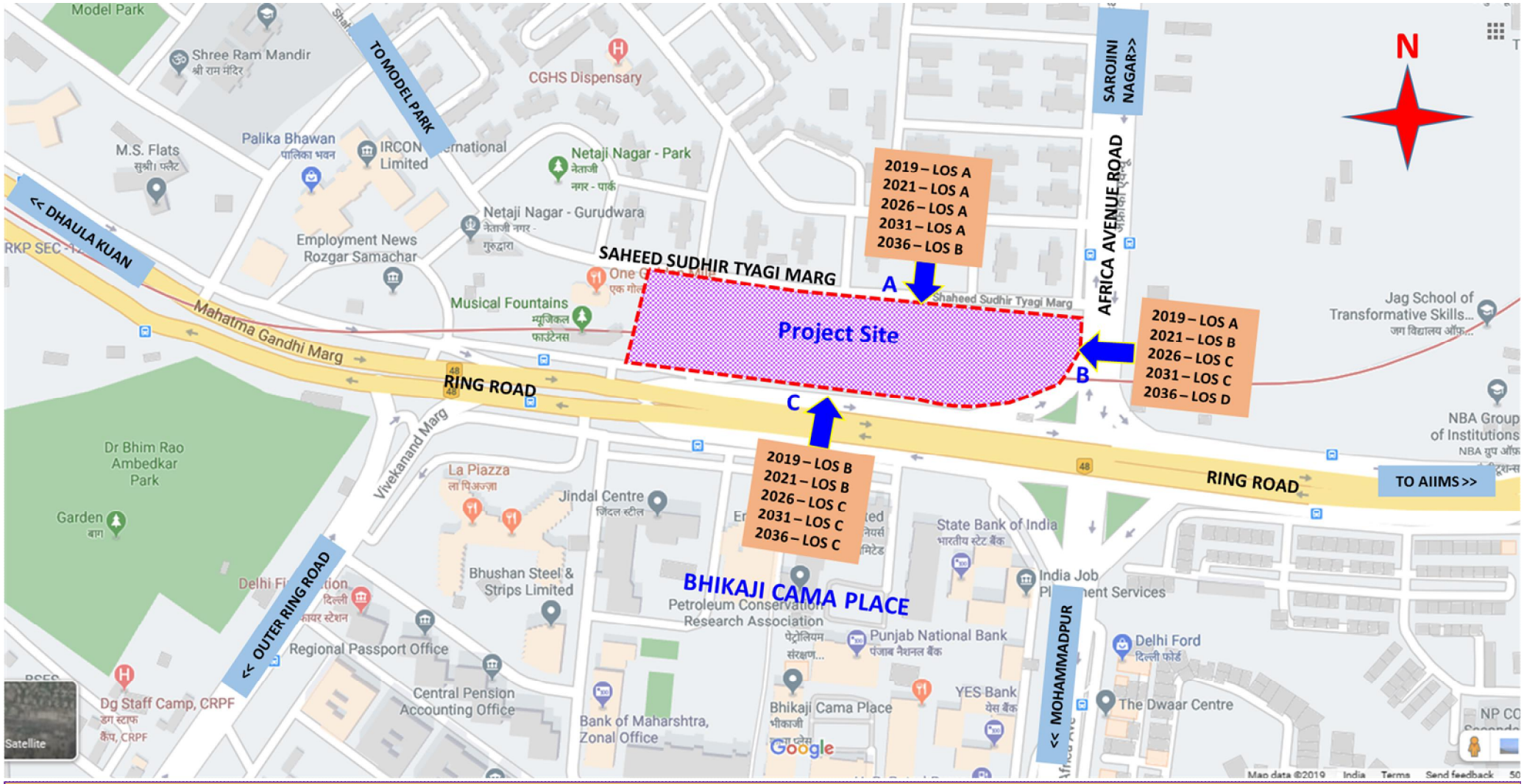


Figure 5.1 (b) Capacity Analysis of Base + Generated Traffic from Project Site during Evening Peak Hour

5.2 TRAFFIC PROJECTION

The consultant has carried out projection of base year traffic (existing approaching traffic during peak hour) and also of generated traffic from proposed Site (generated by additional land uses). The consultant has also estimated the developmental traffic due to proposed land used around the project site which is added to estimate the cumulative traffic. The traffic projection and capacity analysis based on existing network characteristics (Carriageway widths/number of effective lane) during morning peak hour and evening peak hour are presented in **Table 5.3**.

The potential generated traffic from developing area around the project site has been assumed and added to the generated traffic. It is considered that about 10% of existing traffic will likely be added by year 2021 AD as a developmental traffic to the existing traffic and generated traffic from proposed project site.

The Traffic Impact Assessment has been carried out for the Base traffic, incremental traffic due to proposed additional floor and developmental traffic due to adjacent land uses around project site.

The capacity analysis of adjacent network of project site is graphically presented in **Figure 5.2 (a)** and **Figure 5.2 (b)** for morning peak and evening peak hour respectively. The consultant has carried out comparative analysis of Traffic in horizon year “with” and “without” project. The comparative analysis is presented in **Table 5.4.**

It is evident from the analysis that the generated traffic from project site is not likely to have adverse impact on surrounding network.

Table 5.3 Total Traffic Forecast and Capacity Analysis

Year	Location	Approach	Base Year Volume	Generated Traffic from Project Site	Total Traffic	Volume/ Capacity Ratio	Level of Service "LOS"
2019	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	369	NA	369	0.18	LOS A
	B	Africa Avenue Marg	1755		1755	0.34	LOS A
	C	Ring Road Slip Road	2135		2135	0.42	LOS B
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	263	NA	263	0.13	LOS A
	B	Africa Avenue Marg	2253		2253	0.44	LOS B
	C	Ring Road Slip Road	2153		2153	0.42	LOS B
2021	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	407	193	600	0.30	LOS A
	B	Africa Avenue Marg	1935	293	2227	0.43	LOS B
	C	Ring Road Slip Road	2354	292	2645	0.51	LOS B
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	290	327	617	0.31	LOS A
	B	Africa Avenue Marg	2484	451	2935	0.57	LOS C
	C	Ring Road Slip Road	2374	366	2740	0.53	LOS B
2026	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	472	193	665	0.33	LOS A
	B	Africa Avenue Marg	2243	293	2536	0.49	LOS B
	C	Ring Road Slip Road	2729	292	3020	0.59	LOS C
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	336	327	664	0.33	LOS A

Year	Location	Approach	Base Year Volume	Generated Traffic from Project Site	Total Traffic	Volume/ Capacity Ratio	Level of Service "LOS"
	B	Africa Avenue Marg	2880	451	3331	0.65	**LOS C**
	C	Ring Road Slip Road	2752	366	3118	0.61	**LOS C**
2031	**Morning Peak Hour**						
	A	Shaheed Sudhir Tyagi Marg	547	193	740	0.37	**LOS B**
	B	Africa Avenue Marg	2600	293	2893	0.56	**LOS C**
	C	Ring Road Slip Road	3163	292	3455	0.67	**LOS C**
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	390	327	717	0.36	**LOS B**
	B	Africa Avenue Marg	3338	451	3789	0.74	**LOS C**
	C	Ring Road Slip Road	3190	366	3556	0.69	**LOS C**
2036	**Morning Peak Hour**						
	A	Shaheed Sudhir Tyagi Marg	634	193	827	0.41	**LOS B**
	B	Africa Avenue Marg	3014	293	3307	0.64	**LOS C**
	C	Ring Road Slip Road	3667	292	3959	0.77	**LOS C**
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	452	327	779	0.39	**LOS B**
	B	Africa Avenue Marg	3870	451	4321	0.84	**LOS D**
	C	Ring Road Slip Road	3698	366	4064	0.79	**LOS D**

Source: Consultant Estimates

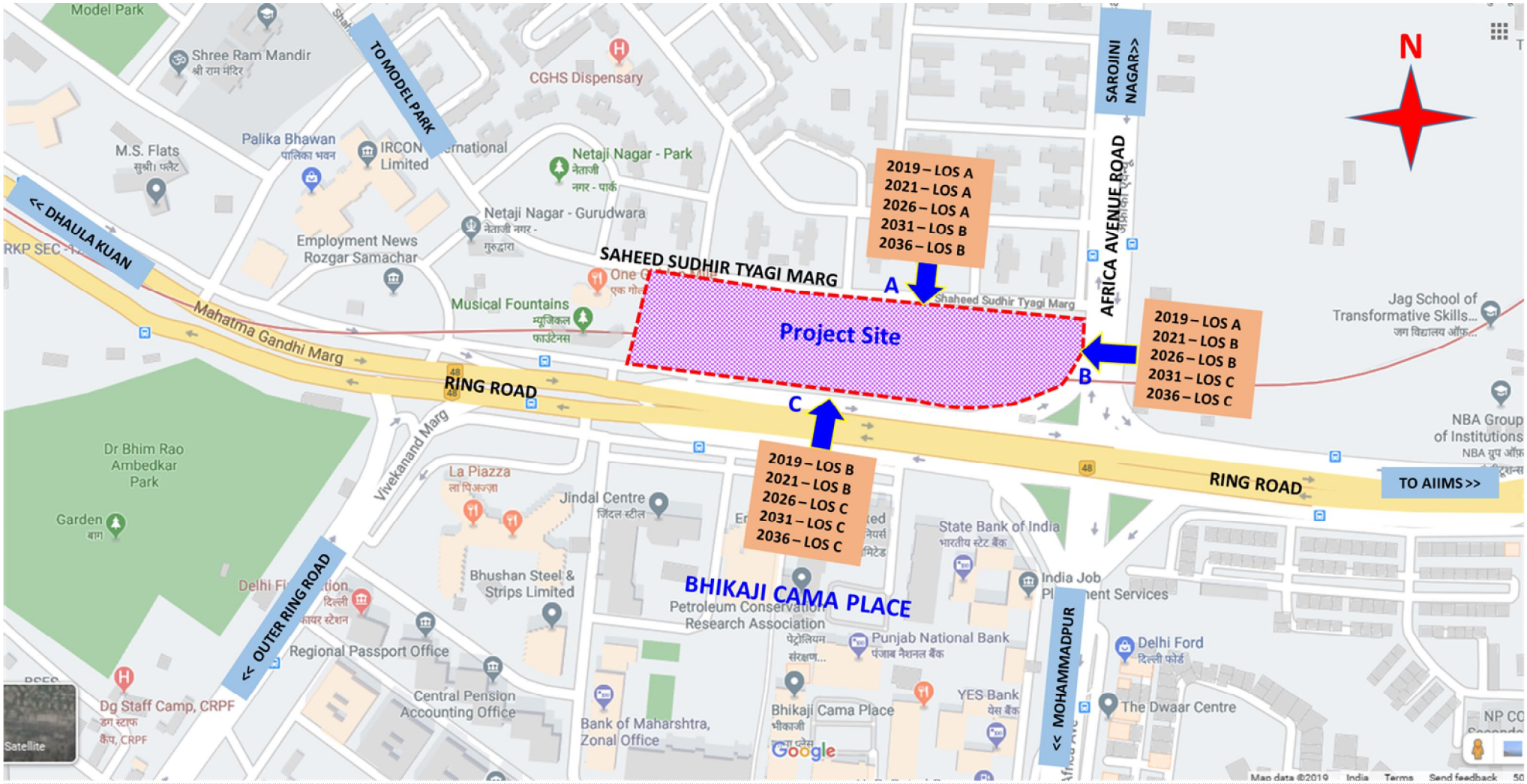


Figure 5.2 (a) Capacity Analysis of Cumulative Traffic (Base + Generated + Developmental) during Morning Peak Hour

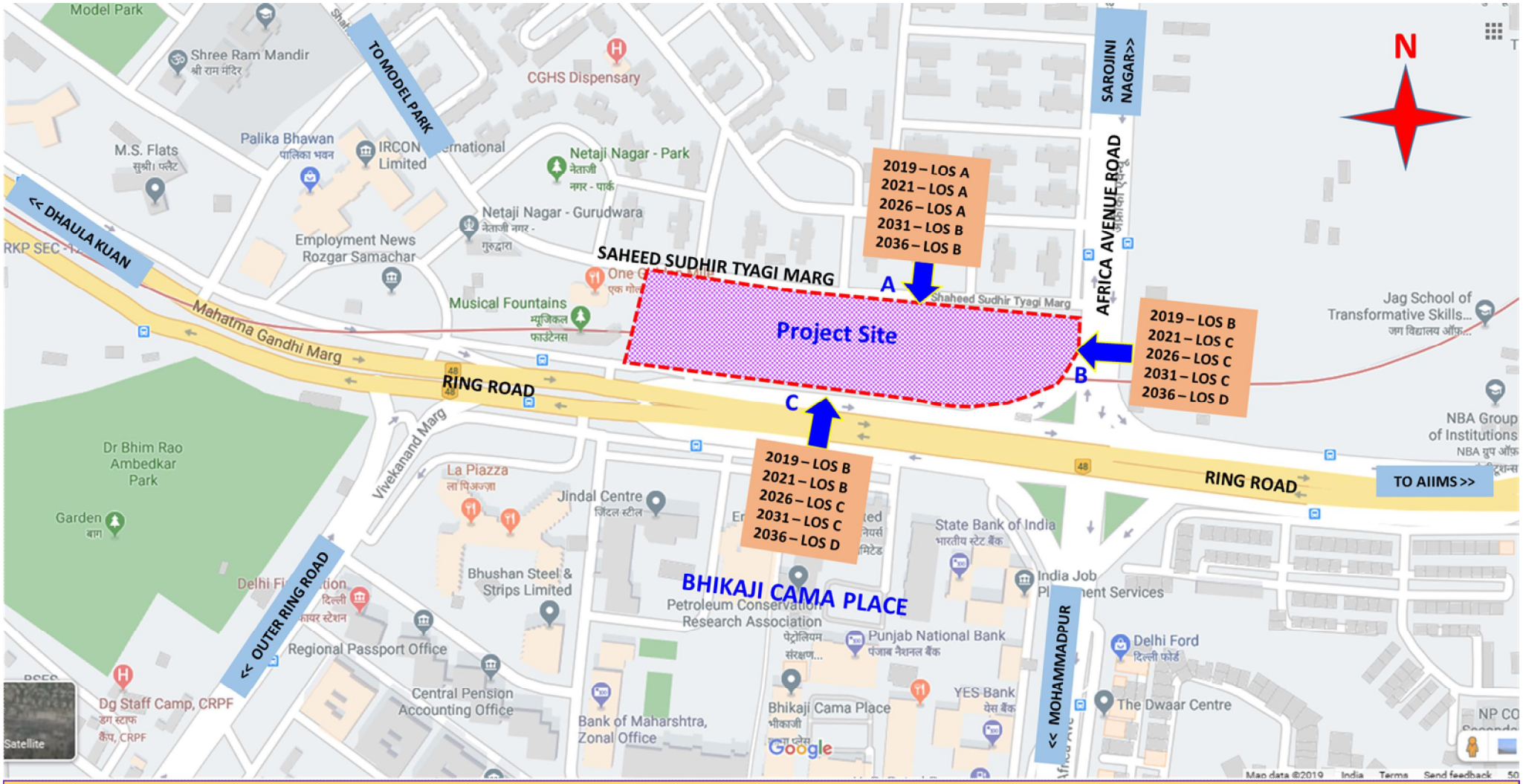


Figure 5.2 (b) Capacity Analysis of Cumulative Traffic (Base + Generated + Developmental) during Evening Peak Hour

Table 5.4 Comparative Analysis of Capacity for With and Without Project

Year	Location	Approach Road	Without Project			With Project		
			Traffic Volume (PCU)	V/c Ratio	LOS	Traffic Volume (PCU)	V/c Ratio	LOS
Morning Peak Hour								
2019	A	Shaheed Sudhir Tyagi Marg	369	0.18	**LOS A**	369	0.18	**LOS A**
	B	Africa Avenue Marg	1755	0.34	**LOS A**	1755	0.34	**LOS A**
	C	Ring Road Slip Road	2135	0.42	**LOS B**	2135	0.42	**LOS B**
2021	A	Shaheed Sudhir Tyagi Marg	407	0.20	**LOS A**	600	0.30	**LOS A**
	B	Africa Avenue Marg	1935	0.38	**LOS B**	2227	0.43	**LOS B**
	C	Ring Road Slip Road	2354	0.46	**LOS B**	2645	0.51	**LOS B**
2026	A	Shaheed Sudhir Tyagi Marg	472	0.24	**LOS A**	665	0.33	**LOS A**
	B	Africa Avenue Marg	2243	0.44	**LOS B**	2536	0.49	**LOS B**
	C	Ring Road Slip Road	2729	0.53	**LOS B**	3020	0.59	**LOS C**
2031	A	Shaheed Sudhir Tyagi Marg	547	0.27	**LOS A**	740	0.37	**LOS B**
	B	Africa Avenue Marg	2600	0.51	**LOS B**	2893	0.56	**LOS C**
	C	Ring Road Slip Road	3163	0.62	**LOS C**	3455	0.67	**LOS C**
2036	A	Shaheed Sudhir Tyagi Marg	634	0.32	**LOS A**	827	0.41	**LOS B**
	B	Africa Avenue Marg	3014	0.59	**LOS C**	3307	0.64	**LOS C**
	C	Ring Road Slip Road	3667	0.71	**LOS C**	3959	0.77	**LOS C**
Evening Peak Hour								
2019	A	Shaheed Sudhir Tyagi Marg	263	0.13	**LOS A**	263	0.13	**LOS A**
	B	Africa Avenue Marg	2253	0.44	**LOS B**	2253	0.44	**LOS B**
	C	Ring Road Slip Road	2153	0.42	**LOS B**	2153	0.42	**LOS B**
2021	A	Shaheed Sudhir Tyagi Marg	290	0.14	**LOS A**	617	0.31	**LOS A**
	B	Africa Avenue Marg	2484	0.48	**LOS B**	2935	0.57	**LOS C**
	C	Ring Road Slip Road	2374	0.46	**LOS B**	2740	0.53	**LOS B**
2026	A	Shaheed Sudhir Tyagi Marg	336	0.17	**LOS A**	664	0.33	**LOS A**
	B	Africa Avenue Marg	2880	0.56	**LOS C**	3331	0.65	**LOS C**
	C	Ring Road Slip Road	2752	0.54	**LOS B**	3118	0.61	**LOS C**
2031	A	Shaheed Sudhir Tyagi Marg	390	0.19	**LOS A**	717	0.36	**LOS B**
	B	Africa Avenue Marg	3338	0.65	**LOS C**	3789	0.74	**LOS C**
	C	Ring Road Slip Road	3190	0.62	**LOS C**	3556	0.69	**LOS C**
2036	A	Shaheed Sudhir Tyagi Marg	452	0.23	**LOS A**	779	0.39	**LOS B**
	B	Africa Avenue Marg	3870	0.75	**LOS C**	4321	0.84	**LOS D**
	C	Ring Road Slip Road	3698	0.72	**LOS C**	4064	0.79	**LOS D**

Source: Consultant Estimate

* With Project – including additional population

* Without Project – excluding additional population

Legend of LOS and V/C Ratio:

LOS A, B & C (=>0.77)	**Stable Flow**
LOS D (0.77 – 0.92)	**Un-Stable Flow**
LOS E & F (<=0.92)	**Congested Flow**

5.3 TRAFFIC DENSITIES WITHIN 5 KMS RADIUS FROM THE PROJECT SITE

The project site generates insignificant traffic during peak hour and the project site will may not cause any significant impact on road network or landuse in immediate surrounding (within 1 km radius) or over area wide road network (approximately 5 kms around project site) due to traffic dispersal on adjacent intersections.

Around the project site, four low density residential settlements for the government employees i.e. Netaji Nagar, Sarojini Nagar, Nauroji Nagar and Mohammadpur are being developed as high density residential colonies under the GPRA scheme of Ministry of Urban Development. Each of these colonies have been planned and their environment/ traffic impact assessment studies have been carried out and the mitigation measures suggested by respective development agencies/ developers. In addition, a traffic decongestion plan of ring road has been prepared which will be a 9 kms long elevated corridor between Moolchand and Africa Avenue. In addition, extension of elevated Barapulla Corridor from INA to Airport is proposed. These two corridors will helpful in alleviating the adverse impact due traffic generated by these 9 GPRA colonies. The nodal agency for execution of these projects appointed a consultant to carry out a composite Traffic Impact assessment study for all the seven GPRA colonies along Ring Road. This study estimated the likely impact of all the colonies and suggested mitigation measures to minimize the impact. The report is attached with this document.

5.4 CONCLUSION

During most intense peak hour, the generated traffic from project site is only 301 PCU's which is insignificant.

Hence it could be said that **the project site will contribute insignificant traffic to adjacent road network and hence cause no impact on the adjacent road network.**

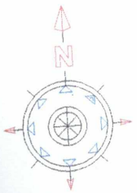
In terms of volume capacity ratio, the project site is a negligible addition. As the contribution of generated traffic from the augmented facility to the existing road capacity is barely 1.5% to 8% of total road capacity. However it is necessary to correct the situation for future by suggesting few mitigating measures along immediate road network. These are discussed in the following chapter.

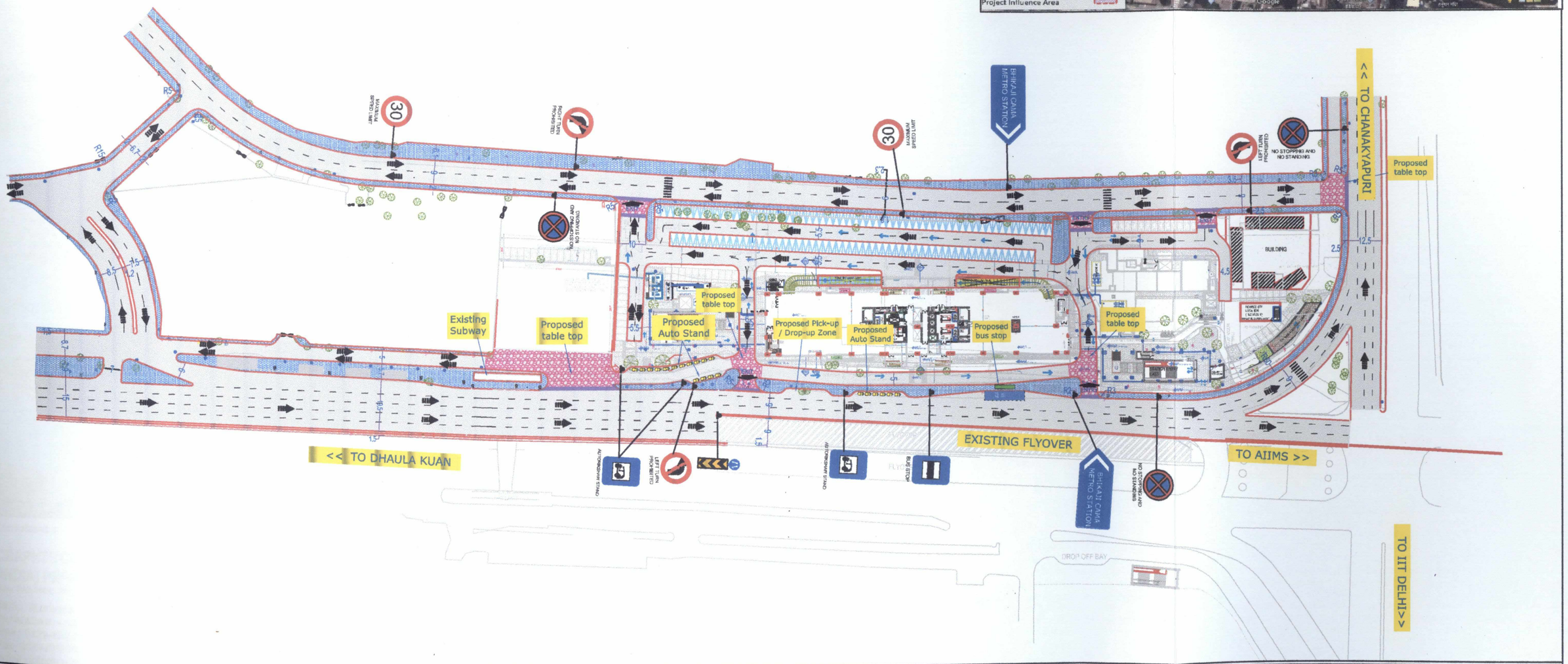
CHAPTER 6.0 MITIGATION MEASURES

The Traffic impacts of the Proposed Project Site "Proposed Property Development above U/G Metro Station at Bhikaji Cama Place" could be mitigated by adopting few measures.

1. On street parking on approach roads outside the project site is proposed to be prohibited through regulatory measures. At the entry/ exit gates of project site, parking will be strictly prohibited to facilitate easy entry and exit as well to maintain sight distance for safety of entering and leaving traffic.
2. Traffic Calming measures to be introduced along Shaheed Sudhir Tyagi Marg.
3. The signage scheme within and around the project site is proposed to provide adequate information, in time and every time, in a simple sign language which will be appropriate for road users and as per IRC guidelines so that they can take safe measures , in time, with minimum confusion.
4. Pedestrians outside and inside the project site are proposed to be guided through signs and protected through footpath about 150 mm above the road surface. Wherever the pedestrians cross the road, a ramp of suitable gradients (1 in 12) is proposed to interchange between levels. On the road. Zebra crossings are suggested to guide the crossing pedestrians.

The traffic management plan as well as the Traffic Impact Mitigation measures along access road network of project is presented in **Figure 6.1.**





Client:
DMRC
DELHI METRO RAIL CORPORATION

Consultant:
TPA Engineering Consultancy (I) Pvt. Ltd.
G-46, Basement, East of Kailash, New Delhi - 110 065
Telephone: +91-011-1623940, Telefax: 41624315,
Email:tpa1@vsnl.com

Project:
TRAFFIC IMPACT ASSESSMENT STUDY FOR PROPOSED COMMERCIAL DEVELOPMENT AT BHIKAJI CAMA PLACE METRO STATION, NEW DELHI.

Date: 13.11.2019	Sheet: 1 of 1
Scale: 1:1500 (A3)	Project Code: 19064

Option.: 0

Survey by:	Approved by:
Drawn by: Vijay Sharma	
Checked by: R. Roy	

No.	Revision/Issue	Date
1	0	13.11.2019

General Notes
01. All dimensions are in meter.
02. All levels are in meter.

Legend:-
Proposed Road Edge
Proposed Road
Proposed Footpath
Proposed Traffic Movement

CIN No. U74899DL 1995GOI068150

दूरभाष Tel.: 23417910/12
फैक्स Fax : 23417921

दिल्ली मेट्रो रेल कॉर्पोरेशन लि०
DELHI METRO RAIL CORPORATION LTD.
(भारत सरकार एंव दिल्ली सरकार का संयुक्त उपक्रम)
(A JOINT VENTURE OF GOVERNMENT OF INDIA AND GOVT. OF DELHI)

No. DMRC/Land/15/1689/ **Dated: 04.02.2020**

The Commissioner (Plg.)
Fifth Floor
Vikas Minar,
New Delhi – 110002

Sub: Regarding change of land use of land measuring 13332 Sqm from 'Recreational' (District Park) to 'Transportation' allotted to DMRC at Bhikaji Cama Place, New Delhi.

Ref: F.20(11)2019/MP/D-11 dated 17.01.2020

Sir,

Kindly recall the meeting held on 31.01.2020 under the chairmanship of VC, DDA in which the matter of change of land use at Bhikaji Cama Place was discussed and it was decided that the matter may be placed in the technical committee meeting for consideration in which DMRC will put up the matter. DDA has sought details vide letter under reference for which point wise reply is as under:

1. NGT has directed PCCF GNCT Delhi to submit their report through mail. In the last hearing dated 27.01.2020, the matter has been deferred to 11th March 2020. Accordingly, NOC of PCCF before the technical committee of DDA may not be insisted upon.

2. The Traffic Impact Assessment Study has been done by TPA Engineering Consultancy (I) Pvt. Ltd. wherein it has been concluded that the commercial Development at site will contribute insignificant traffic to adjacent road network. Hence, it will cause no impact on the adjacent road network. However, PWD GNCT Delhi has also been requested for NOC. (Copy enclosed)

3. The site under reference (03 pockets) shown in the approval layout plan of L&DO has already been submitted to AD, D-Zone, DDA by hand.

In view of above, it is again requested to take up the matter in the next technical committee meeting.

Thanking you,

Yours faithfully

(Ravi Kapoor)
Chief Engineer/General

Sh. DGM/PD III · 05.02.2020

5/2/20

N.o.O: CA, Advisor/PD

दिल्ली विकास प्राधिकरण
योजना ज़ोन-डी
दूसरी मंज़िल, विकास मिनार, नई दिल्ली

संख्या. F.20(11)2019/MP/D-11 दिनांक: 17.01.2020

To,

Chief Engineer/ General,
Delhi Metro Rail Corporation Ltd.
Metro Bhawan, Fire Brigade Lane,
Barakhamba Road, New Delhi-110001

Sub: Regarding change of land use of land measuring 13332 sq.m. from 'Recreational' (District Park) to 'Transportation' allotted to DMRC at Bhikaji Cama Place, New Delhi.

Ref: Hon'ble NGT order dated 07.11.2019 in the matter of Residents of Delhi Through Shobha Agarwal Vs Delhi Metro Rail Corporation & Ors. (O.A. No. 651/2019) forwarded by Conservator of Forests, GNCTD vide letter dated 06.01.2020. (**Copy Enclosed**)

Sir,

May kindly refer the above mentioned Hon'ble NGT order dated 07.11.2019 (O.A. No. 651/2019) in the matter of Residents of Delhi Through Shobha Agarwal Vs Delhi Metro Rail Corporation & Ors vide which the site visit was held under Principal Chief Conservator of Forests, GNCTD in which representation of DMRC and DDA were also present. In the above referred Hon'ble NGT order dated 07.11.2019 following is mentioned: (**copy enclosed**)

> *"In view of allegation that the area was an open land and the open area was to be redeveloped after completion of the construction by the DMRC,* ***any permission for land-use has to be based on an expert study whether open area was required to be preserved as per master plan or in the interest of environment.***
>
> ***Let the PCCF Delhi furnish an expert opinion by email at judicial-ngt@gov.in before the next date.***"

In view of above, I am directed to mention the following:

i. DMRC to submit NOC of Principal Chief Conservator of Forests, GNCTD / Hon'ble NGT order in the above referred Court matter before placing the agenda regarding change of land use before Technical Committee of DDA. Next date of hearing of Hon'ble NGT is on 27.01.2020.

ii. Moreover, it is observed that the site under reference is abutting the major roads i.e. Ring Road and Africa Avenue Road which has RoW of 90 M and 45 M, respectively. Accordingly, DMRC to take necessary clearance from the road owning agency i.e. PWD, GNCTD etc.

iii. The site under reference (three pockets) are to be shown on the approved Layout plan of L&DO.

In view of above, DMRC is requested to furnish the above mentioned details, so that matter could be further examined.

Regards,

Sr DGM/PD/D End: AA

Pl. provide remarks.

17/1/2020

Director (Plg.)
Zone-D

30.1.20.
Adv/PD

CA

Zone-I
डायरी नं. 21
दिनांक 14/01/2020

92/C

O/o Pr. Commr. (Coordn.)
Diary No. 08-MN
Date 07/01/2020

GOVERNMENT OF NCT OF DELHI
DEPARTMENT OF FORESTS & WILD LIFE
2ND FLOOR, A-BLOCK, VIKAS BHAWAN
I.P.ESTATE, NEW DELHI-110002

अति० आयुक्त (यो०)-II
डायरी सं० 68
दिनांक 13-01-20

No.21/PS/PCCF/NGT OA No.651-2019/2019-20/11153-58 Dated:-06-01-2020

To

आयुक्त (योजना) कार्यालय
डायरी सं. M-68
दिनांक 10/01/2020

Commissioner (LD)
Diary No. 14
Date 7-1-2020

The Pr. Commissioner
(Land Management & Land Disposal)
D-Block, Ist Floor
Delhi Development Authority
Vikas Sadan, INA, New Delhi

Renewed today at 03:00 PM
10/01/2020

Sub:-Proposal for construction of commercial complex at Bhikaji Cama Place by Delhi Metro Rail Corporation in a Park.

Sir,

Kindly find enclosed herewith the copy of the order of Hon'ble NGT dated 07-11-2019 alongwith enclosures vide which the Pr. Chief Conservator of Forests has been directed to furnish expert opinion. As the issues raised are about the land use, therefore, Pr. Chief Conservator of Forests, GNCT of Delhi has fixed a site visit at 10.30 hrs on 09-01-2020 of the area affected at Bhikaji Cama Place metro station and other related areas. Kindly attend the site visit alongwith relevant documents e.g. various permissions accorded by DDA while granting permission to DMRC to construct metro station utilizing district parks, land use change alongwith provisions of Master Plan of Delhi in this respect. Kindly ensure that officer not below the rank of Commissioner is deputed to attend the site visit in case you have some compelling reasons for not attending this site visit.

Meeting Point	**Bhikaji Cama Place Metro Station**
Date	**09-01-20120**
Timings	**10.30AM**

Yours faithfully,

This belongs to Planning
No allotment made by Sy

(Nisheeth Saxena)
Conservator of Forests

Encls:-As above 12.

15/01/2020
Pl. Kedia file & examine.
Shri Sai Prasad
Plg. Asstt.
Dr-(Hq) Zone 'D'

14/01/2020

Contd.p.2

Copy to:-

1. The Vice Chairman, Delhi Development Authority, Vikas Sadan, INA, Delhi for information.
2. The Pr. Secretary(E&F), GNCT of Delhi , Delhi Secretariat, I.P.Estate, New Delhi
3. The Pr. Chief Conservator of Forests, GNCT of Delhi for kind information.
4. The Dy. Conservator of Forests, South Forest Division with the direction to attend the site visit without fail alongwith relevant documents.
5. The Chief Engineer/General, DMRC with the request to attend site visit. A copy of the affidavit filed by DMRC in Hon'ble NGT may also be made available.

6.1.2020

(Nisheeth Saxena)
Conservator of Forests

CIN:U74899DL1995GOI068150

दिल्ली मेट्रो रेल कॉर्पोरेशन लि०
DELHI METRO RAIL CORPORATION LIMITED
(भारत सरकार एंव दिल्ली सरकार का एक संयुक्त उपक्रम)
(A JOINT VENTURE OF GOVT. OF INDIA & GOVT. OF DELHI)
Phones: 23417910 /12 Direct: 23418307 Telefax: 23418307

दिनेश कुमार सैनी
निदेशक (परियोजना व नियोजन)
DINESH KUMAR SAINI
DIRECTOR (PROJECT & PLANNING)

No.DMRC/PD/Proposal/BKG/ 25th October, 2019

Dear Shri Kapoor,

Sub: Property development above the station foot print area of Bhikaji Cama Place (underground) metro station of Line 7 of DMRC.

Ref: 1. DMRC's letter No.DMRC/Land/15/BKJ/1689/2074 dated 14.08.2019 addressed to Commissioner (Planning), DDA.
2. Discussions held during the meeting held on 21.10.2019.

Bhikaji Cama Place Metro Station of DMRC's Line 7 is strategically located at the intersection of Ring road and Africa Avenue road. Bhikaji Cama is a commercial hub having offices of premier organisations along with Hotel Hyatt Regency. The area above this underground station offers good potential for property development by DMRC. DMRC approached L&DO for allotment of land in the station area to DMRC on permanent basis so that the same can be developed for property development.

Land measuring 13,332 sqm has been allotted to DMRC on permanent basis by Land & Development Office, Ministry of Housing and Urban Affairs, vide their letter No.L-II-A-1(1836)Bhikaji/2018-PC/169 dated 16.04.2019. To enable property development at this location the land use will have to be changed from recreational / District Park to transportation. A request has been submitted to DDA vide our letter dated 14.8.2019 (referred above). The matter has been further discussed in the meeting held in your office on 21.10.2019.

In the allotment letter dated 16.4.2019, L&DO has mentioned the purpose for the allotment to be property development by DMRC. To serve the purpose of utilising the land through property development, we seek DDA's

contd....2/-

support in getting the land use changed. As discussed during the meeting DMRC will take appropriate action to maintain the green cover that existed prior to construction of underground station and shall provide as much ground cover as possible even by resorting to terrace garden, etc. DMRC shall keep provision for direct access to walkways and cycle ways at the metro station to serve the adjoining areas of Netaji Nagar which is being re-developed under TOD by NBCC.

Kindly convey approval of DDA for the proposed change of land use.

With regards,

Yours sincerely,

(D.K.Saini)

25/X/19

29.X.19

Shri Tarun Kapoor, IAS
Vice Chairman
Delhi Development Authority
Vikas Sadan, INA
New Delhi 110 023

2975/P.
29.10.19.

CIN No. U74899DL 1995GOI068150

दूरभाष Tel.: 23417910/12
फैक्स Fax : 23417921

दिल्ली मेट्रो रेल कॉर्पोरेशन लि०
DELHI METRO RAIL CORPORATION LTD.
(भारत सरकार एंव दिल्ली सरकार का संयुक्त उपक्रम)
(A JOINT VENTURE OF GOVERNMENT OF INDIA AND GOVT. OF DELHI)

No. DMRC/Land/15/~~NSIC~~BHJ/1689/2019 Dated: 14.08.2019

Commissioner(Planning)
Delhi Development Authority
Vikas Minar
New Delhi – 110002

Sub: Change of land use for land measuring 13332 Sqm allotted for Bhikaji Cama Place Metro Station.

Sir,

Bhikaji Cama Place metro station is a station of line-7 (Mukundpur –Yamuna Vihar) corridor of MRTS Phase-III. The station was strategically designed on intersection of Ring Road and Africa Avenue Road at Bhikaji Cama Place so that significant motorize traffic can be made off-road. The station is within close proximity of Govt. offices at RK Puram, business establishment i.e. Hayat Hotel and Bhikaji Cama Place official/Commercial premises. Two Govt. colonies Nataji Nagar, RK Puram and two major hospitals Safdarjung and AIIMS are also in the near vicinity. The station will be very useful to the people of the Delhi. It has been decided by DMRC to explore the potential of Property Development at this station.

The three pocket of land measuring 13332 Sqm (Pkt –B1, 4816 m^2, Pkt-B2, 6109 Sqm and Pkt A-2407 Sqm) has been transferred to DMRC by L&DO for the purpose of construction of metro station and property development at subject location. It is requested that present status of subject land is Recreational/District Park and requires change of land use to "Transportational". The L&DO has issued allotment letter dated 16.04.2019 subject to change of the land use by allottee. The layout plan indicating dimensions details alongwith Annexure A and B are enclosed herewith alongwith allotment letter of L&DO dated 16.04.2019.

An early action is requested.

Thanking you,

Yours faithfully

(Ravi Kapoor)
Chief Engineer/General

Encl: As above

N.o.O: CA for information.

(मेट्रो भवन, फायर ब्रिगेड लेन, बाराखम्बा रोड़, नई दिल्ली-110001)
Metro Bhawan, Fire Brigade Lane, Barakhamba Road, New Delhi-110001

Annexure-A

Change of land use from "Recreational" to "Transportation" for land at Bikaji Cama Place

S.No.	Description	Reply
1.	Background note indicating the current situation/provisions.	Bikaji Cama Place is a station of Line-7 (Mukundpur-Yamuna Vhar) of DMRC Phase-III. Station is located on inner ring road near the intersection of Ring Road and Africa Avenue Road. DMRC has propsed station alongwith part of the area as a property development modated vide MoUD order K-14011/8/2000-MRTS dated 30.3.2009
2.	Whether similar proposals have earlier been considered by DDA/Ministry and/or disposed, and if yes, when and how.	Pertains to DDA.
3.	What were the specific recommendations of the Authority with regard to the proposal.	Pertains to DDA.
4.	How and why the proposal was initiated	Working permission on the land measuring 13332 sqm was granted by L&DO 21st June 2012. On the basis of working permission DMRC constructed Bikaji Cama Station of line-7 and provision has been kept for exploiting some of the area as property development. L&DO finally made the allotment of land on 16.04.2019 subject to condition that change of land use will be taken by allottee itself. Therefore land use needs to be change from "Recreational" to "Transportation".
5.	What are the pros and cons of the proposal, whether they have been carefully examined, and if yes, the outcome thereof.	There is no negative impact on the population and environment. On the other hand people surrounding the locality will get modern & environmental friendly transportation facility. In the nearby area various office complex and residential complex area present which will be benefited through this.
6.	What are the expected short-term and long-term outcomes if the proposal is approved and implemented?	Short Term- Employment generated while constructing the station. Long Term- Resident & office goers will get modern state of art & environmental

		friendly transportation facilities. A large number of ring road motor traffic will be away from the road.
7.	How the proposal will benefit in the development and economic growth of the city.	Transportation hubs & business district will uplift the economic activities & living standards of the people.
8.	What are the provisions corresponding to the proposed policy/changes in other metropolitan cities in India and other countries, and if those provisions differ from the proposal then why are they not considered appropriate of Delhi.	Pertains to DDA.
9.	What will be the public purpose served by the proposed modification.	MRTS is a public purpose project mandated for providing world class transportation system to the general public.
10.	What is the number of people/families/households likely to be affected by the proposed policy.	Nil
11.	Whether the proposal is in consonance with the existing plans, laws, by-law, rules, etc.	Yes
12.	Whether the implementation of the proposal will require changes in certain rules, provisions of/Master Plan, etc., and if yes, what action has been taken to bring about such changes.	Pertains to DDA
13.	Whether the departments/ organizations/Ministries related with the proposal have been consulted and if yes, what were their views and how they were disposed.	In the allotment letter itself L&DO has mentioned that change land use will be taken up by allottee itself.
14.	Whether the relevant guidelines/orders of DOP&T, Ministry of Finance and other nodal Ministry/Departments were taken into account while preparing and examining the proposal.	Pertains to DDA
15.	The name, designation and contact information of an officer of level of Director or above who will be the nodal officer to be contacted by the ministry regarding the proposal.	Ravi kapoor (Chief Engineer/General) Delhi Metro Rail Corporation Ltd. Mobile Number- 9910484359

Annexure-B

Change of land use from "Industrial" to "Transportation" for land at Okhla

S.No.	Description	Reply
1.	Whether the land is government or private and who is the land owning agency?	Govt. Land by L&DO admeasuring 13332 sqm. ((i) 4816 sqm at NDMC Park for Ancillary Building and water boosting station and Vent Shaft (ii) 6109 sqm at NDMC Park for Vent Shaft and Property Development (iii) 2407 sqm at Petrol Pump for Entry and Vent (Shaft and lift)).
2.	On whose request the change of land use case or modification to MPD-2021 has been initiated?	Delhi Metro Rail Corporation Ltd.
3.	Whether a responsible officer from DDA (give details) was deputed for inspection of site and a copy of inspection report be provided.	Pertains to DDA
4.	What is the public purpose to be served by modification of MPD and/or change of land use?	It will improve the economic and living condition of the people.
5.	What will be impact of proposal on the ZAP/MPD and whether the changes are in consonance with the approved plans and policies?	No negative impact is envisaged.
6.	What will be proposal's impact/implications on general public e.g. Law and order etc?	No Law and Order issue is anticipated.
7.	Whether any court cases are ongoing on the land mentioned in proposal? Full details are attached.	No Court Case is going on the land mentioned in proposal.

दिल्ली मेट्रो रेल कॉर्पोरेशन लिमिटेड
DELHI METRO RAIL CORPORATION LTD
(भारत सरकार एवं दिल्ली सरकार का एक संयुक्त उपक्रम(
(A JOINT VENTURE OF GOVERNMENT OF INDIA AND GOVT. OF DELHI)

DMRC/PD/Phase-III/BCP/Vol-05/2019-20 **15.10.2020**

To,

Shri. N. K. Gupta,
Chairman, Joint Committee of Experts,
And Additional Director & Head – UPC-I Division,
Central Pollution Control Board,
Parivesh Bhawan,
East Arjun Nagar,
Delhi – 110032

Dear Sir,

Sub: **Official Documents in the matter of Hon'ble NGT OA No. 651/2019 titled as Residents of Delhi through Shobha Agarwal Vs. Delhi Metro Rail Corporation & Others.**
Ref: **CPCB letter No. B-31013/30/2020/UPC-I dated 30.09.2020**

We are grateful to the Committee of Experts for giving us an opportunity of hearing through video conferencing to present the details in connection with DMRC's proposal for Property development above underground Metro Rail Station at Bhikaji Cama Place by DMRC. As discussed during the video conference, following further information is submitted.

1. Regarding contents of Para 3 (iii) of MoUD's letter dated 30.3.2009 which reads, "The restrictive conditions of land allotment viz. the allottee will use the land only for the purpose for which it has been allotted and not for any other purpose shall be amended/ modified to the effect that DMRC is also authorized to lease/sub-lease/ licence/ concession the land for raising revenue from property development" it is submitted that suitable modifications were issued in 2009 by Land and Development Office (L&DO) in compliance with letter dated 30.03.2009 issued by MoHUA for the land parcels allotted by them to DMRC. The Land at Bhikaji Cama Place has been allotted to DMRC vide letter dated 16th April 2019 (Copy attached as Annexure – I). Aspect of Property Development is covered in Para 2 (iii) of the said letter.

2. "Rail Based Transportation Projects" is not listed in the Schedule attached to Notification dated 14-Sep-2006 issued by Ministry of forests and Environment. As such, Metro Rail Projects do not require prior Environmental Clearance. A copy of the Notification Dated 14th September, 2006 of Ministry of Environment And Forests Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) is enclosed herewith (Annexure – II).

3. As explained above construction of structures pertaining to a Metro Rail Project does not require Environmental Impact studies. However, DMRC has undertaken an Environmental Impact Assessment study for the proposed Property Development above Bhikaji Cama Metro Station. A Copy of the Report on Environment Impact Assessment For Proposed Property Development Complex Above U/G Metro Station At Bhikaji Cama Place New Delhi For Delhi Metro Project Line-7" Is Enclosed (Annexure – III).

4. About change of Land Use it is submitted that normally the land use of land on which a Metro Rail Station is constructed is changed to transportation by DDA on request from DMRC. A request for change in Land Use for Bhikaji Cama Metro Station has been submitted to DDA vide our letter dated 14.8.2019. DDA vide letter dated 17.01.2020 has asked DMRC to submit NOC of Principal Chief conservator of Forest GNCTD/ Hon'ble NGT order in the above referred case before the matter is placed before the Technical committee of DDA for consideration of change in land use. (DDA letter dated 17.01.2020 and other connected letters are enclosed at Annexure-IV).

5. Bhikaji Cama Metro station has been ideally located to serve the requirements of the business establishments as well as residential colonies located in the area. It is well connected to the other side of the Ring road through an underground passage and will encourage people to use Metro Rail Services, avoiding Motorised transport, thus helping the environment. Most of the area of the total allotted land of 13332 sqm by L&DO to DMRC, has been utilized for station entry/exit, circulation pathways, auxiliary buildings and booster pump etc. Proposed PD project has a footprint of about 3000 sqm only. Even under the proposed PD Foot Print, station building and basement parking exits. Thus it has not been feasible to provide a heavily wooded park in the plot.

6. Break-up of built-up area on the land plot of 13332 Sqm covering details like underground station, entry/ exit structures and ancillary structures of station and proposed property development is enclosed at Annexure-V.

7. The area around the station has many green patches particularly in the Netaji Nagar Colony area across the Shaheed Sudhir Tyagi Marg. These area have been depicted in the enclosed Google images. In fact, construction of the station complex has only marginal effect on the green cover in the area as may be seen from Google Earth images of the Bhikaji Cama place area dated 10.02.2006, 12.02.2012, 25.03.2017 and 16.06.2020 which are enclosed at Annexure-VI.

In line with Global Practices, DMRC has to exploit the Property development Potential to enhance its earnings to ensure Financial Sustainability of the Projects. While sanctioning the Delhi MRTS Phase-III, government has asked DMRC to raise funds to the tune of Rs 1586 crore through Property Development to partly meet the construction cost of the project. DMRC has to also generate recurring income from Property development to partly offset its operational expenses.

To meet the above requirement, Property Development above the underground Bhikaji Cama Place Metro station was conceptualized at the planning stage of station itself. In the

requisition of land submitted to L&DO in 2012 it was mentioned by DMRC that permanent land is required for Operational Structures and Property Development.

The case may please be considered in the above overall perspective and DMRC's PD Project may please be given a go-ahead in larger public interest. The benefits that an efficient Metro system brings to the overall development of the area far exceed the adverse impact it have. While the Economic, Social and Environmental benefits will accrue to the population establishments of the area in general, PD Project is important for Financial Sustainability of Metro Rail Projects.

Thanking you,

Yours faithfully,

15.10.2020
(Anirudh Jain)
Advisor/PD

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RECEIVED
Delhi Metro Rail Corporation Ltd.
464
23/4/19

RECEIVED
Office of DM-3A
Delhi Metro Rail Corporation Ltd.
Diary No. 1963
Date 24-04-19
Time 11:15 am

4628
18/4

No. L-II-A-1(1836)Bhikaji/2018-PC/164
Government of India
Ministry of Housing & Urban Affairs (MoHUA)
Land & Development Office (L&DO)

Allotment Letter

Nirman Bhawan, New Delhi-110011
Dated: 16th April, 2019

To

The Chief Engineer (General),
Delhi Metro Rail Corporation Ltd.,
Metro Bhawan, Fire Brigade Lane,
Barakhamba Road,
New Delhi-110 001.

Subject: Allotment of land measuring 13,332 Sqm. to the Delhi Metro Rail Corporation Ltd. on permanent basis (4816 Sqm. for Ancillary building and water boosting station, and Vent Shaft, 6109 Sqm. for Vent Shaft and proposed Property Development, and 2407 Sqm. for Entry and Vent Shaft and lift) at Bhikaji Cama Place, New Delhi

Sir,

KEN/BKCP
24/04/19

I am directed to convey the sanction of the President of India for allotment of land measuring **13,332 Sqm. (4816 Sqm.** at NDMC Park for Ancillary building and water boosting station and Vent Shaft, **6109 Sqm.** at NDMC Park for Vent Shaft and proposed Property Development, and **2407 Sqm.** at Petrol Pump for Entry and Vent Shaft and lift) to the Delhi Metro Rail Corporation Ltd. (DMRC), as per L.D.O Plan No.4202, on permanent basis at Bhikaji Cama Place, New Delhi, subject to the change of land use by the allottee itself.

2. The allotment will be subject to the usual terms and conditions to be given in the Memorandum of Agreement and Lease Deed which shall inter-alia also include the following:-

i. The allottee will pay the land cost @ Rs.475.32 lakh per acre and Re.1/- per annum as ground rent. This rate was valid upto 31.03.2016. The land rates are under revision and the DMRC shall also be required to pay the difference of premium in case the same are revised upward, with retrospective effect.

forwarded to CPM-3 for information. Sir
18/11/19
CPM-3
22/4/19

ii. The date of allotment will be the date of issue of this letter.

For further necessary action and information H.

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iii. The allottee will use the land for the purpose for which it has been allotted and is also authorized to lease/sub-lease/license/concession the land for raising revenue from the property development.

iv The allottee shall ensure that property development is undertaken only on lease/sub-lease/license/on concession basis and not on freehold basis. While undertaking property development, the allottee shall ensure that only those property development which will fetch maximum revenue on a sustainable basis is undertaken. Land may normally not be leased/sub-leased/licensed/given on concession basis for residential development. The allottee will also put in place an efficient lease management mechanism to regulate such lease/sub-lease/license/concession.

v. While undertaking property development by the allottee, the terms and conditions of lease/sub-lease/license/concession shall be suitably drafted by the allottee with the consultation of L&DO to ensure that the land with assets pertaining thereto shall revert to Government/allottee after the expiry of the term or period thereof.

vi. The allottee will have no power of sale/transfer/mortgage/alienation in any manner to third party.

vi. Environmental clearances, where required, shall be obtained by the allottee or by the developers with whom the allottee enters into lease/sub-lease/license/concession agreement for property development.

vii. While developing properties at or adjacent to Metro Rail Stations, due attention shall be given to security related aspect and building the necessary design features in the project in consultation with police and security agencies in a time bound manner.

viii. The allottee while undertaking property development shall comply with the provisions contained in the Order No. K-14011/8/2000-MRTS dated 30.03.2009 (MRTS Cell), Ministry of Urban Development, Government of India.

ix. The removal of the structures/encroachments, if any, on the allotted land will be the responsibility of the allottee.

x. The trees, if any, standing on the plot shall remain as Government property and shall not be removed or otherwise disposed of without obtaining the prior permission of this Office and the amount so realized by disposing the trees shall be remitted to this office. The tree cutting shall be subject to all required statutory clearances and compensatory forestation, etc.

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xi. The allottee will ensure that services lying under the requested land and nearly/close proximity should not be affected.

xiv. The allottee shall execute the Memorandum of Agreement and Lease Deed at their own cost.

xv. The allottee shall deposit Ground Rent on yearly basis in advance, whether it is demanded or not.

xvi. In event of dissolution of the DMRC, the land allotted and the assets created thereon will be transferred to an institution having similar aims and objectives with prior approval of the Government on payment of such compensation that may be determined by the Lessor in its absolute discretion.

xvii. The allottee shall be required to construct the said building in conforming with the architectural surroundings of the area.

xviii. The President of India or his nominee may at any time inspect the site on cause to be inspected the site and the premises thereon with or without any prior notice to allottee. Refusal to allow inspection of the premises shall amount to violation of terms calling for suitable action including re-entry of the property.

xix. Non-fulfillment, non-compliance and violation of any of the aforesaid terms and conditions and also the terms and conditions to be given in the Memorandum of Agreement and Lease Deed will amount to cancellation of the allotment of land.

xx. The attention of Delhi Metro Rail Corporation Ltd. (DMRC) is invited to the various directives under Swach Bharat Mission and to adhere to the same strictly. They are required to ensure through their agencies to keep the construction material properly sanitation/ hygiene arrangements for labourers residing/working at site ensuring that no open defecation is observed.

xxi. The land will be initially given on license basis by signing a Memorandum of Agreement (MoA) and the money deposited at the rate mentioned at 2(i) above, will be treated as security for due performance of the agreement and when the terms of Memorandum of Agreement are successfully completed within the stipulated times, the land will be given on lease and the security will become the premium and the license fee shall become the ground rent.

xxii. The allottee is required to pay the following amount on account of License Fee and Premium :-

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HANDING / TAKING OVER PROCEEDINGS

REF :- L&DO letter no. L-II-A-1(1836)/BHIKAJI/2018-PC/169 dt:-16.04-20

Handed / Taken over possession of land measuring 13332 sqmtr ~~is~~ (including part area of I.O.C.L Global Petrol Pump) is handed over ~~on~~ ~~basis~~ at Bhikaji Cama Place (Pocket measuring 4816 sqm (B1) + B2 (6109 sqm) + 2407 sqm (A)) for construction of Bhikaji Cama Place station in connection with Mukundpur-Yamuna Vihar corridor of Delhi MRTS Project, Phase-III. with reference L&DO letter No. L-II-A-1(1836)/BHIKAJI/2018-PC/169 dt: 16.04.2019. The site is Handed / Taken over as per enclosed plan, shown in drawing as and where basis.

HANDED OVER

JB Bhagwan
23/7/2019

JAI BHAGWAN

OVERSEAR / L&DO

TAKEN OVER

M.K. Srivastava
M.K. SRIVASTAVA
23.7.19

AEN / LAND / DMRC

FURTHER

HANDED OVER

M.K. Srivastava
M.K. SRIVASTAVA
23.7.19

AEN / LAND / DMRC

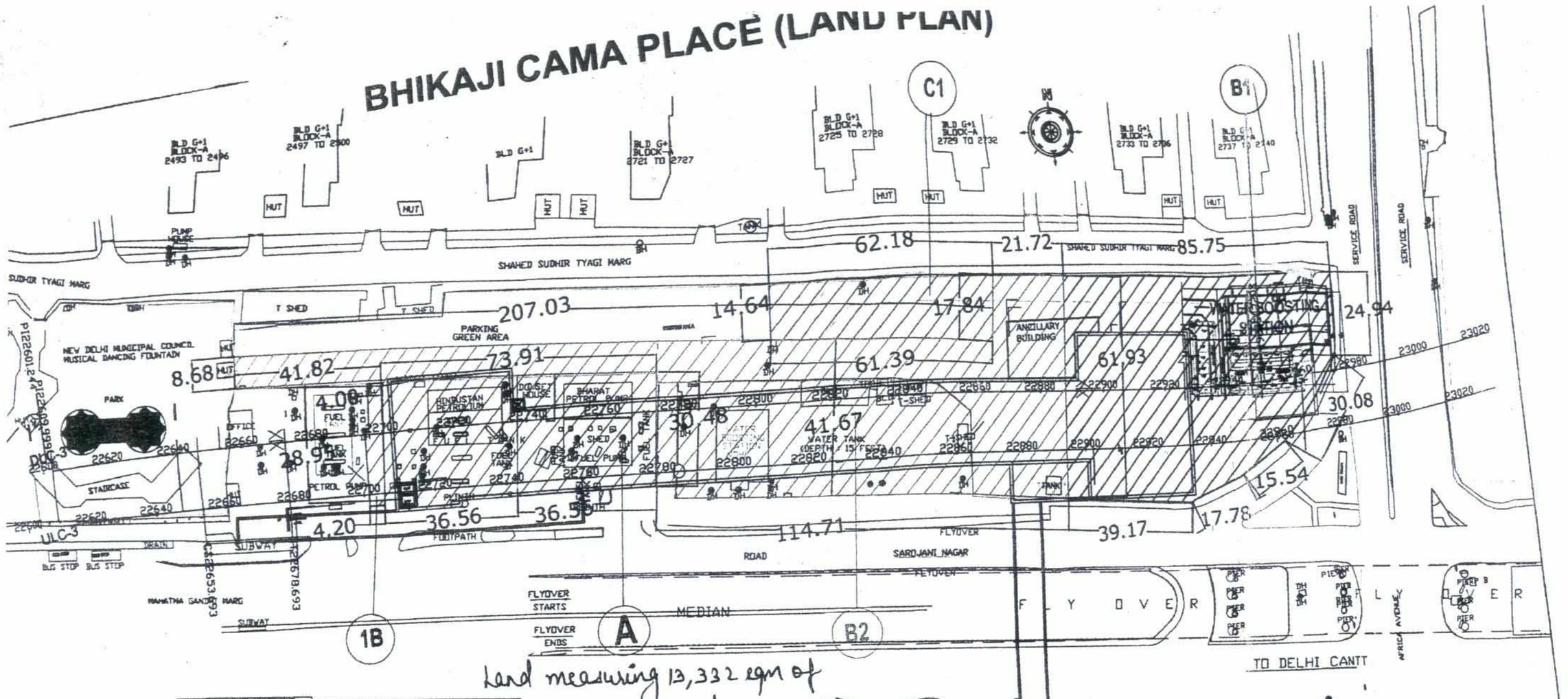
TAKEN OVER

23/7/19

AVINASH SAHU

XEN / CPM3 / DMRC

BHIKAJI CAMA PLACE (LAND PLAN)



Land measuring 13,332 sqm of permanent land

L&DO vide No L-II-A-1(1836)/Bhikaji/2018-PC-I/69 dated: 16/4/19

HANDED OVER
23/7/2019
(OVERSEER, L&DO)

Taken over
7
M.K. Sh. [illegible]
23.7.19
Asstt/Land/DMRC

Taken over
Sd/
KRN/CPM-S/DMRC
23/7/19

PERMANENT LAND FOR CONSTRUCTION (REVISED REQUIREMEMT)

S.NO.	LOCATION	OWNER	AREA	PURPOSE
B1	NDMC PARK	L&DO	4816 Sqm.	ANCILARY BUILDING & WATER BOOSTING STATION AND VENT SHAFT
B2	NDMC PARK	L&DO	6109 Sqm.	VENT SHAFT AND PROPOSED PROPERTY DEVELOPMENT
A	H.P.,BHARAT PETROL PUMP	L&DO	2407 Sqm	Entry Exit,VENT SHAFT& Lift

13,332 sqm

TEMPRORARY LAND FOR CONSTRUCTION

	OWNER	AREA	PURPOSE
		145 Sqm.	FOR NATM RETRIEVAL

LEGEND

TEMPRORARY LAND

PERMANENT LAND (REVISED REQUIREMEMT)

DELHI METRO RAIL CORPORATION LTD

TITLE:- LAND PLAN BHIKAJI CAMA STATION
BHIKAJI CAMA TO H.NIZAMUDDIN

AM Sd/ | DY CE | DY CA
DATE: 08-05-2013 | REV:- R3 | SCALE:- N.T.S. | SHEET NO | OF
DRAWING NO. DMRC/PH-III/LAND/INNER RING/BKJ/2011

(Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii)
MINISTRY OF ENVIRONMENT AND FORESTS

New Delhi 14th September, 2006

Notification

S.O. 1533 Whereas, a draft notification **under sub-rule (3) of Rule 5 of the Environment (Protection) Rules, 1986 for imposing** certain restrictions and prohibitions on new projects or activities, or on the expansion or modernization of existing projects or activities based on their potential environmental impacts as indicated in the Schedule to the notification, being undertaken in any part of India[1], unless prior environmental clearance has been accorded in accordance with the objectives of National Environment Policy **as approved by the Union Cabinet on 18th May, 2006** and the procedure specified in the notification, by the Central Government or the State or Union territory Level Environment Impact Assessment Authority (SEIAA), to be constituted by the Central Government in consultation with the State Government or the Union territory Administration concerned under sub-section (3) of section 3 of the Environment (Protection) Act, 1986 for the purpose of this notification, was published in the Gazette of India ,Extraordinary, Part II, section 3, sub-section (ii) vide number S.O. 1324 (E) dated the 15th September ,2005 inviting objections and suggestions from all persons likely to be affected thereby within a period of sixty days from the date on which copies of Gazette containing the said notification were made available to the public;

And whereas, copies of the said notification were made available to the public on 15th September, 2005;

And whereas, all objections and suggestions received in response to the above mentioned draft notification have been duly considered by the Central Government;

Now, therefore, in exercise of the powers conferred by sub-section (1) and clause (v) of sub-section (2) of section 3 of the Environment (Protection) Act, 1986, read with clause (d) of sub-rule (3) of rule 5 of the Environment (Protection) Rules, 1986 and in supersession of the notification number S.O. 60 (E) dated the 27th January, 1994, except in respect of things done or omitted to be done before such supersession, the Central Government hereby directs that on and from the date of its publication the required construction of new projects or activities or the expansion or modernization of existing projects or activities listed in the Schedule to this notification entailing capacity addition with change in process and or technology shall be undertaken in any part of India only after the prior environmental clearance from the Central Government or as the case may be, by the State Level Environment Impact Assessment Authority, duly constituted by the Central Government under sub-section (3) of section 3 of the said Act, in accordance with the procedure specified hereinafter in this notification.

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[1]Includes the territorial waters

2. Requirements of prior Environmental Clearance (EC):- The following projects or activities shall require prior environmental clearance from the concerned regulatory authority, which shall hereinafter referred to be as the Central Government in the Ministry of Environment and Forests for matters falling under Category 'A' in the Schedule and at State level the State Environment Impact Assessment Authority (SEIAA) for matters falling under Category 'B' in the said Schedule, before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity:

(i) All new projects or activities listed in the Schedule to this notification;

(ii) Expansion and modernization of existing projects or activities listed in the Schedule to this notification with addition of capacity beyond the limits specified for the concerned sector, that is, projects or activities which cross the threshold limits given in the Schedule, after expansion or modernization;

(iii) Any change in product - mix in an existing manufacturing unit included in Schedule beyond the specified range.

3. State Level Environment Impact Assessment Authority:- (1) A State Level Environment Impact Assessment Authority hereinafter referred to as the SEIAA shall be constituted by the Central Government under sub-section (3) of section 3 of the Environment (Protection) Act, 1986 comprising of three Members including a Chairman and a Member – Secretary to be nominated by the State Government or the Union territory Administration concerned.

(2) The Member-Secretary shall be a serving officer of the concerned State Government or Union territory administration familiar with environmental laws.

(3) The other two Members shall be either a professional or expert fulfilling the eligibility criteria given in Appendix VI to this notification.

(4) One of the specified Members in sub-paragraph (3) above who is an expert in the Environmental Impact Assessment process shall be the Chairman of the SEIAA.

(5) The State Government or Union territory Administration shall forward the names of the Members and the Chairman referred in sub- paragraph 3 to 4 above to the Central Government and the Central Government shall constitute the SEIAA as an authority for the purposes of this notification within thirty days of the date of receipt of the names.

(6) The non-official Member and the Chairman shall have a fixed term of three years (from the date of the publication of the notification by the Central Government constituting the authority).

(7) All decisions of the SEIAA shall be unanimous and taken in a meeting.

4. Categorization of projects and activities:-

(i) All projects and activities are broadly categorized in to two categories - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and man made resources.

(ii) All projects or activities included as Category 'A' in the Schedule, including expansion and modernization of existing projects or activities and change in product mix, shall require prior environmental clearance from the Central Government in the Ministry of Environment and Forests (MoEF) on the recommendations of an Expert Appraisal Committee (EAC) to be constituted by the Central Government for the purposes of this notification;

(iii) All projects or activities included as Category 'B' in the Schedule, including expansion and modernization of existing projects or activities as specified in sub paragraph (ii) of paragraph 2, or change in product mix as specified in sub paragraph (iii) of paragraph 2, but excluding those which fulfill the General Conditions (GC) stipulated in the Schedule, *will* require prior environmental clearance from the State/Union territory Environment Impact Assessment Authority (SEIAA). The SEIAA shall base its decision on the recommendations of a State or Union territory level Expert Appraisal Committee (SEAC) as to be constituted for in this notification. In the absence of a duly constituted SEIAA or SEAC, a Category 'B' project shall be treated as a Category 'A' project;

5. Screening, Scoping and Appraisal Committees:-

The same Expert Appraisal Committees (EACs) at the Central Government and SEACs (hereinafter referred to as the (EAC) and (SEAC) at the State or the Union territory level shall screen, scope and appraise projects or activities in Category 'A' and Category 'B' respectively. EAC and SEAC's shall meet at least once every month.

(a) The composition of the EAC shall be as given in Appendix VI. The SEAC at the State or the Union territory level shall be constituted by the Central Government in consultation with the concerned State Government or the Union territory Administration with identical composition;

(b) The Central Government may, with the prior concurrence of the concerned State Governments or the Union territory Administrations, constitutes one SEAC for more than one State or Union territory for reasons of administrative convenience and cost;

(c) The EAC and SEAC shall be reconstituted after every three years;

(d) The authorised members of the EAC and SEAC, concerned, may inspect any site(s) connected with the project or activity in respect of which the prior environmental clearance is sought, for the purposes of screening or scoping or appraisal, with prior notice of at least seven days to the applicant, who shall provide necessary facilities for the inspection;

(e) The EAC and SEACs shall function on the principle of collective responsibility. The Chairperson shall endeavour to reach a consensus in each case, and if consensus cannot be reached, the view of the majority shall prevail.

6. Application for Prior Environmental Clearance (EC):-

An application seeking prior environmental clearance in all cases shall be made in the prescribed Form 1 annexed herewith and Supplementary Form 1A, if applicable, as given in Appendix II, after the identification of prospective site(s) for the project and/or activities to which the application relates, before commencing any construction activity, or preparation of land, at the site by the applicant. The applicant shall furnish, along with the application, a copy of the pre-feasibility project report except that, in case of construction projects or activities (item 8 of the Schedule) in addition to Form 1 and the Supplementary Form 1A, a copy of the conceptual plan shall be provided, instead of the pre-feasibility report.

7. Stages in the Prior Environmental Clearance (EC) Process for New Projects:-

7(i) The environmental clearance process for new projects will comprise of a maximum of four stages, all of which may not apply to particular cases as set forth below in this notification. These four stages in sequential order are:-

- Stage (1) Screening (Only for Category 'B' projects and activities)
- Stage (2) Scoping
- Stage (3) Public Consultation
- Stage (4) Appraisal

I. **Stage (1) - Screening**:

In case of Category 'B' projects or activities, this stage will entail the scrutiny of an application seeking prior environmental clearance made in Form 1 by the concerned State level Expert Appraisal Committee (SEAC) for determining whether or not the project or activity requires further environmental studies for preparation of an Environmental Impact Assessment (EIA) for its appraisal prior to the grant of environmental clearance depending up on the nature and location specificity of the project . The projects requiring an Environmental Impact Assessment report shall be termed Category 'B1' and remaining projects shall be termed Category 'B2' and will not require an Environment Impact Assessment report. For categorization of projects into B1 or B2 except item 8 (b), the Ministry of Environment and Forests shall issue appropriate guidelines from time to time.

II. **Stage (2) - Scoping**:

(i) "Scoping": refers to the process by which the Expert Appraisal Committee in the case of Category 'A' projects or activities, and State level Expert Appraisal Committee in the case of Category 'B1' projects or activities, including applications for expansion and/or modernization and/or change in product mix of existing projects or activities, determine detailed and comprehensive Terms Of Reference (TOR) addressing all relevant environmental concerns for the preparation of an Environment Impact Assessment (EIA) Report in respect of the project or activity for which prior environmental clearance is sought. The Expert Appraisal Committee or State level Expert Appraisal Committee concerned shall determine the Terms of Reference on the basis of the information furnished in the prescribed application Form1/Form 1A including Terns of Reference proposed by the applicant, a site visit by a sub- group of Expert Appraisal Committee or State level Expert Appraisal Committee concerned only if considered necessary by the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned, Terms of Reference suggested by the applicant if furnished and other information that may be available with the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned. All projects and activities listed as Category 'B' in Item 8 of the Schedule (Construction/Township/Commercial Complexes /Housing) shall not require Scoping and will be appraised on the basis of Form 1/ Form 1A and the conceptual plan.

(ii) The Terms of Reference (TOR) shall be conveyed to the applicant by the Expert Appraisal Committee or State Level Expert Appraisal Committee as concerned within sixty days of the receipt of Form 1. In the case of Category A Hydroelectric projects Item 1(c) (i) of the Schedule the Terms of Reference shall be conveyed along with the clearance for pre-construction activities .If the Terms of Reference are not finalized and conveyed to the applicant within sixty days of the receipt of Form 1, the Terms of Reference suggested by the applicant shall be deemed as the final Terms of Reference approved for the EIA studies**.** The approved Terms of

Reference shall be displayed on the website of the Ministry of Environment and Forests and the concerned State Level Environment Impact Assessment Authority.

(iii) Applications for prior environmental clearance may be rejected by the regulatory authority concerned on the recommendation of the EAC or SEAC concerned at this stage itself. In case of such rejection, the decision together with reasons for the same shall be communicated to the applicant in writing within sixty days of the receipt of the application.

III. **Stage (3) - Public Consultation**:

(i) "Public Consultation" refers to the process by which the concerns of local affected persons and others who have plausible stake in the environmental impacts of the project or activity are ascertained with a view to taking into account all the material concerns in the project or activity design as appropriate. All Category 'A' and Category B1 projects or activities shall undertake Public Consultation, except the following:-

(a) modernization of irrigation projects (item 1(c) (ii) of the Schedule).

(b) all projects or activities located within industrial estates or parks (item 7(c) of the Schedule) approved by the concerned authorities, and which are not disallowed in such approvals.

(c) expansion of Roads and Highways (item 7 (f) of the Schedule) which do not involve any further acquisition of land.

(d) all Building /Construction projects/Area Development projects and Townships (item 8).

(e) all Category 'B2' projects and activities.

(f) all projects or activities concerning national defence and security or involving other strategic considerations as determined by the Central Government.

(ii) The Public Consultation shall ordinarily have two components comprising of:-

(a) a public hearing at the site or in its close proximity- district wise, to be carried out in the manner prescribed in Appendix IV, for ascertaining concerns of local affected persons;

(b) obtain responses in writing from other concerned persons having a plausible stake in the environmental aspects of the project or activity.

(iii) the public hearing at, or in close proximity to, the site(s) in all cases shall be conducted by the State Pollution Control Board (SPCB) or the Union territory Pollution Control Committee (UTPCC) concerned in the specified manner and forward the proceedings to the regulatory authority concerned within 45(forty five) of a request to the effect from the applicant.

(iv) in case the State Pollution Control Board or the Union territory Pollution Control Committee concerned does not undertake and complete the public hearing within the specified period, and/or does not convey the proceedings of the public hearing within the prescribed period

directly to the regulatory authority concerned as above, the regulatory authority shall engage another public agency or authority which is not subordinate to the regulatory authority, to complete the process within a further period of forty five days,.

(v) If the public agency or authority nominated under the sub paragraph (iii) above reports to the regulatory authority concerned that owing to the local situation, it is not possible to conduct the public hearing in a manner which will enable the views of the concerned local persons to be freely expressed, it shall report the facts in detail to the concerned regulatory authority, which may, after due consideration of the report and other reliable information that it may have, decide that the public consultation in the case need not include the public hearing.

(vi) For obtaining responses in writing from other concerned persons having a plausible stake in the environmental aspects of the project or activity, the concerned regulatory authority and the State Pollution Control Board (SPCB) or the Union territory Pollution Control Committee (UTPCC) shall invite responses from such concerned persons by placing on their website the Summary EIA report prepared in the format given in Appendix IIIA by the applicant along with a copy of the application in the prescribed form , within seven days of the receipt of a written request for arranging the public hearing . Confidential information including non-disclosable or legally privileged information involving Intellectual Property Right, source specified in the application shall not be placed on the web site**.** The regulatory authority concerned may also use other appropriate media for ensuring wide publicity about the project or activity. The regulatory authority shall, however, make available on a written request from any concerned person the Draft EIA report for inspection at a notified place during normal office hours till the date of the public hearing. All the responses received as part of this public consultation process shall be forwarded to the applicant through the quickest available means.

(vii) After completion of the public consultation, the applicant shall address all the material environmental concerns expressed during this process, and make appropriate changes in the draft EIA and EMP. The final EIA report, so prepared, shall be submitted by the applicant to the concerned regulatory authority for appraisal. The applicant may alternatively submit a supplementary report to draft EIA and EMP addressing all the concerns expressed during the public consultation.

IV. Stage (4) - Appraisal:

(i) Appraisal means the detailed scrutiny by the Expert Appraisal Committee or State Level Expert Appraisal Committee of the application and other documents like the Final EIA report, outcome of the public consultations including public hearing proceedings, submitted by the applicant to the regulatory authority concerned for grant of environmental clearance. This appraisal shall be made by Expert Appraisal Committee or State Level Expert Appraisal Committee concerned in a transparent manner in a proceeding to which the applicant shall be invited for furnishing necessary clarifications in person or through an authorized representative. On conclusion of this proceeding, the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned shall make categorical recommendations to the regulatory authority concerned either for grant of prior environmental clearance on stipulated terms and conditions, or rejection of the application for prior environmental clearance, together with reasons for the same.

(ii) The appraisal of all projects or activities which are not required to undergo public consultation, or submit an Environment Impact Assessment report, shall be carried out on the basis of the prescribed application Form 1 and Form 1A as applicable, any other relevant

validated information available and the site visit wherever the same is considered as necessary by the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned.

(iii) The appraisal of an application be shall be completed by the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned within sixty days of the receipt of the final Environment Impact Assessment report and other documents or the receipt of Form 1 and Form 1 A, where public consultation is not necessary and the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee shall be placed before the competent authority for a final decision within the next fifteen days .The prescribed procedure for appraisal is given in Appendix V ;

7(ii). Prior Environmental Clearance (EC) process for Expansion or Modernization or Change of product mix in existing projects:

All applications seeking prior environmental clearance for expansion with increase in the production capacity beyond the capacity for which prior environmental clearance has been granted under this notification or with increase in either lease area or production capacity in the case of mining projects or for the modernization of an existing unit with increase in the total production capacity beyond the threshold limit prescribed in the Schedule to this notification through change in process and or technology or involving a change in the product –mix shall be made in Form I and they shall be considered by the concerned Expert Appraisal Committee or State Level Expert Appraisal Committee within sixty days, who will decide on the due diligence necessary including preparation of EIA and public consultations and the application shall be appraised accordingly for grant of environmental clearance.

8.Grant or Rejection of Prior Environmental Clearance (EC):

(i) The regulatory authority shall consider the recommendations of the EAC or SEAC concerned and convey its decision to the applicant within forty five days of the receipt of the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned or in other words within one hundred and five days of the receipt of the final Environment Impact Assessment Report, and where Environment Impact Assessment is not required, within one hundred and five days of the receipt of the complete application with requisite documents, except as provided below.

(ii) The regulatory authority shall normally accept the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned. In cases where it disagrees with the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned, the regulatory authority shall request reconsideration by the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned within forty five days of the receipt of the recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned while stating the reasons for the disagreement. An intimation of this decision shall be simultaneously conveyed to the applicant. The Expert Appraisal Committee or State Level Expert Appraisal Committee concerned, in turn, shall consider the observations of the regulatory authority and furnish its views on the same within a further period of sixty days. The decision of the regulatory authority after considering the views of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned shall be final and conveyed to the applicant by the regulatory authority concerned within the next thirty days.

(iii) In the event that the decision of the regulatory authority is not communicated to the applicant within the period specified in sub-paragraphs (i) or (ii) above, as applicable, the

applicant may proceed as if the environment clearance sought for has been granted or denied by the regulatory authority in terms of the final recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned.

(iv) On expiry of the period specified for decision by the regulatory authority under paragraph (i) and (ii) above, as applicable, the decision of the regulatory authority, and the final recommendations of the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned shall be public documents.

(v) Clearances from other regulatory bodies or authorities shall not be required prior to receipt of applications for prior environmental clearance of projects or activities, or screening, or scoping, or appraisal, or decision by the regulatory authority concerned, unless any of these is sequentially dependent on such clearance either due to a requirement of law, or for necessary technical reasons.

(vi) Deliberate concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis. Rejection of an application or cancellation of a prior environmental clearance already granted, on such ground, shall be decided by the regulatory authority, after giving a personal hearing to the applicant, and following the principles of natural justice.

9. Validity of Environmental Clearance (EC):

The "Validity of Environmental Clearance" is meant the period from which a prior environmental clearance is granted by the regulatory authority, or may be presumed by the applicant to have been granted under sub paragraph (iv) of paragraph 7 above, to the start of production operations by the project or activity, or completion of all construction operations in case of construction projects (item 8 of the Schedule), to which the application for prior environmental clearance refers. The prior environmental clearance granted for a project or activity shall be valid for a period of ten years in the case of River Valley projects (item 1(c) of the Schedule), project life as estimated by Expert Appraisal Committee or State Level Expert Appraisal Committee subject to a maximum of thirty years for mining projects and five years in the case of all other projects and activities. However, in the case of Area Development projects and Townships [item 8(b)], the validity period shall be limited only to such activities as may be the responsibility of the applicant as a developer. This period of validity may be extended by the regulatory authority concerned by a maximum period of five years provided an application is made to the regulatory authority by the applicant within the validity period, together with an updated Form 1, and Supplementary Form 1A, for Construction projects or activities (item 8 of the Schedule). In this regard the regulatory authority may also consult the Expert Appraisal Committee or State Level Expert Appraisal Committee as the case may be.

10. Post Environmental Clearance Monitoring:

(i) It shall be mandatory for the project management to submit half-yearly compliance reports in respect of the stipulated prior environmental clearance terms and conditions in hard and soft copies to the regulatory authority concerned, on 1st June and 1st December of each calendar year.

(ii) All such compliance reports submitted by the project management shall be public documents. Copies of the same shall be given to any person on application to the concerned regulatory authority. The latest such compliance report shall also be displayed on the web site of the concerned regulatory authority.

11. Transferability of Environmental Clearance (EC):

A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application by the transferor, or by the transferee with a written "no objection" by the transferor, to, and by the regulatory authority concerned, on the same terms and conditions under which the prior environmental clearance was initially granted, and for the same validity period. No reference to the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned is necessary in such cases.

12. Operation of EIA Notification, 1994, till disposal of pending cases:

From the date of final publication of this notification the Environment Impact Assessment (EIA) notification number S.O.60 (E) dated 27th January, 1994 is hereby superseded, except in suppression of the things done or omitted to be done before such suppression to the extent that in case of all or some types of applications made for prior environmental clearance and pending on the date of final publication of this notification, the Central Government may relax any one or all provisions of this notification except the list of the projects or activities requiring prior environmental clearance in Schedule I , or continue operation of some or all provisions of the said notification, for a period not exceeding one year from the date of issue of this notification.

[No. J-11013/56/2004-IA-II (I)]

(R.CHANDRAMOHAN)
JOINT SECRETARY TO THE GOVERNMENT OF INDIA

SCHEDULE

(See paragraph 2 and 7)

LIST OF PROJECTS OR ACTIVITIES REQUIRING PRIOR ENVIRONMENTAL CLEARANCE

Project or Activity		**Category with threshold limit**		**Conditions if any**
		A	**B**	
1		**Mining, extraction of natural resources and power generation (for a specified production capacity)**		
(1)	(2)	(3)	(4)	(5)
1(a)	Mining of minerals	≥ 50 ha. of mining lease area Asbestos mining irrespective of mining area	<50 ha ≥ 5 ha .of mining lease area.	General Condition shall apply Note Mineral prospecting (not involving drilling) are exempted provided the concession areas have got previous clearance for physical survey
1(b)	Offshore and onshore oil and gas exploration, development & production	All projects		Note Exploration Surveys (not involving drilling) are exempted provided the concession areas have got previous clearance for physical survey
1(c)	River Valley projects	(i) ≥ 50 MW hydroelectric power generation; (ii) ≥ 10,000 ha. of culturable command area	(i) < 50 MW ≥ 25 MW hydroelectric power generation; (ii) < 10,000 ha. of culturable command area	General Condition shall apply
1(d)	Thermal Power Plants	≥ 500 MW (coal/lignite/naphta & gas based); ≥ 50 MW (Pet coke diesel and all other fuels -)	< 500 MW (coal/lignite/naptha & gas based); <50 MW ≥ 5MW (Pet coke ,diesel and all other fuels)	General Condition shall apply

(1)	(2)	(3)	(4)	(5)
1(e)	Nuclear power projects and processing of nuclear fuel	All projects	-	
2		**Primary Processing**		
2(a)	Coal washeries	≥ 1 million ton/annum throughput of coal	<1million ton/annum throughput of coal	General Condition shall apply (If located within mining area the proposal shall be appraised together with the mining proposal)
2 (b)	Mineral beneficiation	≥ 0.1million ton/annum mineral throughput	< 0.1million ton/annum mineral throughput	General Condition shall apply (Mining proposal with Mineral beneficiation shall be appraised together for grant of clearance)

3		**Materials Production**		
(1)	**(2)**	**(3)**	**(4)**	**(5)**
3(a)	Metallurgical industries (ferrous & non ferrous)	a)Primary metallurgical industry All projects b) Sponge iron manufacturing ≥ 200TPD c)Secondary metallurgical processing industry All toxic and heavy metal producing units ≥ 20,000 tonnes /annum -	Sponge iron manufacturing <200TPD Secondary metallurgical processing industry i.)All toxic andheavymetal producing units <20,000 tonnes /annum ii.)All other non –toxic secondary metallurgical processing industries >5000 tonnes/annum	General Condition shall apply for Sponge iron manufacturing
3(b)	Cement plants	≥ 1.0 million tonnes/annum production capacity	<1.0 million tonnes/annum production capacity. All Stand alone grinding units	General Condition shall apply

4		**Materials Processing**		
(1)	**(2)**	**(3)**	**(4)**	**(5)**
4(a)	Petroleum refining industry	All projects	-	-
4(b)	Coke oven plants	≥2,50,000 tonnes/annum -	<2,50,000 & ≥25,000 tonnes/annum	-
4(c)	Asbestos milling and asbestos based products	All projects	-	-
4(d)	Chlor-alkali industry	≥300 TPD production capacityor a unit located out side the notified industrial area/ estate	<300 TPD production capacity and located within a notified industrial area/ estate	Specific Condition shall apply No new Mercury Cell based plants will be permitted and existing units converting to membrane cell technology are exempted from this Notification
4(e)	Soda ash Industry	All projects	-	-
4(f)	Leather/skin/hide processing industry	New projects outside the industrial area or expansion of existing units out side the industrial area	All new or expansion of projects located within a notified industrial area/ estate	Specific condition shall apply
5		**Manufacturing/Fabrication**		
5(a)	Chemical fertilizers	All projects	-	-
5(b)	Pesticides industry and pesticide specific intermediates (excluding formulations)	All units producing technical grade pesticides	-	-

(1)	(2)	(3)	(4)	(5)
5(c)	Petro-chemical complexes (industries based on processing of petroleum fractions & natural gas and/or reforming to aromatics)	All projects -	-	-
5(d)	Manmade fibres manufacturing	Rayon	Others	General Condition shall apply
5(e)	Petrochemical based processing (processes other than cracking & reformation and not covered under the complexes)	Located out side the notified industrial area/ estate -	Located in a notified industrial area/ estate	Specific Condition shall apply
5(f)	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	Located out side the notified industrial area/ estate	Located in a notified industrial area/ estate	Specific Condition shall apply
5(g)	Distilleries	(i)All Molasses based distilleries (ii) All Cane juice/ non-molasses based distilleries ≥30 KLD	All Cane juice/non-molasses based distilleries – <30 KLD	General Condition shall apply
5(h)	Integrated paint industry	-	All projects	General Condition shall apply

(1)	(2)	(3)	(4)	(5)
5(i)	Pulp & paper industry excluding manufacturing of paper from waste paper and manufacture of paper from ready pulp with out bleaching	Pulp manufacturing and Pulp& Paper manufacturing industry -	Paper manufacturing industry without pulp manufacturing	General Condition shall apply
5(j)	Sugar Industry	- -	≥ 5000 tcd cane crushing capacity	General Condition shall apply
5(k)	Induction/arc furnaces/cupola furnaces 5TPH or more	- -	All projects	General Condition shall apply
6		**Service Sectors**		
6(a)	Oil & gas transportation pipe line (crude and refinery/ petrochemical products)**,** passing through national parks /sanctuaries/coral reefs /ecologically sensitive areas including LNG Terminal	All projects -		-

(1)	(2)	(3)	(4)	(5)
6(b)	Isolated storage & handling of hazardous chemicals (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	-	All projects	General Condition shall apply
7		**Physical Infrastructure including Environmental Services**		
7(a)	Air ports	All projects	-	-
7(b)	All ship breaking yards including ship breaking units	All projects	-	-
7(c)	Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes.	If at least one industry in the proposed industrial estate falls under the Category A, entire industrial area shall be treated as Category A, irrespective of the area**.** Industrial estates with area greater than 500 ha. and housing at least one Category B industry.	-Industrial estates housing at least one Category B industry and area <500 ha. Industrial estates of area> 500 ha. and not housing any industry belonging to Category A or B.	Special condition shall apply Note: Industrial Estate of area below 500 ha. and not housing any industry of category A or B does not require clearance**.**
7(d)	Common hazardous waste treatment, storage and disposal facilities (TSDFs)	All integrated facilities having incineration &landfill or incineration alone	All facilities having land fill only	General Condition shall apply

(1)	(2)	(3)	(4)	(5)
7(e)	Ports, Harbours	≥ 5 million TPA of cargo handling capacity (excluding fishing harbours)	< 5 million TPA of cargo handling capacity and/or ports/ harbours ≥10,000 TPA of fish handling capacity	General Condition shall apply
7(f)	Highways	i) New National High ways; and ii) Expansion of National High ways greater than 30 KM, involving additional right of way greater than 20m involving land acquisition and passing through more than one State.	i) New State High ways; and ii) Expansion of National / State Highways greater than 30 km involving additional right of way greater than 20m involving land acquisition.	General Condition shall apply
7(g)	Aerial ropeways		All projects	General Condition shall apply
7(h)	Common Effluent Treatment Plants (CETPs)		All projects	General Condition shall apply
7(i)	Common Municipal Solid Waste Management Facility (CMSWMF)		All projects	General Condition shall apply

(1)	(2)	~~(3)~~	(4)	(5)
8		**Building /Construction projects/Area Development projects and Townships**		
8(a)	Building and Construction projects		≥20000 sq.mtrs and <1,50,000 sq.mtrs. of built-up area#	#(built up area for covered construction; in the case of facilities open to the sky, it will be the activity area)
8(b)	Townships and Area Development projects.		Covering an area ≥ 50 ha and or built up area ≥1,50,000 sq .mtrs ++	++All projects under Item 8(b) shall be appraised as Category B1

Note:-

General Condition (GC):

Any project or activity specified in Category 'B' will be treated as Category A, if located in whole or in part within 10 km from the boundary of: (i) Protected Areas notified under the Wild Life (Protection) Act, 1972, (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time, (iii) Notified Eco-sensitive areas, (iv) inter-State boundaries and international boundaries.

Specific Condition (SC):

If any Industrial Estate/Complex / Export processing Zones /Special Economic Zones/Biotech Parks / Leather Complex with homogeneous type of industries such as Items 4(d), 4(f), 5(e), 5(f), or those Industrial estates with pre –defined set of activities (not necessarily homogeneous, obtains prior environmental clearance, individual industries including proposed industrial housing within such estates /complexes will not be required to take prior environmental clearance, so long as the Terms and Conditions for the industrial estate/complex are complied with (Such estates/complexes must have a clearly identified management with the legal responsibility of ensuring adherence to the Terms and Conditions of prior environmental clearance, who may be held responsible for violation of the same throughout the life of the complex/estate).

APPENDIX I

(See paragraph – 6)

FORM 1

(I) Basic Information

Name of the Project:

Location / site alternatives under consideration:

Size of the Project: *

Expected cost of the project:

Contact Information:

Screening Category:

- *Capacity corresponding to sectoral activity (such as production capacity for manufacturing, mining lease area and production capacity for mineral production, area for mineral exploration, length for linear transport infrastructure, generation capacity for power generation etc.,)*

(II) Activity

1. **Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)**

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)		
1.2	Clearance of existing land, vegetation and buildings?		
1.3	Creation of new land uses?		
1.4	Pre-construction investigations e.g. bore houses, soil testing?		
1.5	Construction works?		

1.6	Demolition works?		
1.7	Temporary sites used for construction works or housing of construction workers?		
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations		
1.9	Underground works including mining or tunneling?		
1.10	Reclamation works?		
1.11	Dredging?		
1.12	Offshore structures?		
1.13	Production and manufacturing processes?		
1.14	Facilities for storage of goods or materials?		
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?		
1.16	Facilities for long term housing of operational workers?		
1.17	New road, rail or sea traffic during construction or operation?		
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?		
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?		
1.20	New or diverted transmission lines or pipelines?		
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?		
1.22	Stream crossings?		
1.23	Abstraction or transfers of water form ground or surface waters?		
1.24	Changes in water bodies or the land surface affecting drainage or run-off?		

1.25	Transport of personnel or materials for construction, operation or decommissioning?		
1.26	Long-term dismantling or decommissioning or restoration works?		
1.27	Ongoing activity during decommissioning which could have an impact on the environment?		
1.28	Influx of people to an area in either temporarily or permanently?		
1.29	Introduction of alien species?		
1.30	Loss of native species or genetic diversity?		
1.31	Any other actions?		

2. **Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):**

S.No.	**Information/checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities /rates, wherever possible) with source of information data**
2.1	Land especially undeveloped or agricultural land (ha)		
2.2	Water (expected source & competing users) unit: KLD		
2.3	Minerals (MT)		
2.4	Construction material – stone, aggregates, and / soil (expected source – MT)		
2.5	Forests and timber (source – MT)		
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)		
2.7	Any other natural resources (use appropriate standard units)		

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)		
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)		
3.3	Affect the welfare of people e.g. by changing living conditions?		
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,		
3.5	Any other causes		

4. Production of solid wastes during construction or operation or decommissioning (MT/month)

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes		
4.2	Municipal waste (domestic and or commercial wastes)		
4.3	Hazardous wastes (as per Hazardous Waste Management Rules)		

4.4	Other industrial process wastes		
4.5	Surplus product		
4.6	Sewage sludge or other sludge from effluent treatment		
4.7	Construction or demolition wastes		
4.8	Redundant machinery or equipment		
4.9	Contaminated soils or other materials		
4.10	Agricultural wastes		
4.11	Other solid wastes		

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

S.No.	**Information/Checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources		
5.2	Emissions from production processes		
5.3	Emissions from materials handling including storage or transport		
5.4	Emissions from construction activities including plant and equipment		
5.5	Dust or odours from handling of materials including construction materials, sewage and waste		

5.6	Emissions from incineration of waste		
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)		
5.8	Emissions from any other sources		

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers		
6.2	From industrial or similar processes		
6.3	From construction or demolition		
6.4	From blasting or piling		
6.5	From construction or operational traffic		
6.6	From lighting or cooling systems		
6.7	From any other sources		

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials		
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)		
7.3	By deposition of pollutants emitted to air into the land or into water		
7.4	From any other sources		
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?		

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S.No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances		
8.2	From any other causes		
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?		

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting. lities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: • Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • housing development • extractive industries • supply industries • other		
9.2	Lead to after-use of the site, which could havean impact on the environment		
9.3	Set a precedent for later developments		
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects		

(III) Environmental Sensitivity

S.No.	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value		

2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests		
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration		
4	Inland, coastal, marine or underground waters		
5	State, National boundaries		
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas		
7	Defence installations		
8	Densely populated or built-up area		
9	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*		
10	Areas containing important, high quality or scarce resources *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*		
11	Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)*		
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (*earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions*)		

(IV). Proposed Terms of Reference for EIA studies

APPENDIX II

(See paragraph 6)

FORM-1 A (only for construction projects listed under item 8 of the Schedule)

CHECK LIST OF ENVIRONMENTAL IMPACTS

(Project proponents are required to provide full information and wherever necessary attach explanatory notes with the Form and submit along with proposed environmental management plan & monitoring programme)

1. LAND ENVIRONMENT

(Attach panoramic view of the project site and the vicinity)

1.1. Will the existing landuse get significantly altered from the project that is not consistent with the surroundings? (Proposed landuse must conform to the approved Master Plan / Development Plan of the area. Change of landuse if any and the statutory approval from the competent authority be submitted). Attach Maps of (i) site location, (ii) surrounding features of the proposed site (within 500 meters) and (iii)the site (indicating levels & contours) to appropriate scales. If not available attach only conceptual plans.

1.2. List out all the major project requirements in terms of the land area, built up area, water consumption, power requirement, connectivity, community facilities, parking needs etc.

1.3. What are the likely impacts of the proposed activity on the existing facilities adjacent to the proposed site? (Such as open spaces, community facilities, details of the existing landuse, disturbance to the local ecology).

1.4. Will there be any significant land disturbance resulting in erosion, subsidence & instability? (Details of soil type, slope analysis, vulnerability to subsidence, seismicity etc may be given).

1.5. Will the proposal involve alteration of natural drainage systems? (Give details on a contour map showing the natural drainage near the proposed project site)

1.6. What are the quantities of earthwork involved in the construction activity-cutting, filling, reclamation etc. (Give details of the quantities of earthwork involved, transport of fill materials from outside the site etc.)

1.7. Give details regarding water supply, waste handling etc during the construction period.

1.8. Will the low lying areas & wetlands get altered? (Provide details of how low lying and wetlands are getting modified from the proposed activity)

1.9. Whether construction debris & waste during construction cause health hazard? (Give quantities of various types of wastes generated during construction including the construction labour and the means of disposal)

2. WATER ENVIRONMENT

2.1. Give the total quantity of water requirement for the proposed project with the breakup of requirements for various uses. How will the water requirement met? State the sources & quantities and furnish a water balance statement.

2.2. What is the capacity (dependable flow or yield) of the proposed source of water?

2.3. What is the quality of water required, in case, the supply is not from a municipal source? (Provide physical, chemical, biological characteristics with class of water quality)

2.4. How much of the water requirement can be met from the recycling of treated wastewater? (Give the details of quantities, sources and usage)

2.5. Will there be diversion of water from other users? (Please assess the impacts of the project on other existing uses and quantities of consumption)

2.6. What is the incremental pollution load from wastewater generated from the proposed activity? (Give details of the quantities and composition of wastewater generated from the proposed activity)

2.7. Give details of the water requirements met from water harvesting? Furnish details of the facilities created.

2.8. What would be the impact of the land use changes occurring due to the proposed project on the runoff characteristics (quantitative as well as qualitative) of the area in the post construction phase on a long term basis? Would it aggravate the problems of flooding or water logging in any way?

2.9. What are the impacts of the proposal on the ground water? (Will there be tapping of ground water; give the details of ground water table, recharging capacity, and approvals obtained from competent authority, if any)

2.10. What precautions/measures are taken to prevent the run-off from construction activities polluting land & aquifers? (Give details of quantities and the measures taken to avoid the adverse impacts)

2.11. How is the storm water from within the site managed?(State the provisions made to avoid flooding of the area, details of the drainage facilities provided along with a site layout indication contour levels)

2.12. Will the deployment of construction labourers particularly in the peak period lead to unsanitary conditions around the project site (Justify with proper explanation)

2.13. What on-site facilities are provided for the collection, treatment & safe disposal of sewage? (Give details of the quantities of wastewater generation, treatment capacities with technology & facilities for recycling and disposal)

2.14. Give details of dual plumbing system if treated waste used is used for flushing of toilets or any other use.

3. VEGETATION

3.1. Is there any threat of the project to the biodiversity? (Give a description of the local ecosystem with it's unique features, if any)

3.2. Will the construction involve extensive clearing or modification of vegetation? (Provide a detailed account of the trees & vegetation affected by the project)

3.3. What are the measures proposed to be taken to minimize the likely impacts on important site features (Give details of proposal for tree plantation, landscaping, creation of water bodies etc along with a layout plan to an appropriate scale)

4. FAUNA

4.1. Is there likely to be any displacement of fauna- both terrestrial and aquatic or creation of barriers for their movement? Provide the details.

4.2. Any direct or indirect impacts on the avifauna of the area? Provide details.

4.3. Prescribe measures such as corridors, fish ladders etc to mitigate adverse impacts on fauna

5. AIR ENVIRONMENT

5.1. Will the project increase atmospheric concentration of gases & result in heat islands? (Give details of background air quality levels with predicted values based on dispersion models taking into account the increased traffic generation as a result of the proposed constructions)

5.2. What are the impacts on generation of dust, smoke, odorous fumes or other hazardous gases? Give details in relation to all the meteorological parameters.

5.3. Will the proposal create shortage of parking space for vehicles? Furnish details of the present level of transport infrastructure and measures proposed for improvement including the traffic management at the entry & exit to the project site.

5.4. Provide details of the movement patterns with internal roads, bicycle tracks, pedestrian pathways, footpaths etc., with areas under each category.

5.5. Will there be significant increase in traffic noise & vibrations? Give details of the sources and the measures proposed for mitigation of the above.

5.6. What will be the impact of DG sets & other equipment on noise levels & vibration in & ambient air quality around the project site? Provide details.

6. AESTHETICS

6.1. Will the proposed constructions in any way result in the obstruction of a view, scenic amenity or landscapes? Are these considerations taken into account by the proponents?

6.2. Will there be any adverse impacts from new constructions on the existing structures? What are the considerations taken into account?

6.3. Whether there are any local considerations of urban form & urban design influencing the design criteria? They may be explicitly spelt out.

6.4. Are there any anthropological or archaeological sites or artefacts nearby? State if any other significant features in the vicinity of the proposed site have been considered.

7. SOCIO-ECONOMIC ASPECTS

7.1. Will the proposal result in any changes to the demographic structure of local population? Provide the details.

7.2. Give details of the existing social infrastructure around the proposed project.

7.3. Will the project cause adverse effects on local communities, disturbance to sacred sites or other cultural values? What are the safeguards proposed?

8. BUILDING MATERIALS

8.1. May involve the use of building materials with high-embodied energy. Are the construction materials produced with energy efficient processes? (Give details of energy conservation measures in the selection of building materials and their energy efficiency)

8.2. Transport and handling of materials during construction may result in pollution, noise & public nuisance. What measures are taken to minimize the impacts?

8.3. Are recycled materials used in roads and structures? State the extent of savings achieved?

8.4. Give details of the methods of collection, segregation & disposal of the garbage generated during the operation phases of the project.

9. ENERGY CONSERVATION

9.1. Give details of the power requirements, source of supply, backup source etc. What is the energy consumption assumed per square foot of built-up area? How have you tried to minimize energy consumption?

9.2. What type of, and capacity of, power back-up to you plan to provide?

9.3. What are the characteristics of the glass you plan to use? Provide specifications of its characteristics related to both short wave and long wave radiation?

9.4. What passive solar architectural features are being used in the building? Illustrate the applications made in the proposed project.

9.5. Does the layout of streets & buildings maximise the potential for solar energy devices? Have you considered the use of street lighting, emergency lighting and solar hot water systems for use in the building complex? Substantiate with details.

9.6. Is shading effectively used to reduce cooling/heating loads? What principles have been used to maximize the shading of Walls on the East and the West and the Roof? How much energy saving has been effected?

9.7. Do the structures use energy-efficient space conditioning, lighting and mechanical systems? Provide technical details. Provide details of the transformers and motor efficiencies, lighting intensity and air-conditioning load assumptions? Are you using CFC and HCFC free chillers? Provide specifications.

9.8. What are the likely effects of the building activity in altering the micro-climates? Provide a self assessment on the likely impacts of the proposed construction on creation of heat island & inversion effects?

9.9. What are the thermal characteristics of the building envelope? (a) roof; (b) external walls; and (c) fenestration? Give details of the material used and the U-values or the R values of the individual components.

9.10. What precautions & safety measures are proposed against fire hazards? Furnish details of emergency plans.

9.11. If you are using glass as wall material provides details and specifications including emissivity and thermal characteristics.

9.12. What is the rate of air infiltration into the building? Provide details of how you are mitigating the effects of infiltration.

9.13. To what extent the non-conventional energy technologies are utilised in the overall energy consumption? Provide details of the renewable energy technologies used.

10. Environment Management Plan

The Environment Management Plan would consist of all mitigation measures for each item wise activity to be undertaken during the construction, operation and the entire life cycle to minimize adverse environmental impacts as a result of the activities of the project. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. It will state the steps to be taken in case of emergency such as accidents at the site including fire.

APPENDIX III

(See paragraph 7

GENERIC STRUCTURE OF ENVIRONMENTAL IMPACT ASSESSENT DOCUMENT

S.NO	EIA STRUCTURE	CONTENTS
1.	Introduction	• Purpose of the report • Identification of project & project proponent • Brief description of nature, size, location of the project and its importance to the country, region • Scope of the study – details of regulatory scoping carried out (As per Terms of Reference)
2.	Project Description	• Condensed description of those aspects of the project (based on project feasibility study), likely to cause environmental effects. Details should be provided to give clear picture of the following: • Type of project • Need for the project • Location (maps showing general location, specific location, project boundary & project site layout) • Size or magnitude of operation (incl. Associated activities required by or for the project • Proposed schedule for approval and implementation • Technology and process description • Project description. Including drawings showing project layout, components of project etc. Schematic representations of the feasibility drawings which give information important for EIA purpose • Description of mitigation measures incorporated into the project to meet environmental standards, environmental operating conditions, or other EIA requirements (as required by the scope) • Assessment of New & untested technology for the risk of technological failure

3.	Description of the Environment	• Study area, period, components & methodology • Establishment of baseline for valued environmental components, as identified in the scope • Base maps of all environmental components
4.	Anticipated Environmental Impacts & Mitigation Measures	• Details of Investigated Environmental impacts due to project location, possible accidents, project design, project construction, regular operations, final decommissioning or rehabilitation of a completed project • Measures for minimizing and / or offsetting adverse impacts identified • Irreversible and Irretrievable commitments of environmental components • Assessment of significance of impacts (Criteria for determining significance, Assigning significance) • Mitigation measures
5.	Analysis of Alternatives (Technology & Site)	• In case, the scoping exercise results in need for alternatives: • Description of each alternative • Summary of adverse impacts of each alternative • Mitigation measures proposed for each alternative and • Selection of alternative
6.	Environmental Monitoring Program	• Technical aspects of monitoring the effectiveness of mitigation measures (incl. Measurement methodologies, frequency, location, data analysis, reporting schedules, emergency procedures, detailed budget & procurement schedules)
7.	Additional Studies	• Public Consultation • Risk assessment • Social Impact Assessment. R&R Action Plans
8.	Project Benefits	• Improvements in the physical infrastructure • Improvements in the social infrastructure • Employment potential –skilled; semi-skilled and unskilled • Other tangible benefits

9.	Environmental Cost Benefit Analysis	If recommended at the Scoping stage
10.	EMP	• Description of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA
11	Summary & Conclusion (This will constitute the summary of the EIA Report)	• Overall justification for implementation of the project • Explanation of how, adverse effects have been mitigated
12.	Disclosure of Consultants engaged	• The names of the Consultants engaged with their brief resume and nature of Consultancy rendered

APPENDIX III A
(See paragraph 7)

CONTENTS OF SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT

The Summary EIA shall be a summary of the full EIA Report condensed to ten A-4 size pages at the maximum. It should necessarily cover in brief the following Chapters of the full EIA Report: -

1. Project Description
2. Description of the Environment
3. Anticipated Environmental impacts and mitigation measures
4. Environmental Monitoring Programme
5. Additional Studies
6. Project Benefits
7. Environment Management Plan

APPENDIX IV

(See paragraph 7)

PROCEDURE FOR CONDUCT OF PUBLIC HEARING

1.0 The Public Hearing shall be arranged in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site(s) or in its close proximity District -wise, by the concerned State Pollution Control Board (SPCB) or the Union Territory Pollution Control Committee (UTPCC).

2. 0 **The Process:**

2.1 The Applicant shall make a request through a simple letter to the Member Secretary of the SPCB or Union Territory Pollution Control Committee, in whose jurisdiction the project is located, to arrange the public hearing within the prescribed statutory period. In case the project site is extending beyond a State or Union Territory, the public hearing is mandated in each State or Union Territory in which the project is sited and the Applicant shall make separate requests to each concerned SPCB or UTPCC for holding the public hearing as per this procedure.

2.2 The Applicant shall enclose with the letter of request, at least 10 hard copies and an equivalent number of soft (electronic) copies of the draft EIA Report with the generic structure given in Appendix III including the Summary Environment Impact Assessment report in English and in the local language, prepared strictly in accordance with the Terms of Reference communicated after Scoping (Stage-2). Simultaneously the applicant shall arrange to forward copies, one hard and one soft, of the above draft EIA Report along with the Summary EIA report to the Ministry of Environment and Forests and to the following authorities or offices, within whose jurisdiction the project will be located:

(a) District Magistrate/s
(b) Zila Parishad or Municipal Corporation
(c) District Industries Office
(d) Concerned Regional Office of the Ministry of Environment and Forests

2.3 On receiving the draft Environmental Impact Assessment report, the above-mentioned authorities except the MoEF, shall arrange to widely publicize it within their respective jurisdictions requesting the interested persons to send their comments to the concerned regulatory authorities. They shall also make available the draft EIA Report for inspection electronically or otherwise to the public during normal office hours till the Public Hearing is over. The Ministry of Environment and Forests shall promptly display the Summary of the draft Environmental Impact Assessment report on its website, and also make the full draft EIA available for reference at a notified place during normal office hours in the Ministry at Delhi.

2.4 The SPCB or UTPCC concerned shall also make similar arrangements for giving publicity about the project within the State/Union Territory and make available the Summary of the draft Environmental Impact Assessment report (Appendix III A) for inspection in select offices or public libraries or panchayats etc. They shall also additionally

make available a copy of the draft Environmental Impact Assessment report to the above five authorities/offices viz, Ministry of Environment and Forests, District Magistrate etc.

3.0 Notice of Public Hearing:

3.1 The Member-Secretary of the concerned SPCB or UTPCC shall finalize the date, time and exact venue for the conduct of public hearing within 7(seven) days of the date of receipt of the draft Environmental Impact Assessment report from the project proponent, and advertise the same in one major National Daily and one Regional vernacular Daily. A minimum notice period of 30(thirty) days shall be provided to the public for furnishing their responses;

3.2 The advertisement shall also inform the public about the places or offices where the public could access the draft Environmental Impact Assessment report and the Summary Environmental Impact Assessment report before the public hearing.

3.3 No postponement of the date, time, venue of the public hearing shall be undertaken, unless some untoward emergency situation occurs and only on the recommendation of the concerned District Magistrate the postponement shall be notified to the public through the same National and Regional vernacular dailies and also prominently displayed at all the identified offices by the concerned SPCB or Union Territory Pollution Control Committee;

3.4 In the above exceptional circumstances fresh date, time and venue for the public consultation shall be decided by the Member –Secretary of the concerned SPCB or UTPCC only in consultation with the District Magistrate and notified afresh as per procedure under 3.1 above.

4.0 The Panel

~~4.1~~ The District Magistrate or his or her representative not below the rank of an Additional District Magistrate assisted by a representative of SPCB or UTPCC**,** shall supervise and preside over the entire public hearing process.

5.0 Videography

5.1 The SPCB or UTPCC shall arrange to video film the entire proceedings. A copy of the videotape or a CD shall be enclosed with the public hearing proceedings while forwarding it to the Regulatory Authority concerned.

6.0 Proceedings

6.1 The attendance of all those who are present at the venue shall be noted and annexed with the final proceedings.

6.2 There shall be no quorum required for attendance for starting the proceedings.

6.3 A representative of the applicant shall initiate the proceedings with a presentation on the project and the Summary EIA report.

6.4 Every person present at the venue shall be granted the opportunity to seek information or clarifications on the project from the Applicant. The summary of the public

hearing proceedings accurately reflecting all the views and concerns expressed shall be recorded by the representative of the SPCB or UTPCC and read over to the audience at the end of the proceedings explaining the contents in the vernacular language and the agreed minutes shall be signed by the District Magistrate or his or her representative on the same day and forwarded to the SPCB/UTPCC concerned**.**

6.5 A Statement of the issues raised by the public and the comments of the Applicant shall also be prepared in the local language and in English and annexed to the proceedings.

6.6 The proceedings of the public hearing shall be conspicuously displayed at the office of the Panchyats within whose jurisdiction the project is located, office of the concerned Zila Parishad, District Magistrate ,and the SPCB or UTPCC . The SPCB or UTPCC shall also display the proceedings on its website for general information. Comments, if any, on the proceedings which may be sent directly to the concerned regulatory authorities and the Applicant concerned.

7.0 Time period for completion of public hearing

7.1 The public hearing shall be completed within a period of 45 (forty five) days from date of receipt of the request letter from the Applicant. Therefore the SPCB or UTPCC concerned shall sent the public hearing proceedings to the concerned regulatory authority within 8(eight) days of the completion of the public hearing .The applicant may also directly forward a copy of the approved public hearing proceedings to the regulatory authority concerned along with the final Environmental Impact Assessment report or supplementary report to the draft EIA report prepared after the public hearing and public consultations.

7.2 If the SPCB or UTPCC fails to hold the public hearing within the stipulated 45(forty five) days, the Central Government in Ministry of Environment and Forests for Category 'A' project or activity and the State Government or Union Territory Administration for Category 'B' project or activity at the request of the SEIAA, shall engage any other agency or authority to complete the process, as per procedure laid down in this notification.

APPENDIX –V
(See paragraph 7)

PROCEDURE PRESCRIBED FOR APPRAISAL

1. The applicant shall apply to the concerned regulatory authority through a simple communication enclosing the following documents where public consultations are mandatory: -

- Final Environment Impact Assessment Report [20(twenty) hard copies and 1 (one) soft copy)]
- A copy of the video tape or CD of the public hearing proceedings
- A copy of final layout plan (20 copies)
- A copy of the project feasibility report (1 copy)

2. The Final EIA Report and the other relevant documents submitted by the applicant shall be scrutinized in office within 30 days from the date of its receipt by the concerned Regulatory Authority strictly with reference to the TOR and the inadequacies noted shall be communicated electronically or otherwise in a single set to the Members of the EAC /SEAC enclosing a copy each of the Final EIA Report including the public hearing proceedings and other public responses received along with a copy of Form -1or Form 1A and scheduled date of the EAC /SEAC meeting for considering the proposal .

3. Where a public consultation is not mandatory and therefore a formal EIA study is not required, the appraisal shall be made on the basis of the prescribed application Form 1 and a pre-feasibility report in the case of all projects and activities other than Item 8 of the Schedule .In the case of Item 8 of the Schedule, considering its unique project cycle , the EAC or SEAC concerned shall appraise all Category B projects or activities on the basis of Form 1, Form 1A and the conceptual plan and stipulate the conditions for environmental clearance . As and when the applicant submits the approved scheme /building plans complying with the stipulated environmental clearance conditions with all other necessary statutory approvals, the EAC /SEAC shall recommend the grant of environmental clearance to the competent authority.

4. Every application shall be placed before the EAC /SEAC and its appraisal completed within 60 days of its receipt with requisite documents / details in the prescribed manner.

5. The applicant shall be informed at least 15 (fifteen) days prior to the scheduled date of the EAC /SEAC meeting for considering the project proposal.

6. The minutes of the EAC /SEAC meeting shall be finalised within 5 working days of the meeting and displayed on the website of the concerned regulatory authority. In case the project or activity is recommended for grant of EC, then the minutes shall clearly list out the specific environmental safeguards and conditions. In case the recommendations are for rejection, the reasons for the same shall also be explicitly stated.

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APPENDIX VI

(See paragraph 5)

COMPOSITION OF THE SECTOR/ PROJECT SPECIFIC EXPERT APPRAISAL COMMITTEE (EAC) FOR CATEGORY A PROJECTS AND THE STATE/UT LEVEL EXPERT APPRAISAL COMMITTEES (SEACs) FOR CATEGORY B PROJECTS TO BE CONSTITUTED BY THE CENTRAL GOVERNMENT `

1. The Expert Appraisal Committees (EAC(s) and the State/UT Level Expert Appraisal Committees (SEACs) shall consist of only professionals and experts fulfilling the following eligibility criteria:

Professional: The person should have at least (i) 5 years of formal University training in the concerned discipline leading to a MA/MSc Degree, or (ii) in case of Engineering /Technology/Architecture disciplines, 4 years formal training in a professional training course together with prescribed practical training in the field leading to a B.Tech/B.E./B.Arch. Degree, or (iii) Other professional degree (e.g. Law) involving a total of 5 years of formal University training and prescribed practical training, or (iv) Prescribed apprenticeship/article ship and pass examinations conducted by the concerned professional association (e.g. Chartered Accountancy),or (v) a University degree , followed by 2 years of formal training in a University or Service Academy (e.g. MBA/IAS/IFS). In selecting the individual professionals, experience gained by them in their respective fields will be taken note of.

Expert: A professional fulfilling the above eligibility criteria with at least 15 years of relevant experience in the field, or with an advanced degree (e.g. Ph.D.) in a concerned field and at least 10 years of relevant experience.

Age: Below 70 years. However, in the event of the non-availability of /paucity of experts in a given field, the maximum age of a member of the Expert Appraisal Committee may be allowed up to 75 years

2. The Members of the EAC shall be Experts with the requisite expertise and experience in the following fields /disciplines. In the event that persons fulfilling the criteria of "Experts" are not available, Professionals in the same field with sufficient experience may be considered:

- **Environment Quality Experts**: Experts in measurement/monitoring, analysis and interpretation of data in relation to environmental quality

- **Sectoral Experts in Project Management**: Experts in Project Management or Management of Process/Operations/Facilities in the relevant sectors.

- **Environmental Impact Assessment Process Experts**: Experts in conducting and carrying out Environmental Impact Assessments (EIAs) and preparation of Environmental Management Plans (EMPs) and other Management plans and who have wide expertise and knowledge of predictive techniques and tools used in the EIA process

- **Risk Assessment Experts**

- **Life Science Experts in floral and faunal management**
- **Forestry and Wildlife Experts**

- **Environmental Economics Expert with experience in project appraisal**

3. The Membership of the EAC shall not exceed 15 (fifteen) regular Members. However the Chairperson may co-opt an expert as a Member in a relevant field for a particular meeting of the Committee.

4. The Chairperson shall be an outstanding and experienced environmental policy expert or expert in management or public administration with wide experience in the relevant development sector.

5. The Chairperson shall nominate one of the Members as the Vice Chairperson who shall preside over the EAC in the absence of the Chairman /Chairperson.

6. A representative of the Ministry of Environment and Forests shall assist the Committee as its Secretary.

7. The maximum tenure of a Member, including Chairperson, shall be for 2 (two) terms of 3 (three) years each.

8. The Chairman / Members may not be removed prior to expiry of the tenure without cause and proper enquiry.

Environment Impact Assessment Report

For

PROPOSED PROPERTY DEVELOPMENT COMPLEX ABOVE U/G METRO STATION AT BHIKAJI CAMA PLACE NEW DELHI FOR DELHI METRO PROJECT LINE-7

दिल्ली मेट्रो रेल कॉरपोरेशन लिमिटेड
Delhi Metro Rail Corporation Limited

Delhi Metro Rail Corporation Limited

(A JOINT VENTURE OF GOVERNMENT OF INDIA AND GOVT. OF NCT DELHI)

Metro Bhawan Fire Brigade Lane, Barakhamba Road, New Delhi - 110001, India

JULY 2020 (Rev.-1)

Environment Impact Assessment Report

for

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JULY 2020 (Rev.-1)

Prepared by

GPS Technologies Pvt. Ltd.

Corporate Office: 1210-Hemkunt House, Rajendra Place, New Delhi-110 008
Telefax: +91 11 25816389, 25811229
Website: www.gpstpl.com E-mail:contact@gpstpl.com

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Abbreviations

Abbreviations

Abbreviation	Meaning
AAI	: Airport Authority of India
ACB	: Aerated Concrete Blocks
AIDS	: Acquired Immune Deficiency Syndrome
APHA	: American Public Health Association
APTI	: Air Pollution Tolerance Index
ASI	: Archaeological Survey of India
ATS	: Anti Terror Squad
AWS	: Automatic Weather Station
AWWA	: American Water Works Association
BDI	: Biodiversity Index
BMTPC	: Building Materials Technology Promotion Council
BOD	: Biochemical Oxygen Demand
C&D	: Construction and Demolition
CEL	: Centre for Environmental Law
CEPI	: Comprehensive Environmental Pollution Index
CEPT	: Centre for Environmental Planning & Technology
CFCs	: Chlorofluorocarbons
CGWA	: Central Ground Water Authority
CGWB	: Central Ground Water Board
CHC	: Community Health Centre
CPHEEO	: Central Public Health and Environmental Engineering Organisation
CPCB	: Central Pollution Control Boards
CTE	: Consent to Establish
CTO	: Consent to Operate
CUM	: Cubic meter
DC	: District Collector
DMRC	: Delhi Metro Rail Corporation Limited
DNA	: Deoxyribonucleic Acid
DPCC	: Delhi Pollution Control Committee
ECS	: Equivalent Car Space
ECBC	: Energy Conservation Building Code
EIA	: Environmental Impact Assessment
EIL	: Engineers India Limited
EMP	: Environmental Management Plan
EMoP	: Environmental Monitoring Plan
EMU	: Environment Management Unit
EPA	: Environment (Protection) Act
ESA	: Eco Sensitive Area
ESZ	: Eco Sensitive Zone
FAB	: Fly Ash Bricks
FCB	: Fired Clay Bricks
FRA	: French Railway Authority
FSR	: Filler Slab Roof
GHG	: Green House Gas
GNCTD	: Government of the National Capital Territory of Delhi
GoI	: Government of India
GRM	: Grievance Redressal Mechanism
GPSTPL	: GPS Technologies Pvt. Limited

Abbreviation	Meaning
GWP	: Global Warming Potential
HCB	: Hollow Concrete Blocks
HCFCs	: Hydrochlorofluorocarbons
HIV	: Human Immunodeficiency Virus
IMD	: Indian Meteorological Department
IGBC	: *Indian Green Building Council,*
IS	: Indian Standards
ISRO	: Indian Space Research Organisation
KLD	: Kiloliter Per Day
LBS	: Load Bearing Structure
LEED	: Leadership in Energy and Environment Design
LU/LC	: Land Use / Land Classification
LPCD	: Liter Per Capita Per Day
LPD	: Litre Per Day
MEEP	: Municipal Energy Efficiency Programme
MF	: Membrane Filter
MoHUA	: Ministry of Housing and Urban Affairs
MoEFCC	: Ministry of Environment, Forests and Climate Change
MoR	: Ministry of Railway
MSW	: Municipal Solid Waste
NAAQS	: National Ambient Air Quality Standards
NABET	: National Accreditation Board for Education and Training
NABL	: National Accreditation Board for Testing and Calibration Laboratories
NACO	: National AIDS Control Organisation
NDIR	: Non-dispersive Infra Red Absorption
NEP	: The National Environmental Policy
NGO	: Non-Governmental Organization
NGT	: National Green Tribunal
NIC	: Nature Interpretation Centre
NMA	: National Monument Authority
NNM	: Neo-Natal Mortality
NNW	: North-North-West
NO	: Oxide of Nitrogen
NOC	: No Objection Certificate
NP	: National Park
NTU	: Nephelometric Turbidity Unit
NW	: North West
NWDA	: National Water Development Authority
ODS	: Ozone Depleting Substance
OHS	: Occupational Health and Safety
OP	: Operational Policy
PA	: Protected Area
PAS	: Public Address System
PBR	: Prefabricated Brick Panel Roof
PDC	: Property Development Complex
PEL	: Permissible Exposure Limit
PF	: Protected Forest
PHC	: Primary Health Centre
PJR	: RC Plank and Joist Roof
PMU	: Project Management Unit

Abbreviation	Meaning
PUC	: Pollution Under Control
PPE	: Personal Protective Equipment
PPP	: Public Private Partnership
PTFE	: Polytetrafluoroethylene
QCI	: Quality Council of India
RAC	: Resident Additional Collector
RAP	: Resettlement Action Plan
RCC	: Reinforced Concrete (framed) Construction
RSR	: RC Ribbed Slab Roof
RO	: Regional Officer
ROR	: Records of Revenue
SC	: Schedule Cast
SE	: Site Engineer
EMU	: Environment Management Unit
SCB	: Soil Cement Blocks
SHE	: Safety Health Environment
SPCB	: State Pollution Control Boards
SPL	: Sound Pressure Level
SPV	: Special Purpose Vehicle
ST	: Schedule Tribe
STP	: Sewerage Treatment Plant
SWM	: Solid Waste Management
TCLP	: Toxicity Characteristics Leaching Procedure
TCM	: Tetrachloromercurate
TDS	: Total Dissolved Solids
TFR	: Total Fertility Rate
TO	: Tree Officer
TSDF	: Treatment, Storage & Disposal Facilities
TSS	: Total Suspended Solids
ULB	: Urban Local Bodies
WNW	: West-North-West
WPCF	: Water Pollution Control Federation
ZOI	: Zone of Influence

Symbols and Units of Measurement

Symbol	Meaning
<	: less than
≤	: less than or equal to
>	: greater than
≥	: greater than or equal to
%	: per cent
amsl	: above mean sea level
bgl	: below ground level
Ca CO_3	: calcium carbonate
CH_4	: methane
cm	: centimetre
CO	: carbon monoxide
CO_2	: carbon
Cu	: copper

Symbol	Meaning
dB	: decibel
dB(A)	: decibel A-weighted
µg/m^3	: micrograms per cubic metre
GHz	: gigahertz
ha	: hectare
hPa	: hectopascal
hr	: hour
Hz	: hertz
kg	: kilogram
KLD	: kilolitre per day
km	: kilometre
kmph	: kilometre per hour
km^2	: square kilometre
kV	: kilovolt
kV/h	: kilovolts per hour
kWh	: kilowatt hour
µm	: micrometre
m	: metre
m^2	: square metre
m^3	: cubic metre
m/s	: metre per second
mm	: millimetre
mm/s	: millimetre per second
min	: minutes
mbgl	: Meter below ground level
mg/kg	: Miligram Per Kilogram
MW	: megawatt
N	: nitrogen
Ni	: nickel
NO	: nitrogen oxide
NO_2	: nitrogen dioxides
NOx	: oxides of nitrogen
O_2	: oxygen
PA	: per annum
Pb	: lead
PAX	: passenger unit
pH	: potential of hydrogen
pkm	: passenger kilometre
PM	: particulate matter
PM_{10}	: particulate matter >2.5µ and <10 µ
$PM_{2.5}$	: particulate matter <2.5µ
PPV	: peak particle velocity
PV	: photo voltic
SO_2	: sulphur dioxide
TJ	: trillion jules
T	: tonne
V	: volt
Zn	: zinc

Chapter 1
Introduction

Chapter 1
Introduction

1.0 RATIONALE AND PROJECT BACKGROUND

The DMRC has been established with the principal object of planning, designing, developing, constructing, maintaining operating and financing Mass Transit and other urban transport and people mover system of all types and descriptions in the National Capital Territory of Delhi and other areas of the National Capital region.

The Delhi Metro Railway (Operation and Maintenance) Act, 2002 has been enacted by the Parliament to provide for the operation and maintenance, and to regulate the metro railway in the metropolitan city of Delhi and for matters connected therewith and incidental thereto.

Delhi Metro Rail Corporation Limited (DMRC), a joint venture of the Government of India (GOI) and the Government of the National Capital Territory of Delhi (GNCTD) has been mandated by the Ministry of Housing and Urban Affairs (MoHUA), Government of India to undertake value capture from property development initiatives for sustainable revenue generation for the DMRC vide its Policy Circular No. K-14011/8/2000-MRTS (Pt.) dated 30/03/2009. The DMRC has been mandated to develop real estate and other commercial facilities in the Metro Stations and standalone(other) places in the Territory and to generate revenues and with the aim of part supporting the project cost and subsidising the charges for the passengers and promoting the use of the Metro Rail.

In pursuance of the above, DMRC decided to offer Property Development Complex of (Area) 6109 Sq. M. of space above u/g Bhikaji Cama Place Metro Station to a Selected Agency for development, operation, maintenance and management of the spaces (hereinafter referred to as "PD Complex Project"). The proposed Property Development Project shall be located on the Line-7 (Mukundpur to Yamuna Vihar Corridor of Phase-III) of Delhi Metro Rail Project above the underground Bhikaji Cama Place Metro Station on the Ring Road (Mahatma Gandhi Road) opposite to Bhikaji Cama Place District Centre, RK Puram, New Delhi.

1.1 IMPLEMENTING AGENCY

As described in the preceding section, the proposed Property Development Complex Project shall be implemented by the Delhi Metro Rail Corporation Limited (DMRC) through a selected agency for development, operation, maintenance and management of the PD Complex.

1.2 NEED OF THE PROJECT

In the backdrop of the mandated policy of the Ministry of Housing and Urban Affairs (MoHUA), Government of India, the necessity for developing commercial multistory building with restaurant at the ground floor and office spaces in the next four floors has been felt in view of meeting the various needs of rapidly growing NCR, expanding economy and sustainable revenue generation for the DMRC. The main features of the project are:

(1) Ideal Location;
(2) Easy approach;
(3) Landmark address;

(4) Surrounded by business hub;
(5) Employment generation; and
(6) Brand Value

1.3 PROJECT LOCATION

The project site is located at the junction of two important Master Plan Roads, *i.e.* Mahatma Gandhi Marg, also known as Inner Ring Road and Africa Avenue, the life lines of Delhi Transportation network. The project site is just opposite to the Engineers India Bhawan (EIL Office Building) in the Bhikaji Cama Place District Centre and Hayat Regency, a prominent 5-star hotel. The site is surrounded by many important office premises and commercial hubs like Sarojani Nagar Market.

The proposed project site is located between the geo-coordinates:

S.No	Point	Geo Co-ordinates
1	A	28°34'12.40"N, 77°11'14.14"E
2	B	28°34'12.11"N, 77°11'18.50"E
3	C	28°34'13.94"N, 77°11'18.55"E
4	D	28°34'14.46"N, 77°11'12.89"E
5	E	28°34'13.93"N, 77°11'12.87"E
6	F	28°34'13.78"N, 77°11'14.24"E

Source: Study Team[1]

1.3.1 ORIENTATION

The proposed building is oriented in EAST-WEST AXIS, which is an ideal condition for harnessing the natural light as the building is facing NORTH and SOUTH direction. This orientation will enable to achieve green rating for the tower.

Cardinal Direction	Context
North	Netaji Nagar Residential Colony
South	Bhikaji Cama Place District Centre
East	Green Space beyond Africa Avenue
West	Petrol Pump

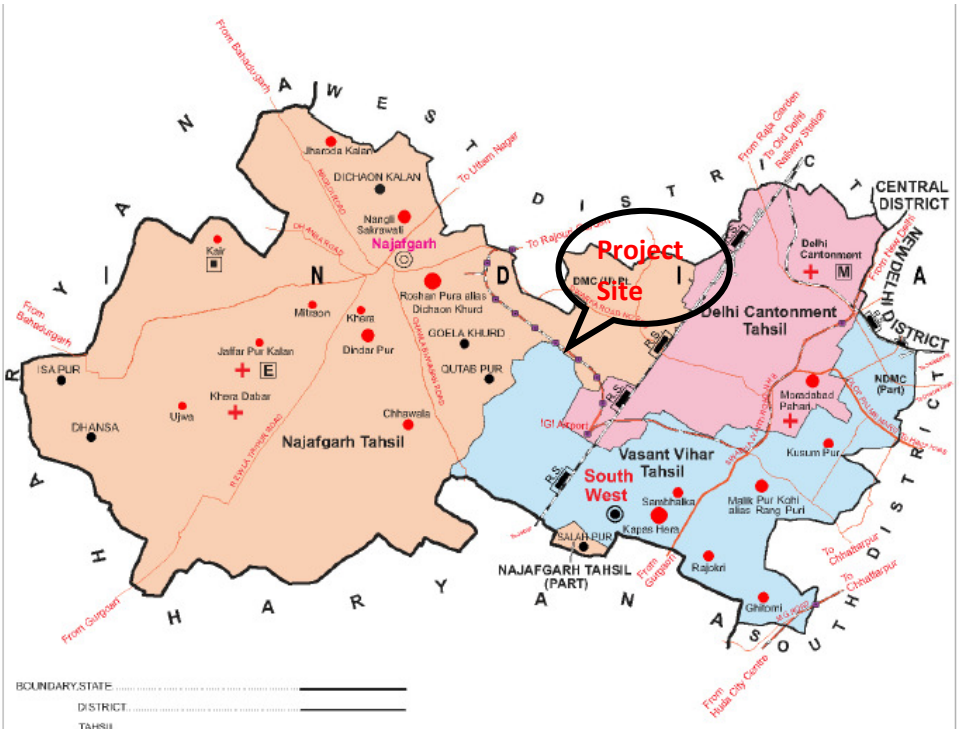
The proposed project site is shown in ***Exhibit 1.3.1*** on the latest google earth imagery, ***Exhibit 1.3.2*** on the District map and ***Exhibit 1.3.3*** google street map *vis-a-vis* Master Plan Delhi 2021.

[1] GPSTPL: GPS Technologies: EIA Report, collection and assessment of primary / secondary environmental data
DMRC: Project Specifications / Data / Maps / Project Drawings provided by DMRC's Project Office

Exhibit 1.3.1: Project Site on the Google Earth Imagery

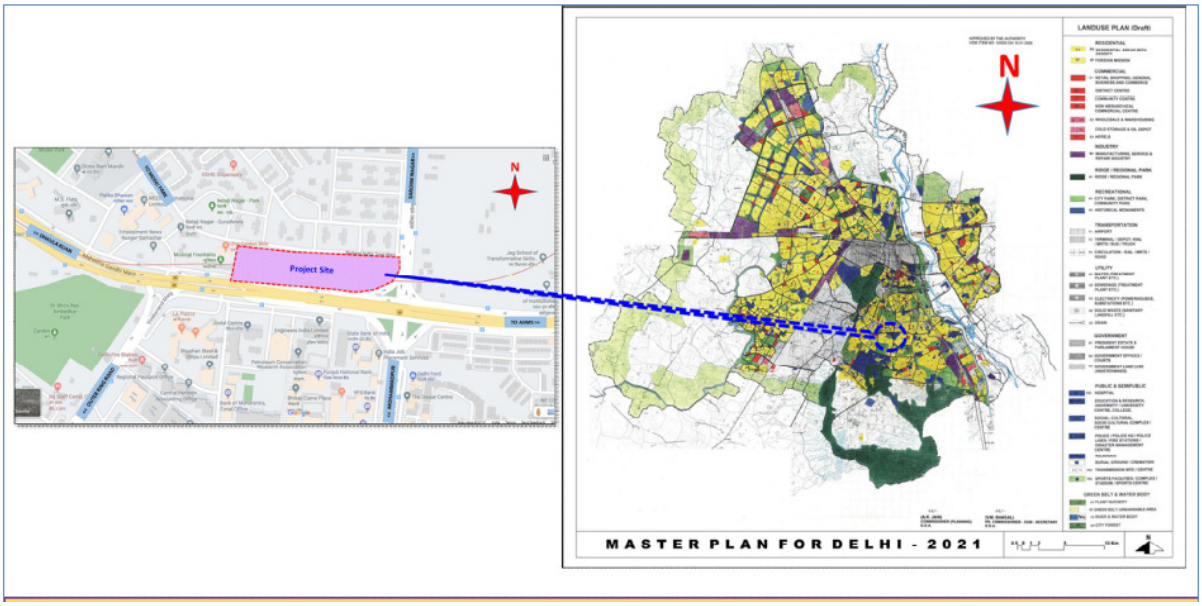
Source: Google earth imagery accessed on 25th July, 2020

Exhibit 1.3.2: Proposed Project Site on District Map



Source: Census Handbook, 2011

Exhibit 1.3.3: Proposed Project Site on Google Street Map *vis a vis* Master Plan Delhi 2021



Source: Study Team

1.4 BRIEF DESCRIPTION OF NATURE, SIZE, LOCATION OF THE PROJECT AND ITS IMPORTANCE TO COUNTRY/REGION

1.4.1 Brief Description of the Project

Brief description of the project's nature, size and location is provided in ***Table 1.4.1***.

Table 1.4.1: Brief Description of the Project

Details	Description
Nature	Building and Construction Project (Commercial Multi-storey Building)
Size	Plot Sixe: 6109 Sq. M., Builtup Area: 18436.84 Sq. M.
Location	Above underground Metro Station, Bhikaji Cama Place, New Delhi, District-South West Delhi, Tehsil- Vasant Vihar

Source: Study Team

1.4.2 Importance of the Project to the Country/Region

Investment

An investment of ~ INR 80 Crore has been budgeted for the project. The investment will go into the local economy.

Direct Employment

Approximately 150 people will get direct employment in the restaurant and maintenance by setting up of this PD Complex project during its operational lifecycle.

Indirect Employment

Approximately 150 people will get indirect employment in different activities by setting up of this PD Complex project during its operational lifecycle.

During the construction phase about 150 workforce shall be deployed for 2-years.

1.5 OBJECTIVE OF THE EIA STUDY

1) Rationale

Schedule of the Environmental Impact Assessment (EIA) Notification issued by the Ministry of Environment Forests and Climate Change (MoEFCC), Government of India, New Delhi on 14th September, 2006, and subsequent amendment therein, under the Environment (Protection) Act, 1986, emphasizes on the requirement of prior Environmental Clearance. Under Schedule, Item 8 (a) Building and Construction project having built up area >20000 sq. m. and <1,50,000 sq. m. requires prior Environmental Clearance.

Since the proposed project is having built up area of 18436.84 sq. m. on the plot area of 6109 sq. m., prior Environmental Clearance is not required.

Since the project is located in the middle of the dense population, an Environment Impact Assessment study is required to be taken for better planning and judicious implementation of the PD Complex project. In view of this, the present EIA study has been taken up and EIA Report has been prepared.

In order to bring out the existing environmental scenario, anticipate and identify the environmental impacts due to the construction and operation of the proposed project and associated facilities, an EIA study has been undertaken by the consultants-M/s GPS Technologies Private Limited, New Delhi appointed by DMRC.

The EIA Study has been conducted in accordance with the latest Guidelines of Ministry of Environment Forests and Climate Change (MoEFCC) and the rules and regulations notified by the Government of National Capital Territory of Delhi. The present EIA Report has been prepared based on the Standard Terms of Reference prepared by Administrative Staff College of India, Hyderabad under the guidance and supervision of MoEFCC for the building construction and township area development projects.

2) Study Objective

The main objective of this EIA study was to identify the impacts due to the construction and operation of the proposed project and propose suitable mitigation measures, wherever required.

The Study consists of the primary data collection, intensive site visits and detailed assessment, consultations with stakeholders and the analysis of available secondary data.

The Study was carried out to achieve the following objectives:

- Execution of primary data collection/surveys to appropriately establish an environmental baseline in the Study area.
- Identification of significant environmental issues to inform decision-making for proposed works.

- Assessment of potential impacts to realize requisite avoidance, minimization, management/mitigation and compensation measures, as needed.
- Planning and proposing of fund allocation to ensure the occupational health & safety of all contract and casual workers.
- Identification of existing occupational and safety hazards, such as the exposure levels of hazards and whether they are within Permissible Exposure Level (PEL). If these are not within the PEL, measures should be identified to keep them within the PEL so that health of the workers can be preserved.
- Development and preparation of appropriate mitigation measures and Environmental Management Plan (EMP), addressing implementation, monitoring and reporting requirements.
- Addressing identified environmental issues through appropriate planning and design of works and integration of EHS requirements into the bidding documents.

Overall, the objective of the Study is to ensure that anticipated adverse impacts on natural, physical and social environment likely to be caused by the proposed Project interventions, to assess the impacts adequately and to address through appropriate mitigation measures integrated into the design and execution of the works.

1.5.1 Study Area

The region targeted by the study is 5 km radius from the periphery of the project site has been considered as Zone of Influence (ZOI) and study area keeping in mind the magnitude of the project component.

1.6 SCOPE OF THE EIA STUDY

To assess the environmental attributes of the study area, core area of 5 km radius around the proposed project site has been considered. The broad scope of the study includes:

- Desktop study/ literature review to collect data relevant to the study area;
- Analysis of Alternatives
- Primary data collection supplemented with secondary data so as to establish the baseline environmental status of the study area;
- Identify various existing pollution loads due to project activities in the study area;
- Evaluate the predicted impacts on the various environmental attributes in the study area;
- Identify mitigation measures and prepare an Environmental Management Plan (EMP) outlining the measures for improving environmental quality and scope for future expansions for environmentally sustainable development;
- Identify critical environmental attributes required to be monitored regularly.

1.6.1 Structure of the EIA Report

The structure of the EIA Report adopted for the proposed project is detailed in ***Table 1.6.1***, keeping in view the Scope of Work as mandated in the Terms of Reference issued along with the Letter of Enquiry document for the EIA Study.

Table 1.6.1: Structure of the EIA Report

Chapter	Title	Description and Content
Chapter 1	Introduction	○ Purpose of the report ○ Need and Importance of the project ○ Implementing agency ○ Scope of the study-details of regulatory scoping.
Chapter 2	Project Description	○ Condensed description those aspects of the project (based on project feasibility study), likely to cause environmental effects. Details should be provided to give clear picture of the following: ○ Type of project ○ Need for the project ○ Size or magnitude of operations (including Associated activities required for the project) ○ Proposed schedule for approval and implementation ○ Technological details ○ Project description including drawing showing the project layout, L-section of the alignment ○ Description of the mitigation measures incorporated into the project to meet environmental standards
Chapter 3	Description of the Environment	○ Study area, period, components and methodology ○ Establishment of baseline for valued environmental components as identified in the scope of study ○ Base maps of all environmental and social components of the Zone of Influence (ZoI)
Chapter 4	Anticipated Environmental Impacts and Mitigation Measures	Describes the qualitative and quantitative analysis of the impacts and also identifies the mitigation measures for each of the environmental attributes.
Chapter 5	Analysis of Alternatives (Technology and Site)	Justification of the selected site, if any
Chapter 6	Environmental Monitoring Program	Description of environmental attributes, parameters, frequency, no. of location *etc.*
Chapter 7	Additional Studies	○ Outcome of the Traffic Study ○ Disaster Management Plan and contingency plan in the case of any natural or manmade disaster
Chapter 8	Project Benefits	○ Improvements in the physical infrastructure ○ Improvement in Social infrastructure ○ Employment Potential in different category ○ Other tangible benefits
Chapter 9	Environmental Management Plan	○ Management Plan delineated based on the outcome of the impacts predictions for implementation in construction phase as well as in operation phase of the project. ○ Description of the administrative aspects of

Chapter	Title	Description and Content
		ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA ○ Grievance Redressal Mechanism
Chapter 10	Summary and Conclusions	○ Brief summary of the EIA Report and finding of the study
Chapter 10	Disclosure of Consultants Engaged	○ The names of the consultants engaged with their brief resume and nature of consultancy rendered

Source: Study Team

1.7 COMPLIANCE TO TOR

The compliance and adherence to the standard terms of reference as approved by the MoEFCC for the building and construction projects is detailed in ***Table 1.7.1***.

Table 1.7.1: Compliance to the Standard Terms and Reference

Sl. No.	Stipulations	Compliance
1.	Profile of the project proponent, name and contact address, implementing organization, organizational chart, project consultants *etc.*, should be mentioned clearly.	*Refer **Section 1.1** of Chapter 1*
2.	Land description- plot/ survey numbers, village, tehsil, district, state and area of the land must be mentioned clearly.	*Refer **Section 1.3** of Chapter 1*
3.	Goal and objectives of the proposed project, significance of the project both at local and regional level, relevance of the project in light of the existing development plans of the region are to be mentioned clearly.	*Refer **Section 1.4.2** of Chapter 1*
4.	A map of the study area 10 km from the boundary of the project area, delineating the major topographical features such as land use, drainage, locations of habitats, major Construction including roads, railways, pipelines, industries if any in the area are to be mentioned. In the same map the details of environmental sensitive areas present within a radial distance of 1 Km from the project boundary shall be specifically shown	*Refer **Section 3.0** of Chapter 3 (**Exhibit 3.0.1 & 3.0.2**).*
5.	Land use map of the study area in 1: 10,000 scale based on high resolution satellite imagery delineating the forest, agricultural land, water bodies, settlements, and other cultural features.	*Refer **Section 3.4.1 (Exhibit 3.4.2)** of Chapter 3.*
6.	Description of the project site, geology, topography, climate, transport and connectivity, demographic aspects, socio, cultural and economic aspects, villages, settlements should be given.	*Refer **Section 3. 1 and Section 3.2.1** of Chapter 3.*
7.	Details of environmentally sensitive places, land acquisition, rehabilitation of communities/ villages, present status of such activities are to be mentioned. .	*Refer **Section 3.9.3.5** of Chapter 3*
8.	Historical data on climate conditions such as wind pattern,	*Refer **Section 3.6.1** of*

Sl. No.	Stipulations	Compliance
	history of cyclones, storm surges, earth quake etc., for the last 25 years are to be given.	*Chapter 3.*
9.	Detailed layout plan of proposed project development, communication facilities, access/approach roads, landscape, sewage disposal facilities, and waste disposal *etc*; to be given. Layout plan of proposed development of built up areas with covered construction such as DG Set rooms, Administrative buildings, Utilities such as Main and Stand By Power, Water supply installations *etc*; to be given.	*Refer **Exhibit 2.1 to Exhibit 2.7** of Chapter 2.*
10.	Map of the study area clearly delineating the location of various monitoring stations (air/ water / soil and noise) superimposed with location of habitats are to be shown. Monitoring should be done as per CPCB guidelines. Primary data should be collected for one season except rainy season. Monitoring of the parameters should be carried out within the study area.	*Refer **Exhibit 3.3.1, 3.5.1, 3.7.1 and Exhibit 3.8.1** of Chapter 3.*
11.	Study of land use pattern, habitation, cropping pattern, forest cover, environmentally sensitive places etc, employing remote sensing techniques and ground truth and also through secondary data sources.	Refer ***Section 3.4.1*** of Chapter 3.
12.	Soil- Type and characteristics, Porosity and permeability Sub-soil permeability, Inherent fertility	Refer ***Section 3.3*** of Chapter 3.
13.	Micro meteorological data consisting of wind speed, wind direction, temperature, cloud cover, (amount and height), humidity, inversions, rainfall (peak and average daily rainfall) and wind rose patterns, from primary and secondary sources in the study area.	Refer ***Section 3.6.2*** of Chapter 3.
14.	Baseline data of air pollutant parameters extending an area of 5 KMs from the project should be monitored at a number of locations. Description of base line data of ambient air parameters namely RSPM, nitrogen dioxide, Sulphur dioxide, and carbon monoxide are to be collected. One season data is to be monitored other than monsoon as per the CPCB Norms. Sampling locations are to be located as per CPCB norms.	Refer ***Section 3.7*** of Chapter 3.
15.	Baseline data of noise at the project area and the neighbourhood habitat areas is to be ascertained. Daytime and nighttime data should be collected.	Refer ***Section 3.8*** of Chapter 3.
16.	Baseline water quality from all sources such as ground water, municipal water, surface water need to be determined and compared to the water quality norms prescribed for drinking water and State PWD specifications for construction water. Quantity of wastewater is to be provided.	Refer ***Section 3.5*** of Chapter 3.
17.	Baseline data on the flora and fauna for the study area is to be detailed out. An inventory map is to be prepared along with a description of the existing terrestrial, wetland and aquatic vegetation. If there are any rare and endangered	Refer ***Section 3.9*** of Chapter 3.

Sl. No.	Stipulations	Compliance
	species in the study area they are to be clearly mentioned.	
18.	Baseline data should include the demography, settlements, existing infrastructure facilities in the proposed area.	
19.	Solid wastes from construction sector can be categorized into two phases *i.e.* during construction & during operation. Details of the following are to be given: Construction or demolition waste, *i.e.,* massive and inert waste, Municipal waste, *i.e.,* biodegradable and recyclable waste, Hazardous waste, E-waste	*Refer **Section 2.9** of Chapter 2 and **Section 4.8** of Chapter 4.*
20.	Impact on the natural drainage system and soil erosion. Loss of productive soil and impact on natural drainage pattern.	*Refer **Section 4.7** of Chapter 4.*
21.	Impacts on air quality during the construction and operation phase should be predicted. The existing surrounding features of the study area and impact on them should be addressed separately.	*Refer **Section 4.3** of Chapter 4.*
22.	Impact of project construction/operation on the noise on account of construction equipment and road traffic is to be studied.	*Refer **Section 4.4** of Chapter 4.*
23.	Impact of construction and operational phases on the surface and ground water on account of the building construction is to be estimated.	*Refer **Section 4.5** of Chapter 4.*
24.	Impact of project during construction and operational phases on the biological environment on account of project activity is to be detailed.	*Refer **Section 4.6** of Chapter 4.*
25.	Predicted impact on the communities of the proposed activity is to be given. Impact on surroundings on socio-economic status is to be detailed.	*Refer **Section 4.10** of Chapter 4.*
26.	Impact of the project during construction and operational phases for generation of waste is to be assessed.	*Refer **Section 4.8** of Chapter 4.*
27.	Describe the project energy requirements, infrastructure requirements needed for this activity. Discuss the steps taken to integrate the needs of other stakeholders into the location and design of access infrastructure to reduce and manage overall environmental impacts from resource development.	*Refer **Section 2.4** of Chapter 2.*
28.	Estimate any environmental implications from transportation related emissions associated with the construction and operational phases and suggest suitable options.	*Refer **Section 4.9.1** of Chapter 4.*
29.	Provide a site plan showing the details of connectivity existing and proposed road and rail transport.	*Refer **Exhibit 7.1** of Chapter 7.*
30.	Discuss the impact of increased vehicle traffic and requirements for access improvements on roads in the site development area as a result of the Project, considering other existing and planned developments and operations in the region including what measures will be taken to reduce traffic and enhance vehicle safety on external roads.	*Refer **Exhibit 4.9** of Chapter 4.*
31.	Discuss any expected change in traffic volume by Average	*Refer **Section 7.1.1** of*

Sl. No.	Stipulations	Compliance
	Annual Daily Traffic (AADT) and any seasonal variability in traffic volume (include mitigation measures) prior to construction, during construction and at full site operation.	*Chapter 7.*
32.	Detail the types of materials use in each component part of the building and landscape(envelope, superstructure, openings, and roads and surrounding landscape). • Detail out the plans and sections of buildings showing use of new technologies and non-conventional methods • Detail out the plans and sections of building using new construction techniques.	*Refer **Section 2.10** of Chapter 2.*
33.	Use of alternate renewable resources such as solar / wind power etc is to be discussed.	*Refer **Section 2.10** of Chapter 2.*
34.	Environmental Monitoring Program Frequency, location, parameters of monitoring Compilation and analysis of data and reporting system	*Refer **Section 6.2** of Chapter 6.*
35.	Risk Assessment (ERA) and Disaster Management Plan (DMP), Discuss emergency plans for any environmental risks and such as earthquakes	*Refer **Section 7.3** of Chapter 7.*
36.	This section details out the improvements in physical infrastructure, social infrastructure if any. Also it details out any employment potential and other benefits that are accrued if the project is taken up.	*Refer **Section 8.2 and Section 8.3** of Chapter 8.*
37.	Detailed EMP may be formulated to mitigate the residual impacts which should inter alias include the impact due to change in land use; due to loss of agricultural land and grazing land besides other impacts of the projects. Budgeting of the EMP may be included in EIA.	*Refer **Section 9.1 and Table 9.1.1, Table 9.1.2 and Table 9.1.3** of Chapter 9.*
38.	Summary & Conclusion (Summary EIA) This document should summarize the significant findings of the study. The summary must describe each significant environmental issue and its resolution in sufficient detail so that its importance and scope, as well as the appropriateness of the approach taken to resolve it are well understood.	***Discussed in Chapter 10.***
39.	This chapter shall include the names of the consultants engaged with their brief resume and nature of consultancy rendered.	***Discussed in Chapter 11.***

Source: Study Team

1.8 LEGAL COMPLIANCE

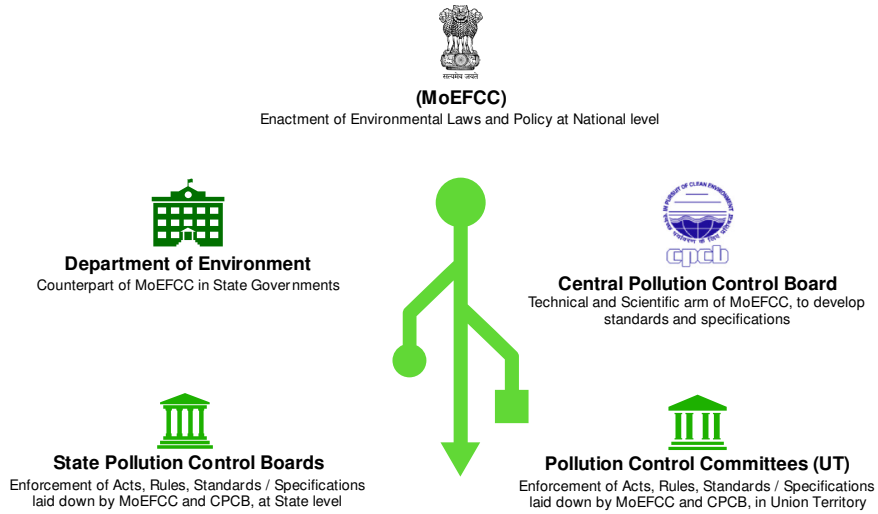
Environmental legislation has developed considerably in India since 1970's and plays an important role in ensuring that environment protection measures are incorporated in the plans, programs and projects advancing the socio-economic development of the nation, so that every project will become environmentally sound and people friendly.

The sincere implementation of these laws ensures that the development is sustainable as well as protects human health and property in the long term. The Ministry of Environment, Forest and Climate Change (MoEFCC), the Central and State Pollution Control Boards / UT

Pollution Control Committees represent the principal administrative and regulatory bodies responsible for the preservation and conservation of the environment as the country undergoes massive social, economic and infrastructural transformation and thereby ensuring environmentally sustainable development in the country.

In India, various Environmental Acts, Rules and Notifications have been introduced to ensure that developmental projects are planned and executed on the principles of sustainable development. The objective of these regulations is that the project should not lead to major ecological or other losses while accruing project benefits. The applications of various regulations/law to the design (project preparation stage), construction (implementation stage) and post project stage (operational phase) of the project are described in detail, in this Chapter. The environmental regulatory framework in India is depicted in ***Exhibit 1.8.1***.

Exhibit 1.8.1: Environmental Regulatory Framework in India



Source: Study Team

1.8.1 Approval, Permissions and Clearances required for PD Complex

In line with the guidelines issued by the various regulatory and statutory authorities for establishment of real estate in the NCT Delhi is detailed in ***Table 1.8.1.***

Table 1.8.1: Clearances/Permissions/NOC required for PD Complex

Sr. No.	Clearances	Acts	Approving Agency	Applicability to the Project	Estimated Time Frame[4]	Responsibility	
						Execution	Supervision
PROJECT PREPARATION /DESIGN STAGE							
1	Land Allotment	-	Ministry of Housing and Urban Affairs, Govt. of India	Applicable	Already in place	DMRC	-
2	Building Layout approval	Building bylaws	Delhi Development Authority/ Municipal Corporation	Applicable	1-month	Selected Agency	DMRC

Sr. No.	Clearances	Acts	Approving Agency	Applicability to the Project	Estimated Time Frame[4]	Responsibility	
						Execution	Supervision
3	Structural Plan	-	Delhi Development Authority/ Municipal Corporation	Applicable	1-month	Selected Agency	DMRC
4	Change of Land Use Permission	-	DDA	Applicable	3-months	Selected Agency	DMRC
5	NOC from Tree Authority	The Delhi Preservation of Trees Act, 1994	Tree Authority Committee of New Delhi Municipal Corporation	Applicable	1-month	Selected Agency	DMRC
6	No Objection Certificate (NOC) [Consent to Establish & Operate]	Water (Prevention and Control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act 1981	Delhi Pollution Control Committee	Applicable	3-6 months	Selected Agency	DMRC
7	NOC for drainage	-	Drainage Owned Agency	Applicable	15-30 days	Selected Agency	DMRC
8	NOC for Discharge of Sewerage	MSW Act 2016	Delhi Development Authority/ Municipal Corporation	Applicable	15-30 days	Selected Agency	DMRC
9	NOC from Electricity Department	Electricity Act 2003	BSES Rajdhani Power Limited	Applicable	15-30 days	Selected Agency	DMRC
10	NOC for Traffic Coordination		Transport Department, Govt. of NCT of Delhi/Traffic Police	Applicable	1-month	Selected Agency	DMRC
11	NOC for Fire & Safety	The Delhi Fire Prevention and Fire Safety Act, 1986	Delhi Fire Service	Applicable	1-month	Selected Agency	DMRC
12	Borewell Permission		State Ground Water Authority	Applicable	15-30 days	Selected Agency	DMRC
PROJECT IMPLEMENTATION STAGE							
13	Permission for withdrawal of ground water and NOC for construction of tube well/bore well	Ground Water Regulation and Control of Development and Management Act, 2005	State Ground Water Authority	Applicable (if contractor abstract ground water	3 months	Contractor	DMRC
14	Cement Batching Plant	Air (Prevention and Control of Pollution) Act. 1981	DPCC	Applicable	3 months	Contractor	DMRC
15	Storage of Hazardous Chemicals	Hazardous Waste (Management and Handling) Rules 1989 and Manufacturing Storage and Import of Hazardous Chemicals Rules 1989	DPCC	Applicable	3 months	Contractor	DMRC
16	Disposal of Hazardous Waste	Hazardous Waste (Management and Handling) Rules 2	DPCC	Applicable	2 months	Contractor	DMRC
17	Disposal of Construction Waste	Construction & Demolition Rules, 2016	Municipal Authority	Applicable	2 months	Contractor	DMRC
18	Pollution Under Control Certificate	Central Motor Vehicles Act 1988	Transport Department	Applicable	1 month	Contractor	DMRC

Sr. No.	Clearances	Acts	Approving Agency	Applicability to the Project	Estimated Time Frame[4]	Responsibility	
						Execution	Supervision
19	Power Supply	BSES Rajdhani Power Limited	BSES	Applicable	1-2 months	Contractor	DMRC
20	Employing Labour	Executing Agency of Building and other Construction Act, 1996	Labour & Employment Department, Gov t of NCTD	Applicable	1 Week	Contractor	DMRC
21	Registration of Workers	Labour welfare Acts.	Labour & Employment Department, Gov t of NCTD	Applicable	1 Month	Contractor	DMRC

Source: Study Team

1.8.2 Applicability of Environmental Laws to PDC

Government of India has prepared National Policies to address various issues relating to the use of natural resources and other environmental matters. There are multiple Environmental Legislations applicable to the PD Complex project. The complete list of applicable Environment and Pollution laws along with the rules framed and notifications issued there under are compiled in ***Table 1.8.2***.

Table 1.8.2: Applicability of Environmental Laws to PDC

Sr. No.	Title of Act and Rules / Notifications	Objective / Intent of the Regulation	Relevance / Applicability to PDC	Responsible Regulatory Authority
1.	The Environment (Protection) Act, 1986	The EPA is a general legislation for environmental protection and designed to cover up areas of environmental hazards not covered by specific environment laws, prescribe standards for discharging pollutants and handling of hazardous substances *etc.*, strengthen control mechanisms and constitute a single authority for studying, planning, implementing and coordinating environment related activities of various regulatory agencies, Central and State. The EPA is essentially implemented through rules, regulations and notifications and many of them are applicable to the PDC.	The proposed PD Complex shall be developed above the U/G Metro station at Bhikaji Cama Place and involve handling, generating and discharging pollutants, debris, hazardous substances, generating noise *etc.*	MoEFCC through Delhi Pollution Control Committee (DPCC)
1.1	The Environment (Protection) Rules, 1986	These rules prescribe the standards for emission or discharge of various pollutants from industries, operations or processes. By virtue of Rule 3A, the parameters and standards for emission and discharge of pollutants are prescribed in Schedule VI of the rules. Further, Schedule III provides Ambient Air Quality Standards with respect to Noise, Schedule IV provides standards for emission of smoke, vapor *etc.* from motor vehicles and Schedule VII provides National Ambient Air Quality Standards.	The rules will be applicable at the Construction sites/yards, project sites *etc.* and during the Operation phase.	Delhi Pollution Control Committee (DPCC)
1.2	Solid Waste (Handling and Management) Rules, 2016	Lay down the procedure and norms for segregation, handling, storage and disposal of Municipal Solid Waste (MSW) generated.	The provisions will be applicable to the labour camps and construction yards / project offices that will be setup during the construction phase and later during the operation phase at the building premises under the control of Project proponent. SWM practices prescribed in the Rules will need to be followed and MSW generated should be disposed through authorised collection / receiving centres as established and instructed by the regulatory authorities.	DPCC and Urban Local Bodies (ULBs)
1.3	Construction and Demolition (C&D) Waste Management Rules, 2016	Procedure for collection, segregation, storage and disposal of C&D waste comprising of building materials, debris and rubble resulting from construction, remodeling, repair and demolition of any civil structure.	C&D waste will be generated during the construction phase from debris from excavations, waste concrete and spoil, pile head, *etc.*	DPCC Urban Local Bodies (ULBs) or any other local authority

Sr. No.	Title of Act and Rules / Notifications	Objective / Intent of the Regulation	Relevance / Applicability to PDC	Responsible Regulatory Authority
1.4	The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	These rules lay down the procedure and responsibility for management, storage, transport, treatment and disposal *etc.* of hazardous and other wastes and regulation of import / export of such waste.	The rules will be applicable as hazardous waste is expected to be generated during the construction and operation phase from the industrial use of solvents, mineral or synthetic oil as lubricants, spent oil, High speed diesel, paints, pigments, lacquers, varnishes, adhesives and resins *etc.*	DPCC Urban Local Bodies (ULBs) or any other local authority
1.5	The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989	These rules lay down the responsibility of the occupier of an industrial installation *w.r.t.* production, storage and import of hazardous chemicals as provided in its schedules and approval and notification of such sites, prepare safety reports and emergency plans, intimation in case of accident.	These rules will be applicable during the construction phase as it is expected that large quantities of flammable gases, flammable chemicals will be stored and used. Prior site approval and notification will be required from the concerned authorities before storing and using the hazardous chemicals under these rules.	DPCC
1.6	The Noise Pollution (Regulation and Control) Rules, 2000.	These rules prescribe the ambient noise standards for different areas and restrict / regulate the use of noise emanating objects and equipment at certain times. The rules are enforced by a local authority designated by the State Govt. which may either be the District Magistrate, Police Commissioner or any other officer not below the rank of Deputy Superintendent of Police.	These rules will be applicable during the Construction and Operation phase. During the Construction phase noise producing heavy construction equipment will be used and during the operation phase, the running of DG set shall produce noise.	Local authority designated by the State Govt. along with DPCC
1.7	The Bio-medical Waste Management Rules, 2016	These rules provide for categorization of biomedical waste, management and safe disposal of it to protect health and environment against adverse effects. The State Pollution Control Boards are entrusted with grant of authorization and monitoring of compliance of provisions of these rules.	These rules will be applicable to the construction sites and Labor camps where first aid/emergency medical help will be provided to the injured / sick workers. They will apply during the operation phase at the PDC where first aid/ emergency medical help will be rendered to the staff.	DPCC

Sr. No.	Title of Act and Rules / Notifications	Objective / Intent of the Regulation	Relevance / Applicability to PDC	Responsible Regulatory Authority
1.8	The Ozone Depleting Substances (Regulation and Control) Rules, 2000.	These rules categorize the Ozone Depleting Substances (ODS) into groups and further regulates, restricts and prohibits the manufacture, sale, use, import/export *etc.* of certain groups of ODS's.	These rules be complied with during the construction and operation phase to ensure that ODS's prohibited from use in construction and operation phases of PDC.	MoEFCC
1.9	The Batteries (Management and Handling) Rules, 2001	These rules regulate the manufacture, sale, stocking, disposal *etc.* of lead acid batteries by consumers, recyclers *etc.*	The project is expected to be a "bulk consumer" of lead acid batteries during the construction phase for providing back up electricity at project sites/offices/ labor camps *etc.* and probably by the occupants of the premises and in the restaurant during the operation phase. The discarded batteries will need to be disposed off in consonance with the provisions of these rules through authorized vendors.	DPCC
1.10	The E-Waste (Management) Rules, 2016	These rules apply to discarded e-waste /electrical/electronic equipment including their components and provide for safe and environment friendly disposal of them though a system of authorized collection centers and e-waste processors.	The project is expected to be a "bulk consumer" of electrical and electronic products like computers, laptops, monitors, computer accessories, printers, copiers, phones, TV's *etc*. during construction as well as operational phase. The discarded products/components will need to be disposed off in consonance with the provisions of these rules through authorized e-waste collection centers and maintain record of e-waste generated and file annual return with the SPCB's.	DPCC

Sr. No.	Title of Act and Rules / Notifications	Objective / Intent of the Regulation	Relevance / Applicability to PDC	Responsible Regulatory Authority
1.11	The Plastic Waste Management Rules 2016	These rules provide for manufacturing standards, plastic waste management, responsibilities of local bodies/gram panchayats/waste generators *etc*. and provides for segregation of plastic waste at source for collection and disposal as per Solid Waste (Management and Handling) Rules, 2000.	The project is expected to be an "Institutional Waste Generator" as defined in the rules during the construction as well as operational phase at project sites, labor camps, depots, local/regional project offices.	DPCC
1.12	The Regulation of Lead Contents in Household and Decorative Paints Rules, 2016	The rules provide for prohibition of presence of lead metal in excess of 90ppm in paints including undercoating used for painting in interior and exterior of buildings, walls, civil structures *etc*. The rule allows a relaxation of 2 years for sale of existing stock till 1.11.2018.	The project will involve construction of civil structures and require the use of paints the structures *etc.* The developers should ensure that the paint purchased and used after 1.11.2018 does not contain lead in excess of prescribed concentration.	DPCC
1.13	Environment Impact Assessment Notification, 2006 (14th September 2006) with subsequent Amendments	Environmental Impact Assessment (EIA) Notification regulates all activities /projects listed in the Schedule of the Notification. The activities listed in Schedule shall require prior Environmental Clearance before commencement of project activities.	Since the proposed project is having built up area of 18436.84 sq. m. on the plot area of 6109 sq. m., prior Environmental Clearance is not required.	Not Applicable.
1.14	Fly Ash Utilization Notification, 1999 and its subsequent amendments	The intent of the notification is to promote and achieve 100% utilisation of fly ash generated from coal or lignite based thermal power plants. The notification mandates that every construction agency in public and private sectors shall utilize fly ash based products within 300 Km of the thermal power plant.	There are many coal based thermal power plants within 300 km of the project site and thus the notification shall be applicable for the construction of all structures.	DPCC
1.15	Central Ground Water Authority (CGWA): Guidelines / Criteria for Evaluation of Proposals / Requests for Groundwater Abstraction, 2015	CGWA has been constituted under Environment (Protection) Act, 1986 to regulate and control development and management of ground water resources in India. CGWA has issued a list of notified and non-notified areas. Ground water abstraction in notified areas is permitted only for drinking water and domestic use purposes through the Authorized officer (Deputy Commissioner/District Magistrate/ District collector) of the revenue district in which the notified area falls.	It is confirmed by the DMRC that ground water shall not be abstracted at any stage of the project, hence CGWA permission is not required.	CGWA

Sr. No.	Title of Act and Rules / Notifications	Objective / Intent of the Regulation	Relevance / Applicability to PDC	Responsible Regulatory Authority
		In the non-notified areas, NOC from CGWA is mandatory to industrial / infrastructural / mining projects for groundwater withdrawal as per the guidelines / Criteria for evaluation of proposals / requests for ground water abstraction.		
2.	The Air (Prevention and Control of Pollution) Act, 1981	The Act provides for preservation of air quality and control and abatement of air pollution, constitution of Boards, functions and powers of the boards, for setting of standards of air quality and standards for emissions of air pollutants into the atmosphere from industrial plants and automobiles, penalties for violation and process for appeals *etc*. It is mandatory to obtain prior consent of the State Pollution Control Board before establishing or operating any industrial plant in an ***Air Pollution Control Area***. The air quality and air emission standards are provided in Chapter 3 of the EIA Report.	Air pollutants will be emitted during the construction and operation phase during activities like demolition of existing structures, excavation, operation of DG Sets, operation of heavy construction machinery, *etc*.	DPCC is nodal agency for granting consent and ensuring compliance with the provisions of the Act
3.	The Water (Prevention and Control of Pollution) Act, 1974 And The Water (Prevention and Control of Pollution) Rules, 1975	The Act provides for prevention and control of water pollution, maintaining or restoring the wholesomeness of water, constitution of Boards, functions and powers of the boards, for prescribing standards of water quality, effluent standards for the sewage and trade effluent and standards of treatment of sewage and trade effluent to be discharged into the streams, penalty for violation and process for appeals *etc*. The Act prohibits the discharge of poisonous, noxious or polluting matter into any stream, well or sewer or on land. It is mandatory to obtain prior consent of the SPCB before establishing any industry, operation or process or any treatment and disposal system which is likely to discharge sewage or trade effluent into a stream or well or on land in **Water Pollution, Prevention and Control Area.**	Sewage effluent will be generated during the Construction phase at the construction workers residential camps, site offices, construction yards, *etc.* and during the operation phase from the proposed PD Complex *etc*.	DPCC

Source: Study Team

Chapter 2
Project Description

Chapter 2
Project Description

2.0 TYPE OF PROJECT

The present proposal is for the construction of the Property Development Complex on the allotted land above the underground Bhikaji Cama Place Metro Station on Line-7. In furtherance of the policy of the Ministry of Housing and Urban Affairs (MoHUA), Government of India, DMRC has been mandated to undertake value capture from property development initiatives for sustainable revenue generation for the DMRC vide its Policy Circular No. K-14011/8/2000-MRTS (Pt.) dated 30/03/2009.

The proposed project shall be developed on the allotted land of 6109 sq. m. earmarked for the property development.

2.1 SITE AND SURROUNDING

The project site is located in the heart of Delhi surrounded by well developed commercial as well as residential areas. The project site is just opposite to the Bhikaji Cama Place District Centre which is a business hub of NCTD. The site well connected to roads and metro network. Some important and salient surround ding features are elaborated in the ***Table 2.1***.

Table 2.1: Site and Surrounding

Important Destination	Description
Nearest Railway Station	Safdarjung Railway Station: 1.33 km/NW New Delhi Railway Station: 8.49 km/NE Hazrat Nizamuddin Railway Station: 6.74 Km/NE
Airport	Indira Gandhi International Airport:6.73 km/SW Safdarjung Air Strip: 2.05 km/NE
Metro Station	Bhikaji Cama Place: 0.0 Km
Hospitals	Safdarjung Hospital-1.84 km/E All India Institute of Medical Sciences (AIIMS)-1.99 km/E
Religious Places	Lotus Temple: 7.07 km/SE Kalka Ji Mandir: 7.45 km/SE

Source: Study Team[1]

2.2 PROJECT PROFILE-SALIENT FEATURES

The salient features of the proposed project are described in the ***Table 2.2***.

Table 2.2: Salient Features

Project Component	Description
Plot Area	6109 sq. m
Proposed Built up Area	18436.84 sq m
Altitude	224 m AMSL
No of Floors	Basement+Ground+4 Floors

[1] The study team comprising the following organizations:

- GPS Technologies: EIA Report, collection and assessment of primary / secondary environmental data
- DMRC: Project Specifications / Data / Maps / Project Drawings

Project Component	Description
Height of the Building	23.70 m
Approved Zoning Plan	Zone D of Master Plan of Delhi-2021
Project Cost	INR 80 Crores
Cost of the land	INR 15.55 Crores
Residing Population	1623
Floating/visitors	100
Security Guard	30
Water Requirement (operational phase)	112 KLD
Parking Proposed	263 ECS
Total Power Requirement	2530 kW

Source: Study Team

2.3 AREA BREAK-UP

Ministry of Housing and Urban Affairs (MoHUA), Government of India has allotted 6109 sq. m. of land parcel for the Property Development Complex in favour of Delhi Metro Rail Corporation Limited. The detailed are statement is presented in ***Table 2.3***.

Table 2.3: Area Statement

Project Component	Area in Sq.m.
Plot Area	6109
Basement built up area for Parking facilities	3292.15
Ground floor built up area to be used for Restaurant and retails	2995.83
First Floor Built up area	3077.09
Second Floor Built up area	2852.06
Third Floor Built up area	2852.06
Fourth Floor Built up area	2436.37
Terrace Floor built up area	931.28
Total Built up Area proposed	18436.84

Source: Study Team

2.4 POWER REQUIREMENT

The requirement of power shall be met from the BSES Rajdhani Power Limited. The total demand load for the proposed commercial tower is 2530 kW.

Standby Arrangement

There is provision of 2 nos. of DG sets having capacity of 500 kVA each (2 x 500 kVA) for power back up. The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion.

2.5 PARKING FACILITIES

In the detailed architecture design, adequate provision has been made for car/vehicle parking at the project site. There shall be adequate parking provisions for visitors so as not to disturb the traffic and allow smooth movement at the site. The provision for the parking facilities has been made in the basement. The parking space criteria and area requirement provided are summarized in the ***Table 2.4***. Parking details are designed as per Delhi Building Bye Laws.

Highlights of parking facilities

- The parking facility shall be semi-automated stack car park for PD Complex.

- One entry and one exit ramp are provided for smooth vehicular movement

Table 2.4: Parking as per Delhi Building Byelaws (DDA)

DDA Norms	No. of ECS	Area in Sq.m.
2 ECS @ 100 sq. m.	263	13150*

Since the area available in the basement is only 3292.15 sq.m., hence semi-automated stack car park has been proposed.

Source: Study Team

2.6 FLOOR PLANS

2.6.1 Basement

- The basement floor shall be primarily used for parking facility with semi-automated stack car park for proposed Property Development (PD) building.
- It will also accommodate building services like electrical HT panel room, LT ISO panel room, UPS room, transformer and fan room for basement ventilation.
- One entry and one exit ramp has been provided for unhindered vehicular movement.
- Car lift provision has been made in the basement.
- Basement shall have 3-staiecase access, 3-passenger lifts and one freight lift for goods.

2.6.2 Ground Floor

- The ground floor has been designed for retail and restaurant on either side of the central service core.
- Toilet area for the office has been provided as per NBC.
- Four numbers of pedestrian ramps have been provided from the North and South side near the central part of the building.
- Provision of service shafts has been made in the central portion of the retail and restaurant.
- AHU rooms, electrical room, fire shaft, telecom shaft, fire control room, pantry and toilets are provided adjacent to staircase and lift block and same repeat on all the floors.
- Smoke Extraction shaft have been provided as per NBC amendments in the central service core along both sides.

2.6.3 First Floor

- The first floor has been designed for office space on either side of the central service core.
- One fire escape staircase has been provided for each office space on either side of the central service core while one common fire escape staircase has been provided in the central service core.
- This floor has been designed with add on feature of fire exits. Fire escape connecting passages and stairs are provided on either side of the building, which lands on the entry and exit structures of the underground metro station. The landing spaces are left open to sky and are designed as Open Air Theatre (OAT), seating areas and landscape garden etc.
- Other features are same as in the ground floor.

2.6.4 Second and Third Floor

- Typical floor has been designed for office space on either side of the central service core.

- One fire escape staircase has been provided for each office space on either side of the central service core while one common fire escape staircase has been provided in the central service core.
- Provision of service shafts has been made in the central portion of each office space.
- Other features are same as in the ground floor.

2.6.5 Fourth Floor

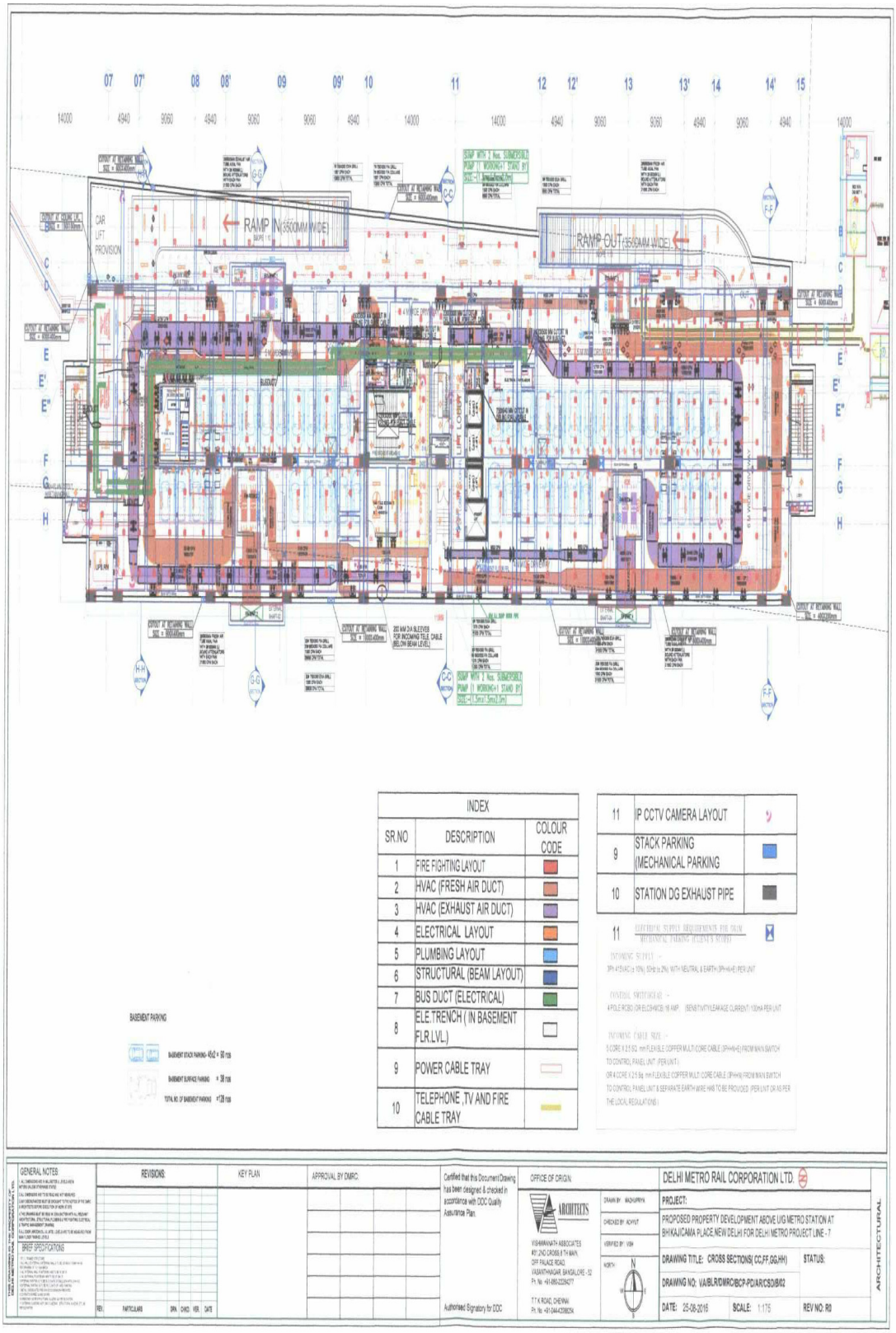
- The fourth floor has been designed for office space on either side of the central service core.
- One fire escape staircase has been provided for each office space on either side of the central service core while one common fire escape staircase has been provided in the central service core.
- Provision of service shafts has been made in the central portion of each office space.
- This floor has open to sky garden areas at the east and west side of the building which acts as lung space.
- Other facilities are same as the ground floor.

2.6.6 Terrace Floor

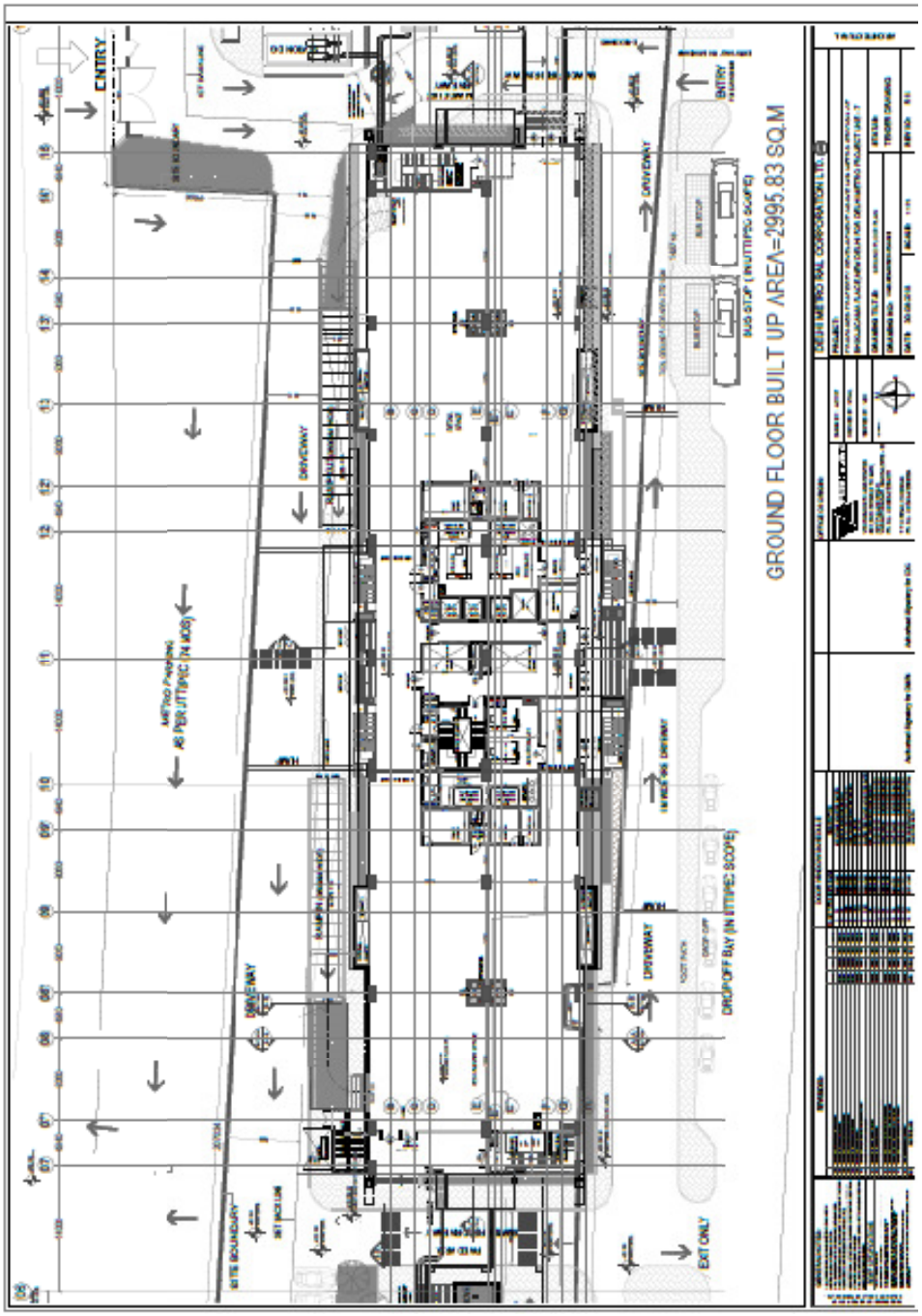
- This floor caters to the services and open terrace space.
- Half portion of the terrace on eastern side is kept open, while western half portion is kept for services like Water Cooled AC chiller Plant, LT/DG Panel room and Central service core.

The architectural drawings for each floor plan are shown in ***Exhibit 2.1*** to ***Exhibit 2.7***.

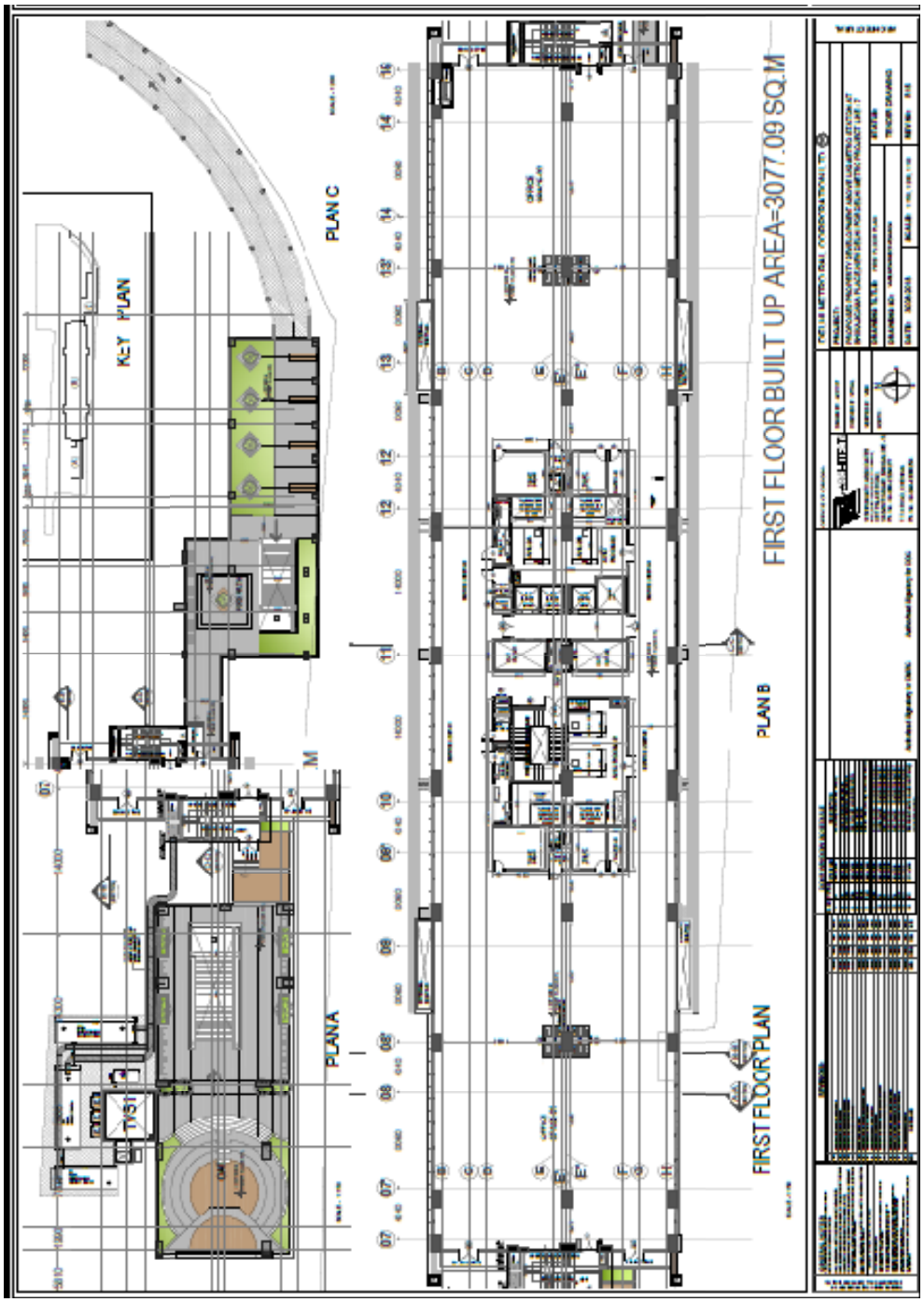
Exhibits 2.1: Basement Plan



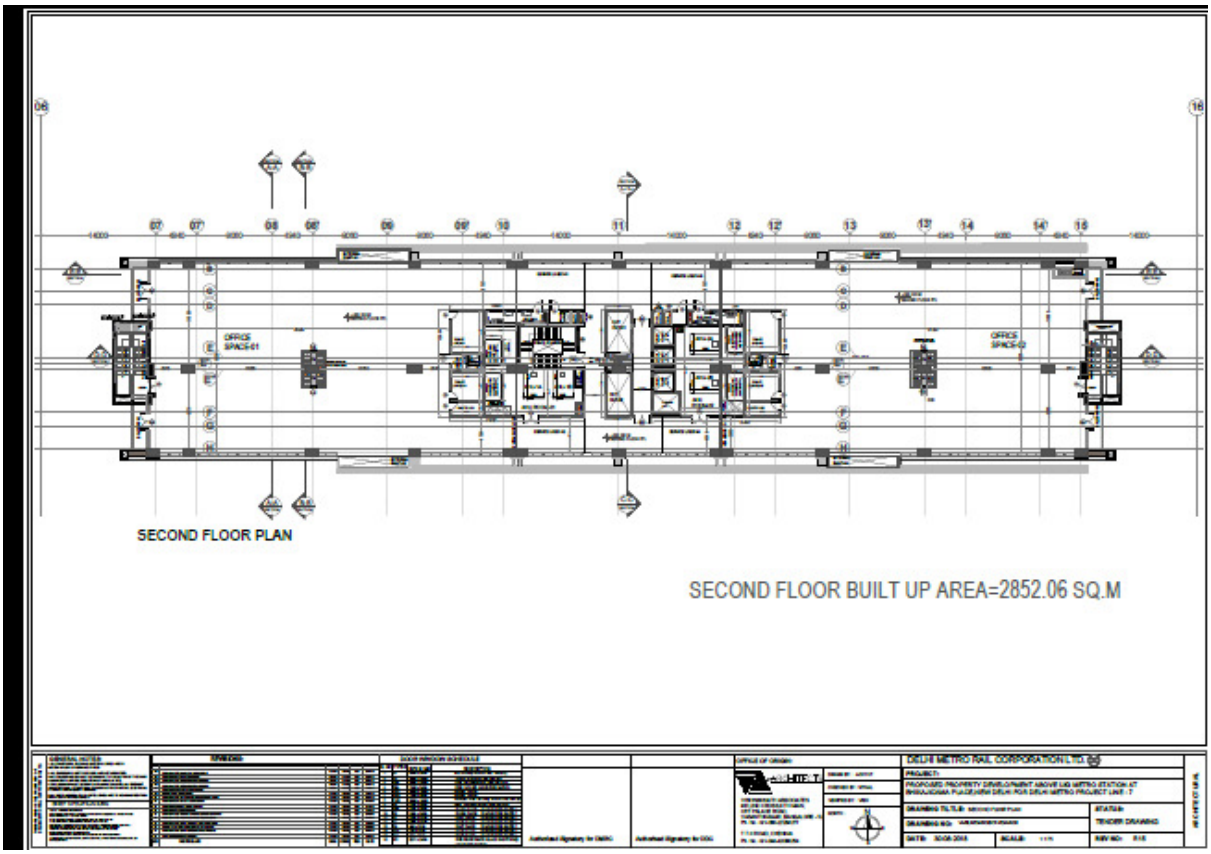
Exhibits 2.2: Ground Floor Plan



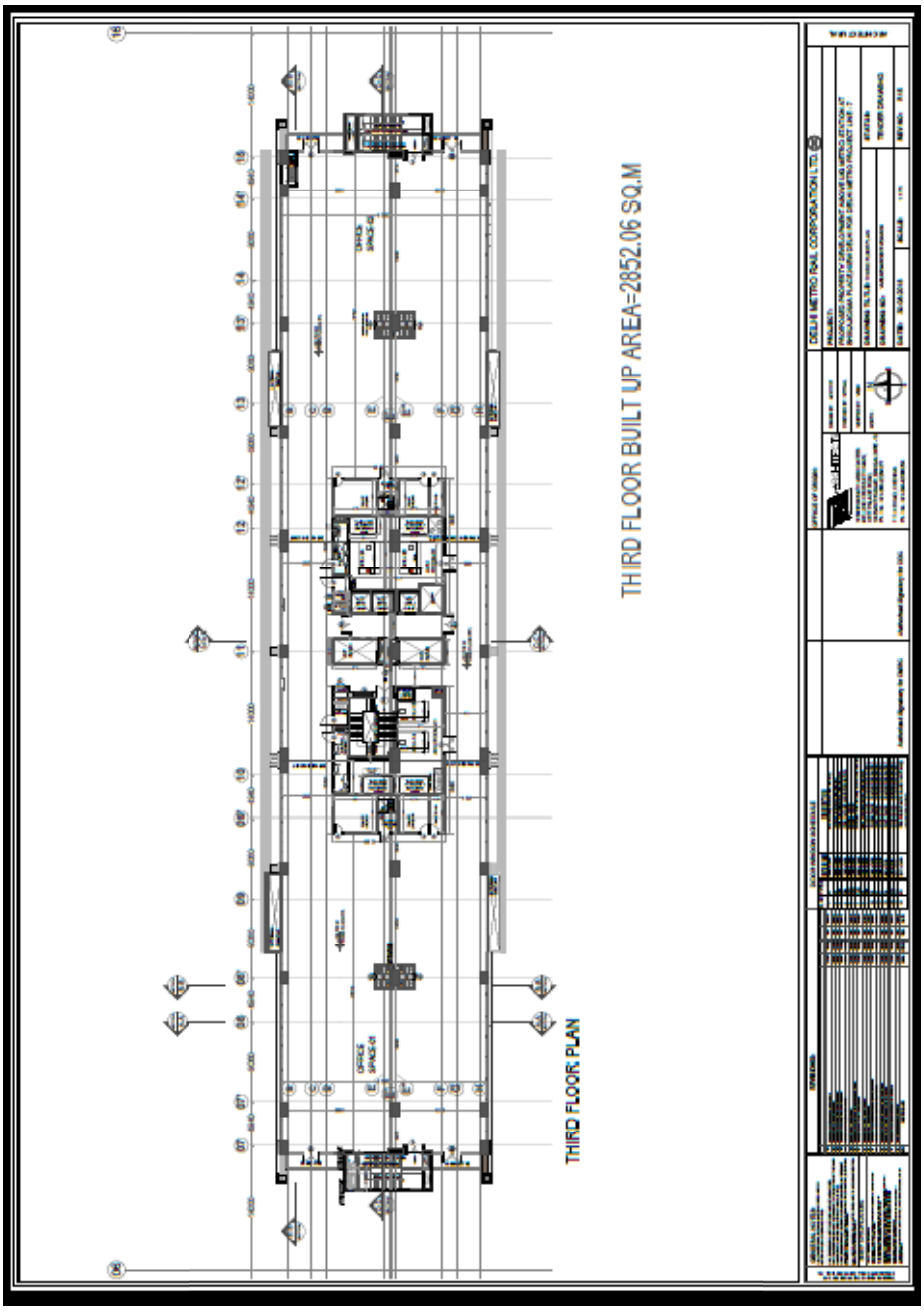
Exhibits 2.3: First Floor Plan



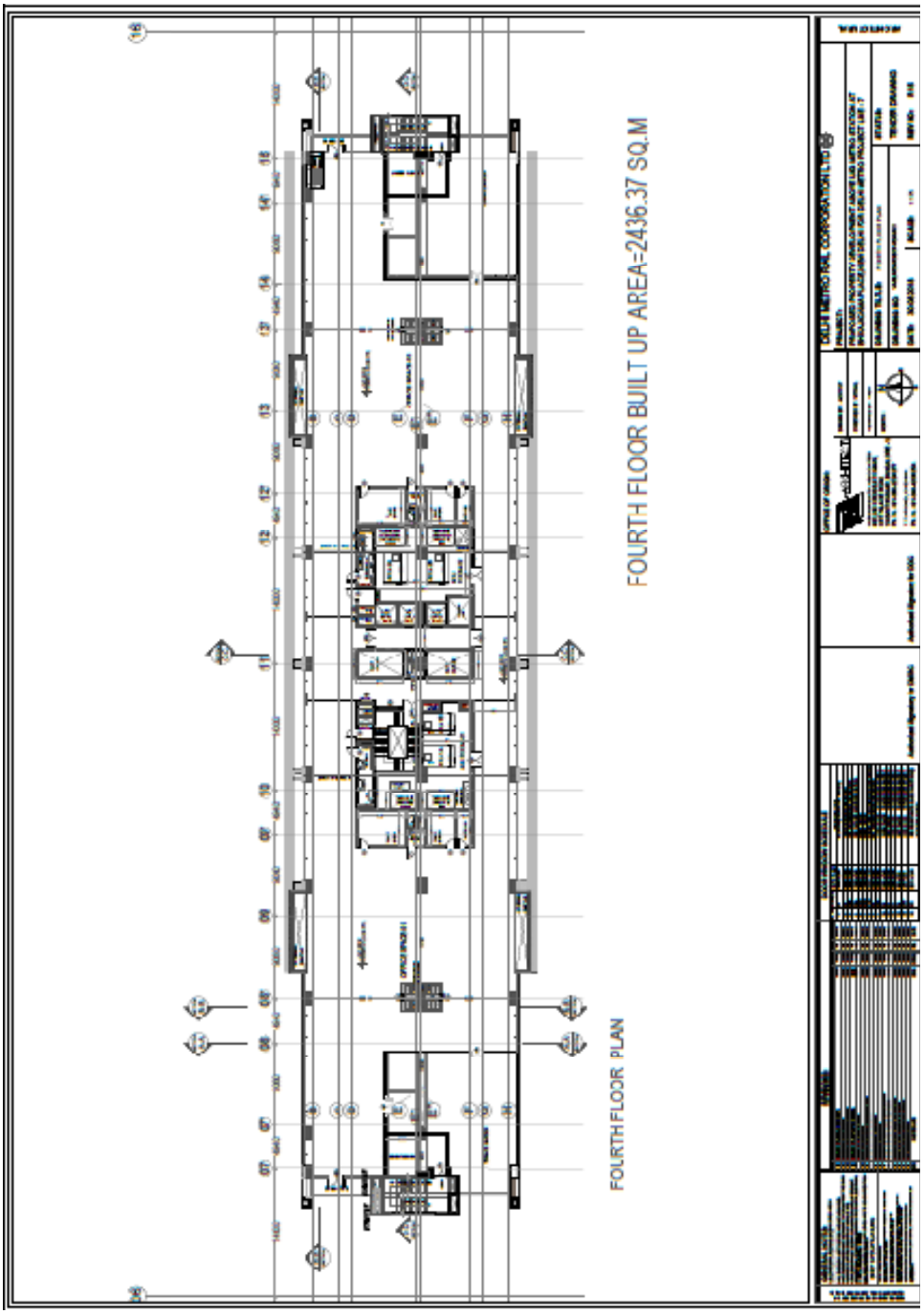
Exhibits 2.4: Second Floor Plan



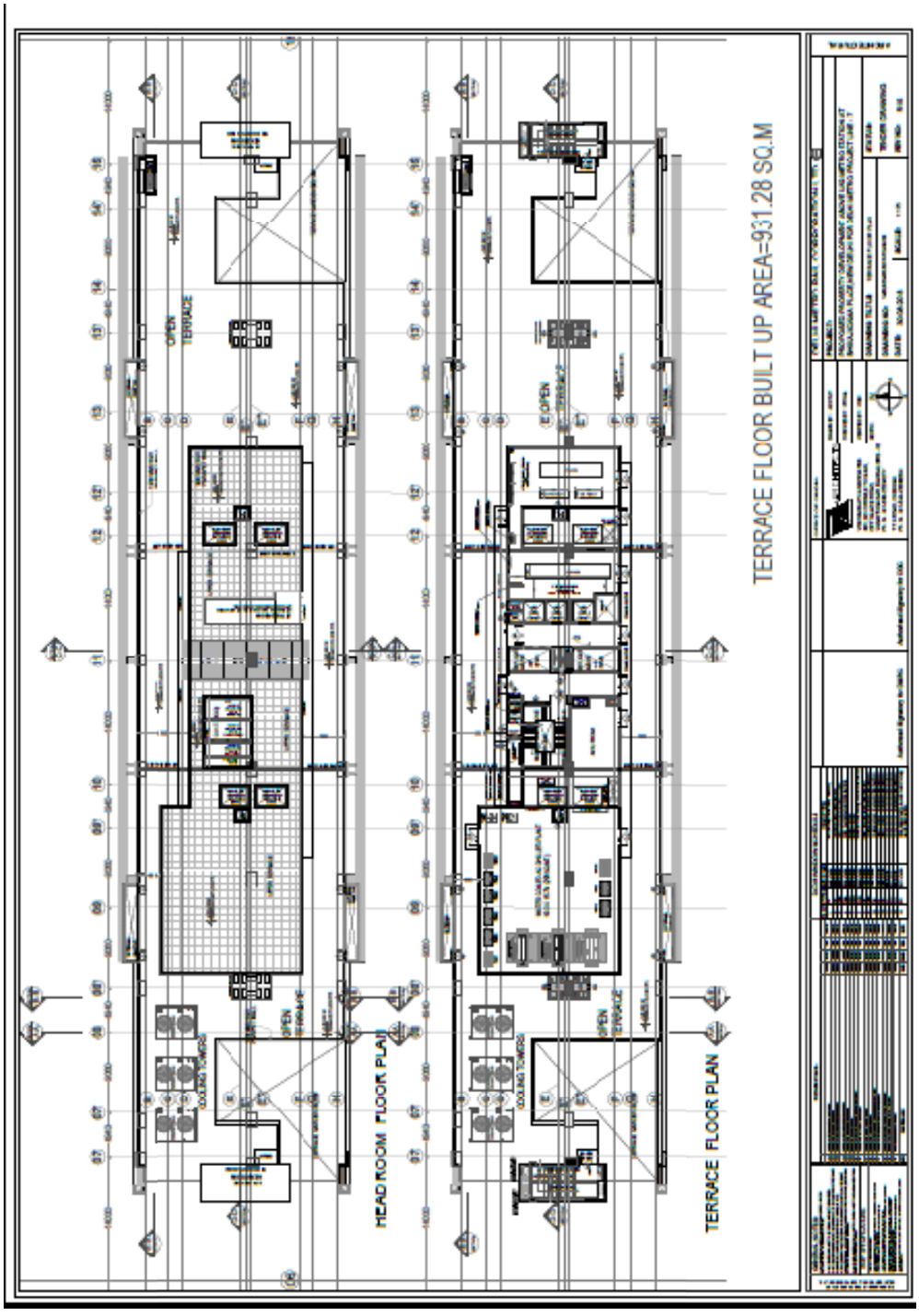
Exhibits 2.5: Third Floor Plan



Exhibits 2.6: Fourth Floor Plan



Exhibits 2.7: Terrace Floor Plan



2.7 WATER REQUIREMENT

2.7.1 Construction Phase

During the construction phase the water requirement will be met from the private supplier and shall be arranged by the contractor or treated wastewater from Nearby STP. No ground water shall be abstracted for construction activities.

2.7.2 Operational Phase

In the operational phase, 112 KLD freshwater shall be required for the proposed PD Complex. The requirement of freshwater shall be met from the Delhi Jal Board (DJB). However, arrangement for secondary source shall be in place in case of any failure/disruption in the water supply from DJB. The break-up of requirement of water in various usages is depicted in ***Table 2.5*** and the water balance diagram is illustrated in ***Exhibit 2.8***.

Table 2.5: Water Requirement for various Usage

Sl. No.	Purpose	Requirement in LPD	
		Domestic	Flushing
1	Visitor- Ground Floor	1480	2950
2	Permanent Staff in Retail	800	640
3	Restaurant	13750	3750
4	Office Area (1st to 4th floor)	26125	20900
5	Visitors for Office Area	500	1000
	Total	42655	29250
	Add 10% Contingencies	4266	2925
	Grand Total	46921	32175
	Or Say	47000	32000
6	Soft water requirement for HVAC cooling tower		60000
7	For Gardening		5000
8	Floor cleaning		5245
9	Total Water (Domestic+Flushing+Cleaning)		84245
10	Flow to STP 80% of total water		67396
11	Say STP Capacity		70000
12	Treated Water available from STP @90%		60656
	Total fresh water (Domestic+Soft+Floor Cleaning)		112245
	Say		**112000**
			=112 KLD

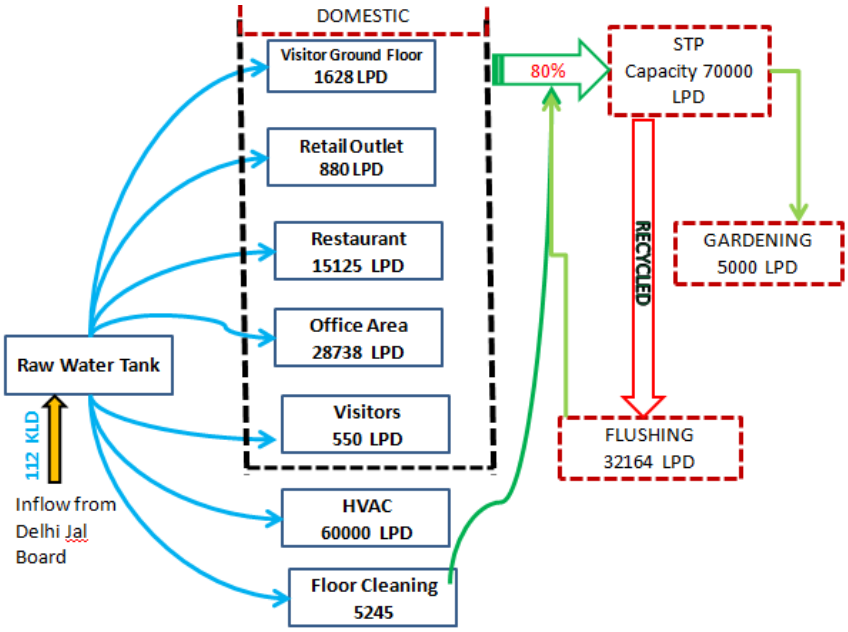
Source: Study Team

Water requirement for Fire Fighting System

As per the mandated protocol of National Building Code of India 2005, Part IV, Fire Protection System, the PD building comes under low hazard occupancy type. As per business building, it will require 100000 Litres, but due to combined building *i.e.* Station Building and PD building, as per Fire Approval, UG water tank of 260000 ltrs capacity shall be commissioned.

Apart from this an additional overhead tank of 100000 liters capacity is proposed to be commissioned on the roof top of PD building.

Exhibit 2.8: Water Balance Diagram



Source: Study Team

2.8 SEWERAGE SYSTEM

External Sewerage System will be designed as per CPHEEO Manual. A Sewage Treatment Plant (STP) of 70 KLD Capacity shall be commissioned within the premises. Treated sewage water shall be stored in a STP water tank of 30 KL capacity. The treated STP water shall be pumped to overhead tank for storage.This recycled water shall be used for gardening and flushing.

2.8.1 STP Technology

It has been proposed to use membrane Bio Reactor (MBR) Process to meet the prescribed treated water quality by the CPHEEO. The process flow diagram of MBR Technology is depicted in ***Exhibit 2.9***.

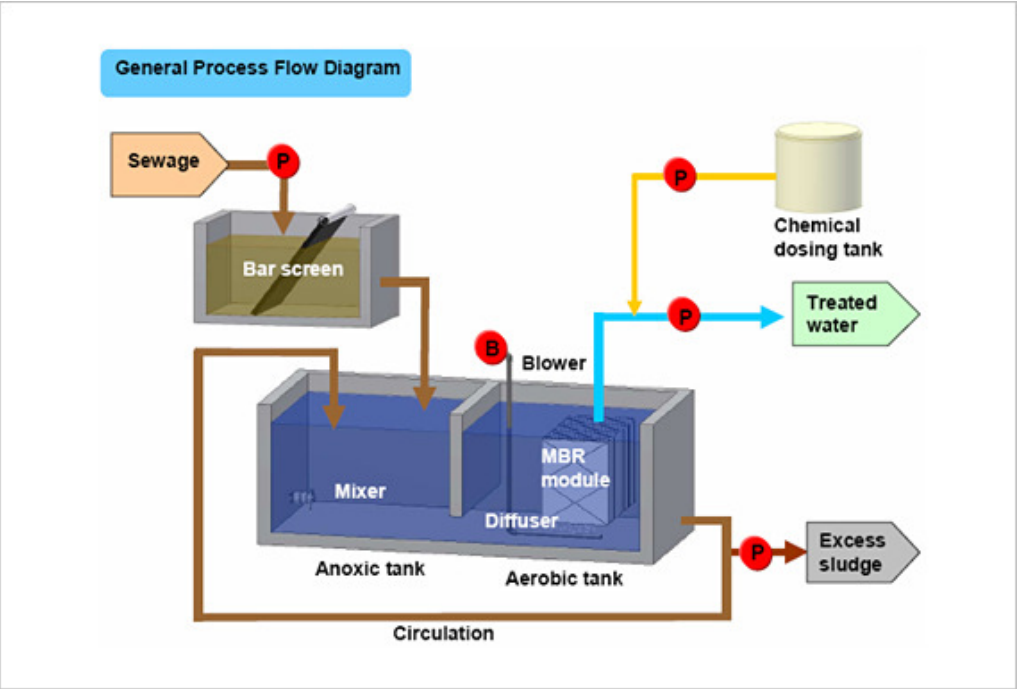
Inlet Sewage Parameter

pH	:	7-9
TSS	:	200-250 mg/l
BOD	:	300-400 mg/l
COD	:	500-600 mg/l

Outlet Sewage Parameter

pH	:	7-7.5
TSS	:	10 mg/l
BOD	:	20 mg/l
COD	:	50-100 mg/l

Exhibit 2.9: Process Flow Diagram of MBR Plant



Source: http://www.hitachi-aqt.com/products/standard_products/wastewater/membrane /index.html

2.9 SOLID WASTE

a) Construction Phase

The significant quantities of solid waste would be generated by the project, especially during the construction, including gravel; concrete; miscellaneous structures, steel, and organic material such as timber; and unused/additional/excavated soil. In addition, there will be spent oils, fuel, grease and chemicals from construction equipment and vehicle servicing. Any hazardous materials that are used will also need to be stored and handled correctly to prevent spills and pollution.

There are multiple waste disposal facilities in the vicinity and disposal shall adhere to the Central Public Health and Environmental Engineering Organization (CPHEEO) Standards of Ministry of Urban Affairs, Government of India, including the usage of such facilities. Recently after notification of the Construction and Demolition Rule 2016, the various municipal authorities have formulated the guidelines for management of C&D waste. The specific amount is unconfirmed at this stage as the detailed construction plan has not been finalized. Exact quantity shall only be known once the construction commences. DMRC has also established recycling plant for re-use of the waste. The schematic diagram for solid waste management during the construction phase is presented in ***Exhibit 2.10.***

Since the contractors are at the vanguard of all construction activities, a contractual mechanism has been devised to address environmental issues and ensure compliance to measures and methodologies that will ensure minimal environmental impact, judicious use of resources and minimal emission and generation of waste. Such methods and strategies during construction that maximize energy efficiency, use cleaner technologies, reuse and or recycle materials and similar other efforts that help to prevent and reduce environmental degradation are elaborated in the DMRC's Environmental Manual prepared specifically for

this purpose. It is an integral part of all contracts of DMRC and all contractors are vigorously monitored and pursued to implement the requirements contained therein.

Exhibit 2.10: Schematic Diagram for Solid Waste Management –Construction Phase

Source: Study team

In adherence to the C&D Rules 2016, following actions are envisaged to be taken:

- Construction yards are proposed for storage of construction materials.
- The excavated material such as topsoil and stones will be stacked for reuse during later stages of construction.
- Excavated top soil will be stored in temporary constructed soil bank and will be reused for landscaping during operational phase of the project.
- Remaining soil shall be utilized for refilling / road work / rising of site level at locations/ selling to outside agency for construction of roads *etc*.

b) Operation Phase

The project will adopt a systematic approach for solid waste collection and disposal. Solid waste generated from the project will be collected properly and will be handled as per MSW Rules, 2000 amended in 2016.

- Waste shall be mainly categories in two classes. 1. Biodegradable Waste 2. Non-biodegradable Waste. The biodegradable portion dominates the bulk of MSW. This is mainly due to food waste.
- These solid wastes will be collected separately by putting three types of separate bins at the source of generation as per the Standard Operating Procedures (SOP) outlined in the Environmental Policy of the DMRC and the guidelines mandated in the MSW Rules 2016.

2.10 RAW MATERIALS

a) Tentative Construction Materials

Following construction materials shall be required for the proposed PD Complex project as enumerated in the ***Table 2.10.1.***

Table 2.10.1: Construction Materials

Coarse sand	Crazy (white marble) in grey cement
Fine sand	P.V.C. conduit
Stone aggregate	MCBs
Stone for masonry work	PVC overhead water tanks
Stone for under floor soling	2 1/2'' thick red colour paver tiles
Cement	'B' class GI pipe (ISI marked)
Reinforcement steel	PVC waste water lines
Plywood & steel shuttering	S.W. sewer line up to main sewer
5 mm thick plane glass	Joinery hardware- ISI marked
3 mm thick ground glass in toilets	Pipe scaffolding (cup lock system)
Fly Ash Bricks	TMT Binding Wires

Source: Study Team

b) Source

The project being located in the centre of the business hub in Delhi, all the required construction materials are easily available from the local supplier. However, all the construction materials shall be procured by the selected developer agency through its contractors.

c) U Value of the Construction Component

The U value of different construction materials and component are detailed in Table 2.10.2.

Table 2.10.2: U Value of the Construction Materials

Type of Construction	U values (in $W/m^2deg\ C$)
Wall	
Bricks	
Brick Wall (230 mm thick brick wall), both side plastered (12 mm-18mm) with thick sand cement plaster on both sides and insulation	0.344
Roof	
50 mm RCC slab with Mud phushka and clay tiles with 65 mm insulation	0.270
Window	
Double glazed Glass only in commercial area	0.33

Source: Study Team

2.11 RAIN WATER HARVESTING

National Capital Territory (NCT) Delhi covers an area of 1483 Sq. Km. The Ground Water available in the territory is controlled by the hydrogeological situation characterized by occurrence of alluvial formation and hard rocks such as quartzite. The hydrogeological set up and the following distinct physiographic units further influence the ground water occurrence: (1) Older Alluvial Plain on the eastern and western side of the ridge. (2) Yamuna Flood Plain deposits. (3) Isolated nd nearly closed Chattarpur alluvial basin. (4) NNE-SSW trending Quartzite Ridge. The high rate of population growth and high level of urbanization in NCT Delhi ha s resulted in over development of ground water resources.

Thus in about 75% area of NCT Delhi ground water levels are declining at an alarming rate of 0.40 m per annum. ***In South and Southwest district the decline is high varying from 1 to 2 m/Yr.*** The annual replenishable ground water resources of the State is 0.31 bcm with a net annual ground water availability of 0.29 bcm. Ground water draft (as on 31st March 2009) is 0.40 bcm with a stage of ground water development of 138%. Out of the 27 assessment units (Tehsils) in the State, 20 have been categorized as over exploited, 05 semi critical and 02 have been categorized as safe from ground water development point of view.

In view of high state of ground water development, and depletion of ground water levels due to its over development Central Ground Water Authority (CGWA) had notified South and South-West district vide Public Notice No. 6 of 2000 dated 15.08.2000 and imposed prohibition and restriction for construction and installation of any structure for abstraction of ground water resources to avoid further depletion and deterioration of ground water quality. Subsequently the Hon'ble Lieutenant Governor had declared the whole NCT Delhi as notified on 31.03.2009 vide order No. F8 (348)/EA/Env/09/14433.

Rainwater outlets provided at various locations on terrace based on the criteria that minimum 1% slope is provided towards rain water outlet from the ridges. The rainwater collected from the rooftop areas within the project area will be conveyed into the rainwater harvesting system consisting of desilting-cum filter chamber, Oil & Grease separators and finely recharges the groundwater. All the rain water will be lead into rainwater harvesting pits and all the pits are interconnected through storm water drainage line. All storm water drains have been designed for adequate size and slope so that there shall not be any flooding in the site. It shall be ensured that no wastewater shall enter into storm water drainage system. The overflow, if any, will be discharged into the municipal storm water drainage line.

Calculation

Run off =

Area of the project Site (a) x Rainfall per hour(b) x Rainfall Coefficient(c)

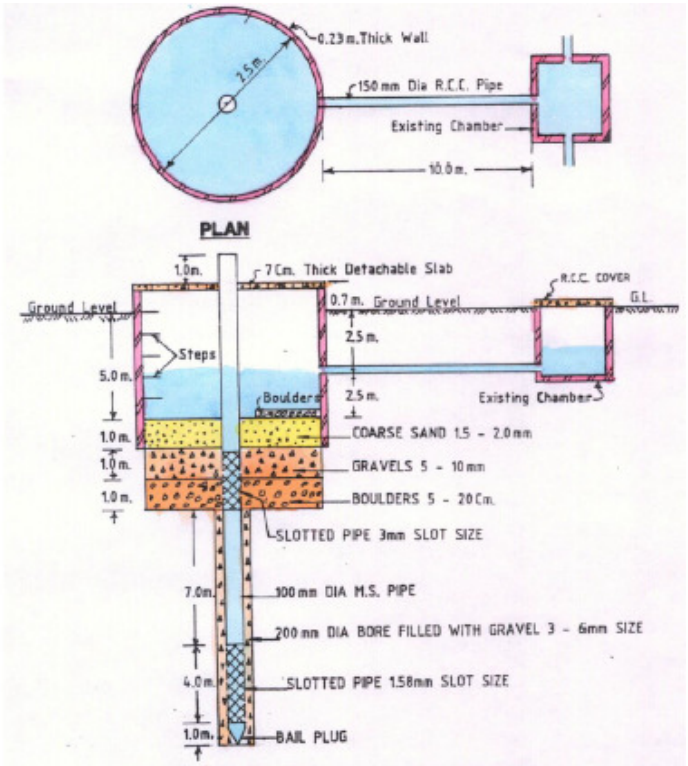
= 13112 x 0.025 x 0.80

= 262.24 Cum/Hr

Storage of Recharge Pit	=	343.49 cum or Say 345 cum
Volume of one Recharge pit	=	L=6m, b=3m, Depth= 4m
	=	(6 x 3 x 4) m^3= 72 cum
Number of Recharge Pit Required	=	345/72

= 4.79 Nos.
= Say 4 Nos.

Exhibit 2.11: Rain Water Harvesting Structure



Source: Central Ground Water Board, Manual on norms and standards for environment Clearance of large construction projects, MoEF&CC

Chapter 3

Description of the Environment

Chapter 3
Description of the Environment

3.0 STUDY AREA & STUDY PERIOD

A) Study Area

This chapter presents information on the existing environmental status in the project area with reference to prominent environmental attributes.

The study area covers 10 km radius around the project site. The land use and socio-economic aspects were studied with respect to 10 km radius around the site. The extent of the study area with respect to the proposed project site is shown on the latest google earth imagery (*Ref.* ***Exhibit 3.0.1***) and on the topo sheet of the Survey of India (*Refer* ***Exhibit 3.0.2***).

For most of the issues involving physical impacts, this could be considered as the project "footprint," or the area that would be directly used for the proposed Property Development Complex.

Collection of baseline information on bio-physical, socio-economic aspects of the project area is a very important initial step for environmental assessment studies. The description of environmental settings includes the characteristic of area in which the activity of project would occur and cover area affected by all environmental impacts. For environmental assessment of the proposed Property Development Complex, information and data have been obtained by intensive site visits, primary data collection, secondary data from published sources, and various government agencies. All ecosystem components have been systematically analysed and presented in this chapter.

B) Study Period

The present EIA study has been taken up during the pre-monsoon season (01/03/2020-31/05/2020). The environmental baseline data generation and other field survey commenced from 01-March-2020 and completed on 31-May-2020, covering pre-monsoon season as per the requirement of the environmental components. It was a challenging task to complete the environmental baseline data generation during the complete lock down due to pandemic COVID -19. However, with the cooperation and guidance of DMRC officials, it was completed.

3.1 TOPOGRAPHY, PHYSIOGRAPHY AND DRAINAGE PATTERN

1) Topography

The study area is generally plain with slight undulation. The topography of the proposed project site is fairly plain land having an average elevation of 224-m above MSL. Land will be required to be dressed up. Earthwork in filling and levelling work may be required to a certain extent. The proposed project site is flat.

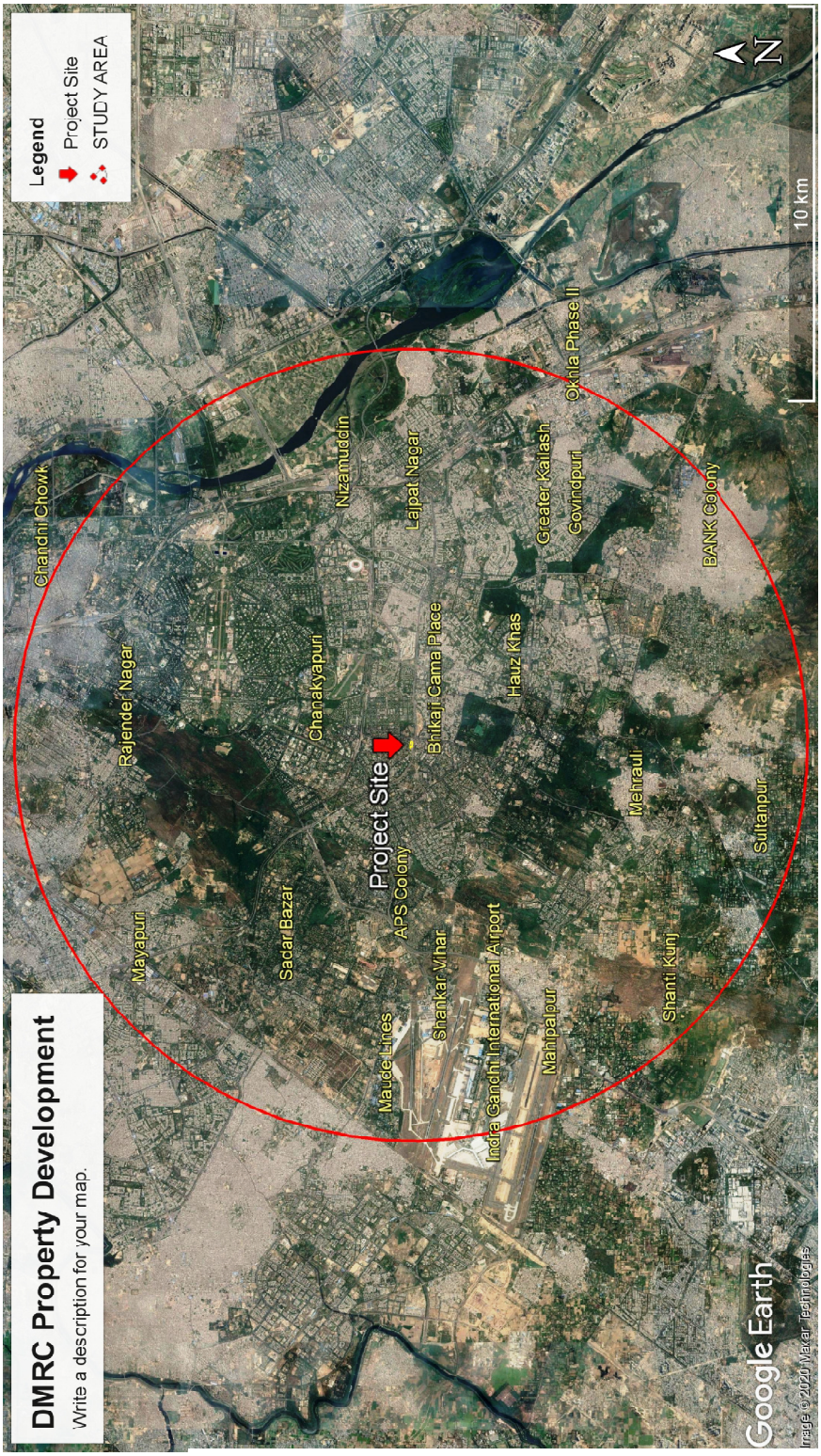
2) Physiography

The physiographic units in Delhi can be described into 3-categories:

- Masudpur-Wazirabad Ridge;
- Older Alluvial Plain;
- Yamuna Flood Plain.

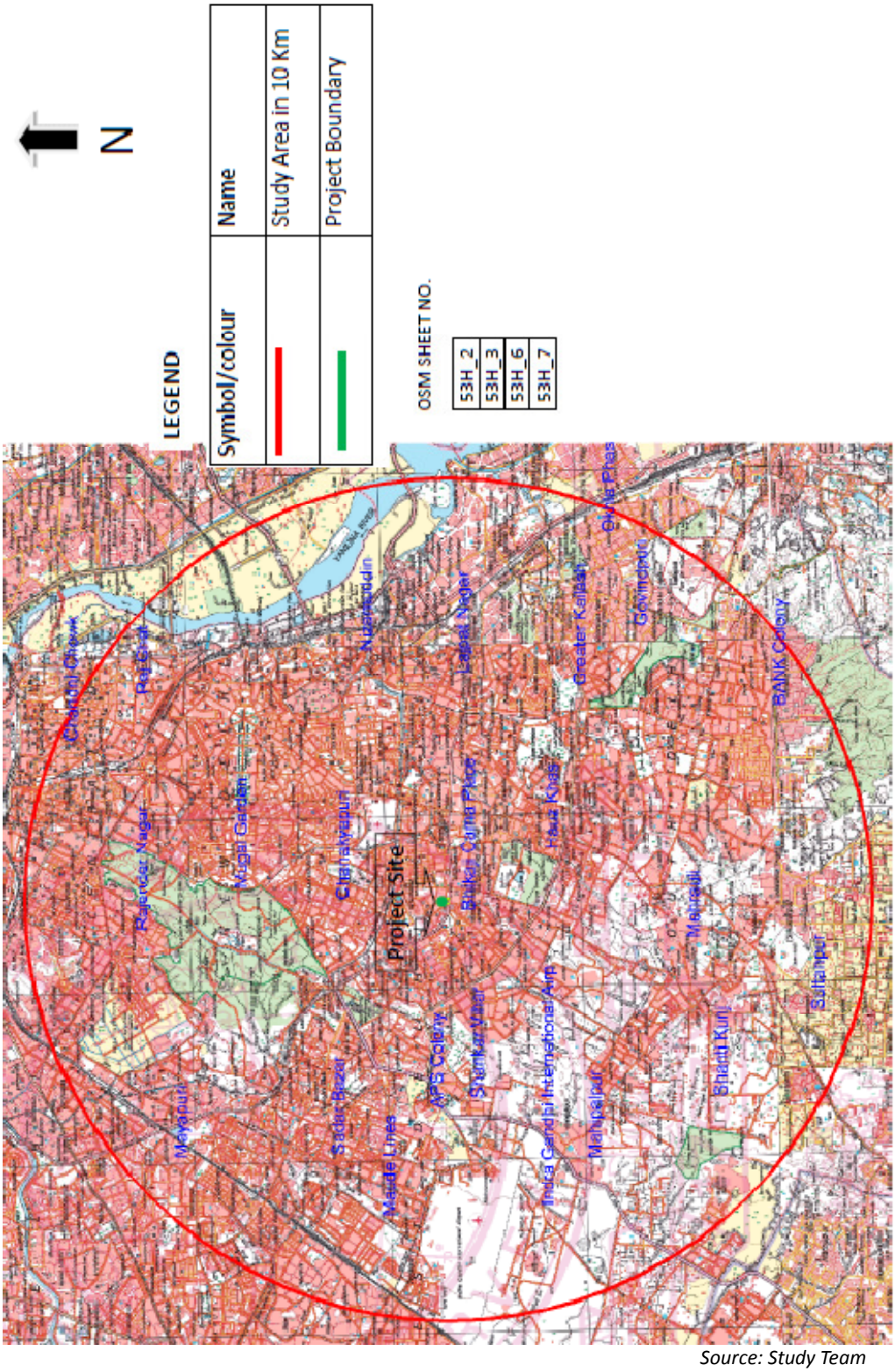
The study area falls under Yamuna Flood Plain. The elevation of study area varies from 210-m to 224-m above the MSL.

Exhibit 3.0.1: A Bird-Eye View of the Study Area on the Google Earth Imagery



Source: Google Earth imagery assessed on July 01, 2020

Exhibit 3.0.2: Study Area on the Topo sheet of Survey of India



Source: Study Team

The NCT of Delhi comprises almost flat plain land with clusters of sand dunes in the south-western part and a long rocky ridge extending roughly from north-north east to south-south west. The plains on either side of this ridge slope away from it. The Yamuna river which enters from the north eastern edge passes through the Shahdara block and marks the south-eastern boundary of the territory. Physiographically the NCT of Delhi is characterized

by Piedmont plain, old flood plain, Yamuna Khadar and the Aravalli ridge. The physiographic conditions of the territory are mainly influenced by the river Yamuna and Aravalli range. The general slope is from north to south, whereas it is from east to west in the southern part of the territory. The Delhi ridge is the last spur thrown out by the Aravalli towards the plains of northern India. This reaches near the bank of Yamuna river at Wazirabad village, and runs parallel to the river encircling the walled city. It extends towards the western part of New Delhi and further towards Qutab and Mehrauli, where it throws out numerous branches, some of which extend towards Gurgaon district and others push eastward again towards river Yamuna.

3) Drainage

The drainage pattern of the study area is mainly controlled by the River Yamuna which enters Delhi at Palla and runs about 25-Km to Wazirabad and from there traverses a similar distance to the Okhla Barrage, where it exits to Haryana. The floodplain area is about 2-Km wide, contiguous to the banks of the river. There are three major drainage basins in the NCT of Delhi, *i.e.* Najafgarh, Barapullah and Trans-Yamuna basins, and there are 22 natural drainage systems in these basins which outfall into Yamuna somewhere during its 46-km run through Delhi. There are 201 sub-segments of the natural drains in these networks. These 'drains' are actually the waterways that carry the run-offs from the plains to the river Yamuna, and also recharge groundwater and support biodiversity. Calling them natural drains that provide safe exit to storm water, including flood waters, understates their ecological significance.

4) Climate

The climate of the region is semiarid type, with three well defined seasons. Winter starts in November and peaks in January. Delhi is notorious for its heavy fog during the winter season. In December, visibility is reduced to nearly zero disrupting road, air and rail traffic in the city. During the summer season, the city faces extreme power and water shortage when the demand for these utilities is at its peak. Every year, the heat wave in summer claims several lives in Delhi. The temperature is usually between 21.1°C to 40.5°C during these months. The city, however, has a pleasant climate from February to April and from August to November.

Winters are usually cold and night temperatures often fall to 6.5°C during the period from December to February. The average annual temperature recorded in Delhi is 31.5°C based on the records over the period of 70 years maintained by the India Meteorological Department (IMD).

About 87% of the annual rainfall is received during the monsoon months June to September. The rainfall varies from 400-mm to 600-mm. On an average, rain of 2.5-mm or more falls on 27 days in a year. For design considerations, rainfall intensity of 20 to 30 mm which generally occurs in one hour duration has been taken into account.

The EIA Report is based on environmental baseline data generated during March 2020 to May 2020. Apart from primary data generated during the field monitoring/measurement, environment related data was also collected from secondary sources like Forest Department of Government of NCT Delhi, published journals and electronic media, India Meteorological Department (IMD), Central Ground Water Board (CGWB), Water Resource Department of Government of Delhi, *etc.*

3.2 GEOLOGY & SEISMICITY

3.2.1 General Geology of the Study Area

The study area basically consists of older alluvium *i.e.* unconsolidated inter bedded, inter fingering deposits of sand, clay and *kankar*. It is moderately sorted with variable thickness.

The basement and surface exposure of the hard rock in N.C.T Delhi is occupied by quartzite inter-bedded with mica schist belonging to Delhi Super Group. Unconsolidated sediments of Quaternary to Recent age unconformably overlie Delhi Super group. The quartzite is grey to brownish grey, massive to thinly bedded and structurally form a coaxially refolded regional anticline plunging towards north. The major planar structure strikes NE-SW with steep south-easterly dips. Quartzite occurs in the central and southern part of the area while the Quaternary sediments comprising Older and Newer Alluvium cover the rest of the area. The older Alluvium comprises silt, clay mixed with *kankar* in varying proportions. The Newer Alluvium mainly consists of un-oxidized sands, silt and clay occurring in the Yamuna flood plain. The thickness of alluvium on eastern and western side of the ridge is variable but west of the ridge it is generally thicker (>300m). The area is dissected by number of faults, fractures and shears, the trend of these varies from NNE-SSW to ENE-WSW.

Geologically, Delhi is located on folded crustal ramp with basement rocks of Delhi Supergroup, bounded by two regional faults *viz* Mahendragarh-Dehradun Fault in the west and Great Boundary Fault in the East. The ramp trending NNE-SSW across 'fore deep', is juxtaposed to Himalayan thrust belt. Thus, the seismic vulnerability of built environment of Delhi need be examined *vis-a-vis* high frequency ground motions due to events endemic to faults of Peninsular Domain and also due to frequency content of attenuated events with source zone in thrust domain of Himalayas. Fault lines of consequence in the domain are (i) Mahendragarh Fault, (ii) Great Boundary Fault, (iii) Moradabad Fault and (iv) Sohna Fault. The 1st level microzonation map discretizes the territory of NCT Delhi in 9 units viz. (i) Ridge ambience of exposed rock with low hazard, (ii) Layer of impedance contrast at shallow depth (<30 m) with Moderate Hazard, (iii) Weathered rock zone with Moderate Hazard due to weathering induced pronounced ground response, (iv) Chhattarpur Basin with High Hazard due to anticipated Basin effect, (v) Central Delhi with Moderate Hazard due to amplification in mid frequency level and Basin margin effect (vi) North-West Delhi plains (Bangar) of Moderate Hazard due to thick soil cover, (vii) South Najafgarh sedimentary fill (Dabar) with Moderate Hazard due to high amplification and liquefaction, (viii) Zone of Basin margin effect west of Delhi ridge: High Hazard, (ix) Newer alluvium proximal to Yamuna river: High Hazard due to Liquefaction Potential. Hazard levels have been alluded to different microzones based on anticipated amplification and liquefaction susceptibility.

The Delhi ridge which is the northernmost extension of Aravalli mountain consists of quartzite rocks and extends from southern parts of the territory to western bank of Yamuna for about 35 Km. The alluvial formations overlying the quartizitic bedrock have different nature on either side of the ridge. The Yamuna flood plain contains a distinct river deposit. The nearly closed Chattarpur alluvial basin covering an area of about 48-Km² is occupied by alluvium derived from the adjacent quartzite ridge. The Geological map of NCT Delhi and Study Area is shown in ***Exhibit 3.2.1***. The geological units are described below:

- Alluvial plain on eastern and western sides of the ridge;
- Yamuna flood plain deposits;
- Isolated and nearly closed Chattarpur alluvial basin;

- NNE-SSW trending Quartzitic Ridge.

3.2.2 Geological Succession

The geological succession in and around the site area is as follows:

Quaternary - Alluvium
Post Delhi Intrusive - Pegmatite and basic intrusive
Delhi Group - Alwar quartzite

The rock outcrops in the Delhi area form the northern most prolongation of the Alwar formation of the Delhi Super Group. The strike varies from N-S to NESW with dips towards East and Southeast in the North and West to Northwest in the south. The rocks are thickly bedded, dark colored quartzite with some inter banded schist and phyllites. The quartzite is of various types and usually coarsely crystalline in texture. The general stratigraphic sequence is given below:

Quaternary	Newer Alluvium	Unconsolidated, inter-bedded lenses of sand, silt, gravel and clay in narrow flood plains of Yamuna River
	Older Alluvium	Unconsolidated, inter-bedded, inter-fingering deposits of sand, clay and kankar, moderately sorted. Thickness variable, at places more than 300 metres.
Pre-cambrian	Alwar Quartzites	Well stratified, thick bedded, brown to buff colour, hard and compact, intruded locally by pegmatite and quartz veins inter-bedded with mica schists.

Source: CGWB and CPCB (2000)

3.2.3 Tectonics and Seismicity

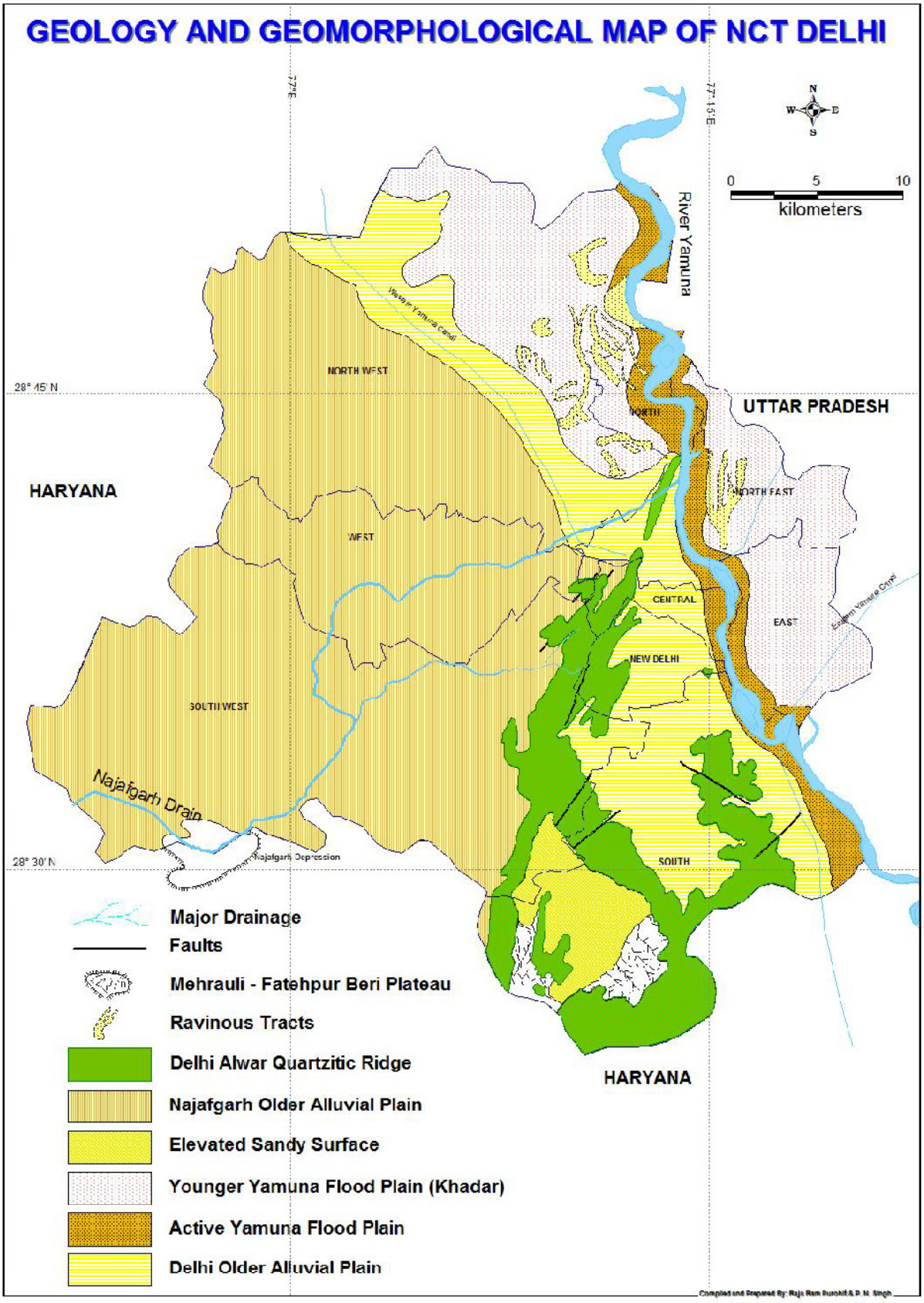
The geological succession in and around the site area is as follows:

1) Seismicity

Delhi and its surroundings are seismically active. It falls in Seismic Zone IV. Earthquakes of magnitude from 3 to 7.4 on Richter Scale have been observed in and around Delhi during the past three centuries. The epicentres of some moderate and large earthquakes, which occurred in Delhi region, as well as the events which occurred in the Himalayan region, along the Main Boundary Thrusts (MBT) and Main Central Thrusts (MCT), that have been felt in Delhi are shown in ***Exhibit 3.2.2***. The Himalayan thrust zone, just 200-250-Km North of the megacity, has been identified as a significant seismic gap in the Central Himalayas (Khattri, 1987; Bilham et al., 2001), thus it can be presently considered one of the most hazardous areas of the world.

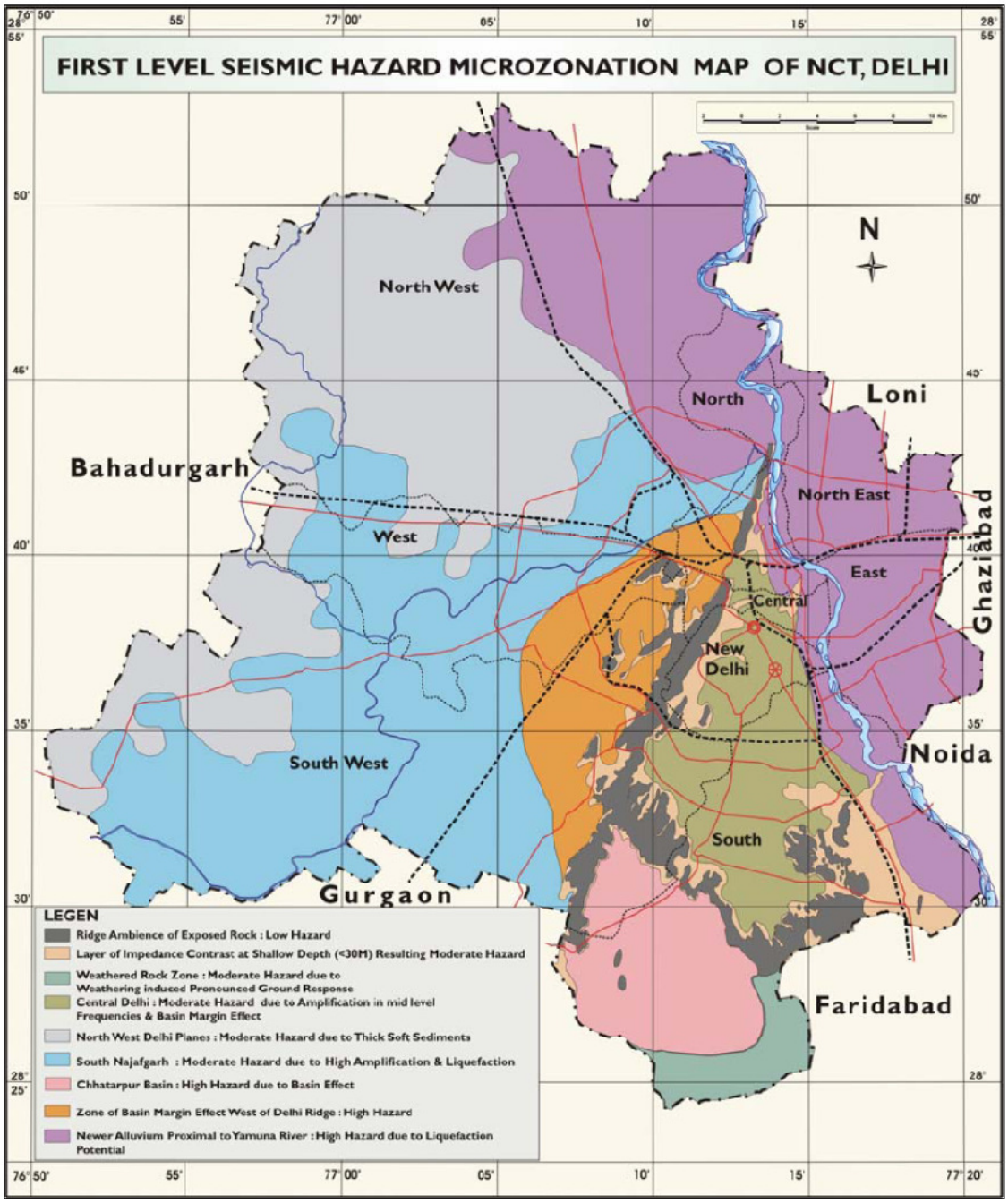
The Seismic Map of Delhi is shown in ***Exhibit 3.2.2***.

Exhibit 3.2.1: Geological Map of Delhi



Source: Geological Survey of India

Exhibit 3.2.2: Seismic Map of Delhi



Source: Geological Survey of India

3.3 SOIL QUALITY

General Characteristics of the Soil in the Study Area

The Yamuna river and terminal part of the Aravalli hills range are the two main geographical features of Delhi. Physiographically, Delhi consists of the Yamuna flood plain, the old Khadar (earlier floodplain), and the Bangar (upper Alluvial plain). Thus, a major part of Delhi is covered by the alluvial soils of Yamuna. Fourteen soil series are observed in Delhi. Majority of the area is covered by fine to coarse loamy soils with different levels of moisture-retention capacity. Areas under these soils have been converted to urban use. Good-to-moderate quantity soil is being lost to non-agricultural uses. The Aravalli hill range is covered with forests called the Ridges.

The Delhi series consists of very deep, somewhat excessively drained soils. They formed in wind modified material weathered from granitic rock sources. Delhi soils are on floodplains, alluvial fans and terraces. Slopes are 0 to 15 percent. Delhi soils have short undulating slopes of 0 to 15 percent and lack stratification. The mean annual soil temperature at a depth of 20 inches is 15.55 to 18.88^{0}C and the soil temperature usually is not below 8.33^{0}C at any time. The average January soil temperature is about 500F and the average July temperature is 23.88 to 29.44^{0}C The soil between depths of about 12 to 35 inches is continuously dry from late April or May until late October or early December and is continuously moist in some or all parts all the rest of the year. Very coarse sand is 0 to 5 percent and combined coarse and very coarse sand is 35 percent or less. The soils are somewhat excessively drained; negligible to slow runoff; rapid permeability that are being used for growing grapes, peaches, truck crops, alfalfa and for home sites. Principal native plants are buckwheat and a few shrubs and trees. Typical vegetation is annual grasses and forbs.

The soils are mostly light with subordinate amount of medium texture soils. The light texture soils are represented by sandy, loamy, sand and sandy loam; whereas medium texture soils are represented by loam silty loam. The soils that occur in all the blocks in Delhi are generally suitable for irrigating moderately salt resistant crops such as wheat, barley and mustard. The soil texture is predominantly loamy sand in the study area.

3.3.1 Selection of Sampling Locations

3 soil sampling locations were selected based on the local geological formation and the agricultural practices and based on the intensity and magnitude of the proposed PD Complex. The sampling locations are shown in ***Exhibit 3.3.1*** and presented in ***Table 3.3.1***.

Table 3.3.1: Soil Sampling Locations

Location Code	Location	Distance & Direction w.r.t. Project Site	Present Land Use
SQ1	Project Site	-	Part of the MCD park
SQ2	Netaji Nagar Park	0.22 Km/NNW	Barren land of a park
SQ3	Dr Bhim Rao Ambedkar Park	0.40 km/SSW	Barren land of a park

Source: Study Team

3.3.2 Methodology

The soil samples were collected from three sampling locations in the pre-monsoon season (March-2020). The samples collected from all the locations were homogeneous

representatives of each location. At random 5 sub-locations were identified at each location and soil samples were collected from 30, 60 and 90-cm below the surface. It was uniformly mixed before homogenizing the soil samples. The samples were packed in dependable, waterproof containers and analysed as per ASTM, USEPA, IS: 2720, M.L. Jackson (Soil Chemical Analysis).

Exhibit 3.3.1: Soil Sampling Locations

Source: Study Team

3.3.3 Results and Discussion

The result of laboratory analysis of the collected soil samples is presented in ***Table 3.3.2*** and the rating chart for assessing the nutritional value is presented in ***Table 3.3.3***.

Table 3.3.2: Physico-Chemical Characteristics and nutrient status of Soil

Parameter	Unit	SQ1	SQ2	SQ3
Physical Characteristics				
Textural Class		Loamy sand	Loamy sand	Loamy sand
Bulk Density	gm/cc	1.6	1.2	1.5
Water Holding Capacity	%	65.8	57.6	65.7
Particle Size Distribution				
Sand	%	86.2	78.5	84.6
Silt	%	8.3	13.3	10.3
Clay	%	5.5	8.2	5.1
Chemical Characteristics				
pH		7.4	6.6	7.5
EC	µmhos/cm	715	625	727
Organic Carbon	%	0.91	0.81	0.93
CEC	meq/100gm	7.12	5.65	7.08
Sodium Absorption Ratio		0.42	0.34	0.45
Nutrients				
Available N	Kg/Ha	535.3	512.2	548.8
Available P	Kg/Ha	22.3	15.8	23.6

Parameter	Unit	SQ1	SQ2	SQ3
Available K	Kg/Ha	264.5	245.6	273.5

Source: Study Team

Table 3.3.3: Rating Chart for Available Nutrients in Soil

(in Kg/Ha)

Parameters	Low	Medium	High
Available Nitrogen (N)	<280	280-560	> 560
Available Phosphorus (P)	< 10	10 – 25	> 25
Available Potash (K)	<110	110 – 280	>280

1) Physical Characteristics

Sand content is slightly higher and ranges from 77.8% to 86.2%, while silt content is moderate and ranges from 8.3 to 13.5 %. Clay content is lower and ranges from 5.1% to 8.2%. Therefore, as per U.S. Bureau of Soil and Chemistry Textural System (Triangular Classification System), the Soil in the study area can be described as loamy sand. The water holding capacity of the soil varies between 57.6 %-65.8% (*Refer Table 3.3.2*).

2) Chemical Characteristics

The soil is slightly alkaline in nature, pH ranging from 6.6 to 7.5. Electrical conductivity (EC) is moderate, varying between 625 to 727 µmhos/cm. Mercury was not detected in any soil samples.

Cation Exchange Capacity (CEC) varied between 5.65 and 7.12 meq/100 gm.

3) Fertility Status of Soil

The soil in the project area possess reasonable organic matter (0.81-0.93%), available phosphorus (15.8-23.6 Kg/Ha), available nitrogen (512.2-548.8 Kg/Ha) and available potassium (245.6 to 273.5 Kg/Ha), which indicate medium fertility or agricultural potential of the Soil.

3.4 LAND USE

Land is the most vital resource for sustenance of life and degradations of land due to industrialization; urbanization and population growth is a matter of concern. Therefore, it is necessary to establish the existing land use pattern to optimize the land use as well as minimize degradation due to the developmental activities.

The basic idea of land use classification for the purpose of EIA study is to define the distribution of the existing land according to its actual use. The land use pattern indicates the manner in which different parts of land in the study area is being utilized or un-utilized. It is an important indicator of environmental health and human activity and a degree of inter-play between these two. Even though the soil quality, water availability and climatic conditions have strong influence on agriculture and vegetation, the human activity may alter the natural environment to a large extent to suit human needs. Unsuitable land use often triggers rapid environmental deterioration and disturbs ecological balance.

The objectives of the present study are:

- To map the study area with respect to various land use/land cover categories;
- To identify the sensitive areas within 10-Km radius around the project site.

The land use pattern of the study area as deciphered from satellite imagery of March 2020 with ground truth verifications has been established. Ground and ancillary information have been used to identify the sensitive places within 10-Km radius around the proposed project with the help of topo sheet of the area. The land use/land cover map has been developed based on the satellite imagery.

3.4.1 Land Use/Land Cover Classification Based on Satellite Imagery

1) Method of Data Preparation

The land use/land cover has been presented in the form of a map prepared by using LANDSAT 7 ETM+ satellite imagery of March 2020. The satellite data has been processed using ERDAS Imagine 9.1 software supported with ground checks and ground truth verification by qualified and experienced professionals. Area and distance calculations have been carried out using GIS software after geo-referencing the interpreted data with the help of Survey of India topo sheet of scale 1:50,000.

2) Area under Different Land Use

The land use classes with the areas falling under the respective classification are presented in ***Table 3.4.1*** and represented through graphics (refer ***Exhibit 3.4.1***).

Maps depicting major land use/ land cover classes under various categories are presented in ***Exhibit 3.4.2***. The data indicates that the study area is predominantly occupied by settlements.

Table 3.4.1: Land Use/Land Cover Based on Satellite Imagery (March 2020)

Sl. No.	Land Use Class	Area in Ha	%
1	Agriculture	251.2	0.8
2	Waterbody	753.6	2.4
3	Settlements	17489.8	55.7
4	Vegetation Cover	2669	8.5
5	Fallow land	2433.5	7.75
6	Waste Land	785	2.5
7	Miscellaneous	7017.9	22.35
	Total	**31400.00**	**100**

Source: Study Team

Exhibit 3.4.1: Land Use/Land Cover of the Study Area

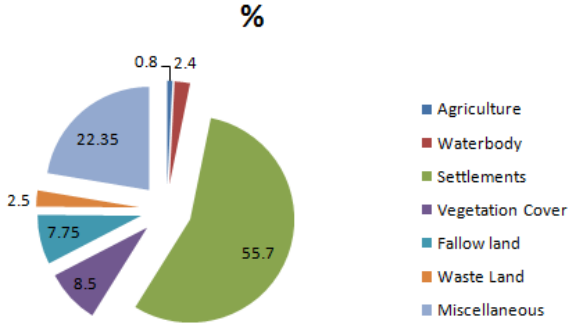
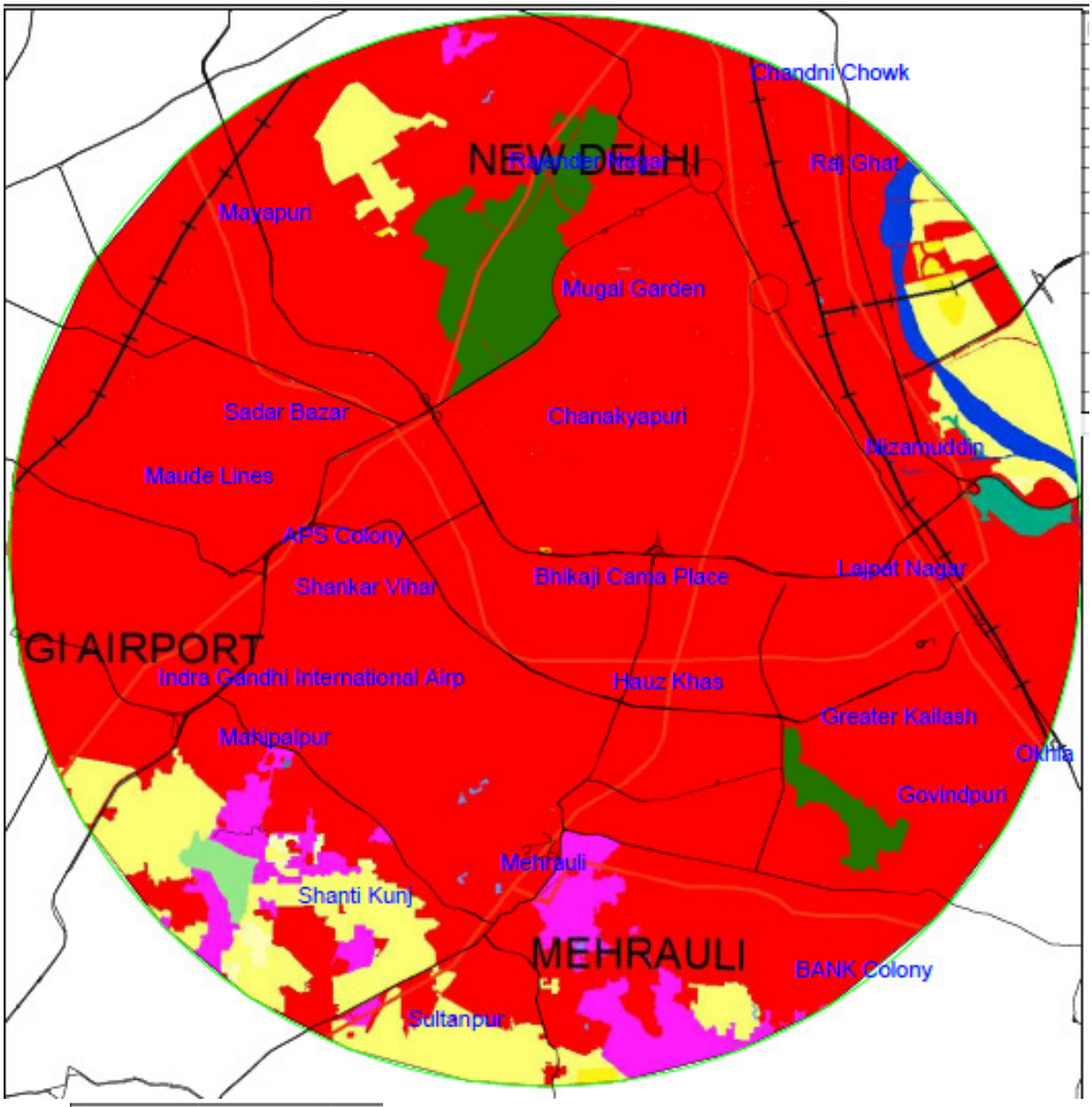


Exhibit 3.4.2: Land Use/Land Cover Map of the Study Area (Based on Satellite Imagery- March 2020)



Legend	
Name	**Symbol/ Colour**
Study Area	
Project Site	
Road	
Railways	
Canal	
Land Use Land Cover Classes	
1st Level Classification	**2nd Level Classification** / **Symbol**
Built-up / Habitation	Urban
	Rular
Agriculture Land	Crop land/ Fallow Land
	Plantation
Water Bodies	Ponds/ Lakes/ Tanks
	Rivers
	Scrubs
Waste Land	Land without Shurbs
	Muddy Area
Green Cover	Forest Plantation

Source: Satellite Imagery of March-2020

3.5 WATER QUALITY & RESOURCES

This section discusses the status of the water resources and quality of the NCT Delhi.

3.5.1 Water Availability in the Region/Study Area

Delhi depends largely on river Yamuna and partially on the river Ganga for its share of raw water. For sustainable development of Delhi, it is essential to ensure adequate supply of water in terms of reliability, quality and quantity. Although, Delhi has an average water availability of 225 lpcd, the distribution of the same is not uniform. The water requirement has to be made from river water allocation and *ranney* wells in Yamuna flood plains. The future supply crucially depends on the progress of the proposed dams in U.P, Uttaranchal and H.P; Satluj Yamuna link canal and Sharda Yamuna link canal. Further it will also depend upon the conveyance system, which should be in place before the release of allocated water to Delhi. However to some extent localized ground water extraction and its supply after treatment to prescribed level of quality may also be required to meet up the demands. In addition, promotion of recycled wastewater based on techno economic feasibility is also to be done by the concerned agencies for water augmentation.

3.5.2 Groundwater Characteristics

National Capital Region (NCR) is basically a water scarce region, dependent upon surface water resources from outside its boundaries for its water supply. The complex situations of ground water occurrence in different formations, presence of saline ground water at varying depth in the aquifers and growing urbanization influences availability of ground water in different parts of NCR of Delhi.

According to Central Ground Water Board, Total annually replenishable ground water resources of the district have been assessed as 9751.58 ham, out of which net annual ground water availability has been assessed as 9127.013 ham. Total annual ground water draft for all uses has been estimated to be 12777.7 ham, with overall stage of ground water development at 139.99%. All the 3 tehsils are falling under over exploited category. This is based on the Ground Water Information Booklet of South West District, NCT, Delhi published by the Central Ground Water Board, Ministry of Water Resources, State Unit Office, New Delhi.

3.5.3 Groundwater Level-South West District

Depth to water level of the district shows large variation. Shallow water level is observed in the south western part of the district while deeper water levels are observed in the eastern part of the district. The depth to water level during pre monsoon period in the district ranges from 2.40 to 53.17 m bgl and during post monsoon period, it varies from 0.69 to 54.02 m bgl.

a) Seasonal Water Level Fluctuation

The seasonal water level fluctuation has been computed from the water level data obtained from the ground water observation wells monitored in the area during pre-monsoon and post-monsoon periods. Fluctuation in water level is the outcome of mainly the amount of rainfall received by the area and ground water withdrawal taken from the ground water

reservoir. The seasonal fluctuation in water level between pre and post monsoon seasons shows rise in water level ranging from 0.25 to 7.18 m and fall ranging from 0.05 to 1.27 m.

b) Long Term Water level Trend

The long-term water level trend analysis in the district over the last 10 years period shows-

- a fall of 0.30 to 6.90 m during the pre-monsoon period; and
- a fall of 0.07 to 6.08 m in during the post-monsoon period.

3.5.4 Water Quality

The only surface water source in the study area is Yamuna River flowing at a distance of 8.50 km in the northeast. The project area is very small, to the extent of 6109 sq. m. only. The adverse impact if any shall be confined to the project site only. Neither drawal from nor discharge are envisaged into the Yamuna River.

Therefore, only ground water sampling and analysis has been carried out during the EIA study and same has been documented and reported in the EIA Report.

The ground water quality characteristics of the study area have been established through monthly monitoring of the following parameters:

- **Physical Parameters** – pH, conductivity, total suspended solids.
- **Chemical parameters** – Total dissolved solids, alkalinity, hardness, NO_3, Cl, SO_4, Na, K, Ca, Mg, Silica, oil and grease, PO_4, Phenolic compounds BOD and COD.
- **Heavy metals** – Cd, Cr^{+6}, Cu, Fe, Pb, Zn, Hg, Se and As.
- **Bacteriological characteristics** – Total coliform.

3.5.5 Sampling Locations

The Ground water quality was monitored at two locations considering the zone of influence of the project. The ground water quality sampling locations are described in ***Table 3.5.1*** and shown in ***Exhibit 3.5.1***.

Table 3.5.1: Ground Water Sampling Locations

Location Code	Source	Location Description	Distance & Direction w.r.t. Project Site
GW1	Borewell	Proposed Project Site	-
GW2	Borewell	Dr Bhim Rao Ambedkar Park	0.40 Km/SSW

Source: Study Team

Exhibit 3.5.1: Ground Water Sampling Locations

Source: Study Team

3.5.6 Methodology of Sampling and Analysis

Water samples were collected on monthly basis during the study period and analyzed for selected physico-chemical and biological parameters. The parameters such as pH and temperature were analyzed at the site itself at the time of collection of sample (with the help of water testing kit developed by CPCB) while for other parameters, samples were preserved and analysed in NABL accredited laboratory. Samples were collected, preserved and analyzed as per Standard Methods for the Examination of Drinking Water (APHA, AWWA and WPCF) Quality.

3.5.7 Results and Discussion

Water samples were collected on monthly basis during the study period and analyzed for The range of values observed for various physico-chemical and microbiological parameters for ground water at two sampling locations are presented in ***Table 3.5.2***. pH varied from 7.0 to 9.2. TDS content varied between 385 to 524 mg/l. Degree of hardness ranged from 110 to 253 mg/l. Calcium varied between 20.8 to 60.3 mg/l which is below the permissible limit of 100 mg/l. BOD varied from 1.0 to 2.0 mg/l and COD varied from 2.0 to 8.0 mg/l.

The chloride level (22 to 398 mg/l) was observed to be higher. The sulphate level varied between 148 to 198 mg/l. The Fluoride content varied from 0.20 to 0.52 mg/l. Oil & Grease and phenolic compounds were below the detectable limit. Most of the heavy metals were absent.

The result of physico-chemical analysis of ground water samples indicates marginal variation among the sampling locations. However, most of the parameters are within the permissible limits for Drinking Water Standards and many parameters are within the desirable limits.

Table 3.5.2: Ground Water Quality –Study Period

Parameters	Unit	GW1	GW2	D.W. Std. (IS:10500)	
No. of Observations		3	3	Desirable Limit**	Permissible Limit*
Value Observed					
pH		7.0 - 8.4	7.2 - 9.2	6.5 - 8.5	NR
Total Suspended Solids	mg/l	8.2 - 14	4 - 11		
Total Dissolved Solids	mg/l	385 – 432	398 - 524	500	2000
Conductivity	µmhos/cm	554-658	560 -812		
Alkalinity (as $CaCO_3$)	mg/l	103- 285	110 - 320	200	600
Hardness (as $CaCO_3$)	mg/l	110- 232	115 - 253	300	600
Calcium (as Ca^{+2})	mg/l	20.8 -47.6	23.6 -60.3	75	200
Magnesium (as Mg^{+2})	mg/l	8.2 – 18.5	11.5 – 21.3	30	100
Sodium (as Na^{+})	mg/l	49.5 – 148.6	52.9 -162.1		
Potassium (as K^{+})	mg/l	1.2 – 21.0	2.1 – 20.5		
Nitrate (as NO_3^{-})	mg/l	16- 30	18- 28	45	NR
Phosphate (as PO_4^{-2})	mg/l	<0.1	<0.1		
Chloride (as Cl^{-})	mg/l	22- 332	22- 398	250	1000
Sulphate (as SO_4^{-2})	mg/l	152 -194	148- 198	200	400
Fluoride (as F^{-})	mg/l	0.20 - 0.45	0.21 - 0.52	1.0	1.5
Oil & Grease	mg/l	<0.01	<0.01	0.01	0.03
Phenolic Compounds (as C_6H_5OH)	mg/l	<0.001	<0.001	0.001	0.002
BOD	mg/l	1.0 – 2.1	1.2 – 2.0		
COD	mg/l	3 - 7	2 - 8		
Arsenic (as As)	mg/l	<0.01	<0.01	0.01	NR
Mercury (as Hg)	mg/l	<0.001	<0.001	0.001	NR
Lead (as Pb)	mg/l	<0.05	<0.05	0.05	NR
Cadmium (as Cd)	mg/l	<0.01	<0.01	0.01	NR
Hexavalent Chromium (as Cr^{+6})	mg/l	<0.05	<0.05	0.05	NR
Copper (as Cu)	mg/l	<0.05	<0.05	0.05	1.5
Zinc (as Zn)	mg/l	<1	<1	5	15
Selenium (as Se)	mg/l	<0.01	<0.01	0.01	NR
Iron (as Fe)	mg/l	0.05 - 0.35	0.08 - 0.37	0.3	1.0
Total Coliform (MPN)	/100 ml	Absent	Absent		

Source: Study Team

*** Desirable limit specified in Indian Specifications for Drinking Water (IS: 10500 – 1991)*

** Permissible limit, in absence of alternate source specified in IS: 10500 – 1991.*

3.6 METEOROLOGY AND CLIMATOLOGY

1) Rationale

The weather of a place represents the state of the atmospheric environment over a brief period of time. Meteorological factors play an important role in dispersion of air pollution. This information is useful to assess the capacity of dispersion and diffusion of pollutants during the construction and operation phases of the project.

Delhi has a semi-arid climate with high variation between summer and winter temperatures. Due to Delhi's proximity to the Himalayas, cold waves from the Himalayan region dip temperatures across Delhi. Summers are long, from early April till October, with the monsoon season in between. Extreme temperatures have ranged from −0.6 °C (10 January 1935) to 47°C. Winter starts in November and peaks in January. Delhi is notorious for its heavy fog during the winter season. In December, visibility is reduced to near zero disrupting road, air and rail traffic in the city. During the summer season, the city faces extreme power and water shortage when the demand for these utilities is at its peak. Every year, the heat wave in summer claims several lives in Delhi. The city, however, has a pleasant climate from February to April and from August to November.

The average annual rainfall is approximately 670 mm (27 inches), most of which falls during the Monsoons, in July and August. Traditionally, the Monsoons are supposed to touch Delhi by June 29th every year.

As per the Indian Meteorological Department, a year has been divided into following seasons in the Indian sub-continent:

Summer (Pre-monsoon)	:	March-to-May
Monsoon Season	:	June–to-September
Post-monsoon Season	:	October-November
Winter Season	:	December-to- February

3.6.1 Past Records

3.6.1.1 Data Collected

Climatological data for the period 1999-2008 of IMD Station, Safdarjung, Delhi located at a distance of about 15 km from the BTPS has been collected and used to bring out the synoptic features of the area. The climatological data collected from the IMD observatory is presented in ***Table 3.6.1*** and illustrated in ***Exhibit 6.1.1.***

3.6.1.2 Temperature

May is the hottest month of the year with mean daily maximum temperature of 40.9^{0}C. Temperature gradually decreases with the onset of monsoon. With the passage of monsoon, in October, both day and night temperature further lowers gradually. December is the coldest month of the year having daily mean minimum temperature of 6^{0}C. The average minimum and maximum temperatures are 16.5^{0}C and 30.7^{0}C respectively (***Refer Table 3.6.1***). Sometimes, minimum temperature further drops down to as low as 5^0 to 6^{0}C due to cold wave blowing from North India.

3.6.1.3 Rainfall

The analysis of the rainfall figures show that the rainfall has shown increasing trend since the year 2004. The year 2004 received 594.4 mm rainfall and the year 2010 received 1069 mm of rainfall.

3.6.1.4 Relative Humidity

The relative humidity is moderate throughout the year. The maximum Relative Humidity recorded is during the month of August and minimum in the month of May.

3.6.1.5 Atmospheric Pressure

The diurnal variation of atmospheric pressure reveals that the barometric pressure is highest during early morning and gradually decreases as the earth's surface starts warming up through absorption of solar radiation to reach a minimum at or immediately after sunset. This diurnal variation has been observed to be true, irrespective of the season. As regards monthly variation, it has been observed that barometric pressure is lowest in the month of July (974.7 mb-830 IST and 971.7 mb- 1730 IST) and highest in December (992.7 mb- 0830 IST and 990.2 mb at 1730 IST).

3.6.1.6 Wind Direction and Speed

Wind directions vary with season. In the summers, the predominant wind directions are from the west in the morning and either west or northwest in the evening. In the monsoons, the predominant wind directions are from the west in the morning and from east (in July and August) or north-west (in June and September) in the evenings. During the post monsoon season, west and calm winds predominate in the mornings while in the evenings, northwest winds are most frequent. In the winter mornings, northwest and west winds dominate, while in the evenings, northwest and north winds are frequent. The annual windrose diagram showing the wind pattern is depicted in ***Exhibit 3.6.2*** and ***Exhibit 3.6.3***.

Analysis of wind records during 1999-2008 show that the winds are generally light to moderate in this area with annual mean wind speed of 9.5 Km/Hr. The strongest winds are observed during the months of May-June *i.e*. Summer Season and the weakest during October -November.

3.6.1.7 Conclusions

The following conclusions can be drawn from the climatological data:

- The area is semi arid;
- The area receives rainfall mainly during the southwest monsoon months;
- The wind is gentle with low to moderate strengths.

Table 3.6.1: Climatological Data of IMD Safdarjung (1999-2008)

Month	Mean Max. Temp (°C)	Mean Min. Temp (°C)	Mean Monthly Relative Humidity (%)	Mean Atmospheric Pressure (mb)		Monthly Mean Wind Speed (Km/Hr)
				0830 IST	1730 IST	
January	20.7	6.5	77	992.2	989.9	8.3

Month	Mean Max. Temp (°C)	Mean Min. Temp (°C)	Mean Monthly Relative Humidity (%)	Mean Atmospheric Pressure (mb)		Monthly Mean Wind Speed (Km/Hr)
				0830 IST	1730 IST	
February	25.3	9.1	68	990.1	987.6	10.1
March	33.4	14.5	56	987.2	984.3	10.7
April	38.3	21.1	39	983.5	980.0	11.2
May	40.9	24.8	37	978.9	975.3	12.8
June	40.3	26.7	52	975.1	971.3	13.7
July	39.4	26.2	75	974.7	971.7	9.9
August	35.7	26.2	80	976.5	973.6	8.3
September	36.3	23.7	72	980.9	977.8	8.9
October	34.7	18.2	62	986.7	983.7	6.1
November	29.4	11.7	61	991.0	988.2	6.1
December	24.4	6.0	73	992.7	990.2	7.4
Annual Avg	**30.68**	**16.52**	**63**	**984.1**	**981.1**	**9.5**

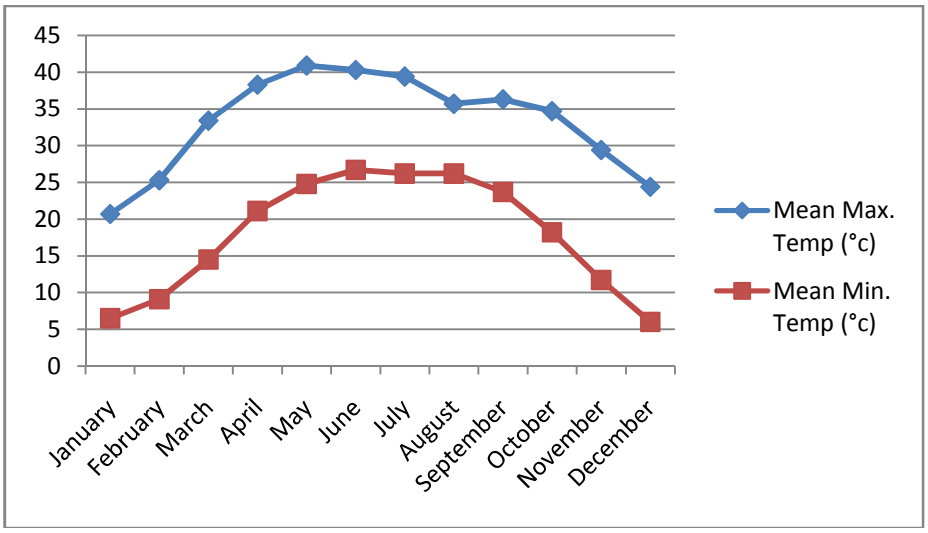
Monthly Rainfall during 2004-2010

Year→	2004	2005	2006	2007	2008	2009	2010
January	15.8	6.6	1.7	1.5	1.9	4.2	0.0
February	0.3	42	0.0	69.5	1.9	6.5	14.2
March	0.0	31.4	33.2	55.1	0.0	3.9	0.0
April	39.6	5.8	1.8	1.0	23.6	2.0	1.2
May	52.7	11.6	52.6	45.3	146.2	43.0	7.6
June	48.0	65.7	92.5	137.7	120.0	5.4	4.6
July	40.6	175.9	196.3	156.9	159.1	124.2	236.8
August	284.7	89.1	88.2	189.7	245.4	188.6	455.1
September	4.2	233.1	127.6	61.6	109.2	201.9	313.8
October	108.5	0.0	2.8	0.0	0.0	0.3	22.0
November	0.0	0.5	1.5	0.7	0.0	14.2	13.4
December	0.0	0.0	2.3	0.1	0.0	1.0	0.3
Total	**594.4**	**661.7**	**600.5**	**719.1**	**807.3**	**595.5**	**1069**

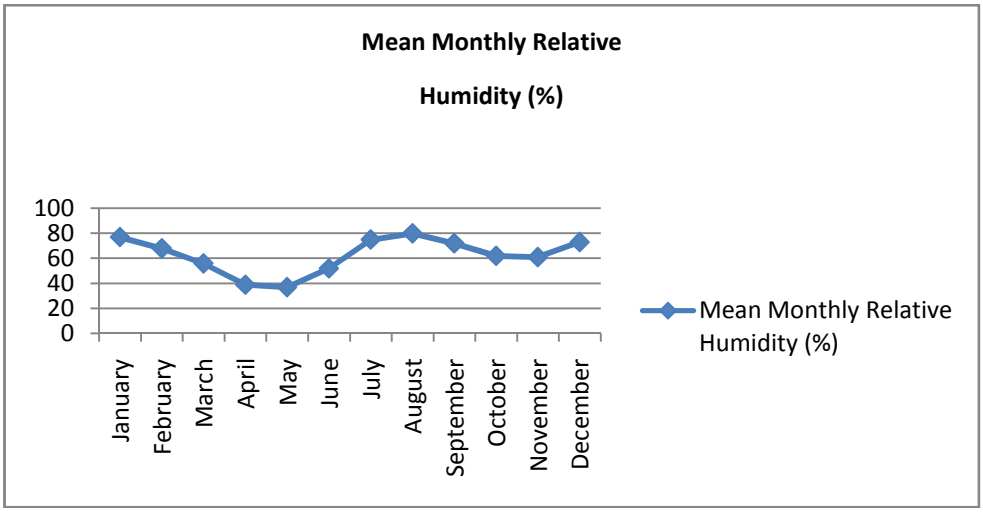
Source: IMD Observatory Safdarjung

Exhibit 3.6.1: Long term normal of the Climatological Data in Graphical Form

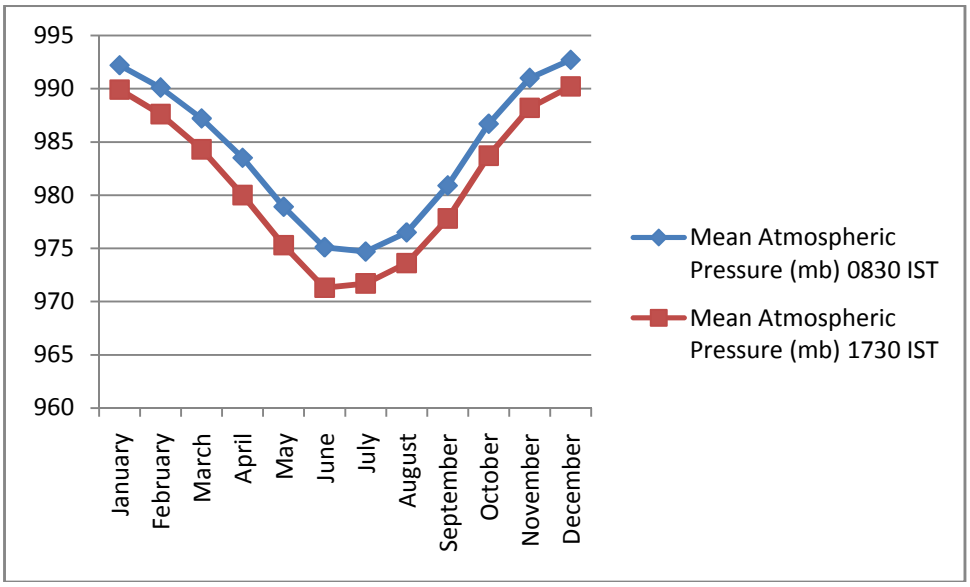
a) Temperature



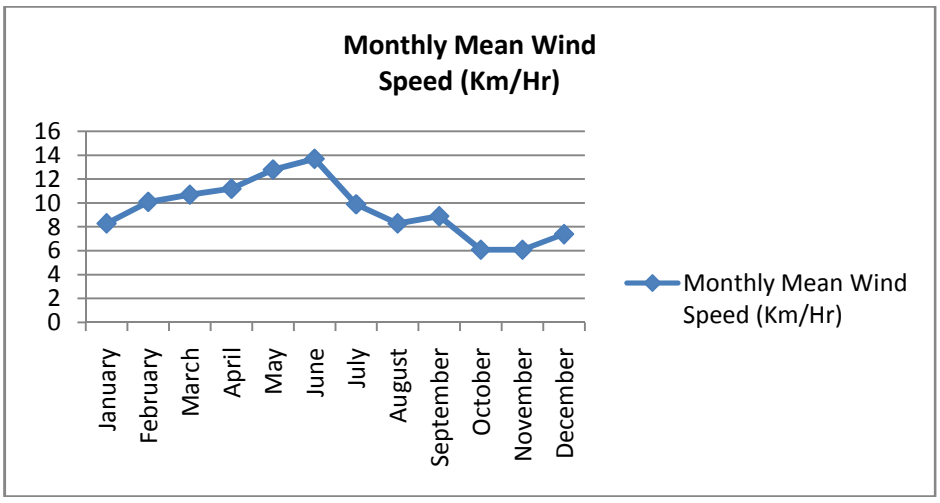
b) Humidity



c) Atmospheric Pressure



d) Wind Speed



e) Annual Rainfall (Normal in mm)

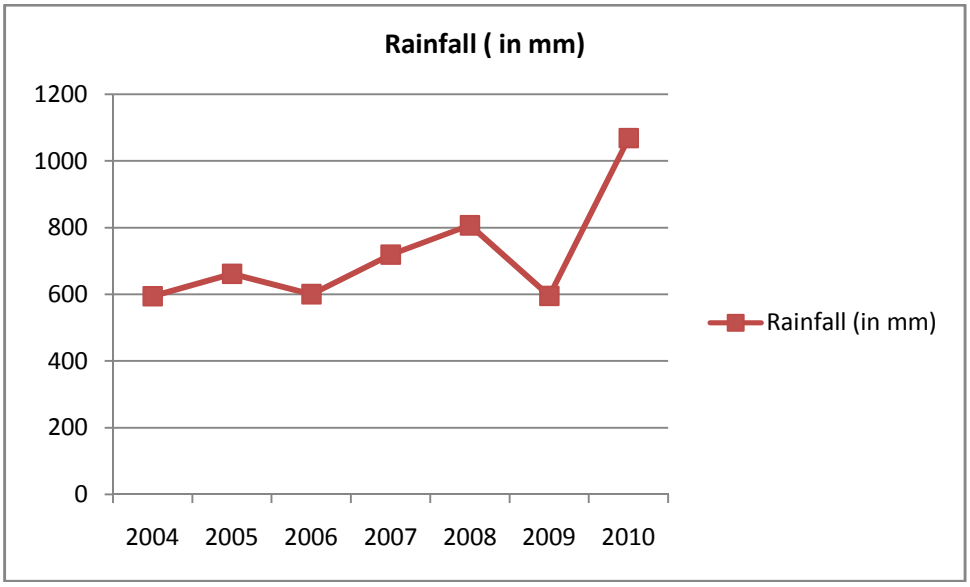


Exhibit 3.6.2: Annual Wind Rose Diagram-IMD, Safdarjung (0830 HRS)

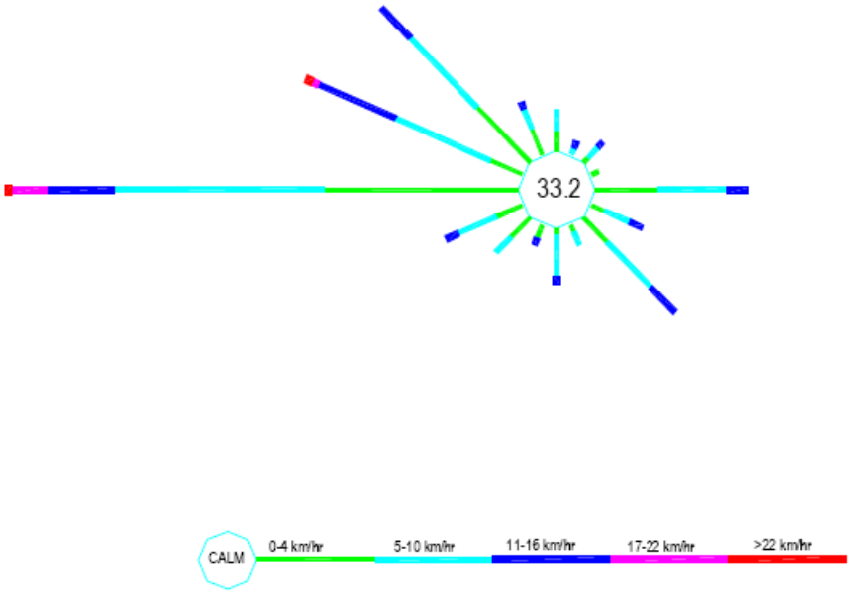
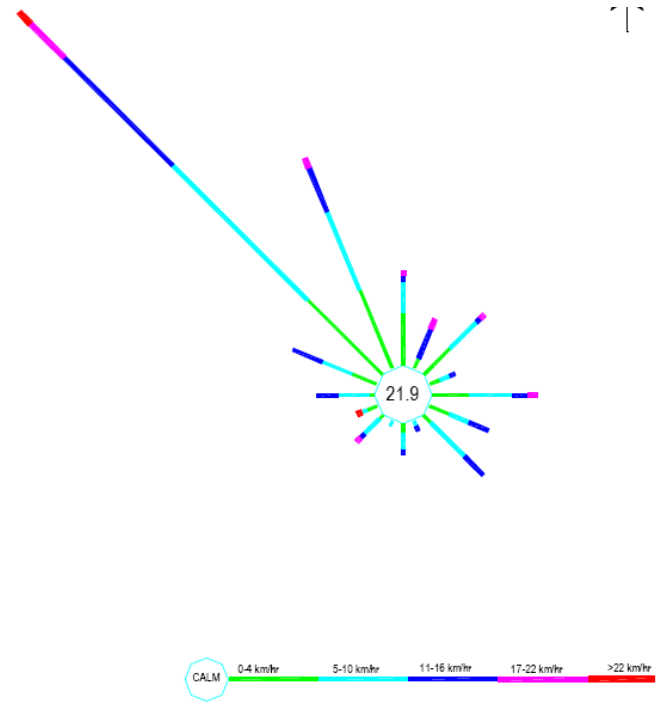


Exhibit 3.6.3: Annual Wind Rose Diagram-IMD, Safdarjung (1730 HRS)



3.6.2 Micro-Meteorology

The micro-meteorological conditions at the project sites regulate the transport and diffusion of air pollutants released into the atmosphere. The principal meteorological variables are horizontal convective transport (average wind speed and direction), vertical convective transport (atmospheric stability, mixing height) and topography of the area. The data on surface meteorological parameters (wind speed and direction, ambient temperature, relative humidity, atmospheric pressure, solar radiation, rainfall *etc.*) in the study area were collected using automatic weather monitoring station. In this report the on-site meteorological data generated from 01-March-2020 to 31-May-2020 has been incorporated and subjected to statistical analysis. The Monthly variation in on-site meteorological parameters at site has been given in ***Table 3.6.2.***

Table 3.6.2: On-Site Meteorological Data (Pre-monsoon Season)

Month	Temp. (^{0}C)		Relative Humidity (%)		Rainfall (mm)	Mean Wind Speed (Km/Hr)	Atmospheric Pressure (hPa)	
	Min.	Max.	Min	Max			0830HRS	1730HRS
March 2020	21.57	32.78	76.12	100	4.17	5.9	985.2	983.3
April 2020	13.33	32.78	63.27	100	1.17	6.26	981.1	978.4
May 2020	21.11	45.56	64.17	100	1.06	2.4	979	976
Total/Average	***18.67***	***37.04***	***67.85***	***100***	***6.40***	***4.85***	***981.77***	***979.23***

Source: Study Team

Discussion

On perusal of ***Table 3.6.2*** it can be inferred that the highest temperature was recorded during the month of May 2020 (45.56^{0}C) and the lowest temperature was recorded in the

month of April 2020(13.33^{0}C). The mean minimum and mean maximum temperature stood at 18.67^{0}C and 37.04^{0}c respectively.

The relative humidity was on higher side and even touched 100% on certain days. However the mean minimum relative humidity stood at 67.85 %.

The monthly mean wind speed varied from 2.4 km/hr to 6.26 km/hr with seasonal mean of 4.85 km/hr. On perusal of the wind rose diagram (***Refer Exhibit 3.6.4***) of pre-monsoon season, it is inferred that the prevalent and dominant wind is from southwest.

The diurnal variation of atmospheric pressure reveals that the barometric pressure is highest during early morning and gradually decreases as the day progresses. As regards monthly variation, it was observed that the atmospheric pressure was lowest in May 2020 (0830 IST: 979 hPa and 1730 IST: 976 hPa) and highest in March 2020 (0830 IST: 985.2 hPa and 1730 IST: 983.3 hPa). The average atmospheric pressure at 0830 IST and 1730 IST were 981.77 hPa and 979.23 hPa respectively.

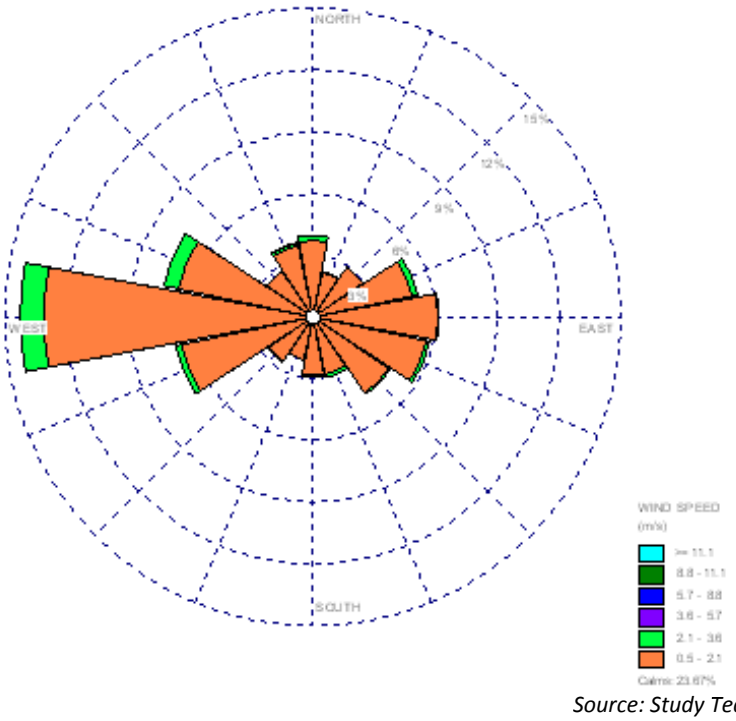
It would be observed from the ***Table 3.6.2*** that during the study period (pre-monsoon season), the total rainfall was recorded as 6.40 mm.

3.6.2.1 Comparison of On-Site Meteorological Data with Climatological Data

A comparison of site data generated during the study period (March 2020-May 2020, Pre-monsoon season) with that of IMD, Safdarjung reveals the following:

- The temperatures show the similar trend in both the cases.
- The rainfall pattern differs in amount of rainfall recorded in both long term meteorological data and on-site data.

Exhibit 3.6.4: Wind rose Diagram for the Pre-monsoon Season – Onsite Meteorology



Source: Study Team

3.7 AMBIENT AIR QUALITY

Anthropogenic activities are rapidly altering the proportion of gases in the atmosphere and causing unprecedented climate change, having serious repercussions for life on Earth.

Air pollutants degrade the atmosphere by reducing visibility, damaging property, combining to form smog, agricultural yield, deleteriously affecting human / animal health, altering ecosystems *etc*. Air quality in the India is governed by the National Ambient Air Quality Standards (NAAQS) formulated under the Air (Prevention and Control of Pollution) Act, 1981 by Central Pollution Control Board. Pollutants that have established national standards are referred to as "criteria pollutants." Pollutants considered for the proposed Property Development project are **Particulate Matter (PM_{10}& $PM_{2.5}$), Carbon Monoxide (CO), Oxides of Nitrogen (NOx) & Sulfur Dioxide (SO_2)**.

The major sources of anthropogenic air pollution in a region are vehicular traffic, industrial emissions, domestic fuel burning, construction and demolition activities *etc.* A baseline study was conducted by the study team to establish the existing air quality and to compare with the NAAQS.

The prime objective of the baseline air quality monitoring is to establish the existing representative ambient air quality in and around the project site. This will also be useful for assessing the incremental impact and conformity to standards of the ambient air quality specified by CPCB due to the construction and operation of the proposed project. The ambient air quality monitoring was conducted in pre-monsoon season (March-May 2020) at 4 locations during baseline survey to assess the ambient air quality status in the study area. At all the monitoring stations $PM_{2.5}$, PM_{10}, SO_2, NOx and CO were monitored on 24-hourly basis. The data collected was subjected to statistical analysis to arrive at maximum, minimum and average value.

3.7.1 Criteria for Selection of Monitoring Locations

The ambient air quality monitoring locations has been established on the basis of the following considerations:

- Meteorological conditions;
- Topography of the area;
- Sensitive locations;
- Representativeness of locations for obtaining baseline environmental status.

Four ambient air quality monitoring locations were selected in view of the above and in accordance with the prescribed Terms of Reference (TOR), taking into consideration the predominant downwind direction, population zone and sensitive receptors and one monitoring location in the upwind direction.

Logistic considerations as easy accessibility, security, availability of reliable power supply *etc*. were also examined while finalizing the locations.

The Ambient Air Quality Monitoring locations are shown in ***Exhibit 3.7.1***. The distance and direction of these locations with respect to the proposed project site are given in ***Table 3.7.1***.

Table 3.7.1: Ambient Air Quality Monitoring Locations

Location Code	Location	Distance/Direction w.r.t the Project Site	Selection Criteria (as per TOR)
AAQ1	Above Bhikaji Cama Place Metro Station	-	Proposed project Site
AAQ2	Block G1-by the side of Mata Vijaya Raje Scindia Marg	0.56 Km/E	Dominant downwind direction
AAQ3	Safdarjung Enclave-By the side of park	0.71 Km/SSE	Secondary downwind direction
AAQ4	Opp. DPS School-Sector-10, R K Puram	0.90 Km/W	Upwind direction as Reference location

Source: Study Team

Exhibit 3.7.1 : Ambient Air Quality Monitoring Locations

Source: Google Earth Imagery

3.7.2 Frequency and Parameters for Monitoring

Ambient air quality monitoring has been carried out with a frequency of two 24 hourly samples per week at four locations. The baseline data of ambient air has been generated for the following parameters:

- Respirable Suspended Particulate Matter (RSPM) $PM_{2.5}$, PM_{10};
- Sulphur Dioxide (SO_2);
- Oxides of Nitrogen (NOx);
- Carbon Monoxide (CO).

3.7.3 Details of the Monitoring Locations

The monitoring locations represent the areas of maximum deposition, reference ambient air quality and locational characteristics.

3.7.4 Sampling and Analytical Technique

Techniques Used For Ambient Air Quality Monitoring

Parameters	Technique	Minimum Detectable Limit ($\mu g/m^3$)	Minimum Reportable Value ($\mu g/m^3$)
Particulate Matter (size less than 10µm) or PM_{10}	-Gravimetric -TOEM -Beta attenuation	1.0	10.0
Particulate Matter (size less than 2.5µm) or $PM_{2.5}$	-Gravimetric -TOEM -Beta attenuation	1.0	5.0
Sulphur Dioxide	-Improved West and Gaeke, -Ultraviolet fluorescence	0.04	3.0
Oxide of Nitrogen	-Modified Jacob & Hochheiser (No Arsenite) -Chemiluminescence	0.03	9.0
Carbon Monoxide (CO)	Sensor/ GC method	0.5 mg/ m^3	-

Source: Study Team

3.7.5 Presentation of Results

The summarized data for minimum, maximum, average of $PM_{2.5}$, PM_{10}, SO_2, NO_X and CO during the study period are presented in ***Table 3.7.2***. The National Ambient Air Quality Standards (NAAQS) is presented in ***Table 3.7.3***.

3.7.6 Observation Based on Monitoring Data

The observations based on the monitoring results presented in ***Table 3.7.2*** are summarized in the subsequent sub-sections.

Table 3.7.2: Summarised Ambient Air Quality Monitored Data- Pre-monsoon season

Parameter	Observed	AAQ1	AAQ2	AAQ3	AAQ4
PM_{10} ($\mu g/m^3$)	**NAAQS: 100**				
	Minimum	31	20	14	**7**
	Maximum	320	157	167	**141**
	Average	82	78	76	**74**
$PM_{2.5}$ ($\mu g/m^3$)	**NAAQS: 60**				
	Minimum	27	8	5	**2**
	Maximum	329	260	170	**150**
	Average	72	64	66	**65**
SO_2 ($\mu g/m^3$)	**NAAQS: 80**				
	Minimum	8	6	7	**6**
	Maximum	41	34	32	**28**
	Average	28	22	24	**18**

Parameter	Observed	AAQ1	AAQ2	AAQ3	AAQ4
NOx ($\mu g/m^3$)	NAAQS: 80				
	Minimum	29	21	8	**6**
	Maximum	173	79	54	**44**
	Average	40	34	41	**28**
CO (mg/m^3)	NAAQS: 4				
	Minimum	36	25	14	**12**
	Maximum	65	55	42	**24**
	Average	26	14	25	**8**

Source: Study Team

3.7.6.1 Particulate Matter ($PM_{2.5}$)

The statistical analysis of ambient air quality status in the study area revealed that the maximum concentration of $PM_{2.5}$ varied from 150 µg/m^3 to 329 µg/m^3 during pre-monsoon season. The minimum concentration ranged from 2 µg/m^3 to 27 µg/m^3. The average concentration of $PM_{2.5}$ varied from 64 to 72 µg/m^3 in the study period.

3.7.6.2 Particulate Matter (PM_{10})

The statistical analysis of ambient air quality status in the study area revealed that the maximum concentration of PM_{10} varied from 141 µg/m^3 to 320 µg/m^3 during pre-monsoon season. The minimum concentration ranged from 7 µg/m^3 to 31 µg/m^3. The average concentration of PM_{10} varied from 74 to 82 µg/m^3 in the study period.

3.7.6.3 Sulphur Dioxide (SO_2)

The statistical analysis of ambient air quality status in the study area revealed that the maximum concentration of SO_2 varied from 28 µg/m^3 to 41 µg/m^3 during pre-monsoon season. The minimum concentration ranged from 6 µg/m^3 to 8 µg/m^3. The average concentration of SO_2 varied from 18 to 28 µg/m^3 in the study period.

3.7.6.4 Oxide of Nitrogen (NOx)

The statistical analysis of ambient air quality status in the study area revealed that the maximum concentration of NOx varied from 44 µg/m^3 to 173 µg/m^3 during pre-monsoon season. The minimum concentration ranged from 6 µg/m^3 to 29 µg/m^3. The average concentration of NOx varied from 28 to 40 µg/m^3 in the study period.

3.7.6.5 Carbon Monoxide

The statistical analysis of ambient air quality status in the study area revealed that the maximum concentration of CO varied from 24 mg/m^3 to 65 mg/m^3 during pre-monsoon season. The minimum concentration ranged from 12 mg/m^3 to 36 mg/m^3. The average concentration of CO varied from 8 to 26 mg/m^3 in the study period.

3.7.6.6 Conclusions

On the basis of results presented in ***Table 3.7.2***, it can be concluded that the concentration of pollutants like RSPM ($PM_{2.5}$, PM_{10}) in ambient air in the study area crosses the permissible limit of NAAQS (***Refer Table 3.7.3***). The concentration of gaseous pollutants SO_2, NOx and

CO are well within the prescribed limits of NAAQS during the lock down period. However, the concentration of all the pollutants was well above the permissible limits.

Table 3.7.3: National Ambient Air Quality Standards

S. No.	Pollutants	Time Weighted Average	Concentration in Ambient Air		
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Govt.)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO_2), µg/m^3	Annual*	50	20	-Improved West and Gaek, -Ultraviolet fluorescence
		24 hours **	80	80	
2	Nitrogen Oxide (NO_2), µg/m^3	Annual*	40	30	-Modified Jacob & Hochheiser (No Arsenite) - Chemiluminescence
		24 hours **	80	80	
3	Particulate Matter (size less than 10µm) or PM_{10} µg/m^3	Annual*	60	60	-Gravimetric -TOEM -Beta attenuation
		24 hours **	100	100	
4	Particulate Matter (size less than 2.5µm) or $PM_{2.5}$ µg/m^3	Annual*	40	40	-Gravimetric -TOEM -Beta attenuation
		24 hours **	60	60	
		1 hour**	04	04	
5	CO mg/m^3	1 hour**	4	4	- Non Dispersive Infra-Red (NDIR) spectroscopy

Source: CPCB

** Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.*
*** 24 hourly or 8 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring*

Source:

The principal rules were published in the Gazette of India, Extraordinary vide number S.O 844 (E) dated the 19th November, 1986; and subsequently amended vide numbers S.O. 433 (E), dated the 18th April, 1987; G.S.R. 176 (E), dated the 2nd April 1996; and were recently amended vide numbers G. S.R. 97(E), dated the 18th February, 2009; G. S.R. 149(E), dated the 4th March 2009; G.S.R. 512(E), dated the 9th July 2009; G.S.R. 543(E) dated the 22nd July, 2009; G.S.R. 595 (E), dated the 21st August, 2009; and G.S.R. 794 (E), dated the 4th November, 2009.

3.8 AMBIENT NOISE

Ambient noise refers to the sound energy content of the natural system including any sound produced due to anthropogenic activities. Noise from any activity is expressed in terms of a "source-path-receiver" framework. The "source" generates noise levels that depend on the type of source and its operating characteristics. The "receiver" is the noise-sensitive land use (*e.g.*, residence, hospital, or school) exposed to noise from the source. In between the source and the receiver is the "path," where the noise is reduced by distance, intervening buildings, and topography. Noise criteria are established for the various types of receivers because not all receivers have the same noise sensitivity.

During environmental assessment, preliminary survey was undertaken to identify the major noise generating sources in the area. The noise levels at different noise generating sources has been measured based on the commercial and residential activities, traffic and noise at sensitive areas as per the Gazette Notification dated 14.02.2000 of MoEFCC and The Noise Pollution (Regulation and Control) (Amendment) Rules 2010 on Ambient Noise Standards. Ambient noise measurement was conducted in March 2020 to establish baseline ambient noise to identify areas with existing high noise levels and areas that are expected to experience higher noise levels on account of construction and operation of the project. The information will be assisting in designing appropriate and adequate mitigation measures and allocate resources judiciously.

In the present study, Sound Pressure Level (SPL) was measured by a sound level meter (Integrating Sound Level Meter Cygnet, Model 2031A). Since loudness of sound is important by its effects on people, the dependence of loudness upon frequency must be taken into account in environmental noise assessment. This has been achieved by the use of A-weighting filters in the noise measuring instrument which gives a direct reading of approximate loudness.

3.8.1 Selection of Measurement Locations

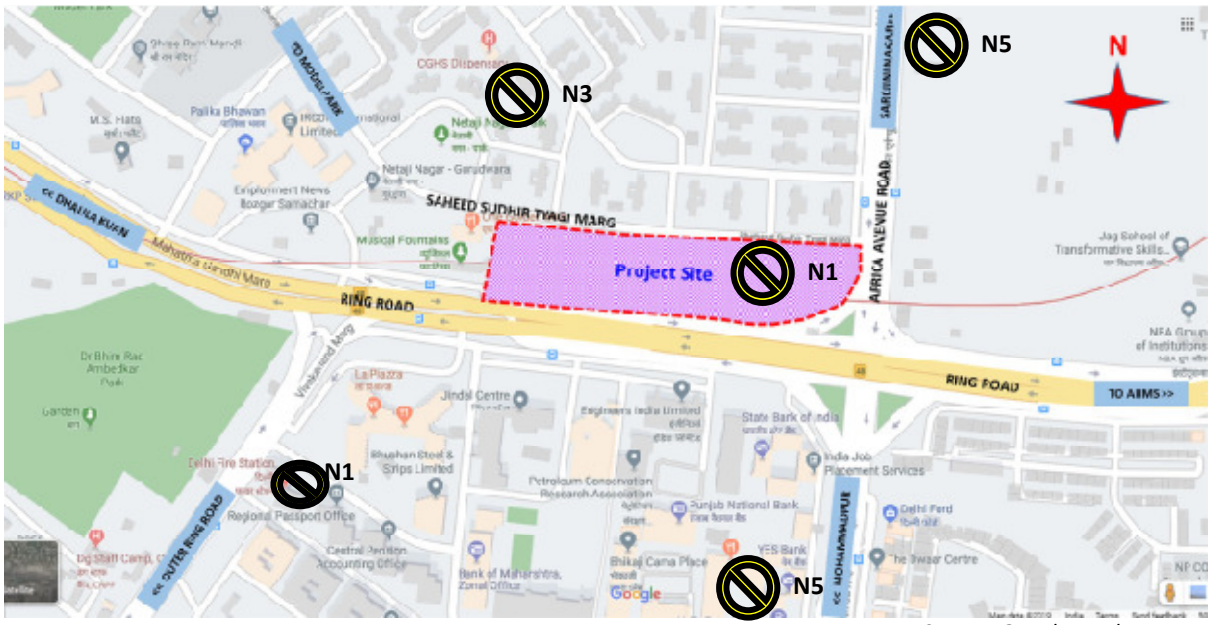
The ambient noise level was measured at five locations in the study area in the month of March 2020 (10/03/2020- 15/03/2020) in the pre-lockdown period. The sampling locations for the noise measurement were selected keeping in view of the existing industrial, commercial, residential and sensitive areas like hospitals, schools *etc.* The noise measurement locations are presented in ***Table 3.8.1*** and shown in ***Exhibit. 3.8.1***.

Table 3.8.1: Noise Measurement Locations in the Study Area

Location Code	Location	Distance w.r.t Project Site (Km)	Description
N1	Project Site	0.0	Commercial Area
N2	Fire Station, Bhikaji Cama Place	0.70	Commercial
N3	Netaji Nagar, B Block	0.38	Residential
N4	Church-Rama Colony	0.86	Church, Sensitive Receptor
N5	Sulekha Vihar	0.25	Residential

Source: Study Team

Exhibit 3.8.1: Noise Measurement Locations



Source: Google Earth Imagery

3.8.2 Parameters Measured

The important parameters measured are L_{eq}, L_{day}, and L_{night}.

L_{eq}: Noise monitoring equipments have the facility for measurement of L_{eq} directly. However, L_{eq} can also be calculated using the following equation:

$$L_{eq\,(hrly)} = L_{50} + (L_{10} - L_{90})^2/60$$

Where,

L_{10} (Ten Percentile Exceeding Level) is the level of sound, which exceeds 10% of the total time of measurement.

L_{50} (Fifty Percentile Exceeding Level) is the level of sound, which exceeds 50% of the total time of measurement.

L_{90} (Ninety Percentile Exceeding Level) is the level of sound, which exceeds 90% of the total time of measurement.

L_{day}: This represents L_{eq} of daytime. L_{day} is calculated as Logarithmic average using the hourly L_{eq}'s for day time hours from 6.00 A.M to 10.00 P.M

L_{night}: This represents L_{eq} of nighttime. L_{night} is calculated as Logarithmic average using the hourly

L_{eq}'s for nighttime hours from 10.00 PM to 6.00 A.M.

3.8.3 Method of Measurement

Ambient noise level measurement was carried out continuously for 24-hours outside the plant premises. During each hour, parameters like L_{10}, L_{50}, L_{90} and Leq were directly computed by the instrument based on the Sound Pressure Levels (SPL). Measurement was carried out at 'A' weighting and in fast response mode.

3.8.4 Results and Discussion

Perusal of the measured values (***Refer Table 3.8.2***) shows that the overall L_{eq} value varied between 57.8 dB(A) to 70.8 dB(A) among all locations. L_{Day} and L_{Night} value varied between 52.1 dB(A) to 67.8 dB(A) and 49.6 dB(A) to 61.2 dB(A) respectively. The highest L_{eq} value 70.8 dB(A) was recorded at Project site due to proximity of plying vehicles and running of various equipment while the lowest L_{eq} 54.7 dB(A) was recorded at Sulekha Vihar. The highest L_{Day} 67.8 dB(A) was recorded again at project site again and the lowest value of L_{Day} 52.1 dB(A) at Sulekha Vihar. The existing ambient noise levels were higher than prescribed standards at multiple locations.

Table 3.8.2: Ambient Noise Levels around the Project Site

CPCB Standards *dB(A)*		Location	*Values in dB(A)*					
			24-Hourly				Day Time	Night Time
Day	Night		L_{10}	L_{50}	L_{90}	L_{eq}	L_{day}	L_{night}
65	55	N1-Project Site- Commercial	74.3	66.4	59.4	70.8	67.8	61.2
65	55	N2-Fire Station-Commercial	65.3	60.4	57.8	61.5	59.4	52.4
55	45	N3-Netaji Nagar-Residential	62.3	59.8	56.7	60.4	56.8	51.7
50	40	N4-Church-Silent	62.1	59.2	57.9	59.5	55.1	50.8
55	45	N5-Sulekha Vihar-Residential	60.2	57.2	54.7	57.8	52.1	49.6

Source: Study Team

3.8.5 Ambient Noise Standards

The Ambient Air Quality Standards with respect to Noise have been stipulated by Government of India vide Gazette Notification dated 14.2.2000 and The Noise Pollution (Regulation and Control) (Amendment) Rules 2010 and given in ***Table 3.8.3***.

Table 3.8.3: Ambient Air Quality Standards with Respect to Noise*

Area Code	Category of Area	Limits in dB(A), L_{eq}	
		** Day time	#Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone @	50	40

Source: CPCB

* *Environment (Protection) Third Amendment Rules, 2000. Gazette Notification Government of India dated 14.2.2000 and The Noise Pollution (Regulation and Control) (Amendment) Rules 2010.*

** *Day Time: 6.00 AM to 10.00 PM*

\# *Night Time: 10.00 PM to 6.00 A.M*

@ *Silence zone is defined as an area up to 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent authority; Use of vehicular horns, loudspeakers and bursting of crackers shall be banned in these zones.*

3.9 ECOSYSTEM

In this section, we have concentrated only on the terrestrial ecosystem in view of the magnitude and intensity of the project. There is no natural water body around 500-m of the project site. Moreover, there would not be any liquid discharge to the only surface water source of Delhi, *i.e.* Yamuna River, which is far off from the project site (about 8.50 km).

3.9.1 Terrestrial Ecosystem

The floristic and faunal description of the study area is based on field survey and secondary data collected from the Forest Department, Govt. of NCT of Delhi. Delhi has 111 Sq. Km of forest cover and 40 Sq. Km. of tree cover against the geographical area of 1483 Sq. Km, representing 10.2% of total land area of the city. The green cover is not uniformly distributed in Delhi as some parts have considerable greenery than the others. The New Delhi and South Districts are much greener compared to other Districts.

As a consequence of urbanization, much of the naturally existing vegetation has been cleared over the years. The city level forests, the Ridge, the protected and reserved forests have surviving pockets of natural vegetation in Delhi. The other open spaces are an admixture of indigenous and exotic species project.

Vegetation of Delhi is typical Northern Tropical Thorn Forest Type (Champion & Seth 1968). Among trees, species of Acacia such as *A. nilotica*, *A. leucophloea*, *A. catechu*, *A. modesta*, *Butea monosperma* (Dhak), *Cassia fistula* (Amaltas), *Salvadora persica*. Good patches of *Anogeissus latifolia* and abundance of *Prosopis juliflora* are observed.

Among the city's residential area, the ones in the area are amply dotted with trees and shrubs. The area is covered by roadside plantations, private and public gardens as well as plantations done by the institutions and housing colonies.

The shrubs include *Capparis sepiaria*, *C.decidua*, *Zizyphus aenoplia*, *Croton sparsiflorus*. Herbaceous flora includes *Calotropis procera*, *Withania somnifera*, *Achyranthes aspera*, *Tridax spp.*, *Alysicarpus vaginalis*, *Peristrophe bicalyculata*. Main grasses are *Cenchrus ciliaris*, *Aristida spp.*, *Eragrostis poaeioides*, *Saccharum spontaneum*.

Project Site

As far as project site is concerned, it is devoid of plantation. Only peripheral hedges and ornamental plants are there. The project area is not part of the scheduled forest (Reserved/Protected Forest).

3.9.2 Flora

The vegetation in the study area comprises of stunted, medium-sized trees and shrubs which are more or less widely spaced and do not form a continuous canopy-a characteristic of semi-desert scrub.

The field investigation shows the dominance of members of *Dalbergia sissoo, Mangifera indica, Butea monosperma, Ficus racemosa, Cynodon dactylon, Acacia catechu* and *Acacia nilotica, Azadirachta indica* are commonly observed. Grasses like *Adhatoda spp.,*

Bougainvillea spp. within the study area. The lists of tree species observed in the study area are given in ***Table 3.9.1.***

Mainly three types of ecosystem exist in study area:

1) Agro Ecosystem

The main crops were rice, wheat, millet, maize and sugarcane. Vegetables are grown in small patches. The major agricultural crops are Mustard (*Brassica juncea*), wheat (*Triticum aestivum*), maize (*Zea mays*), rice (*Oryza sativa*), and millets (*Sorghum vulgare*). A number of leguminous crops were grown for crop rotation purpose such as moong (*Phaseolus mungo*), masoor (*Lens culnaris*), Arhar (*Cajanus cajan*), Gram (*Cicer arietinum*), and pea (*Pisum sativum*).

2) **Grassland Ecosystem**

Mostly covered by Congress grass and doob. List of shrubs/grass species are given in ***Table 3.9.2.***

3) Groves

The presence of groves in the study area has been noticed. These groves are mainly of *Psidium guava*, *Citrus auvaulium*, *Mangnifera indica*. The trees grown under social forestry mainly consists of *Mangifera indica*, *Terminilia catapa*, *Citrus auvaulium, Pisidium guava* and other local species of economic importance.

Manmade Plantation Ecosystem

This has been developed by the Forest Department and industries. Babul, Neem, Shisham, Jamun, were the main species, planted under afforestation programmes.

Table 3.9.1: Common Tree Species observed in the Study Area

Scientific Name	Common Name
Acacia nilotica	Babool
Acacia catechu	Khair
Azadirachta indica	Neem
Cassia fistula	Amaltas
Cassia tora	Panwar
Eugenia jambolana	Jamun
Ficus religiosa	Peepal
Bauhinia purpurea	Kachnar
Albizzia lebbeck	Siris
Morus alba	Shahtoot
Salmalia malbarica	Silk Cotton
Eucalyptus globulus	Eucalyptus
Dalbergia sissoo	Shisham (Indian Rosewood)
Aegle marmalos	Bel
Butea monosperma	Dhak
Mangifera indica	Mango

Source: Study Team

Table 3.9.2: Shrubs and Grasses observed in the Study Area

Scientific Name	Common Name
Abutilon indicum	Pathaka
Achyranthes aspera	Puthkanda
Argemone mexicana	Mexican prickly poppy
Calotropis procera	Aak
Bouigainvillea spp.	Bougainvillea
Capparis sepiaria	Hedge Caper bush
Capparis decidua	Karir
Croton sparsiflorus	Garden croton
Cynodon dactylon	Doob
Chenopodium album	Bathu
Launaea nudicaulis	Bold leaf Launaea
Madhuca latifolia	Mahua
Nerium odorum	Kaner
Parthenium hysterophorus	Congress Grass
Ricinus communis	Castor
Tamarix dioica	Saltcedar
Tridax procumbens	Coat button

Source: Study Team

3.9.3 Fauna

This section describes the terrestrial fauna including domestic animals. The description is based on the field investigation and literature review. There is no unique faunal community within the study area, except most common ones like toad, frog, crow, sparrow and myna *etc.*

3.9.3.1 Domestic Animals

There is a reasonable cattle population comprising of buffalo, cow, goat, besides domestic fowls. The list of domestic animals reported in the study area are given in ***Table 3.9.3.***

Table 3.9.3: Domestic animals observed in the Study Area

Zoological Name	Common Name
Bos indicus	Cow
Bubalus indicus	Buffalo
Canis familiaris	Dog
Capra hircus	Goat
Equus caballus	Horse
Equus hermionus	Ass
Felis domesticus	Cat
Sus cristatus	Pig
Presdystis entellus	Monkey

Source: Literature Review

3.9.3.2 Reptiles and Amphibia

The reptiles and amphibians reported based on the literature review are presented in ***Table 3.9.4*** and ***Table 3.9.5.***

Table 3.9.4: Reptiles reported in the Study Area

S. No.	Common Name	Scientific Name
Rodents		
1	Mouse	*Mus muscatus*
2	House Rat	*Rattus rattus*
3	Bandicoot rat	*Bandicota indica*
4	Indian Palm Squirrel	*Funambulus pennanti*
Snakes		
1	Rat snake	*Ptyas mucosus*
2	Dhanda	*Xensch rophis piscator*
3	Checkeered keel back	*Natrix piscator*
4	Banded krait	*Bungarus fasiatus*
Lizards		
1	Brook's House Gecko	*Homidactylus brookii*
2	Indian chameleon	*Chameleon zeylanicus*
3	Garden geeko	*Calotes versicolor*
4	Rock geeko	*Hemidactylus maculates*
5	House lizard	*Hemidactylus flaviviridis*

Source: Literature Review

Table 3.9.5: Amphibians reported in the Area

Frog		
S. No.	**English Name**	**Scientific Name**
1	Toad	*Bufo melanostidus*
2	Frog	*Rana tigrina*
3	Tree Frog	*Rhacophorus bimaculatus*
Tortoise		
1	Land tortoise	*Trionyux gangeticus*

Source: Literature Review

3.9.3.3 Avian Fauna

The avian fauna reported based on the literature review in the study area are listed in ***Table 3.9.6***.

Table 3.9.6: Avian Fauna reported in the Study Area

Sl.No.	Common Name	Scientific Name	WPA Schedule
1.	Rose-ringed Parakeet	*Psittacula krameri*	IV
2.	House Crow	*Corvus splendens*	V
3.	Large-billed Crow	*Corvus macrorhynchos*	IV
4.	Rufous Treepie	*Dendrocitta vagabunda*	IV
5.	Common Myna	*Acridotheres tristis*	IV
6.	Asian Pied Starling	*Sturnus contra*	IV
7.	Indian Grey Hornbill	*Ocycerus birostris*	IV
8.	Red-vented Bulbul	*Pycnonotus cafer*	IV
9.	Red-Whiskered Bulbul,	*Pycnonotus jocosus*	IV
10.	Rock Pigeon	*Columba livia*	IV
11.	Yellow-footed Green Pigeon	*Treron phoenicoptera*	IV

Sl.No.	Common Name	Scientific Name	WPA Schedule
12.	Eurasian Collared Dove	*Streptopelia decaocto*	IV
13.	Laughing Dove	*Streptopelia senegalensis*	IV
14.	Asian Koel	*Eudynamys scolopacea*	IV
15.	Lineated Barbet	*Megalaina lineate*	IV
16.	Coppersmith Barbet	*Megalaima haemacephala*	IV
17.	Grey Partridge	*Francolinus pondicerianus*	IV
18.	Red-wattled Lapwing	*Vanellus indicus*	IV
19.	Oriental Honey Buzzard	*Pernis ptilorhynchus*	IV
20.	Black Kite	*Milvus migrans*	IV
21.	Red-throated Flycatcher	*Ficedula parva*	IV
22.	Oriental Magpie Robin	*Copsychus saularis*	IV
23.	Indian Robin	*Saxicoloides fulicata*	IV
24.	Ashy Prinia	*Prinia socialis*	IV
25.	Plain Prinia	*Prinia inornata*	IV
26.	Grey-breasted Prinia	*Prinia hodgsonii*	IV
27.	Tailor Bird	*Orthotomus sutorius*	IV
28.	Jungle Babbler	*Turdoides striatus*	IV
29.	Oriental White-eye	*Zosterops palpebrosus*	IV
30.	Purple Sunbird	*Nectarinia asiatica*	IV
31.	House Sparrow	*Passer domesticus*	IV
32.	Peacock	*Pavo*	I

Source: Literature Review

3.9.3.4 Endangered Species

None of the plant species recorded is endangered in the study area. However, some of the animal species recorded were endangered as per the Red Data Book and Schedule I of Indian Wildlife (Protection) Act 1972.

3.9.3.5 Eco Sensitive Zone-Protected Areas

There is no any notified Eco Sensitive Area (ESA) within 10-Km radius of the study area. However, in NCT region there are two prominent wildlife Sanctuaries.

1) The Asola Wildlife Sanctuary, Delhi is located at a distance of 10.12-Km in Southeast direction
2) The Okhala Bird Sanctuary, Noida, (UP), is located at a distance of 12.90 km in the Southeast.

3.9.3.6 Forests

The allocated land parcel does not involve the scheduled forest (Reserved/Protected Forest).

3.10 SOCIO-ECONOMIC PROFILE OF THE STUDY AREA (ZONE OF INFLUENCE)

This section presents the socio-economic profile of the study area with respect to indicators like -population trends, sex ratio, occupational pattern *etc.*, The socio-economic data used in the section are derived from various sources, including the published data of Census of India, District Census Handbook, electronic media and published reports/journals.

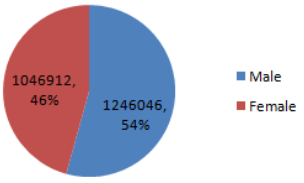
1) Study Area

Demography and socio-economic features include population, number of houses and households, literacy, population density *etc.* The project site falls in the South West District of Delhi. However, the study area (10-km radius) falls under South, South-west, East districts, Central and New Delhi of Delhi and NCR. As per the census records, the study area is predominantly urban in character.

In order to assess the demographic features of the study area, census records (Census Handbook of 2011-Primary Abstract) of Delhi for the year 2011 have been compiled and analyzed with respect to demographic profile, community structure, educational facilities, occupational structure and infrastructure facilities.

2) Population

As per Census 2011, the total population of the Project district in 2292958 comprising of urban (2149282) and rural 143676. The male population recorded as 1246046 and the female population stood at 1046912. This district has recorded a decadal growth of 30.6 percent in totality, -36.3 percent in rural and 40.5 percent in urban areas. In this district, 93.7 percent population resides in urban areas.



3) Sex Ratio

The sex ratio of this district (840) has fallen below by 28 points than the State sex ratio (868).In this district, the highest sex ratio in recorded in Najafgarh tahsil (872) followed by Vasant Vihar tahsil (802) and ,the lowest one is recorded in Delhi Cantonment tahsil (783).

4) Scheduled Caste Population

In this district, the proportion of Scheduled Castes population recorded in rural areas is 17.14 percent and 13.67 percent is in urban areas. In the urban areas the highest proportion (18.83 percent) of SC population is recorded in Delhi Cantonment Tahsil and the lowest (12.03 percent) is recorded in Najafgarh Tahsil. Najafgarh is the only Tahsil which constitutes the rural area and that has recorded 17.14 percent of Scheduled Caste population. In Delhi, no Scheduled Tribe has been notified. The population of scheduled Caste in the District stood at 318408 contributing 13.90 % of the total population.

5) Literacy Rate

In this district, the overall literacy rate for males and females are 93.14 and 82.5 respectively. The total population of the male literate recorded as 1025261 against of female as 762428. Both male and female literacy rates are higher in urban areas than that of the

rural areas. Tahsilwise, the highest male literacy rate is recorded in Najafgarh Tahsil (93.78) and the lowest is in Delhi Cantonment Tahsil (91.75). As far as female literacy rate is concerned, Vasant Vihar Tahsil has recorded the highest (82.94) and Delhi Cantonment Tahsil has recorded the lowest (82.28). Najafgarh Tahsil has recorded the literacy rate of 84.95 in rural areas. The gap in male-female literacy rate indicates that females are lagging behind males in the rural and urban areas. In urban areas of the tahsils, again Najafgarh tahsil has recorded the highest literacy rate of 88.84 and lowest is recorded in Delhi Cantonment tahsil (87.62).

6) Workers Participation/Occupational Pattern

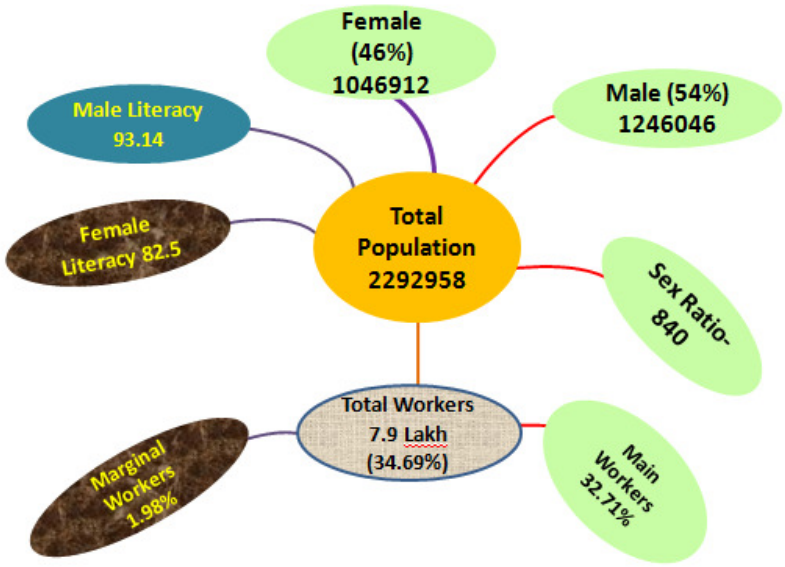
In the District about 7.9 lakh, out of the total population of 22.92 lakh, are reported as Workers and they constitute 34.69 percent of the total population. Of this, 32.71 percent is Main Workers and 1.98 percent is Marginal Workers. In the three tahsils of the district, the highest proportion of male workers is recorded in Delhi Cantonment Tahsil (58.01 percent) and the lowest is recorded in Najafgarh Tahsil (50.79 percent). Najafgarh Tahsil has also recorded the lowest percentage of female workers (9.73 percent). The highest proportion of female workers is recorded in Vasant Vihar Tahsil (16.78 percent). The percentage of Non-workers in the three tahsils ranges between 60.67 (Vasant ViharTahsil) and 68.34 (Najafgarh Tahsil).

7) Basic Amenities

Out of the 39 inhabited villages in the district, Drinking Water facility, Telephone, Transport Communication, Approach by pucca road and Power Supply amenities are available to all the 39villages (100 percent) . Education facility is available to 38 villages (97.44 percent). Medical and Post Office facilities are available to 19 villages (48.72 percent) and 20 villages (51.28 percent) respectively. Bank facility is available to only 6 villages (15.38 percent). Agricultural Credit Society facility is not available to any of the villages.

The demography profile of the project t district is presented in ***Exhibit 3.10.1.***

Exhibit 3.10.1: Demographic Profile of the Project District



Source: Study Team

Chapter 4

Anticipated Environmental Impacts and Mitigation Measures

Chapter 4
Anticipated Environmental Impacts and Mitigation Measures

4.0 INTRODUCTION

DMRC shall establish the proposed PD project on the land allotted by the Ministry of Housing and Urban Affairs (MoHUA), Government of India. The project site is surrounded by the commercial hub and densely populated residential area. Therefore, it is evident that the proposed project will have certain adverse impacts across these receptors.

While most impacts (related to construction phase) are common in and around the project area and easily and commonly mitigated, some impacts are expected to be irreversible and long term. Such impacts need to be carefully assessed and suitable mitigation measures be put in place.

The proposed project is also expected to influence major positive impacts and benefits such as improvement in commercial activities, generation of employment and promote entrepreneurship.

The subsequent sections in this chapter deal with the assessment and anticipation of impacts due to the project on the natural, biological environment and socio and cultural environment as well as recommend mitigation measures and interventions in the construction stages and the operation stages. The Chapter 9, assimilates the various mitigation interventions in to a management plan and environmental monitoring program.

Evaluation and prediction of impacts is the most important step of an environmental impact assessment. Superimposing predicted impacts over baseline environmental scenario provides an understanding of the resulting environmental impact scenarios. In the present study baseline environmental scenario was established through baseline data generated over the period of March-May 2020 (pre-monsoon season) and supplemented by the secondary data collected through various media.

Quantification of impact assessment in terms of measurable units would be the ideal case. However, due to lack of information/data, uncertainties involved and complex inter-relationships between various attributes of the environment, it is not always practically possible to do so. In such cases, only qualitative predictions have been made based on rationale, experience elsewhere and reasonable judgment.

Adequacy of proposed mitigation measures suggested in environmental management plan has been evaluated against predicted environmental impacts and various standards notified by

MoEFCC under the Environment Protection Act, 1986 and other relevant standards/criteria published by Bureau of Indian Standards as well as other National and International agencies.

As a first step, the proposed project has been divided into a number of smaller sub-activities, for construction and operation phases. The probable potential impacts of each of these activities on various sectors of environment (such as air, water, noise, soil, biota, socio-economic, topography, geology, climate change, ecology both flora and fauna, *etc.*) have been identified and listed. Table 4.0.0(a) lists various activities of construction phase and their probable impacts on various components of environment. The impacts further have been classified as long-term impacts and short-term impacts. Most of these impacts are envisaged to be short term impacts, confined to the construction period only. Mitigation measures for significant impacts are discussed in respective sections.

Table 4.0.0(a): Identification of Construction Activities and Probable Impacts

Construction Activities	Environmental Attributes	Potential Impacts
A) Long Term Impacts		
Land	Topography	• Permanent change in the local topography of the area
	Landscape	• New landscape will be created due to coming up of 4-storeys tower
		• Permanent change in land use
Basement	Geology & Hydrology	• Void shall be created due to construction of basement • Excavated soil debris from the tunnel will need to be disposed
B) Short Term Impacts		
Site clearing and Leveling (cutting, stripping, excavation, earth movement, compaction)	Air	• Fugitive Dust (PM_{10} and $PM_{2.5}$) Emissions causing health concerns to local community and workers • Air Emissions from construction equipment & machinery and backup power generation, causing health concerns to local community and workers
	Water	• Domestic effluent discharge from the labour camp and construction camp
	Groundwater	• Seepage of wastewater from the project site into the groundwater table
	Soil	• Loss of fertile top soil • High concentration of heavy metals in some areas
	Ecology	• Loss of vegetation cover • Topographic Transformations

Construction Activities	Environmental Attributes	Potential Impacts
	Noise & Vibration	• Increase in noise levels due to running of construction equipment • Noise propagation due to plying of heavy construction vehicles at the sites
	Climate Change	• Due to loss of vegetation cover (tree felling) there may be a temporary / short term rise in the local ambient temperature
Transportation and Storage of Construction Material/ Equipment	Air	• Gaseous emissions from construction vehicles particularly on unpaved access roads • Fugitive Dust Emissions due to Traffic Movement • Fugitive emissions arising out of construction materials (cement, paints and varnishes)
	Water	• Spillage of construction material and flow into streams particularly during the monsoon months • Run-off from Storage areas of Construction Material
	Soil	• Deposition of spilled construction material on soil
	Public Utilities	• Increased traffic volume and density • Congestion on roads
	Climate Change	• Due to excessive emission from the construction vehicle, there may be increase in the concentration of CO and CO_2 (GHGs) however it is not expected to impact local climate significantly
Civil Construction Activities	Air	• Gaseous Emissions from Construction Machinery • Fugitive Dust (PM_{10} and $PM_{2.5}$) Emissions due to Movement of Traffic on the unpaved way • Fugitive dust (PM_{10} and $PM_{2.5}$) emission from the batching, mixing and concreting plant
	Water	• Run-off from Construction Areas during curing and also from the storage area of the construction materials
	Groundwater	• Seepage of wastewater from the project site into the groundwater table
	Noise	• High noise emitting from the construction equipment • Noise generated from the running of heavy vehicles deployed in the construction activities
	Vibration	• Running of heavy construction equipment
Mechanical and Electrical Works	Air	• Air emissions from running of construction machineries due to fuel
	Water	• Run-off from erection areas containing spent oils, Paints

Construction Activities	Environmental Attributes	Potential Impacts
	Vibration	• Induced vibration may be experienced due to erection activities • Running of heavy mechanical and electrical equipment
Influx of Labour & Construction of Temporary Houses/Camps	Socio-economic	• Stress on infrastructure • Stress on social relations • Social conflict due to inflow of workforce
	Land	• Change in land use pattern of the area due to coming up of labour camps
	Water	• Sanitary effluents from labour colonies/camps
Transportation and Disposal of Construction & Demolition Waste	Air	• Noise and Air Emissions from Transport Vehicles • Fugitive Dust Emissions due to Movement of Traffic on the unpaved access roads • Spillage and fugitive emissions during handling of C&D waste • Fugitive emission from the pile of C&D waste
	Water	• Spillage/ spread of debris material and flow into streams • Run-off from Disposal Areas • Leaching effect from the debris disposal area
	Soil	• Spillage/ spread/ deposition of debris • Conversion of land into waste land

Source: Study Team

Table 4.0.0(b) lists various activities of operation and maintenance phase and their probable impacts on various components of environment. Most of these impacts are long term impacts. However, the significance of most of these impacts is envisaged to be moderate, as discussed in the following sections.

Table 4.0.0(b): Identification of Operation and Maintenance Activities and Potential Impacts

Operation and Maintenance Activities	Sector	Potential Impacts
Commencement of Business Activities at the PD Complex	Air	• None
	Water	• Discharge of untreated sanitary effluents from the PD Building into local sewers • Spillage of spent oils • Increased water demand • Scarcity of water to the competing users
	Public Utilities	• Increased traffic volume and density • Additional load on the public storm water drain network
	Noise	• Generation of noise due to running of DG sets in case of power failure

Operation and Maintenance Activities	Sector	Potential Impacts
	Ecosystem	• None
	Climate Change	• Green House Gas (GHG) emission from the air conditioning system • The outside temperature around the building
Consumption of Water	Water	• Reduced availability to competing users
	Ecology	• None
Maintenance (Cleaning, Oil Change, Lubrication *etc.*) of DG Sets	Water	• Generation of effluents containing oil/ chemicals from the Maintenance activities in the DG Room
	Hazardous Waste	• Generation of hazardous waste from the maintenance
Domestic Use of Water	Water	• Generation of sewage

Source: Study Team

4.1 PHYSICAL CHANGE

4.1.1 Impacts- Construction Phase

This impact is unavoidable as the land partial on which the proposed PD project will be constructed has to be cleared of all vegetation, but damage to land adjoining it due to dumping of spoils from cuts and excavation, can with a little care, be minimized.

During the construction period, the project envisages requirement of labour camp which shall be established on the adjoining land. The land on temporary basis shall be required for material stock yard, *etc*. Such lands will need to be rehabilitated post-construction phase.

The locations where the proposed PD building shall be constructed, will bring permanent change in the physiographic and land use of the area.

4.1.2 Mitigation Measures

- Before start of construction activities, all suitable disposal sites should be identified for solid waste and any other form of waste likely to be generated from the construction activities.
- A designated solid waste disposal site should be secured away from human settlements. In addition, a disposal site should be away from water streams and any archaeological and historical monuments. Generally barren lands are preferable for this purpose.
- No dumping should be carried out on private property without written consent of the owner.
- No dumping should be allowed on wetlands, forest areas, and other ecologically sensitive areas.
- Prepare and implement a hazardous waste management plan for the disposal of waste oil, batteries and other hazardous materials.

- All areas designated for the storage of fuels, oils, chemicals or other hazardous liquids should have a dense base and be surrounded by a bund to contain any spillage. These areas should be covered by a roof structure to minimize the potential for infiltration and contamination of rainwater.
- Areas designed for the storage of hazardous materials are to be clearly designated and storage of such materials outside these areas strictly prohibited.
- Chip and mulch vegetation cleared and reuse it as an organic base for re-vegetation; ensuring that materials, which may cause land/water contamination or create odor problems, are not disposed of on the site.
- Ensure that there is the adequate provision of correctly marked waste containers made available at convenient locations for the disposal of wastes.

4.2 LAND USE/LAND COVER

4.2.1 Impacts – Construction Phase

The proposed project is to be developed in an area of 6109 sq. m. The project site has been categorized as commercial area as per Delhi Master Plan 2021. The project will involve construction of roads, green areas, open spaces, *etc*. With these upcoming structures, it is expected that the land use pattern of the area will be enhanced without compromising on the socio-economic status of the local people. The site is located in an urban landscape. The development of the project will lead to a positive change in aesthetics and visual appeal of the region.

Change in Topography: The proposed project site is having flat topography with elevation of 224 m AMSL. During the construction phase, due to earth work, foundation, development of drains, etc. an inevitable change in the topography is envisaged.

4.2.2 Impacts – Operation Phase

The change in the land use/land cover would have already been taken place in the construction phase. Hence, no further change in the land use of the project site is envisaged.

4.2.3 Mitigation Measures

- Cutting and filling operations will be limited, only as and when necessary;
- During excavation works, the topsoil will be preserved in stockpiles. At such locations, the depth of borrow pits shall not exceed 45 cm and it may be dug out to a depth of not more than 30 cm after stripping the 15 cm top soil aside;
- The movement and parking of heavy machinery and other vehicles will be restricted to identified routes; thereby limiting the possibility of compaction.
- An attempt should be made to preserve, establish and promote a vegetative cover, appropriate to the site prior to the onset of intense rain or windstorms.
- Good housekeeping at labour camps and the construction area will ensure the aesthetics of the area.
- All debris and excavation material will be stored securely and removed within a stipulated period.

- Proper routing and adequate capacity of the storm water run-offs drains/garland drains with catch pits will be provided at the construction areas to collect the construction waste water/runoff.

4.3 AMBIENT AIR QUALITY

4.3.1 Impacts – Construction Phase

During the construction phase, the impact on ambient air quality is envisaged due to fugitive dust emission coming out of the construction site. However, this impact would be of temporary nature and will be localized.

- The earthmoving and construction activities are likely to generate dust.
- In the majority of cases, dust generation would only be a temporary impact. In the event that dust from the construction activities is being deposited on the nearby settlement then the mitigation measures are to be adopted as early as possible.
- Emissions from vehicles and machinery could also impact quality of air in and around construction sites.
- Fugitive dust emission from the plying of construction equipment and vehicles on the unpaved way.
- Continuous gaseous emission from the running of DG sets at the construction camp.

Mitigation Measures

- Maintain all construction vehicles to minimize vehicle emissions.
- Payload area of the trucks or dumpers should be covered by tarpaulin when transporting soil and crush in order to prevent fall out of fines and emissions of dust.
- The material carrying trucks or dumpers will carry on the haulage corridors provided for the transport.
- Spray water on the stones while unloading from the truck/dumper, at the primary crusher feeder chute and the transfer points from one belt conveyor to another, *etc*.
- Facility for regular cleaning and wetting of the unpaved roads and exposed soil on construction sites should be provided in dry weather.
- Concrete batching plant or other machinery liable to generate dust should be kept away at safer distance from residential areas and should not be in predominant upwind direction of these areas.
- Ensure that all major construction machineries including batching plant placed on construction sites are inbuilt with appropriate dust reduction measures.
- The water sprinkling of trucks used, as construction vehicles, should be properly and regularly undertaken, so that dust deposition problem on vegetation is minimized.
- The haul freight corridors inside the quarry should be properly watered to arrest the dust arising out of it.
- Conduct periodic monitoring of ambient air quality as per NAAQS, 2009 and submit reports to local State Pollution Control Boards.

4.3.2 Operation Phase

No major adverse impact on air quality is envisaged in the operation phase as it will be a tower and no source of air pollution. The only adverse impact on air quality is envisaged in the form of gaseous and particulate emission from DG set.

The only mitigation measure required for mitigating the impact is to provide adequate height of the stack of DG set to have wider dispersion of the gaseous emission and also to attain the mixing height.

4.4 NOISE

4.4.1 Impacts – Construction Phase

Noise assessment is a key element of the environmental impact assessment process. Experience has shown that regular high noise and vibration can cause sleep disorder to the surround population. Deployment of construction machinery in the area during the construction phase of the project will adversely affect the noise level of the surrounding for quite some time. However, this will be temporarily in nature.

Construction Noise

The project is expected to have large scale construction activities, mostly mechanized, related to foundations, RCC structures, road construction *etc*. The major noise generating sources envisaged during construction phase are given in Table 4.4.1.

Table 4.4.1: Typical Noise Sources during Construction Phase

Description	Noise Levels in dB(A)
Earth Movers	
Dozers	95-100
Front Loaders	72-84
Backhoes	72-93
Tractors	76-96
Tippers/Trucks	82-94
Material Handlers	
Concrete mixers	75-83
Concrete pumps	81-83
Cranes (movable)	75-86
Vehicular Traffic (Construction material & plant machinery)	85-98
Stationary Equipment	
DG Sets	90-95
Pumps	69-71
Compressors	74-86
Impact Based Equipment	
Pneumatic Wrenches	83-88

Description	Noise Levels in dB(A)
Jack hammer and rock drills	81-98
Pile drivers (peak)	95-105

Source: FRA

The noise generation during construction activities would be considerable. The impacts during construction phase are temporary and would be marginal on the surrounding communities.

4.4.2 MITIGATION MEASURES

- The construction areas shall be provided with sheet barriers or temporary walls along the boundary close to any habitations;
- Rubber padding shall be provided in the construction machinery for vibration control; No noise generating activity shall be permitted from 22:00P.M-6:00 AM.
- The contractors will adopt measures such as regular maintenance of its vehicles and repair of its equipment/machinery.
- Notify the local people prior to undertake the construction activities associating with higher noise level.
- Machinery and vehicles should be maintained regularly, with particular attention to silencers and mufflers, to keep construction noise levels to minimum.
- The construction yards should be located away from the settlement areas. Where a construction yard is unavoidably located at the residential areas and sensitive receptors, the time of the construction activities should be limited.
- Protection devices (ear plugs or ear muffs) should be provided to the workers operating in the vicinity of high noise generating machines.
- Avoid nighttime construction.
- Locate stationary construction equipment as far as possible from noise-sensitive sites.
- Re-route construction-related truck traffic along roadways that will cause the least disturbance to residents.
- Use low-noise designed equipment.
- Implement noise-deadening measures for truck loading and operations.
- Monitor and maintain equipment to meet noise limits.
- Line or cover storage bins, conveyors, and chutes with sound-deadening material.
- Use acoustic enclosures, shields, or shrouds for equipment and facilities.
- Use high-grade engine exhaust silencers and engine-casing sound insulation.
- Prohibit aboveground jack hammering and impact pile driving during nighttime hours.
- Minimize the use of generators for power requirement.
- Limit use of public address systems (PAS).
- Grade surface irregularities on construction sites.
- Use moveable sound barriers at the source of the construction activity.
- Limit or avoid certain noisy activities during nighttime hours.

4.4.3 OPERATIONAL NOISE

No any adverse impact on the surrounding populace is envisaged after the establishment and commencement of the regular business in the proposed PD on account of noise. The only adverse impact is envisaged due to noise emitted from the DG set.

The DG set shall have in built silencers and located inside the soundproof enclosure in the basement.

The Ambient Air Quality Standards with respect to Noise have been stipulated by Government of India vide *Gazette Notification dated 14.2.2000* and The Noise Pollution (Regulation and Control) (Amendment) Rules 2010, depicted in ***Table 4.4.2***.

Table 4.4.2: Ambient Air Quality Standards with Respect to Noise*

Area Code	Category of Area	Limits in dB(A), L_{eq}	
		** Day time	#Night time
A	Industrial Area	**75**	**70**
B	Commercial Area	**65**	**55**
C	Residential Area	**55**	**45**
D	Silence Zone @	**50**	**40**

Source: CPCB

* *Environment (Protection) Third Amendment Rules, 2000. Gazette Notification Government of India dated 14.2.2000 and The Noise Pollution (Regulation and Control) (Amendment) Rules 2010.*

** *Day Time: 6.00 AM to 10.00 PM*

\# *Night Time: 10.00 PM to 6.00 A.M*

@ *Silence zone is defined as an area up to 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent authority; Use of vehicular horns, loudspeakers and bursting of crackers shall be banned in these zones.*

4.5 IMPACTS ON EXISTING WATERS SOURCES (QUANTITY) AND QUALITY

4.5.1 Construction Phase

Water Usage

The water requirement for the construction phase will include dust suppression, curing and formation of concrete mixtures and water for domestic consumption. The water required for both domestic purpose and construction activities will be sourced from DJB through water tankers while drinking water for the labourers will be supplied through packaged drinking water cans.

Water Quality

The impact on the surface and ground water quality during the construction phase of the project may be expected from the following activities as detailed below:

- Effluent discharge from the construction camp
- Sludge from the construction activities
- Breeding of mosquitoes due to stagnant pool of water
- Surface runoff from the unpaved road
- Discharge of untreated sewage from labour camps

- Slight change in hydrology and geomorphology of the stretch of water course directly affected by the temporary works at the site
- Water quality of nearby water bodies due to spillage and uncontrolled release of construction and toxic materials such as cement, concrete, oil, fuel and paints.
- Run-off of silt and spilled materials into the river water may arise from earth works, exposed ground, water collecting in excavations, stockpiled materials and site roads *etc.*

4.5.2 Operation Phase

During operation phase, no any adverse impact is envisaged on the water quality. However, requirement of fresh water to the tune of 112 KLD may have marginal impact on the competing users. The water requirement shall be met from the Delhi Jal Board (DJB). Ground water shall not be tapped any stage of the project.

4.5.3 Mitigation Measures

- All applicable water quality standards should be complied with, at the construction site.
- It should be ensured that no liquid is discharged from any construction site/activity without treatment.
- Site drainage should be retained in purpose-built lagoons for enough time to allow most sediment to settle out before discharge to urban drains.
- Stockpiled soil and other loose material should be covered with secure tarpaulin and drainage should be passes from stockpile areas into settlement lagoons.
- In order to prevent materials leaking from static plant, such as pumps and generators, contaminating the ground and being washed into the drainage system, static plant should be placed on drip trays.
- All parking, repair and fuel storage areas should be located more than 100 m away water body.
- All hazardous materials on-site should be stored in areas with concrete floors enclosed by concrete bunds.
- Oil catch pit/ oil trap may be erected along drain channel from construction site to prevent oily water to flow into any water body.
- As temporary/emergency mitigation, a floating oil boom should be placed on the water surface near construction site to prevent discharge of any trace oil or fuel that may have entered the drainage system. This would serve as a contingency measure.
- Used oil may be sold to CPCB/ SPCB approved authorized recycler/ re-processor.
- Waste oil should be collected and stored in sealed damage-proof containers and disposed-off at legally approved common landfill site, which can be approached for disposal of waste oil according to local laws.
- To avoid disturbance to natural water course.
- Greening of the excavated area to prevent erosion of soil is one of the mitigation measures on the content.
- Silt fencing may be provided near water bodies.
- Proper sanitation facilities as per PHED norms shall be provided at the construction site to prevent health related problems due to water contamination.

4.6 IMPACTS ON ECOLOGY

4.6.1 Construction Phase

During the clearance and preparation of the project site, 178 numbers of trees of native species shall be felled for which the tree cutting permission from the Forest Department, Government of NCTD has been obtained. Since the project site is surrounded by the multi-storey building, other structures which shall act as the protection wall and will not allow the pollutants to disperse and travel to longer distance. In view of this, no any adverse impacts are envisaged on the ecology of the surrounding.

4.6.2 Operation Phase

The project area/region has already witnessed such developmental activities and it is as per the Delhi Master Plan 2021. No immediate action required because all local species from project site would be common as reported from nearby environment and well adapted to the routine urban activities, so they would not face significant impact on their normal movements. However, it is site specific and temporary impact.

4.6.3 Mitigation Measures

The following mitigation measures need to be put in place to address the potential impacts on ecology due to construction activities:

- The plantation should be undertaken to mitigate natural vegetation loss by planting native species. Every care will be taken to prevent the introduction of any alien species into the project area;
- The construction contractors shall be instructed to avoid removal of any natural vegetation to the maximum extent possible;
- The project activities shall ensure measures as suggested for ambient air quality and traffic and transport of material so as to minimize impacts on the ecology of the site and its surroundings;
- Levels of noise shall be maintained at a minimum during construction activities;
- Cutting or lopping of trees shall be avoided. Mature trees and standing trees should not be cut to the extent possible;
- The construction contractors will be instructed to provide fuel for any heating requirements at site and not to use firewood from adjoining areas.

4.7 IMPACTS ON SOIL

Existing soil quality could be adversely impacted in the following manner:

- Contamination of land / soil due to concrete slurries, sewage wastewater from labour camps;
- Excavation of contaminated soil debris (from tunneling) and disposal in adjoining areas;
- Spills of materials and construction waste during hauling, storage or transport from site;
- Pollution / contamination at construction camps, electric substations;
- Improper storage & handling of construction materials;
- Improper storage, handling & disposal of wastewater;
- Generation and handling of solid waste.

4.7.1 Construction Phase

- The soil contamination may take place near the construction camp site due to untreated discharge of sewerage, spillage from the material storage area, surface run off in the monsoon months from the construction sites.
- Soil contamination is also expected from the leachate phenomena at the C&D dump sites.
- Soil contamination may also take place during filling of oil in vehicles or leakage from vehicles.

4.7.2 Operation Phase

With the STP in place no any adverse impact is envisaged during the operation phase of the project.

4.7.3 Mitigation Measures

The following mitigation measures need to be put in place to ameliorate any adverse impacts on soil due to construction activities:

- A stilt fence should be used to detain sediments from a small drainage area.
- Staging should be done to separate undisturbed land from land disturbed by construction activity and material storage.
- Spill prevention and control plans should be made, clearly stating measures to stop the source of the spill, to contain the spill, to dispose the contaminated material and hazardous wastes, and stating designation of personnel trained to prevent and control spills.
- Vegetation may therefore be used for modifying the microclimate, by obstructing, guiding, deflecting or filtering wind current.

4.8 IMPACTS OF WASTE GENERATION

4.8.1 Construction Phase

1) Impacts

The significant quantities of solid waste would be generated by the project, especially during the construction, including gravel; concrete; miscellaneous structures such as pile head, poles and cables, steel, and organic material such as cleared vegetation; and unused/additional/excavated soil. In addition, there will be spent oils, fuel, grease and chemicals from construction equipment and vehicle servicing. Any hazardous materials that are used will also need to be stored and handled correctly to prevent spills and pollution.

There are multiple waste disposal facilities in the vicinity and disposal shall adhere to the Central Public Health and Environmental Engineering Organization (CPHEEO) Standards of Ministry of Urban Affairs, Government of India, including the usage of such facilities. Recently after notification of the Construction and Demolition Rule 2016, the various municipal authorities have formulated the guidelines for management of C&D waste.

The specific amount is unconfirmed at this stage as the detailed construction plan has not been finalized. Exact quantity shall only be known once the construction commences.

2) Mitigation Measures

- Comply with relevant laws pertaining to the management and disposal of solid waste and hazardous waste;
- Comply with the C&D Rules 2016;
- Before start of construction activities, all suitable disposal measures should be identified for solid waste and any other form of waste likely to be generated from the construction activities;
- A designated solid waste disposal site should be secured away from human settlements. In addition, a disposal site should be away from water streams and any archaeological and historical monuments. Generally barren lands are preferable for this purpose;
- No dumping should be carried out on private property without written consent of the owner;
- No dumping should be allowed on wetlands, forest areas, and other ecologically sensitive areas;
- All the workers at the disposal yard should be provided with safety attire;
- Prepare and implement a hazardous waste management plan for the disposal of waste oil, batteries and other hazardous materials;
- All areas designated for the storage of fuels, oils, chemicals or other hazardous liquids should have a dense base and be surrounded by a bund to contain any spillage. These areas should be covered by a roof structure to minimize the potential for infiltration and contamination of rainwater;
- Areas designed for the storage of hazardous materials are to be clearly designated and storage of such materials outside these areas strictly prohibited;
- Chip and mulch vegetation cleared and reuse it as an organic base for plantation; ensure that materials, which may cause land/water contamination or create odour problems, are not disposed of on the site;
- Ensure that there is the adequate provision of correctly marked waste containers made available at convenient locations for the disposal of wastes;
- Excavated materials shall be used for backfilling material in other locations simultaneously;
- Construction wastes from site such as metal cuttings debris, plastic packing material, wooden logs etc will be segregated and kept in specially identified waste bins;
- The recyclable items like metal and plastic shall be stored separately and sent to authorized recyclers;
- Potentially hazardous waste shall be segregated from non-hazardous construction site debris;
- The contractor shall educate the workers and subcontractors about hazardous waste storage and disposal procedures.

4.8.2 Operation Phase

The project will generate very marginal quantity of MSW during operational phase. The potential impacts associated with disposal of solid waste include the following:

- Inadequate collection and treatment of municipal solid waste can lead to unhygienic conditions leading to spread of diseases and other vectors;
- Improper transportation of municipal solid waste may lead to generation of odour;
- The accumulation of waste along streets can clog drains and cause localized flooding.

Mitigation Measures

- An integrated solid waste management will be put in place for collection, transport, treatment and disposal of solid waste generated from the activities; Municipal Solid Waste Management and Handing Rules, 2016 shall be adhered to.
- The e-waste generated shall be sold to authorized recyclers in accordance with e- waste Management Handling Rules, 2016.
- The recyclable waste like glass, metal, plastics, paper *etc.* shall be collected separately and sold to authorized recyclers/ vendors.

4.9 IMPACTS ON TRAFFIC

4.9.1 Construction Phase

1) Impacts

The construction phase will witness transportation of construction materials and movement of workforce. It is expected that, adjacent road will see reasonable increase in the traffic movement, which may lead to traffic issue in this densely populated area. The area is already having heavy traffic, being the core business centre.

The potential impact due increase in traffic and transportation during construction phase would be:

- Increased potential for traffic hazards on the adjacent roads of the area, due to the construction activities.
- The condition of roads may deteriorate during the construction phase due to frequent movement of heavy vehicles and equipment.
- Disruption of traffic is anticipated on connecting roads due to unplanned entry to the site, parking of trucks, breakdowns, *etc*.
- Increase in transportation will lead to increase in road traffic;
- Generation of dust;
- Emission of pollutants like HC, SO_2, CO, CO_2;
- Noise generation from vehicular movement;
- Spillage or leak of raw materials during transportation.

2) Mitigation Measures

- The movement of traffic entering the site shall be properly managed so as to cause minimum problems to local users on this road;
- Vehicles shall be PUC certified;
- Traffic will be regulated through proper signage, instruction & parking spaces'
- Separate entry and exit will be provided'

- Internal roads with 6 m width for movement of vehicles and also for fire tender (in case of emergency) will be provided'
- Ample parking spaces will be provided at surface, basement levels. Speed limit within the premises will be minimum to reduce traffic congestion'
- Signpost will be provided for smooth traffic flow and also inculcate residents to follow traffic rules'
- The contractors will undertake consultation with local Police prior to movement of the construction traffic particularly for the movement of heavy machinery;
- The construction vehicles shall be allowed to move in the site only through exclusive entry and exit points;
- Adequate training shall be given to the drivers of construction vehicles for speed restrictions; and Roads damaged due to project vehicle shall be repaired and maintained at regular intervals during the construction period;
- Transportation movement shall be done during non-peak hours.

4.9.2 Operation Phase

1) Impacts

A well planned transport infrastructure with adequate public transport infrastructure already exists near the area, the details for the same have been provided in chapter two of the report. The potential impacts on traffic and transport for proposed project include the following:

- Increase in traffic volume due to proposed developments and likelihood of congestion on the existing and proposed road network;
- Random parking of vehicles and unplanned loading/ unloading areas can lead to confusion.

2) Mitigation Measures

Traffic Analysis/Management

This includes various transport improvement strategies and proposed alternatives keeping in mind the vehicular density of the area surrounding project site. Alternatives are proposed in order to reduce the traffic congestion due to goods and passenger movement on the roads connecting to the project site. In order to accommodate the increased traffic, following measures shall be put in place:

- Traffic diversion shall be encouraged by proposing alternate routes;
- Hierarchy in roads should be adopted to segregate the traffic according to the size, frequency and density of traffic;
- Comprehensive traffic and travel surveys shall be conducted every 5 years to monitor traffic characteristics and travel behavior to develop strategies for effective transportation.

4.10 IMPACTS ON SOCIO-ECNOMIC ASPECTS

4.10.1 Construction Phase

1) Impacts

The construction activities might bring about certain impacts which might affect the population in nearby villages. The impacts enlisted below are limited to construction phase only and can be mitigation by implementing proper measures, as mentioned in the later section.

- The construction activities and big machineries which will be operated in the construction phase are bound to generate a higher decibel of noise which might disturb the local adjoining residential area for a very short duration. In addition, during the operation phase, the vehicular movement of buses and cars will also tend to create higher noise exposure in the surrounding villages.
- With the commencement of construction activities, accumulation of water in the dugout areas of the site might result in being breeding place for mosquito breeding and spread of vector borne diseases.
- Once the construction activities commences, problem of traffic congestion in the area might arise because of movement of heavy vehicles, to and fro from the site.

2) Mitigation Measures

The following mitigation measures can be implemented to ameliorate the anticipated impacts:

- Locals from nearby areas will be preferred and engaged in construction activities and during the operation phases, as per their skill set, to supplement their income.
- Once the construction activities commences, it shall be ensured that all the deployed drivers are having valid driving license.
- A speed limit should be determined and followed for all vehicles passing that particular route.
- The operations of big machines will be restricted to day time only.
- No noise generating activity will be permitted from 22:00P.M-6:00AM.
- To minimize adverse impacts due to the discharge of untreated sewage outside the project site, adequate number of portable toilets, soak pits shall be provided onsite for disposal of sewage.
- Preference of giving the locals from the area an opportunity of being hired in various jobs.

4.10.2 Operation Phase

1) Impacts

No any adverse impact is envisaged during the operation phase of the project this issue shall be settled and mitigated at the construction phase of the project.

However, some positive impact may be seen after commencement of the business activities in the building premises.

- Improve building structures with Green building concepts;
- Proper garbage disposal system; smooth traffic movement;
- Aesthetics of the surroundings will improve

2) Mitigation Measures

Local unemployed youth shall be preferred for indirect employment through contractors on the basis of their skill and qualifications.

4.11 IMPACTS ON OCCUPATION, HEALTH AND SAFETY

4.11.1 Construction Phase

1) Impacts

The workers engaged in construction activities will be exposed to occupational health and safety hazards and risks. Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal injury at construction sites.

The key health and safety concerns associated with construction activities are:

- Injury due improper handling, operation and execution;
- Occupational hazards like high noise, electric shocks *etc.;*
- Trip and fall, inadequate fall safe arrangements;
- Diseases from unhygienic surrounding;
- Exposure to hazardous substances *etc*.;
- Construction activities may also pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities.
- The workers will also be exposed to temporary hazards such as physical contact, spills, dust, emissions, and noise due to vehicular movement and use of lifting equipment in the movement of machinery.

2) Impacts

The contractor will ensure that:

- The construction staff and contractors involved in the construction activities shall be trained on the necessary precaution and safety practices prior to commencement of construction activity;
- The necessary safety measures shall be taken up before and during the construction activities for all electrical driven machinery;
- A work permit system shall be implemented for all works related to working at heights (typically when working over 2m and above). All works related to working at heights shall be undertaken only during the daytime when sufficient sunlight is available;
- Workers shall be provided with required PPEs to be used at site;
- All excavation activities shall be conducted in supervision of the site contractor;
- Proper signage shall be provided in places of excavated areas; and
- The switchyard building and transformer areas shall be provided with adequate fire extinguishers and sand buckets at all strategic locations to deal with any incident of fire.

4.11.2 Operation Phase

1) Impacts

No any adverse impact is envisaged during operation.

2) Mitigation Measures

Following precautionary measures should be put in place:

- Only trained and qualified electrician shall be deployed in the electrical control room;
- Only qualified and trained liftman shall be deployed in the lift;
- All the technician should be well trained to deal with any eventuality.

Chapter 5

Analysis of Alternatives

(*Site and Technology*)

Chapter 5
Analysis *of* Alternatives
(Site and Technology)

5.0 ANALYSIS OF ALTERNATIVES

Designing perfect building premises is often a complex task due to the multidisciplinary aspects involved. Environmental aspects (together with the socio-economic variables) assume considerable importance for green rating, and energy efficient in particular.

This chapter presents a comparative analysis between several alternatives considered to avoid or minimize environmental and social impacts. Along with technical aspects (based on design), these alternatives were used to adopt the preferred options.

The proposed Property Development project is being implemented in line with the guidelines issued by the Ministry of Housing and Urban Affairs (MoHUA), Government of India. The proposed project site is an integral part of the Bhikaji Cama Place Metro Station on Line-7.

The analysis of alternatives for various scenarios like 'With' and 'Without' project, consideration of Sarojini Nagar as alternate site and use of alternate energy efficient construction materials, is discussed in the subsequent sections.

5.1 PROJECT *Vs* NO PROJECT- A COMPARISON

The comparative analysis of Project *Vs* No Project scenario is presented in ***Table 5.1.1***.

Table 5.1.1: Project *Vs* No Project Scenario

Parameter	With Project	Without Project
Economy	Boost to local economy with an investment of INR 80 Crore	Loss of reasonable investment
Revenue	Means of revenue generator for the DMRC and Govt. of NCT D as well in the form of tax contributor	Loss of regular revenue
Employment	Approximately 150 direct and 150 indirect employment opportunities will be created for the unemployed youth. Apart from this, about 100 workers shall be engaged for two years at the site during construction period.	Loss of employment opportunities
Entrepreneurship	Opportunities for	No any such creation of

Parameter	With Project	Without Project
	development of entrepreneurship by offering prime business hub	entrepreneurship
Landscape	The present site which is in unpleasant look shall be converted into a eye catching landscape.	No change in landscape which is bad shape.
Pollution Abatement	The proposed 4-storeys tower will act as barrier between the pollution source (vehicular emission from Ring Road, noise) and the residential colony- Nataji Nagar	No relief from the present pollution

Source: Study Team

With the above, it can be inferred that it is always better to go with the project in the present economic scenario in the country.

5.2 SITE- Comparison

The comparative analysis of site- Sarojini Nagar *Vs* Bhikaji Cama Place scenario is presented in ***Table 5.2.1***.

Table 5.2.1: Sarojini Nagar *Vs* Bhikaji Cama Place

Parameter	Sarojini Nagar	Bhikaji Cama Place
Approach	The proposed site is not on the main road. The approach in not smooth.	Located along the Ring Road with easy approachable
Site Suitability	The site is surrounded by the densely populated residential colony and the establishment of business centre would create nuisance for the local habitants.	It is situated amidst the business hub of Bhikaji Cama Place, a perfect surrounding for establishment of commercial tower.
R & R issue	The site may involve R & R issue.	It does not involve any R & R issue as required land is vacant.
Traffic	On establishment of commercial tower, the area may witness increased traffic which can't be accommodated on the present road network.	A Traffic Impact Assessment study has been carried out by the DMRC and it concludes that the present road network is sufficient to accommodate the additional traffic load.

Source: Study Team

Keeping in view the above scenario, the proposed site for Property Development Complex above u/g Metro Station at Bhikaji Cama Place has an edge over the Sarojini Nagar Metro Station.

5.3 TECHNOLOGICAL ASPECT

The building sector represents around 40 % of the primary energy use throughout the world, which makes them the single most energy intensive sector. The construction sector in India is responsible for the largest share of CO_2 emissions (24 %) into the atmosphere and a primary energy use of nearly 41 % [4]. About 80 % of the above emissions are resulting mainly from industrial/production processes of four energy intensive building materials, namely—cement, burnt clay bricks, lime and steel.

According to a survey by development alternatives the demand for cement is expected to increase from 92.5 million tones in 2000 to 202 million tones in 2020. The demand for steel is expected to increase from 9.6 to 23 million tones and for bricks from 61 to 89 billion during the same period. The CO_2 emissions due to cement production is expected to increase from 85 million tones in 2000 to 186 million tones in 2020. The CO_2 emissions due to production of steel is expected to increase from 23 to 55.2 million tones and for bricks from 18 to 26 billion during the same period.

The increased consumption of these building materials is also due to a switch over from the conventional load bearing construction to RC framed construction even for two storied residential structures, where load bearing construction would prove more economical.

Several potential alternative walling units and roofing systems have been analyzed and compared with conventional materials used in construction (***Refer Table 5.3.1***). The building is evaluated for its embodied energy with the existing conventional materials namely fired clay bricks, cement and steel. For the modified cases, alternative (low energy and cost effective) materials like fly ash bricks, hollow concrete blocks, soil cement blocks and cellular concrete blocks are used for masonry walls. Filler slabs, RC ribbed slabs, prefabricated brick panels and RC plank and joist are used as alternatives for roofs.

Table 5.3.1: Comparison of Alternative use of Construction Materials

Type of Component	Name of Building Materials Component	Specifications	Embodied energy per unit volume (MJ/m^3)	Weight of masonry/m^3 (Density) kg/m^3	Cost, Rs/m^3	CO_2 Emissions, kg/m^3
Wall	Brick masonry	Type: Conventional Size—230 x 110 x 75 Composition—Clay As per IS 2691	2,550	1,700	3,900	250
	Clay fly ash brick masonry (clay, flyash and lime)	Type- Alternative Size—230 x 110 x 75 Composition—Clay, fly ash, lime As per IS 13757	1,392	1,270	2,400	136

Type of Component	Name of Building Materials Component	Specifications	Embodied energy per unit volume (MJ/m^3)	Weight of masonry/m^3 (Density) kg/m^3	Cost, Rs/m^3	CO_2 Emissions, kg/m^3
Wall	Hollow concrete block masonry (with 10 % cement, sand, coarse aggregates)	Type: Alternative Size—400 x 200 x 200 Composition—10 % cement, sand, coarse aggregates As per IS 2185 (part 1)	971	1,200	2,646	95
	Aerated concrete block masonry (cement, fine aggregates and aluminium)	Type: Alternative Size—400 x 200 x 200 Composition—cement, fine aggregates & aluminium As per IS 2185 (part 3)	819	750	3,150	80
Roof	RCC slab (110 mm thick, in M15 CC)	Type-Conventional Size—10 m^2 area Composition—M15 CC-Cement, sand, aggregates in ratio (1:2:4) As per IS-456	640	-	1150	63
	Filler slab roof (110 mm thick, M15 CC with Mangalore tiles as infill)	Type: Alternative Size—10 m^2 area Composition—M15 CC-cement, sand, aggregates in ratio (1:2:4), Mangalore tiles as filler material As per IS-456	350	-	581	34
	RC ribbed slab roof (50 mm thick in M20 CC)	Type-Alternative Size—10 m^2 area Composition—M20 CC cement, sand, aggregates in ratio (1:1.5:3) for slab, RC ribs As per IS-456	491	-	979	48
	Prefabricated brick panel roof (110 mm thick	Type: Alternative Size—10 m^2	426	-	927	42

Type of Component	Name of Building Materials Component	Specifications	Embodied energy per unit volume (MJ/m^3)	Weight of masonry/m^3 (Density) kg/m^3	Cost, Rs/m^3	CO_2 Emissions, kg/m^3
	in M20 CC)	area Composition—Brick panels for slab, 30 mm of M20 CC slab over brick panels As per IS-456				
	R.C. plank & Joist roof (110 mm thick in M20 CC)	Type: Alternative Size—10 m^2 area Composition-R.C. planks, RC joits, 30 mm of M20 CC slab over R.C. planks As per IS-456	506	-	1,043	49.6
Mortar/Plaster	Cement plaster (1:6 CM)	Type-Conventional Size—1 m^2 area Composition—CM-1:6 cement, sand As per IS-269, 383	1,268	-	2777	124
	Cement pozzolona mortar (20 % fly ash based- 1:6 CM)	Type: Alternative Size—1 m^2 area Composition-CPM-(0.8:0.2):6 Cement (80 %), pozzolona (20 %), sand As per IS-1489, 383	918	-	2,355	90

Source: J. Inst. Eng. India Ser. A (April–June 2014) 95(2):117–127

Discussion

The conventional RC framed construction is expensive in terms of environmental impact. A conventional load bearing construction is more eco friendly in comparison to a conventional RC framed construction, giving a 20 % reduction in the CO_2 emissions. Among the alternatives, Soil cement blocks and cellular concrete blocks have the least environmental impact corresponding to a 53–55 % reduction in the CO_2 emissions when compared to conventional construction methods.

It can be inferred from the above that a conventional load bearing construction alone can reduce the Embodied Energy demand of the building by about 22 % and its corresponding environmental impact by 20 %. When alternative materials are used the energy savings amount to between 50 and 60 % corresponding to a 44–55 % reduction in CO_2 emissions for a load bearing construction technique. Soil cement blocks + filler slabs (60 %) and aerated concrete blocks + filler slabs (57 %) have better energy performance and least environmental

impact (45–47 %) among the alternative materials using the load bearing construction technique. The same alternative materials give energy savings between 30 and 42 % and reduction in CO_2 emissions between 25 and 36 % for a RC framed construction technique.

As we know, the city of Delhi is located in Seismic Zone IV, the second-highest earthquake hazard zone in the country. Keeping in mind of this fact, appropriate construction technique shall be adopted for safety and environmental issues as well.

5.3.1 Use of Energy Efficient Design and Eco-friendly Equipment

The project will be designed such that there is optimal solar energy utilization, especially for natural light availability. Shading will be provided on sides that will otherwise reduce the energy efficiency of the building. Energy conservation will be one of the focuses during the planning, development, construction and post construction stages.

5.3.2 Use of Renewable Energy

The electrical supply is largely dependent on thermal power plants that are largely responsible for accelerating the phenomenon of global warming and consumption of limited natural resources. It is of paramount importance to shift focus on other renewable sources of energy to achieve sustainable development in the energy sector. The project area in Delhi receives adequate intensity of sunlight for effective solar energy generation. Taking full cognizance of the availability of natural sunlight and technology, the project proposes the use of solar energy to reduce the power demand of the project. Solar energy will be used for the purpose of heating of the water.

5.3.3 Indoor Air Quality for Human Safety and Comfort

To provide the occupants with a safe building is the primary responsibility of a developer. Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems in homes. Inadequate ventilation can increase indoor pollutant levels by not bringing in enough outdoor air to dilute emissions from indoor sources and by not carrying indoor air pollutants out of the home. High temperature and humidity levels can also increase concentrations of some pollutants. Likewise, it is proposed to use all user safe building materials such as:

- The buildings will be painted with low VOC, ammonia free paints;
- Asbestos will not be used;
- Adequate ventilation will be provided in each residential unit and floor;
- Adequate openings for sunlight to enter the building, thereby reducing chances of microbial growth; and
- All building maintenance and cleaning materials will be kept in an isolated and well ventilated room with restricted entry.

5.3.4 Energy Conservation

To achieve conservation of energy, appropriate design of a building is of paramount importance. Accordingly, it is proposed to incorporate the guidelines of Energy Conservation Building Code, 2005 for the structures of the proposed PD Complex building.

The concept of passive solar design emphasizes architectural design approaches that minimize building energy consumption by integrating conventional energy-efficient devices,

such as mechanical and electrical pumps, fans, lighting fixtures, and other equipment, with passive design elements, such as building sitting, an efficient envelope, appropriate amounts of fenestration, increased day lighting design, and thermal mass. The basic idea of passive solar design is to allow daylight, heat, and airflow into a building only when beneficial.

The proposed PD building layout has been finalized after taking into consideration the various aspect of harnessing natural light and wind leading to energy conservation. Advanced Solar Passive Techniques are employed to achieve energy efficiency.

Following technological aspects shall be implemented during the construction:

- Glazed windows are located to receive maximum sunlight in winter. To reduce heat losses during the night these windows are often double-glazed and have insulating curtains.
- Thermal storage wall is placed between the glazing and habitable space to prevent solar radiation from directly entering the living space.
- Passive cooling systems *i.e.* cooling directly from evaporation, convection radiation without using any intermediate electrical devices.
- Provisions for use of desert cooler (Indirect evaporative cooling which comprises water, evaporative pads, a fan and a pump).
- Effective measures have been incorporated to minimize the energy consumption in following manners:
  - Use of CFL lamps instead of GLS lamps for Common area.
  - Solar water heating systems shall be provided as per Delhi Solar Policy 2016.

Chapter 6

Environmental Monitoring Program

Chapter 6
Environmental Monitoring Program

6.0 RATIONALE

This chapter presents environmental monitoring plan based on the significant environmental impacts and mitigation measures, discussed in the earlier Chapter 4.

An Environmental Monitoring Plan/Program (EMoP) provides a basis for monitoring the status of different components of environment in the construction and operation phases of the project. The information derived from environmental monitoring activities can be used to mitigate and reduce environmental impacts and enhance project benefits through adaptive management. The implementation of the EMoP is adopted in all project works. An EMoP is important as it provides useful information and helps to:

- Assist in detecting the development of any unexpected environmental or social situation and thus provides opportunities for adopting appropriate control, management or mitigation measures.
- Defines the responsibilities of the project proponents, site engineers, contractors and environmental monitors and provides means of effectively communicating environmental issues among them.
- Defines the monitoring mechanism and identifies monitoring indicators, methods and parameters.
- Provides information, which allows for the evaluation of the performance and effectiveness of mitigation measures proposed in the EMP and enables managers to make improvements in management plan.
- Identifies training requirement at various levels.

6.1 THE OBJECTIVE OF THE MONITORING

- Measure effectiveness of operational procedures;
- Confirm statutory and mandatory compliance;
- Identify unexpected changes;
- Assess the changes in environmental conditions, if any, during operation of the Project;
- Monitor the effective implementation of mitigatory measures envisaged; and
- Warning of any significant deterioration in environmental quality so that additional mitigatory measures may be planned in advance.

6.2 THE ENVIRONMENTAL MONITORING PROGRAM

A comprehensive Environmental Monitoring Program (EMoP) has been formulated for the proposed PD Complex project to be implemented by the selected agency under close supervision of DMRC (during Construction and Operation Phases of the project) and for contractors for construction phase, presented in ***Table 6.2.1*** and ***Table 6.2.2.***

Table 6.2.1: Environmental Monitoring Plan-Construction Phase

Location	Parameters	Measurement Protocol	Frequency	Indicative Budget (INR)	Procurement Schedule
Air Environment					
At project site	Ambient Air Quality Monitoring for $PM_{2.5}$, PM_{10}, SO_2 & NOx	PM_{10} - Gravimetric IS: 5182 (Part 23) 2006. $PM_{2.5}$ – Gravimetric IS: 5182 (Part 23) 2006. SO_2 – Colorimetric IS: 5182 (Part II) 2001. NO_x – Colorimetric IS: 5182 (Part VI) 20066.	Continuously as specified in the CPCB guidelines during entire construction period.	250000/- For Ambient Air Quality Monitoring to be outsourced	Construction Phase
Noise Environment					
At project site -at different locations	Leq of Ambient Noise level	ISLM 100	Monthly during the entire construction period	50,000/-	Construction Phase
Water Environment					
At project Site-Labour Camp	One ground water sample (Essential parameters as per IS: 10500:1991)	APHA methods of each parameters	Monthly	50,000/-	Construction Phase
Solid and Hazardous Waste and Construction Waste					
At Site	Solid & Hazardous Waste Generation, handling, storage and disposal	Record of Generation, handling, storage and disposal of solid waste (MSW)	Weekly	1,00,000/-	Construction Phase
At Site	C & D Waste	Record of generation and handling as per C & D Rule 2016.	Weekly	1,00,000/-	Construction Phase
			Total	**5,50,000/-**	

Source: Study team

Table 6.2.2: Environmental Monitoring Plan-Operational Phase

Location	Parameters	Measurement Protocol	Frequency	Indicative Budget (INR)		Procurement Schedule
				Capital	Recurring (per annum)	
Air Environment						
At project site	Ambient Air Quality Monitoring for $PM_{2.5}$, PM_{10}, SO_2 & NOx	PM_{10} - Gravimetric IS: 5182 (Part 23) 2006. $PM_{2.5}$ – Gravimetric IS: 5182 (Part 23) 2006. SO_2 – Colorimetric IS: 5182 (Part II) 2001.	Half yearly	-	50,000/- For Ambient Air Quality Monitoring and Stack Monitoring - outsourced	Operational Phase

Location	Parameters	Measurement Protocol	Frequency	Indicative Budget (INR)		Procurement Schedule
				Capital	Recurring (per annum)	
		NO_x – Colorimetric IS: 5182 (Part VI) 20066.				
At project site (Flue gas stack of DG Set)	Stack air monitoring for PM, SO_2, NOx, HC & CO in stack	Stack Monitoring by Isokinetic sampling IS: 11255	Half yearly	10,00,000/- (DG Set and Stack Installation cost)		Operational Phase
Noise Environment						
At project site -at different locations	Leq of Ambient Noise level	ISLM 100	Half yearly	-	50,000/- (Ambient & DG noise level monitoring)	Operational Phase
Water Environment						
At project Site	One ground water sample of recharge well (IS: 10500:1991)	APHA methods of each parameters	Half yearly	-	50,000/-	Operational Phase
At project site	Treated waste water from the STP pH, BOD, COD, TDS, TSS, DO	General Standards for discharge of effluents	Half Yearly	-	50,000/-	Operational Phase
Solid and Hazardous Waste						
At Site	Solid waste (MSW) Generation, handling, storage and disposal	Record of Generation, handling, storage and disposal of solid waste (MSW)	Once in a week	-	1,00,000/-	Operational Phase
			Total	**10,00,000/-**	**3,00,000/-**	

Source: Study team

6.3 DATA MANAGEMENT

The monitoring shall be carried out only through MoEFCC recognized or NABL approved laboratory as specified by the nodal agency. All results and records shall be maintained at the project site so as to ensure easy availability during the site visit by the statutory bodies and submitted to the DPCC as per the reporting requirements.

6.4 REPORTING SCHEDULES

The Environment Division shall be responsible for timely conduct of the monitoring activities. The results of the analysis shall be intimated to the project head. Any anomaly in test results shall be investigated into and proper corrective actions shall be undertaken. A complaint register shall also be maintained to note any complaints from the staff and visitors in the project or any other stakeholder. Corrective actions taken against the complaints shall also be noted.

6.5 INSTITUTIONAL FRAMEWORK FOR IMPLEMENTATION OF EMoP

In order to efficiently manage the multitude of environment, institutional arrangements are

essential in any project to provide the necessary human resources in a structured form so as to achieve certain level of quality in the work execution during implementation of various project components by DMRC.

Ensuring the better implementation of EMoP, DMRC has developed Environmental Management Unit (EMU) in Delhi.

EMU will have the following staff:

1. The Environment Division is headed by the General Manager assisted by DyGMs, Managers.
2. Two Assistant Environmental Engineers with Masters in Environmental Science or Master in Environmental Engineering followed by minimum 5 years of experience in liner projects including 1 in rail or metro in each unit.

6.5.1 Reporting Arrangement

The Site Engineer (SE) shall report regarding compliance of the EMP and other environment related issues by concerned stakeholders to EMU in his periodic progress report for reviewed by EMU during the construction stage. Monthly report of the SE shall indicate clearly regarding the compliance of environmental provisions by Contractor. Contractor's failures to implement the environmental provisions are to be reported to EMU regularly with request for action. Incidents of contamination or pollution due to Contractor's activities whether due to negligence or otherwise are to be reported in periodic reports.

Chapter 7
Additional Studies

Chapter 7
Additional Studies

7.1 TRAFFIC STUDY

Anthropogenic emissions not only contribute to the Green house effect but also participate in the reaction resulting in photochemical oxidants. The effect of photochemical oxidants is well known for forming smog. Among the anthropogenic sources of pollutants forming the green house gases, burning of fossil fuels constitute a major source. Highway mobile sources that contribute significantly to poor quality of air have not been regulated for the past two decades.

In India two-wheelers are a very popular mode of personal transport. Most of them are powered by two-stroke engines because of initial and maintenance costs. However, they have high emission levels causing air pollution. The objective of traffic study and emission quantification is to assess the magnitude of the emissions resulting from two wheelers, three wheelers and four wheelers that are extensively used as a means of common transport.

7.1.1 Traffic Impact Assessment

The study has recently been undertaken by the consultant M/s TPA Engineering Consultancy (I) Pvt. Ltd. New Delhi, engaged by the DMRC to **"Preparation of Traffic Impact Assessment Report for Proposed Property Development above U/G Metro Station at Bhikaji Cama Place, New Delhi**". The total plot area is 6109 sq. m is having Offices, Retail and Food Court/ Restaurant. The proposed development will be on four floors above ground floor. The car parking space is 280 ECS which includes basement stack parking of 164 ECS and 116 ECS at ground level stack parking within the plot area. The construction period is assumed to be 2 years and project is expected to become operational by year 2021.

The approach to the project is from Ring Road and Shaheed Sudhir Tyagi Marg.While the former is a 3 lane one way arterial road, the latter is a 2 Lane undivided collector street. The traffic density on the road network adjacent to project site is moderately high during peak hour as well as entire day. The land use around the project is existing low density residential area (Government quarters) on northern and eastern side which are proposed to be converted in to high density residential settlements. Towards the south of the site is the commercial district center (Bhikaji Cama Place) which is the main contributor to Ring Road Africa Avenue Intersection.

The project site and road network characteristics including Right of Way, effective carriageway, Bus Stop *etc.* are presented in ***Exhibit 7.1*** and the locations of traffic survey are shown in ***Exhibit 7.1 (a).***

7.1.2 Objective of the Study

- To estimate the traffic impact due to the project site within One Km of the project site or up to the major intersection, whichever is nearer, up to horizon Year 2036 AD.

- To quantify the impact of generated traffic from site on Level of Service of approach roads.
- To suggest mitigating measures to minimize the traffic impact.

Exhibit 7.1: Project Site with Road Network Characteristics

Source: Study Team

Exhibit 7.1 (a): Traffic Survey Locations

Source: Study Team

7.1.3 Data Sources

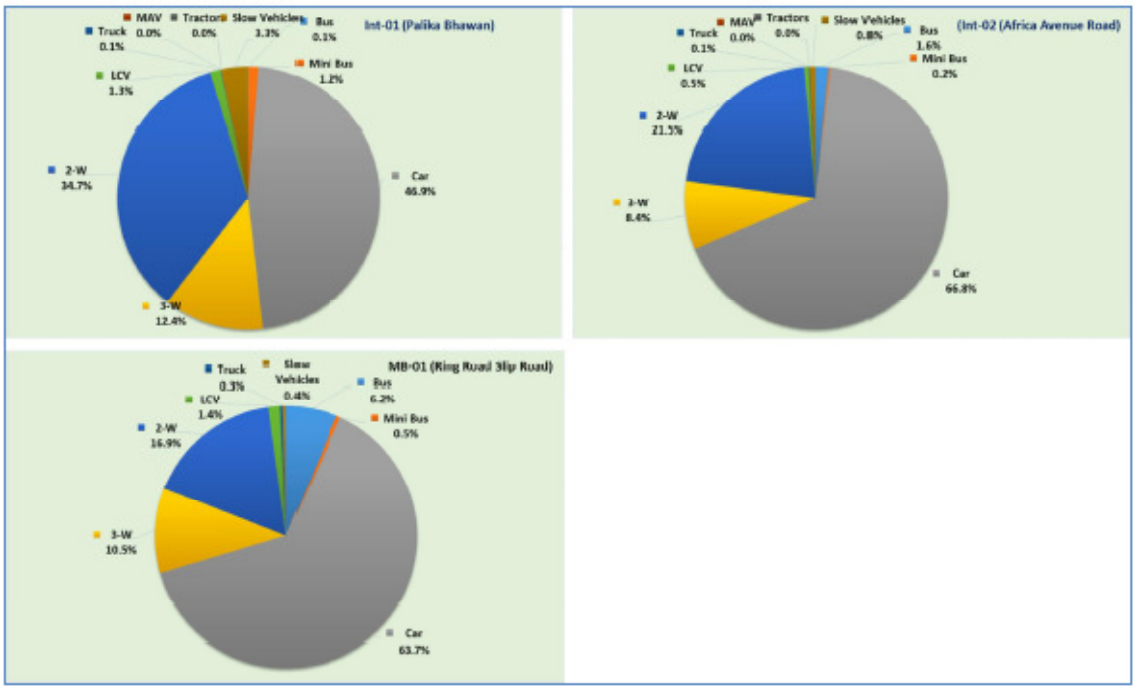
The traffic survey was carried out by the consultants at 3 locations around each approach of neighboring road network for the period of 12 hours on working day including Mid-Block Traffic Counts within Influence Area. Presently, the traffic density along approach road during peak hour is not much high along project site corridor on normal working day and also used the secondary data to carry out trip impact. Suitable assumptions have been made, wherever necessary, based on experience of consultant on similar projects elsewhere. The finding of the study has been discussed in the subsequent section.

7.1.4 Traffic Characteristics and Composition

The total approach traffic at Palika Bhawan intersection is 5281 PCU's during entire day while the traffic along Ring Road slip road is 24183 PCUs. The straight movement traffic from Mohammadpur to Sarojini Nagar along Africa Avenue Road is 19800 PCU's over entire day while left in and left out traffic to Shaheed Sudhir Tyagi Marg is 1770 and 1747 PCU's respectively over entire day.

The traffic composition chart (refer ***Exhibit 7.2***) shows that the share of car is varying from 47% to 67% of total traffic followed by 2-wheelers and 3-wheelers. The share of 2 wheelers is varying from 17 to 35% of total traffic while the share of 3-wheelers is varying from 8 to 12% of total traffic. The share of buses is insignificant at Palika Bhawan Intersection while 6% along Ring Road and about 2% along Africa Avenue Road.

Exhibit 7.2: Traffic Composition at Mid-Block Location



Source: Study Team

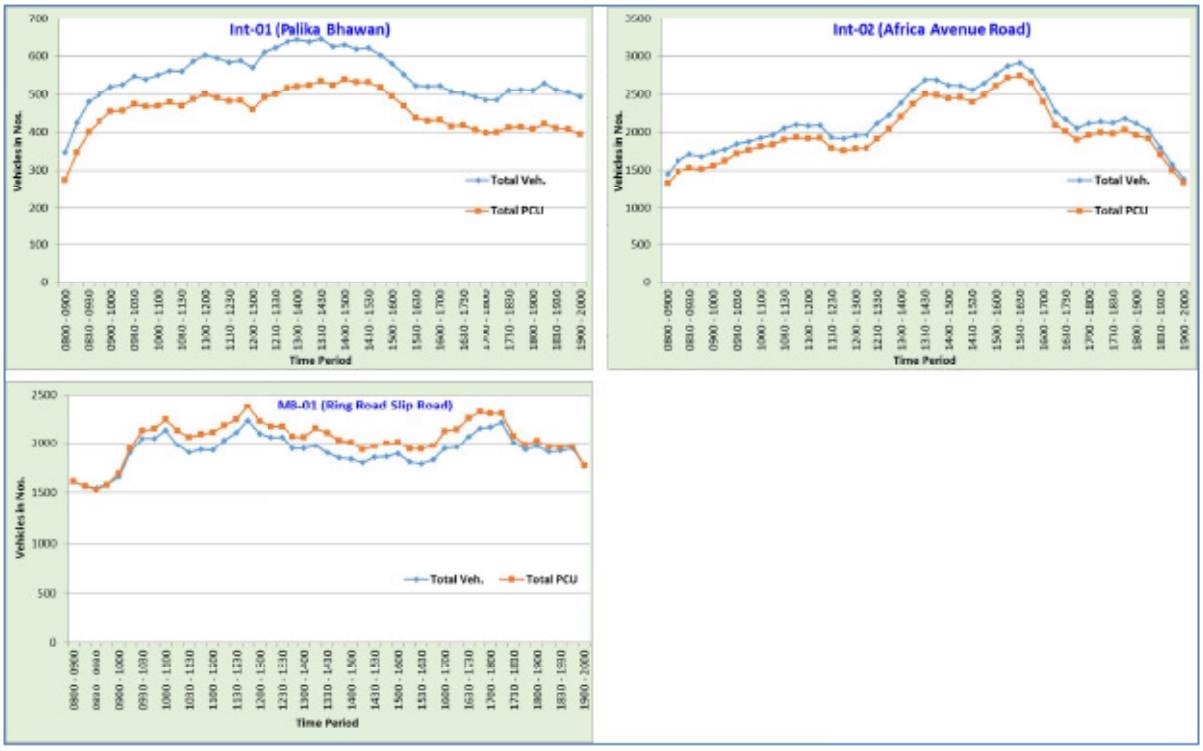
7.1.4 Traffic Characteristics and Composition

The total approach traffic at Palika Bhawan intersection is 5281 PCU's during entire day while the traffic along Ring Road slip road is 24183 PCUs. The straight movement traffic from Mohammadpur to Sarojini Nagar along Africa Avenue Road is 19800 PCU's over entire day while left in and left out traffic to Shaheed Sudhir Tyagi Marg is 1770 and 1747 PCU's respectively over entire day.

7.1.5 Hourly Variation

The overall share of peak hour traffic of total traffic (PCU) is about 9% during morning peak hour and 8% during evening peak hour (***refer Exhibit 7.3***). It could be observed from charts that the evening peak hour is more intense compared to morning peak which extends over longer period.

Exhibit 7.3: Hourly Variation of Traffic at Mid-Block Location



Source: Study Team

7.1.5 Traffic Projection

The projection of base year traffic (existing approaching traffic during peak hour) and also of generated traffic from proposed Site (generated by additional land uses) has been carried out. The developmental traffic has been estimated due to proposed land used around the project site which is added to estimate the cumulative traffic. The traffic projection and capacity analysis based on existing network characteristics (Carriageway widths/number of effective

lane) during morning peak hour and evening peak hour are presented in ***Table 7.1.1***. The potential generated traffic from developing area around the project site has been assumed and added to the generated traffic. It is considered that about 10% of existing traffic will likely be added by year 2021 AD as a developmental traffic to the existing traffic and generated traffic from proposed project site.

The Traffic Impact Assessment has been carried out for the base traffic, incremental traffic due to proposed additional floor and developmental traffic due to adjacent land uses around project site. The capacity analysis of adjacent network of project site is graphically presented in ***Exhibit 7.4 (a)*** and ***Exhibit 7.4 (b)*** for morning peak and evening peak hour respectively.

The comparative analysis of Traffic in horizon year "with" and "without" project has been undertaken and presented in ***Table 7.1.2***. It is evident from the analysis that the generated traffic from project site is not likely to have adverse impact on surrounding network.

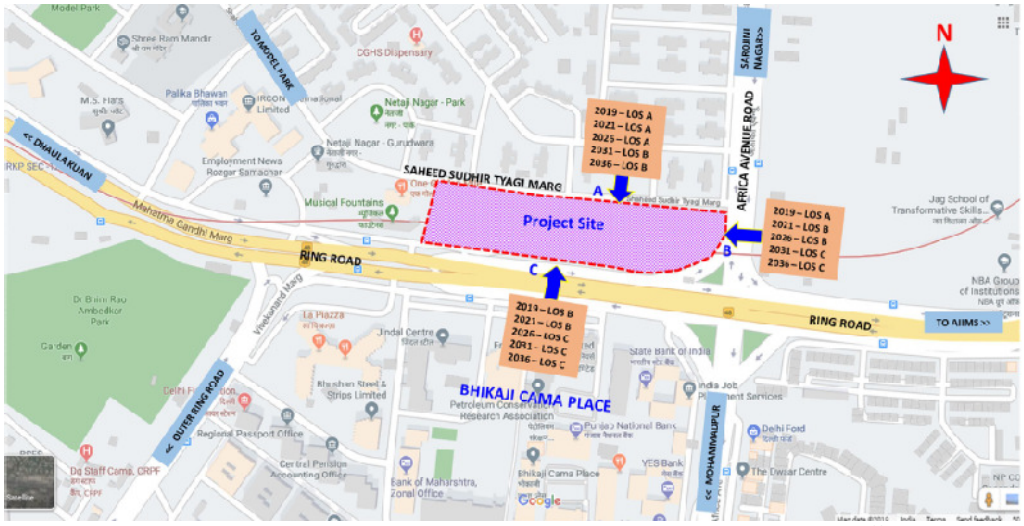
Table 7.1.1: Total Traffic Forecast and Capacity Analysis

Year	Location	Approach	Base Year Volume	Generated Traffic from Project Site	Total Traffic	Volume/ Capacity Ratio	Level of Service "LOS"
2019	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	369	NA	369	0.18	LOS A
	B	Africa Avenue Marg	1755		1755	0.34	LOS A
	C	Ring Road Slip Road	2135		2135	0.42	LOS B
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	263	NA	263	0.13	LOS A
	B	Africa Avenue Marg	2253		2253	0.44	LOS B
	C	Ring Road Slip Road	2153		2153	0.42	LOS B
2021	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	407	193	600	0.30	LOS A
	B	Africa Avenue Marg	1935	293	2227	0.43	LOS B
	C	Ring Road Slip Road	2354	292	2645	0.51	LOS B
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	290	327	617	0.31	LOS A
	B	Africa Avenue Marg	2484	451	2935	0.57	LOS C
	C	Ring Road Slip Road	2374	366	2740	0.53	LOS B
2026	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	472	193	665	0.33	LOS A
	B	Africa Avenue Marg	2243	293	2536	0.49	LOS B
	C	Ring Road Slip Road	2729	292	3020	0.59	LOS C
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	336	327	664	0.33	LOS A
	B	Africa Avenue Marg	2880	451	3331	0.65	LOS C
	C	Ring Road Slip Road	2752	366	3118	0.61	LOS C
2031	Morning Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	547	193	740	0.37	LOS B
	B	Africa Avenue Marg	2600	293	2893	0.56	LOS C
	C	Ring Road Slip Road	3163	292	3455	0.67	LOS C
	Evening Peak Hour						
	A	Shaheed Sudhir Tyagi Marg	390	327	717	0.36	LOS B
	B	Africa Avenue Marg	3338	451	3789	0.74	LOS C
	C	Ring Road Slip Road	3190	366	3556	0.69	LOS C

Year	Location	Approach	Base Year Volume	Generated Traffic from Project Site	Total Traffic	Volume/ Capacity Ratio	Level of Service "LOS"
			Morning Peak Hour				
2036	A	Shaheed Suchir Tyagi Marg	634	193	827	0.41	LOS B
	B	Africa Avenue Marg	3014	293	3307	0.64	LOS C
	C	Ring Road Slip Road	3667	292	3959	0.77	LOS C
			Evening Peak Hour				
	A	Shaheed Suchir Tyagi Marg	452	327	779	0.39	LOS B
	B	Africa Avenue Marg	3870	451	4321	0.84	LOS D
	C	Ring Road Slip Road	3698	365	4064	0.79	LOS D

Source: Study Team-Traffic Consultants

Exhibit 7.4 (a): Capacity Analysis of Cumulative Traffic (Base + Generated+ Developmental) Morning Peak Hour



Source: Study Team-Traffic Consultants

Exhibit 7.4 (b): Capacity Analysis of Cumulative Traffic (Base + Generated+ Developmental) Evening Peak Hour

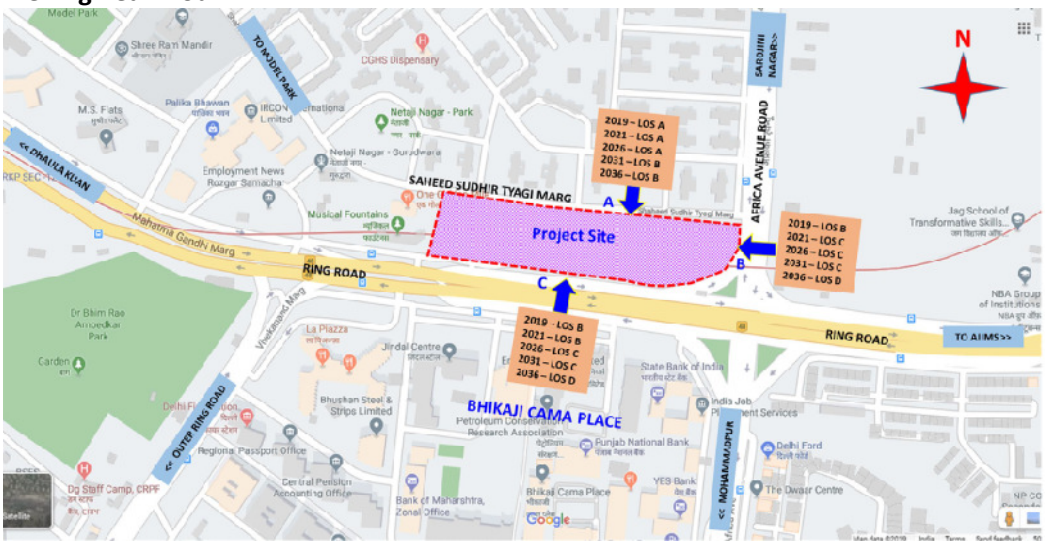


Table 7.1.2: Capacity Analysis for With and Without Project

Year	Location	Approach Road	Without Project			With Project		
			Traffic Volume (PCU)	V/c Ratio	LOS	Traffic Volume (PCU)	V/c Ratio	LOS
Morning Peak Hour								
2019	A	Shaheed Sudhir Tyagi Marg	369	0.18	LOS A	369	0.18	LOS A
	B	Africa Avenue Marg	1755	0.34	LOS A	1755	0.34	LOS A
	C	Ring Road Slip Road	2135	0.42	LOS B	2135	0.42	LOS B
2021	A	Shaheed Sudhir Tyagi Marg	407	0.20	LOS A	600	0.30	LOS A
	B	Africa Avenue Marg	1935	0.38	LOS B	2227	0.43	LOS B
	C	Ring Road Slip Road	2354	0.46	LOS B	2645	0.51	LOS B
2026	A	Shaheed Sudhir Tyagi Marg	472	0.24	LOS A	665	0.33	LOS A
	B	Africa Avenue Marg	2243	0.44	LOS B	2536	0.49	LOS B
	C	Ring Road Slip Road	2729	0.53	LOS B	3020	0.59	LOS C
2031	A	Shaheed Sudhir Tyagi Marg	547	0.27	LOS A	740	0.37	LOS B
	B	Africa Avenue Marg	2600	0.51	LOS B	2893	0.56	LOS C
	C	Ring Road Slip Road	3163	0.62	LOS C	3455	0.67	LOS C
2036	A	Shaheed Sudhir Tyagi Marg	634	0.32	LOS A	827	0.41	LOS B
	B	Africa Avenue Marg	3014	0.59	LOS C	3307	0.64	LOS C
	C	Ring Road Slip Road	3667	0.71	LOS C	3959	0.77	LOS C
Evening Peak Hour								
2019	A	Shaheed Sudhir Tyagi Marg	263	0.13	LOS A	263	0.13	LOS A
	B	Africa Avenue Marg	2253	0.44	LOS B	2253	0.44	LOS B
	C	Ring Road Slip Road	2153	0.42	LOS B	2153	0.42	LOS B
2021	A	Shaheed Sudhir Tyagi Marg	290	0.14	LOS A	617	0.31	LOS A
	B	Africa Avenue Marg	2484	0.48	LOS B	2935	0.57	LOS C
	C	Ring Road Slip Road	2374	0.46	LOS B	2740	0.53	LOS B
2026	A	Shaheed Sudhir Tyagi Marg	336	0.17	LOS A	664	0.33	LOS A
	B	Africa Avenue Marg	2880	0.56	LOS C	3331	0.65	LOS C
	C	Ring Road Slip Road	2752	0.54	LOS B	3118	0.61	LOS C
2031	A	Shaheed Sudhir Tyagi Marg	390	0.19	LOS A	717	0.36	LOS B
	B	Africa Avenue Marg	3338	0.65	LOS C	3789	0.74	LOS C
	C	Ring Road Slip Road	3190	0.62	LOS C	3556	0.69	LOS C
2036	A	Shaheed Sudhir Tyagi Marg	452	0.23	LOS A	779	0.39	LOS B
	B	Africa Avenue Marg	3870	0.75	LOS C	4321	0.84	LOS D
	C	Ring Road Slip Road	3698	0.72	LOS C	4064	0.79	LOS D

Source: Study Team –Traffic Consultants

**With Project-Including additional population*
**Without project-excl. additional population*

Stable Flow
Unstable Flow
Congested Flow

7.1.6 Traffic Densities within 5-Km Radius of the Project Site

The project site would generate insignificant traffic during peak hour and the project site will may not cause any significant impact on road network or land use in immediate surrounding (within 1 km radius) or over area wide road network (approximately 5 km around project site) due to traffic dispersal on adjacent intersections.

Around the project site, four low density residential settlements for the government employees *i.e.* Netaji Nagar, Sarojini Nagar, Nauroji Nagar and Mohammadpur are being developed as high density residential colonies under the GPRA scheme of Ministry of Housing and Urban Affairs. Each of these colonies have been planned and their environment/ traffic impact assessment studies have been carried out and the mitigation measures suggested by respective development agencies/ developers. In addition, a traffic decongestion plan of ring road has been prepared which will be a 9 km long elevated corridor between Moolchand and Africa Avenue. In addition, extension of elevated Barapulla Corridor from INA to Airport is proposed. These two corridors will helpful in alleviating the adverse impact due to traffic generated by these 9 GPRA colonies. The nodal agency for execution of these projects appointed a consultant to carry out a composite Traffic Impact assessment study for all the seven GPRA colonies along Ring Road. This study estimated the likely impact of all the colonies and suggested mitigation measures to minimize the impact.

7.1.7 Traffic Management Plan

- Provision for separate entry and exit;
- Provision for Hollow plinth, open & basement Parking ;
- Provision for internal minimum 6 m wide roads within the project premises;
- Provision for uninterrupted movement of fire tender and ambulance;
- Traffic control by trained staff;
- Proper signage for entry, exit & vehicle's parking;
- The road markings, Lane markings, Signs and Signage are clearly shown;
- Footpaths will be well prepared using interlocking blocks;
- To establish smooth entry and exit of vehicles, bell mouth shape geometry is provided at the gates.
- Rubber humps are introduced for the outgoing vehicles at the exit gate drive way. Not more than 3 m from the gate.
- All gates are manned with efficient security who can guide the entry and exit of vehicles.
- Solar blinker lights must be used at the gate to caution vehicles which are moving out.
- Sign boards are also installed to this effect & indicating the hump at least 20m before once and again 10 m before the hump location.
- All precautionary measures are ensured for the safety of construction labourers while working at the site.
- Adequate sign & guide posts for traffic as per IRC (Indian Roads Congress) to be installed.
- Road marking, STOP lines, parking lanes, slot numbers etc, must be clearly painted so as to guide the drivers.
- On street parking on approach roads outside the project site is proposed to be prohibited through regulatory measures. At the entry/ exit gates of project site, parking will be strictly prohibited to facilitate easy entry and exit as well to maintain sight distance for safety of entering and leaving traffic.

- Traffic Calming measures to be introduced along Shaheed Sudhir Tyagi Marg.
- The signage scheme within and around the project site is proposed to provide adequate information, in time and every time, in a simple sign language which will be appropriate for road users and as per IRC guidelines so that they can take safe measures , in time, with minimum confusion.
- Pedestrians outside and inside the project site are proposed to be guided through signs and protected through footpath about 150 mm above the road surface. Wherever the pedestrians cross the road, a ramp of suitable gradients (1 in 12) is proposed to interchange between levels. On the road, Zebra crossings are suggested to guide the crossing pedestrians.

7.1.8 Conclusions

During most intense peak hour, the generated traffic from project site is only 301 Passenger Car Units (PCU) which is insignificant. The pollution load from additional 301 PCU's shall be in the tune of – $PM_{2.5}$: 100.233 gm/km, NOx: 349.762 gm/km, CO: 1664.53 gm/km, VOC: 311.836 gm/km which is very insignificant, considering the emission factor for 4-wheeler as PM 2.5=0.333 gm/km, NOx: 1.162 gm/km, CO: 5.530 gm/km and VOC: 1.036 gm/km. Hence it could be said that the project site will contribute insignificant traffic to adjacent road network and hence cause no impact on the adjacent road network.

In terms of volume capacity ratio, the project site is a negligible addition. As the contribution of generated traffic from the augmented facility to the existing road capacity is barely 1.5% to 8% of total road capacity. However it is necessary to correct the situation for future by suggesting few mitigating measures along immediate road network.

7.2 HAZARD IDENTIFIED AT SITE

Emergency prevention through good design, operation, maintenance and inspection are essential to reduce the probability of occurrence and consequential effect of such eventualities. The overall objective of the Emergency Response Plan ('ERP') is to make use of the combined resources at the site and outside services to achieve the following:

- Localize the emergency ;
- Minimize effects on property and people;
- Effective rescue and medical treatment ;
- Evacuation.

Major hazards identified include:

- Hazards pertaining to fires in buildings;
- Fire in diesel storage areas;
- Earthquakes;
- LPG gas leak.

7.3 RISK ASSESSMENT & DISASTER MANAGEMENT PLAN (DMP)

The proposed PD building shall house the lives of a large number of people. It also involves installation of various structures and machineries that meet the comfort and needs of its population but may also pose serious threat to the occupants in case of an accident. It is thus

considered necessary to carry out a risk assessment and disaster management plan for the project.

It is attempted to plan and construct the buildings following all safety norms. However, it is not always possible to totally eliminate such eventualities and random failures of equipment or human errors. An essential part of major hazard control has, therefore, to be concerned with mitigating the effects of such emergency and restoration of normalcy at the earliest. Details are presented in the ***Table 7.3.1*** depicting the major hazard threat and its corrective actions.

Table 7.3.1: Anticipated Hazard/Risk vis-à-vis Corrective Actions

Anticipated Hazard	Corrective/Control Actions
Manual Handling	
-Strains and sprains due to incorrect lifting - too heavy loads -twisting, bending, repetitive movement -body vibration.	-Exercise/warm up - get help when needed - control loads - rest breaks/no exhaustion - no rapid movement /twisting/ bending / repetitive movement - Good housekeeping.
Falls - Slips - Trips	
Falls on same level - falls to surfaces below - poor housekeeping - slippery surfaces - uneven surfaces - poor access to work areas climbing on and off plant - unloading materials into excavations wind - falling objects.	- Good Housekeeping - tidy workplace - guardrails, handholds, harnesses, hole cover, hoarding, no slippery floors/trip hazards - clear/ safe access to work areas - egress from work areas - dust/water controlled - PPE.
Fire	
-Flammable liquids/Gases like LPG, -Diesel Storage area and combustible building materials - poor housekeeping - grinding sparks - open flames, absence of Fire hydrant network.	- Combustible/flammable materials properly stored/used - good housekeeping - fire extinguishers made available & Fire hydrant Network with reserve Fire water (As per NFPA Code) - Emergency Plan in case of Fire or collapse of structure.
Absence of Personal Protective Equipment	
-Lack of adequate footwear - head protection - hearing/eye protection - respiratory protection - gloves -goggles.	-Head/face - footwear - hearing/eye - skin - respiratory protection provided - training - maintenance

Anticipated Hazard	Corrective/Control Actions
Defective or wrong Hand Tools	
- Wrong tool - defective tool - struck by flying debris - caught in or on - missing guards	- Right tool for the job - proper use of tools - good condition/ maintenance guards - isolation/ proper demarcation of work space - eye/face protection - flying debris controlled
Electricity	
- Electrocution - overhead/underground services - any leads damaged or poorly insulated - temporary repairs -no testing and tagging - circuits overloaded - non use of protective devices.	-Leads good condition and earthed - no temporary repairs - no exposed wires - good insulation - no overloading - use of protective devices testing and tagging - no overhead/ underground services
Scaffolding	
- Poor foundation - lack of ladder access insufficient planking - lack of guardrails and toe boards - insufficient ties or other means - all scaffolds incorrectly braced or stabilized to prevent overturning.	-All scaffolds correctly braced and stabilized - 3:1 height to base ratio - firm foundation, plumb and level - ladder access provided and used - proper platform (3 planks/675 mm) - planks secured - guardrails and toe boards - 900 mm to 1100 mm high, within 200 mm of working face.
Ladders	
-Carrying loads - not secured against dislodgement - defective ladders - not sufficient length - wrong positions - incorrectly placed (angles, in access ways, vehicle movements.	-Secured against movement or footed - ladders in good condition - regularly inspected - extend 1m above platform - 4:1 angle - out of access ways, vehicle movements - not carrying loads - 3 points of contact - no higher than 3rd step down - use for access only, not working platforms
Excavations	
-Trench collapse - material falling in undetected underground services - falls - hazardous atmosphere struck by traffic and mobile plant.	- Soil stability known - no water accumulation - existing services known - material 600mm from edge - clear of suspended loads - hardhats/PPE - ladders - public protection – atmospheric testing

Anticipated Hazard	Corrective/Control Actions
	- traffic controls - Emergency Plan.
Gas Cutting and Welding	
- Fire - welding flash, burns, fumes, electrocution in wet conditions - flashback in oxygen set, leaking cylinders, acetylene cylinders lying down - poorly maintained leads.	- Welding flash and burns controlled with PPE and shields - fumes controlled with ventilation and PPE (in good condition and properly positioned),Gas cylinders be kept upright & secured position (properly tied) - Combustible materials to be kept at secured place to avoid fire & Fire Extinguishers to be kept in fire prone area with training to people for its use.
Falling Material	
- Fall during carrying/Lifting materials dislodged tools and materials from overhead work areas.	-Materials to be secured - kept away from edge - toe boards - Use of hard hats.
Crane and Lifts	
- Display of carrying capacity *i.e.* load (No. of persons), incorrectly slung, defective lifting equipment, unsecured loads, craning in close proximity to building people and plant - falls - falling materials.	- Periodic testing by competent authority - correctly slung/secured loads, lifting equipment good condition - use of proper hand signals - falls while unloading controlled.
Visitors Presence at site	
- Falls - struck by dropped materials - road accidents - insufficient hoarding or fencing - pedestrian access past site - mechanical plant movement on and off site.	- Sufficient hoarding - fencing and barricades - safe pedestrian access past site traffic management for loading and delivery - Construction separated from occupied areas of projects.

Source: Study Team

7.4 EMERGENCY RESPONSE PLAN (ERP)

The overall objective of an Emergency Response Plan (ERP) is to make use of the combined resources at the site and outside services to achieve the following:

- To localize the emergency and if possible eliminate it;
- To minimize the effects of the accident on people and property;
- Effect the rescue and medical treatment of casualties;
- Safeguard other people;
- Evacuate people to safe areas;
- Informing and collaborating with statutory authorities;
- Initially contain and ultimately bring the incident under control;

- Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the emergency;
- Investigating and taking steps to prevent reoccurrence.

The ERP is therefore related to identification of sources from which hazards can arise and the maximum credible loss scenario that can take place in the concerned area. The plan takes into account the maximum credible loss scenario - actions that can successfully mitigate the effects of losses/ emergency need to be well planned so that they would require less effort and resources to control and terminate emergencies, should the same occur.

Main hazards identified for the project include hazards pertaining to fires in buildings and fire in diesel storage areas, earthquake and LPG leakage and an ERP pertaining to these is described in the following sections.

7.4.1 Response in Case of Earthquake

Earthquake

An earthquake poses a major threat to the property, life and environment. Some of the effects of an earthquake are ground shaking, ground lateral displacement, ground uplift, ground settlement, soil liquefaction and fires. Though the earthquake is not a regular phenomenon in this region, the possibility of its occurrence cannot be ruled out especially since occasional shocks are perceived sometimes.

As per the geological map published by Geological Survey of India, Project area is categorized in the seismic Zone IV which comes under the high risk zone.

Keeping in view the risk of earthquake, the structural design is as per Zone IV to safeguard the structures from the risk of earthquake.

1) Response Procedures for Occupants

If indoors*:*

- Cover yourself under a piece of heavy furniture or against an inside wall and hold on.
- Stay inside: The most dangerous thing to do during the shaking of an earthquake is to try to leave the building because objects can fall on you.

If outdoors:

Move into the open, away from buildings, streetlights, and utility wires. Once in the open, stay there until the shaking stops.

If in a moving vehicle:

Stop quickly and stay in the vehicle. Move to a clear area away from buildings, trees, overpasses, or utility wires. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake.

After the quake

- After the quake be prepared for aftershocks.
- Although smaller than the main shock, aftershocks cause additional damage and may bring weakened structures down. Aftershocks can occur in the first hours, days, weeks, or even months after the quake.

Help injured or trapped persons.

- Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. Call for help.
- Remember to help those who may require special assistance--infants, the elderly, and people with disabilities.
- Stay out of damaged buildings.
- Use the telephone only for emergency calls.

Cyclone

All the construction work is designed to withstand wind speed. The strategic actions during a cyclone can be activated by receiving advance information from the local meteorological department as well as from Disaster Management Centre of Govt. of Gujarat. While establishing strategic actions that need to be taken during such scenarios, factors such as poor communication, loss of utilities, disrupted logistics and life-threatening rescue facilities will be considered.

Flood

A flood is an overflow of water that submerges land, which is normally dry. Floods can happen on flat or low-lying areas when the ground is saturated and water either cannot run off or cannot run off quickly enough to stop accumulating. Project site area is almost flat with adequate drainage pattern network so storm water cannot flood the area. Slopes are given along with the roadside, so that Rainwater will get collected in collection pits and eventually flow through the storm water network.

7.4.2 Response Procedure for Emergency Team

- Formulate an Emergency Response Team for earthquake response.
- Using the public address system, inform residents of response procedures discussed above.
- Inform the necessary authorities for aid.
- Ensure no person is stuck beneath any debris, in case of a structural failure.
- Ensure that all occupants standing outside near the buildings are taken to open areas.
- Ensure that the first aid ambulance and fire tender vehicles are summoned if necessary.
- Inform the nearby hospitals if there are any injuries.
- Check the utilities and storage tanks for any damage.

7.5 RESPONSE FOR LPG LEAKAGE

- The affected area should be evacuated and cordoned off immediately
- Initiate an Emergency Response Team for LPG leakage.
- Shut down the main valves in the gas bank.
- Ensure that only concerned personnel are present in the affected area and all other personnel and visitors are moved to the nearest assembly points.
- Rescue trapped personnel, also check if any personnel are unconscious in the area and immediately move them outside and provide first aid. Ambulance should be summoned to take injured personnel to the nearest hospital.
- Personnel in the nearby buildings to close all doors and windows to prevent entry of the leaked gas.
- Source of leakage to be traced and isolated from all the other areas. And if required use pedestal fans to bring down the gas concentration.
- In case of a fire follow the instructions in case of fire.

7.6 RESPONSE IN CASE OF FIRE

- Required response during in the event of a fire should be described in signs located in the lobby.
- On sighting a fire, it should be immediately informed to the Incident Controller giving the exact location and type of fire in detail.
- Initiate the Emergency Response Team for fires.
- If the fire is small, engage in extinguishing the fire using the nearest fire extinguisher.
- Guide the Emergency Response Team staff to the emergency assembly point.
- The Emergency Response Team should immediately inform the nearest dispensary and security force. If required a fire tender should be summoned.
- The response team should immediately move to the point of fire and take all necessary steps to stop the fire. If the fire is not controllable and spreads then the manager in charge should inform the district authorities and call for external help.
- The Emergency Response Team will provide immediate relief to the injured residents at the scene of incident. Any injured persons should be evacuated on priority to the dispensary or one of the nearest hospitals based on their condition.

Instructions for occupants

- Get out of buildings as quickly and as safely as possible.
- Use the stairs to escape. When evacuating, stay low to the ground.
- If possible, cover mouth with a cloth to avoid inhaling smoke and gases.
- Close doors in each room after escaping to delay the spread of the fire.
- If smoke is pouring in around the bottom of the door or if it feels hot, keep the door closed.
- Open a window to escape or for fresh air while awaiting rescue.
- If there is no smoke at the bottom or top and the door is not hot, then open the door slowly.
- If there is too much smoke or fire in the hall, slam the door shut.
- Stay out of damaged buildings.
- Check that all wiring and utilities are safe.

A state of the art fire fighting system is proposed for the project to prevent and control fire outbreaks. The fire fighting system will consist of portable fire extinguishers, hose reel, wet riser, yard hydrant, automatic sprinkler system, and manual fire alarm system. The entire PD Complex shall be provided with automatic fire detection and alarm system.

7.6.1 Fire and Safety

Adequate fire protection facilities will be installed including fire detectors, fire alarm and firefighting system to guard the building against fire. All fire protection facilities will be designed as per the National Building Code 2016. Maximum height of the building is 27.30 meter. Nearest fire station from the project site is Bhikaji Cama Place Fire station at ~ 0.750 km in SSW direction. The fire tender will take approx. 2-5 min to reach the project site during emergency.

Fire-fighting installation system

According to prospective plans, fire-fighting arrangements in all building blocks will be provided considering maximum building height as per NBC of India, 2016, Part 4: Fire and life safety as below:

- Fire Extinguisher;
- Hose reel ;
- Wet riser ;
- Yard hydrant;
- Automatic sprinkler system;
- Manually operated electric fire alarm system ;
- Underground static water storage tank: 75,000 L;
- Terrace tank: 26000 L, pump near underground static water storage tank: one electric and one diesel pump of capacity 280 L/min each and one electric pump of capacity 180 L/Min.

7.7 EVACUATION, ESCAPE AND RESCUE (EER) PLAN

In a major emergency, it will be necessary to evacuate personnel from effective areas and as a safety measure to further evacuate non-essential workers from areas likely to be affected should the emergency escalate. Arrangements could include announcements over the public address system or through other suitable means. On evacuation, staff/guests should be directed to pre-determined assembly points already explained earlier. If they are required to be evacuated outside the site and at a remote place, their transportation will be necessary for which vehicles will be required. During the evacuation, announcements should continue to all areas of the building to reassure guests and employees.

7.7.1 Training

- Training pamphlet will be provided to every occupant;
- Mock drills and training on safety aspects will be provided to all the staff & residents;
- Training in use of first aid kit.

7.7.2 General Measure

- The fire water tank will be always full loaded & there will be fire engine & diesel engine, in case of power backup
- Safe assembly points
- Fire/emergency exit boards will be displayed at suitable locations
- Proper signage
- Emergency lighting will be provided in D.G. Area, Lifts and common area
- Lighting of adequate capacity and luminous will be provided to illuminate areas during dark
- Lighting signage will be provided to guide during emergencies.
- First aid kit will be provided.

7.8 EVALUATION OF FUNCTIONING OF DISASTER MANAGEMENT PLAN

In order to evaluate the functioning and effectiveness of procedures laid in Disaster Management Plan, regular mock drills are conducted. The Mock drills are carried out step by step as stated below:

First Step	Test the effectiveness of communication system.
Second Step	Test the speed of mobilization of the emergency teams.
Third Step	Test the effectiveness of search, rescue and treatment of casualties.
Fourth Step	Test emergency isolation and remedial measures taken on the system.
Fifth Step	Conduct a full rehearsal of all the actions to be taken during an emergency.

There are two types of mock drills recommended in Disaster Management Plan-Full Mock Drill (to be conducted at least once in 6 months) and Disaster Management Efficacy Drill (to be conducted at least once in 3 months). The details of these drills are presented in following sections.

Full Mock Drill

This shall be conducted with Plant Head as Chairman; Head of O&M as Vice Chairman; Heads of Operation, Maintenance, Medical, Personnel, CISF, Auto Base and Materials as Members and Head of Safety as Convener and it shall test the following:

- Functioning of Emergency Control Center, specifically availability of all facilities *etc.* as mentioned in the DMP and its functional healthiness.
- To evaluate communication of the DMP to all occupants and employees of the PD Complex, to familiarize them about their responsibilities in case of any disaster including evaluation of behavior of others.
- To ensure that all facilities as required under the plan from within or from nearby industries / aid center under mutual assistance scheme or otherwise are available.
- To ensure that the necessities under material assistance scheme is properly documented and the concerned employees are fully aware in this regard.

- To ensure that employees are fully aware to fight any emergency like sealing of chlorine leakage, fire fighting other such cause.

The Disaster Management Plan shall be periodically revised based on experiences gained from the mock drills.

Emergency Helpline Numbers

Police	100
Fire Station	101
Ambulance	108

Chapter 8
Project Benefits

Chapter 8
Project Benefits

8.1 RATIONALE

The proposed PD Complex shall be established in the core of the business hub which will bring new avenues for business opportunities. Being strategically and conveniently located in the heart of Delhi, it will attract business houses as it is well connected with all means of transport facilities, surrounded by five star hotel and backed by well developed public amenities. It will give new dimension and definition to the commercial complex and set an example for others.

Overall, following benefits are envisaged out of the proposed project:

- Indirect employments in transportation and construction allied sectors;
- During operation phase, long-term job opportunities will be created in terms of security, housekeeping and gardening personnel which will lead to increase their living standard;
- Exposure of modernized infrastructural & technological facilities due to proposed project activities will helpful to boost knowledge of employees, workers, locals.
- Increase in income of local population;
- 30% of the plot area shall be developed as landscape area /green belt, which will enhance the beauty and aesthetics of the project area;
- Adequate parking space for occupants and visitors;
- Good solid waste management system consisting of proper collection, designated storage, provision of composting facility for bio degradable waste disposal;
- Effective site security with separate entry-exit checks;
- Project will set a good example for surrounding area about good solid waste management system consisting of proper collection, storage and disposal facility.

8.2 EMPLOYMENT POTENTIAL

The employment potential shall increase with the start of construction activities, reach a peak during construction phase and then reduce with completion of construction activities. During operation phase also there will be employment opportunities, mainly in service sector, although its magnitude will be much less.

During the construction period of two years, it is estimated that about 100 workers shall be employed directly/indirectly locally.

After completion of the project construction activities, employment opportunities shall be generated by the selected agency, who will own, operate and maintain the complex. It is expected that about 150 staff shall be employed directly in restaurant and maintenance segment. At the same time about 150 workforce shall get indirect employment in the various ancillary activities like security, technicians, gardener, *etc.* The direct employment opportunities with DMRC are extremely limited and the opportunities exist mainly with the contractors and sub-contractors. These agencies will be persuaded to provide the jobs to local persons on a preferential basis wherever feasible.

8.3 ECONOMIC FRONT

The proposed PD Complex project has been initiated with the aim to generate sustainable revenue for the DMRC as mandated by the Ministry of Housing and Urban Affairs (MoHUA), Government of India. It will not only bring revenue to the DMRC but also open several avenues for the locals and boost economy. It will open door for the locals with several ancillary business opportunities especially in the service sectors. It will be helpful in uplifting the economy of the local government also.

It is expected that about INR 80 crore investments earmarked for the proposed PD Complex project shall boost the local economy.

Chapter 9

Environmental Management Plan

Chapter 9
E n v i r o n m e n t a l Management Plan

9.0 ENVIRONMENTAL MANAGEMENT PLAN-*Rationale*

This chapter presents a broad Environmental Management Plan (EMP) based on the significant environmental impacts and mitigation measures, discussed in the preceding Chapter 4.

While it was not possible to avoid or reverse all of the adverse impacts of the proposed project, an effort has been made to address some of the significant impacts, by careful consideration and selection of pollution control systems and mitigation measures. Further, suitable measures to minimize, control and manage the residual environmental impacts have been identified and described in the EMP in this chapter.

The EMP has been prepared based on a hierarchy of impact avoidance, minimization, mitigation and control of residual impacts, for both, construction and operation phases for all the relevant environmental attributes. It describes administrative aspects of ensuring that mitigatory measures are implemented and their effectiveness is monitored over the life of the project. This chapter also proposes green belt development plan.

Mitigation measures have been identified along with the following supporting aspects for effective implementation of the proposed EMP:

- Institutional arrangements, human resource requirements and their role & responsibilities;
- Budgetary estimates of financial resources required;
- Performance indicators for tracking mitigation measures.

EMP includes four major elements:

- **Commitment and Policy**: The proposed project management will strive to provide and implement the Environmental Management Plan that incorporates all issues related to air, noise, land, and water.
- **Planning**: This includes identification of environmental impacts, legal requirements and setting environmental objectives. The various potential impacts of project are discussed in Chapter 4.0.
- **Implementation**: This comprises of resources available to the developers, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken.
- **Measurement & Evaluation**: This includes monitoring, corrective actions, and record keeping.

EMP specifies various technological measures for pollution prevention, waste minimization, end-of-pipe treatment, attenuation *etc.* proposed to be undertaken to mitigate the environmental impacts on each sector of environment during each phase of the project, *i.e.* construction phase and operation phase. The responsibility for implementation for all mitigatory measures rests with DMRC. However, at this stage, it is not feasible to give a detailed physical and financial plan for individual measures.

9.1 STAGE WISE ACTIVITIES OF ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides guidance on how the project activities are to be planned, implemented and monitored in order to minimize and manage environmental and social impacts. ***Table 9.1.1, Table 9.1.2*** **and** ***Table 9.1.3*** summarize the main management activities for significant adverse impacts in Planning/Design, Construction and Operation stages respectively. They provide mitigation/management measures for significant impacts and an estimated budget provision for their implementation. They also identify the parties to incur the costs and implement the measures.

Table 9.1.1: Environmental Management Plan and Responsibilities during Planning/Design Phase

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision & Reporting		
Land Acquisition	- In the present project, the land has been allocated by the Ministry of Housing & Urban Affairs, Government of India. -It should be ensured that the proposed development should be in coherence with the Master Plan 2021 of Delhi.	DMRC	DMRC	Government of NCT Delhi	The Cost of the Land has already been paid.
Tree Cutting & Afforestation	- Avoidance of non-essential tree-cutting -Cutting of old trees such as banyan and other native species should be avoided -Cutting of firewood within the natural areas should not be allowed -Cutting of vegetation should be avoided which may lead to complete breakage of canopy cover in closed-canopy forests - Planting of alien tree species such as eucalyptus and acacia wattles should not be taken up -Any grove or tree deemed sacred by local communities and related places of worship should not be felled -Should avoid felling of all banyan, peepal, neem, and tamarind trees, and any other species valued by local communities as determined through open consultations or deemed useful for local people -Clearing should not be undertaken in such a manner that there is slashing of all under-storey vegetation - Green belt development around the periphery of the PD Complex should be taken up.	Design Consultant and Contractor	DMRC	Forest Department, Govt. of NCTD	Not Available
Concrete Batching Plants	- Arrangements to control dust pollution including respirable dust through provision of wind screens, water sprinklers, and dust suppressant and extraction systems should be provided at all such sites. - Specifications for crushers, and concrete batching plants should be designed to comply with the requirements of the relevant emission control legislation at the State level. - Consent for the establishment and operation from State Pollution Control Boards should be obtained before establishment and operation of work sites, respectively.	Design Consultant and Contractor	Engineer and Supervisor Consultant	DPCC, State Ground Water Authority,and State Department of Mines& Geology	Item specific cost not available
Construction	- All vehicles, equipment and machinery to be procured for	Design	DMRC	State	Item specific cost

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision & Reporting		
Vehicles, Equipment & Machinery	construction should conform to the relevant Bureau of India Standard (BIS) norms. - The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 1988 should be considered while procuring vehicles. - The silent/quiet equipment available in the market should be preferred.	Consultant and Contractor		Transport Department and DPCC	not available
Construction Water	- Ground /surface water for construction requires necessary permissions which should be obtained from the State Ground Water Authority	Design Consultant and Contractor	Engineer and Supervisor Consultant	CGWA	The statutory consent fees should be required to be paid by the DMRC
Quarry Areas	- Procurement of construction materials from quarries should be finalized after assessment of the availability of sufficient materials, quality, regulatory and other logistic arrangements. - Necessary clearances should be obtained for the locations selected from the statutory agencies like the State Pollution Control Boards and from the Mining Department. - Planning of haul roads for accessing quarry areas should be undertaken during this stage. - The haul roads should be routed to avoid agricultural areas as far as possible and will use existing village roads wherever available. - The sand should be procured from identified sand mines as far as possible. - Permissions to be obtained from the statutory departments of the state.	Design Consultant and Contractor	Engineer and Supervisor Consultant	State Govt. Mines & Geology Dept.	Item specific cost not available
Labour	- Unskilled labour required for the works should preferably be drawn from local communities to maximize their benefits.	Contractor	DMRC	Labor Department	Item specific cost not available

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision & Reporting		
Construction Camp	- The construction camps will be located at least 200 - 500 m away from habitations at identified sites to avoid conflicts and stress over the infrastructure facilities with the local community. - Location for stockyards of construction materials should be identified at least 500 m away from watercourses. - The sewage and solid waste treatment and management for the camp should be designed, built and operated (preferably by the respective contractor agencies). - The site used for camp should be adequately drained. - The camp must be located such that the drainage from and through the camps will not endanger any domestic or public water supply. - The labour camp/construction camp should be established as per the provision of ***Occupational Safety and Health Administration*.**	Contractor	DMRC	Revenue Department, Local Community, Municipal Corporation	Item specific cost not available
Disaster	- The seismic factors should be appropriately incorporated in the civil and structural designs of the proposed structures. - Services of an geologist should be used to identify any slope instability potential among the uniform rock structure.	Design Consultant and Contractor	DMRC	District Collectors, National Disaster Management Authority (NDMA)	Item specific cost not available
Labour Health and Welfare - HIV/AIDS	The project developers should make provisions for the prevention of HIV transmission amongst the workmen. A few of the recommendations are given below as an illustration: i. Easy availability of personal protection devices like condoms and diaphragms. ii. Sustained ICE activities and counseling mechanism. iii. Provide work breaks for periodic home visit holidays iv. Collaboration with local police to curb the sale and use of narcotics.	Contractor	DMRC	District Collector, Health Department	Built in Construction Cost
Women & Children's Rights	- Children and young person below the prescribed age (as defined in the respective statutes), should not be deployed at any stage of the project. - Women rights should be protected by the contractor agencies and suitable care & welfare services should be provided as necessary (such as crèche, feeding / changing rooms *etc.*)	Contractor	DMRC	District Collector	No cost envisaged
Labour Health & Safety	- During the construction phase, a large workforce is expected to be deployed.	Contractor	DMRC	District Health Department	Cost is built up in cost of the

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision & Reporting		
	- The construction period being assumed to be of 2 years, it is reasonably expected the workers to bring along their family. - A construction labour housing camp for the workers (should be established having provisions for health care facilities to the workforce. - Regular health check up of the deployed workforce (including employees and contracted employees) should be undertaken to see any degradation in health. This facility should be provided through the entrusted construction contractors, in line with the BOCW Act and Rules (State level). - OSHA guidelines (29-CFR) for Health and Safety should be adhered to.				construction
Ethnic Community and Indigenous People	- The right and interest of the ethnic community and indigenous people should be protected by the DMRC - Right of 'any section of the citizens' to 'conserve' its 'distinct language, script or culture'; [Article 29(1)] -Right of all Religious and Linguistic Minorities to establish and administer educational institutions of their choice;[Article 30(1)] - Freedom of Minority-managed educational institutions from discrimination in the matter of receiving aid from the State;[Article30(2)]	Design Consultants/Contractor	DMRC	Panchayat / Village community / Collector	Built in Construction Cost
Cultural and Religious site	- Following mitigation measures should be taken for the religious and cultural sites- • Construction yards/labour camp should be located 1000 m away from the religious structures/sites. • Enclosures should be provided at the construction sites which are close to religious sites • Effective noise barriers/screens should be provided close to working heavy equipment. • Night time working shall be avoided.	Design Consultants/Contractor	DMRC	Panchayat / Village community / Collector	Built in Construction Cost

Source: Study Team

Table 9.1.2: Environmental Management Plan and Responsibilities during Construction Phase

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Reporting		
Land Use	• Clearance of vegetation limited to project footprint. Proper management and use of top soil and its reuse for greenbelt development. Landscape development within site. • Use of excavated earth for backfilling. Maintain natural drainage pattern of the surrounding area as it is.	Contractor and Supervisor Consultants	DMRC	DPCC/CPCB	Item specific cost not available
Air Pollution	• Water sprinkling system should be put in place. • Use of mist spray • Covering the construction material/waste during transportation to/from the construction site should be considered to reduce diffusion of dust. • Equipment and trucks should be properly maintained at regular intervals. • Roads leading to or at construction sites must be paved and blacktopped (*i.e*. metallic roads). • No excavation of soil should be carried out without adequate dust mitigation measures in place. • No loose soil or sand or Construction & Demolition Waste or any other construction material that causes dust should be left uncovered. • Grinding and cutting of building materials in open area should be prohibited • Construction material and waste should be stored only within earmarked area and road side storage of construction material and waste should be prohibited • Uncovered vehicles carrying construction material and waste should not be permitted • Construction and Demolition Waste processing and disposal site should be identified and required dust mitigation measures be notified at the site. • Motorized vehicles at site should be restricted to a maximum speed of 10-15 kilometer/hr. These results in improved safety and less dust emission. • Wheel washing facility at exit of construction sites should be provided • Dust mitigation measures should be displayed prominently at the construction site for easy public viewing. • Lead free paints will be used	Contractor and Supervisor Consultants	DMRC	DPCC/CPCB	Item specific cost not available

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Reporting		
	• Regular preventive maintenance of the DG set will be carried out.				
Noise Pollution	• Construction activities generating high noise levels should be carried out at different time intervals to curtail the noise levels. • The equipment used should have exhaust mufflers to reduce noise levels. • All equipment should be properly lubricated. • The construction yards located near sensitive receptors should be provided with noise barriers. • Avoid night time activities. • Periodical inspection and effective maintenance of vehicle and equipment	Contractor and Supervisor Consultants	DMRC	DPCC/CPCB	Item specific cost not available
Clearing and Grubbing of Vegetation	• If required, vegetation should be removed from the construction zone before commencement of construction after obtaining necessary permissions. • All works should be carried out such that the damage or disruption to flora other than in those areas identified for cutting is kept to a bare minimum. • Trees identified under the project should be cut only after getting permission from the designated authorities	Contractor and Supervisor Consultants	DMRC	DPCC /CPCB	Item specific cost not available
Disposal of debris	• The construction and demolition waste generated during the construction phase should be managed in accordance with the C&D Waste Management Rules, 2016.	Contractor and Supervisor Consultants	DMRC	DPCC /CPCB	Item specific cost not available
Stripping, stocking and preservation of top soil	• Stockpile should be designed such that the slope does not exceed 1:2 (vertical to horizontal), and height of the pile is restricted to 2 m. To retain soil and to allow percolation of water, silt fencing will protect the edges of the pile. • Stockpiles will not be surcharged or otherwise loaded and multiple handling should be kept to a minimum to ensure that no compaction will occur. • The stockpiles should be covered with sheets or vegetation. • Proper drainage systems should be provided to prevent stagnation of water.	Contractor and Supervisor Consultants	DMRC	DPCC /CPCB	Item specific cost not available
Traffic diversions and detours	• The temporary traffic detours should be kept free of dust by sprinkling water during the daytime depending on weather conditions.	Contractor and Supervisor Consultants	DMRC	DPCC /CPCB	Item specific cost not available
Transporting Construction	• Dumpers and trucks carrying the construction material should be spill-proof.	Contractor	DMRC	DPCC /CPCB	Item specific cost not

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Reporting		
materials and haul road management	• Trucks and dumpers should be properly maintained. • Water should be sprinkled on the haulage roads. • Strict speed limits should be followed at the settlement areas and on the haulage roads. • All the truck and dumper drivers should be properly trained. • All the truck and dumper carrying materials should be properly covered.				available
Construction water use and wastewater generation from construction yard and labour camp	• If ground water is drawn then permission from the CGWA or equivalent State GW authority should be obtained. • The wastewater from construction yard and labour camp should be treated (as per applicable discharge standards) before being discharged into natural water bodies.	Contractor	DMRC	DPCC /CPCB	Item specific cost not available
Petroleum Oil and Lubricants	• Such products should be handled with special care. • The necessary permissions should be obtained for handling and use of the POL Products. • The used oil and lubricants should be sold to authorized parties. • The storage places for POL should have restricted entry. • Accidental spillage of oil and lubricant should be immediately cleared. • The trucks and dumpers will not be washed at the nearby water bodies, instead of that they should be cleaned in the construction yard and the waste water should be collected in a settling tank before it can be re-used for some other purposes.	Contractor	DMRC	DPCC /CPCB	Item specific cost not available
Public Health and Safety	• Barriers (e.g., temporary fence), should be created at construction areas to deter pedestrian access • The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation. • Speed restrictions should be imposed on deployed vehicles and equipment when traversing areas with sensitive receptors (residential, schools, temples, churches, hospitals *etc.*). • Marshaling attendants should be provided at traffic junctions outside construction yard sites to regulate material / construction vehicles and general vehicular traffic / pedestrians in a safe manner. • Traffic diversion plans should be prepared / executed and communicated in areas where construction is being carried out on or near existing roads / highways. These plans should be approved by the local traffic police office.	Contractor	DMRC	DPCC /CPCB	Item specific cost not available

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Reporting		
Construction Yards	• Site construction yards should minimize adverse impacts by good management practices. • Implement malaria control, HIV/AIDS education. • Plan and carry out post construction site clean-up.	Contractor	DMRC	DPCC /CPCB	Item specific cost not available
Installation and Operation / Maintenance of Electrical Equipment	• All necessary fencing and lights should be provided to protect the public in construction zones. • All machines to be used in the construction should be kept in good working order, and should be regularly inspected and properly maintained.	Contractor	DMRC	DPCC /CPCB	Item specific cost not available
Establishment and Operation of the Labour Camps	• The labour camp should be established as per the OSHA guidelines • Labour Camp should be provided with adequate treatment system and drainage to avoid accumulation of stagnant wastewater. • COVID 19 precautionary measures should be put in place. • The following facilities should be provided at the workers' camps: • Washing facilities or showers should be provided at the workers' camps. • Toilets/sanitation facilities with proper flushing provisions in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities should be well maintained to allow effective operation. • Accommodation for taking meals and for shelters during interruption of work due to adverse weather conditions. • First aid room or station under the charge of qualified first aid personnel or a nurse should be provided at a readily accessible place for treatment of minor injuries and as a rest place for seriously sick or injured workers. • Construction equipment should be operated by workers who have received appropriate training in accordance with laws and regulations. • The drivers and operators of vehicles and materials handling equipment should be medically fit, trained and qualified and of at least the prescribed minimum age as required by the government rules and regulation. • Suitable scaffolds from the ground should be provided for the work force, who are working at elevated heights, if a ladder is used proper foot holds and hand holds should be provided on the ladder. • Safety provisions should be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work	Contractor	DMRC	DPCC /CPCB	Item specific cost not available

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Reporting		
	locations. • The contractor should be responsible for observance by his sub-contractors, of all health and safety provisions. • The contractor should take adequate measures for the control of malaria, typhoid, dengue, cholera *etc.* • All vehicles used in the construction yard should have reverse horns • There should be proper demarcation of work areas with sign boards showing the work areas. The signboards should be in local and English language. • Suitable warnings should be displayed at all places where contact with or proximity to electrical equipment can cause danger. • Persons operating electrical equipment should be fully instructed as to any possible dangers associated with the equipment concerned. All electrical equipment should be inspected before use to ensure that it is suitable for its purpose. • Water transport tanks, storage tanks and dispensing containers should be designed, used, cleaned and disinfected at suitable intervals in a manner approved by the competent authority. • Secure storage areas should be provided for flammable liquids, solids and gases such as liquefied petroleum gas cylinder, paints and other such materials in order to deter trespassers. • Smoking should be strictly prohibited and no smoking notices be prominently displayed in all places containing combustible or flammable materials • Only suitably protected electrical installations and equipment, including portable lamps, should be used. • Oil rags, waste and clothes or other substances liable to spontaneous ignition should be removed to a safe place. • Fire-extinguishing equipment should be provided at construction camps, asphalt plants, storage areas for combustible materials and other areas where fire hazards are found. Such equipment should be properly maintained and inspected at suitable intervals by a competent person. • All site workers should be provided with personal protective equipment such as safety shoes, helmets, earmuff, nose mask as relevant to the risks that they are exposed *etc*. • Welders should be provided with face shields and gloves.				

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Reporting		
	• Ear plugs / muffs should be provided for workers working in high noise zones. • Workers will not be allowed to work without the appropriate personal protective equipment. • Workers should be provided with an adequate potable water supply. • Provision of reflective clothing or colored devices or otherwise conspicuously visible material when there is regular exposure of workers to danger from moving vehicles. • Monitoring and control of the working environment and planning of safety and health precautions should be performed as prescribed by laws and regulations. • There should be provision of penalty on the contractors for non-compliance of the SHE standards/guidelines. • There should be provision of award to the contractors based on SHE/OSHA compliance to encourage them.				

Source: Study Team

Table 9.1.3: Environmental Management and Responsibilities during the Operation Phase

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Accepting Report		
Noise	• Well-developed greenbelt along the periphery as well as roadside plantation to maintain noise level. Peripheral compound wall to maintain noise level outside the premises. Use of slogans on road side within premises to encourage people not to blow horn.	EMU	DMRC	DPCC/CPCB	Estimated at the detail design stage
Maintenance Performance	• Monitoring of the operational performance of the various mitigation/ enhancement measures should be carried out as a part of the project. • The indicators selected for monitoring include the survival rate of trees; status of noise barriers.	EMU	DMRC	DPCC/CPCB	Included in Routine cost of operation
Green belt Development and Management	• Maintenance of plantation • Local pollutants tolerant species like *Azardirachta indica, Polyalthia longifolia, Syzgium cumini etc.*	EMU	DMRC	DPCC/CPCB	Estimated at the detail design stage
Training for	• The training should be for all the executives regarding the environment	EMU	DMRC	DPCC/CPCB	

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Accepting Report		
operational staff	and safety. • The process should be followed for a minimum period for first six months. • The training should be about the implementation of standards and requirement of OSHA pertaining to Safety, Health and Environment .				
Emergency Preparedness and Response Management	• Risk and Disaster Management Plan should be formulated	EMU	DMRC	IMD	
Ambient Air Quality	• DG sets will be located in the downwind direction with respect to residential areas. • Stack heights for DG sets shall be as per CPCB/MoEFCC norms. • Good housekeeping to be practiced. • Vegetative barriers in form of green belt shall be provided around the proposed PD Complex which will act as pollution sink to certain extent.	EMU	DMRC	DPCC/CPCB	Estimated at the detail design stage
Water Resource & Quality	• Water consumption will be minimized by a combination of water saving devices and other domestic water conservation measures. Furthermore, to ensure ongoing water • Conservation, an awareness programme will be introduced for the residents. The following section discusses the specific measures, which will be implemented: • Domestic and Commercial Usage • Use of water efficient plumbing fixtures (ultra-flow toilets and urinals, low flow sinks, water efficient dishwashers and washing machines). Water efficient plumbing fixtures • Use less water with no marked reduction in quality and service. • Leak detection and repair techniques. • Sweep with a broom and pan where possible, rather than hose down for external areas. • Meter water usage; employ measurement and verification methods. Monitoring water use is a precursor for management. • Awareness campaign to disseminate knowledge on strategies and technologies that can be used for water conservation. • Landscaping-Plants with similar water requirements shall be grouped	EMU	DMRC	DPCC/CPCB	Estimated at the detail design stage

Project / Environmental Component	Mitigation/ Management Measures	Responsibility Allocation		Other Interested parties	Indicative Budget Estimate in INR
		Planning and Implementation	Supervision and Accepting Report		
	on common zones to match precipitation heads and emitters. • Rainwater harvesting shall be proposed.				
Solid Waste Disposal	• The recyclable waste like glass, metal, plastics, paper etc likely to be generated from different land uses, will be collected separately and sold to authorized recyclers/ vendors • For processing of biodegradable waste, an onsite organic waste convertor (2 nos. of 1000 kg) will be setup • An integrated solid waste management will be put in place for collection, treatment, transportation and disposal of solid waste generated in the PD Complex from different activities.	EMU	DMRC	MCD	Estimated at the detail design stage
Socio-economic	• The project level project implementation agency to undertake CSR program to ensure communal harmony and cooperation. • Mechanism to train and improve the skill sets of the local community.	EMU	DMRC		Estimated at the detail design stage

Source: Study Team

9.2 WASTE MANAGEMENT

9.2.1 Construction Waste Management

Responsible management of waste is an essential aspect of sustainable building. In this context, managing waste means eliminating waste where possible; minimizing waste where feasible; and reusing materials which might otherwise become waste. Solid waste management practices have identified the reduction, recycling, and reuse of wastes as essential for sustainable management of resources.

An initiative has been taken up by the Government of NCT Delhi and issued an advisory on C & D utilization. *The Delhi government has issued an advisory on the use of products made out of recycled C & D waste by the Public Works Department (PWD). All Delhi government agencies will be required to incorporate a clause in their tenders that mandates use of a minimum of 2 per cent recycled products from construction waste in all future contracts for building works and 10 per cent recycled products for road works. (Ref. CSE August 26, 2015).*

In pursuance of the C & D Rules 2016, The Building Materials and Technology Promotion Council (BMTPC) in 2016 released "Guidelines for utilization of C & D waste in construction of dwelling units and related infrastructure in housing schemes of the Government". The construction and demolition (C & D) waste guidelines pertain to building industry.

Management of building-related waste is expensive and often presents unintended consequences. However, common sense suggests that failure to reduce, reuse and recycle societal wastes is unsustainable. It stands to reason that efficient and effective elimination and minimization of waste, and reuse of materials are essential aspects of design and construction activity. Creativity, persistence, knowledge of available markets and businesses, and understanding of applicable regulations are important skills for design and construction professionals.

The main components for management of C & D waste are elaborated in the next sections.

a) Eliminating Waste

Some waste generated in the process of construction can be eliminated. For example, durable modular metal form systems for use in concrete construction may be selected on the basis of being readily demountable and reusable on other projects, thus eliminating wood waste associated with formwork fabricated of plywood and dimensional lumber. Elimination of waste can be beneficial to reduce impacts on human health and the environment.

b) Minimizing Waste

Some building-related waste can be minimized. For example, construction products can be selected on the basis of its being designed and manufactured to be shipped with minimal packaging. Also consider that selection and use of recyclable materials and products offers potential to minimize waste.

c) Reusing Materials

Some materials can be reused. For example, doors and windows in good, resalable condition might substitute for new products, or be donated and or sold for use on another project—a form of beneficial reuse.

d) Disposal

The construction wastes generated at the site, which are not suitable for reuse, recycle shall be disposed off at the designated dumping site as per the guidelines of the C & D Rules, 2016.

The waste generated during the construction should be handled and managed in accordance with the provision of Construction and Demolition Waste Management Rules, 2016.

In order to avoid associated health and aesthetic problems caused by improper management, the following measures should be taken into consideration for construction waste management.

- Avoid uncontrolled solid waste dumping which could be breeding ground for vermin, and as such could pose a vector for disease. Uncontrolled solid waste dumping invariably attract casual dumping by others and also this could encourage improper disposal of hazardous wastes; and
- Segregation of waste depending on the nature of the materials should be carried out. Special attention should be given to diverting hazardous materials/wastes for proper management in accordance with applicable regulatory requirements as detailed below.
- The prevailing rules and act MSW Act, 2016 should be strictly adhered to.

9.2.2 Storage, Handling and Emergency Response for Hazardous Materials

Safe handling of fuel is everyone's responsibility. One can take steps to ensure their own safety and health, as well as that of those around and ensure that the environment is protected. Improper handling of fuel and hazardous material can result in serious injury or death caused by fire, explosion, or asphyxiation.

The storage and handling of hazardous materials and waste should be done in compliance to the provision of the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 and the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.

To deal with any emergency Risk Management and Disaster Management Plan have been prepared. The action plan recommended in the report should be followed.

Handling Hazardous Materials

Whenever it is feasible, engineering controls should be used to reduce employee exposure to hazardous materials. When engineering controls are not available, or they fail to adequately reduce hazards, other personal protective equipment is required. Examples of personal protective equipment include: safety glasses, hearing protection, gloves, respirators, *etc.* Personal Protective Equipment (PPE) devices must be provided and worn in accordance with the manufacturer's recommendations indicated on the label of the product or as stated in the Material Safety Data Sheet for the product. Hazardous chemical spills can be handled effectively when a plan of action has been developed. Spill procedures should include the following general procedures:

- If the spilled material is flammable, turn off ignition and heat sources;

- Attend to any person who may have been infected or affected;
- Notify individuals in the area about the spill;
- Evacuate non-essential personnel;
- Avoid breathing vapours of spilled material. Establish an exhaust or ventilation, if it is safe to do so. Air handling units are not to be used because they re-circulate the hazardous vapours. Contact Safety, Health and Environment (SHE) for information about the proper ventilation or exhaust required;
- If a spill is relatively large, or involves a highly toxic material, a carcinogen or flammable material, contact SHE for assistance in cleaning up the spill and disposing of the hazardous waste resulting from the cleanup.

Hazardous wastes undergo different treatments in order to stabilize and safe disposal.

- Recycling
- Neutralization
- Hazardous waste landfill

9.3 CONSTRUCTION CAMP MANAGEMENT FOR ITS DEVELOPMENT, OPERATION AND DEMOBILIZATION

Construction camps may damage trees, habitats and landscapes when they are constructed, and affect water quality when in use. Poor accommodation management could lead to affect the workers physically, physiologically and psychologically, and also cause social problems around the camp sites. Therefore, the following mitigation measures are proposed.

- Camps should be located carefully to minimize loss of trees/habitats;
- The construction camps will be located at least 200 -500 m away from habitations at identified sites;
- Camps should be designed as per the local laws and guidelines;
- Proper accommodation should be provided to all employees who are working at significant distance from their home;
- Water storage tanks should be located above ground and boreholes should be away from toilets/drains;
- Clean and properly staffed and equipped canteen should be provided at camps;
- Wastewater from the camps should be suitably treated and disposed away from the sites as per the applicable standards and guidelines;
- Regular spray of a mixture made from diesel and insecticides should be done at all water stagnation areas to avoid mosquito breeding and spread of any vector borne diseases; and
- Garbage bins should be provided at suitable locations and should be ensured that each site is tidied and refuse taken to a licensed site regularly.

The following mitigation measures are proposed for demobilization of the contractor:

- All garbage, debris and hazardous materials should be removed from the construction sites and deposed of at designated approved disposal sites.
- Consult with the owner of the site and leave any buildings, well or any structure if wanted by them.
- All trenches should be filled and all equipment, plant and materials should be removed from the site.

- Compensate for rehabilitating the landscape and vegetation disturbed during construction activities.

9.4 OCCUPATIONAL HEALTH AND SAFETY (OHS) MANAGEMENT

9.4.1 Construction Phase

During the construction phase construction/labour camps should be located preferably at the project site itself or adjacent to the site. Large numbers of workers are likely to cause a significant increase in the local population in the project area. A proper Construction Camp Development Plan has to be formulated to control degradation of the surrounding environment due to the location of the proposed construction camp. The contractor must provide, and maintain adequate living conditions and ancillary facilities that must be included in the contract document provided to the Contractor.

The following actions should be undertaken at construction/labour camps and stipulated in construction contracts:

- Sufficient supply of potable water must be provided at camps and working sites. If the drinking water is obtained from an intermittent public water supply then storage tanks must be provided. All water supply storage must be at least 15 m away from the toilets or drains.
- Adequate washing and bathing facility must be provided in clean and drained condition.
- Adequate sanitary facilities must be provided within every camp. The place must be cleaned daily and kept in strict sanitary condition. Separate latrines, bathing and changing areas must be provided for women.
- Collection of domestic waste and its suitable disposal must be carried out on a regular basis.
- Adequate supply of fuel in the form of kerosene or LPG must be provided to construction labourers to avoid the felling of trees or collection of firewood for cooking and other household activities. No open fires should be allowed in camps.
- The access to the site be controlled.
- Construction equipment and POL products should be stored 500 m away from the local settlements, workers living areas and it should be away from the water resource.
- The contractor should be required to submit and obtain approval for a health and safety plan prior to the commencement of work;
- Adequate training on medical surveillance, engineering control, good work practices and handling of hazardous material, housekeeping and emergency response.
- There should be provision of adequate health care facilities; and
- Workers should be required to undergo pre-employment medical screening and treatment (if required) and periodic health checks thereafter.

1) First Aid Facilities

- The contractor should be responsible for ensuring that first aid, including the provision of trained personnel, is available. Arrangements should be made for ensuring medical attention of workers who have suffered an accident or sudden illness.
- The manner in which first aid facilities and personnel are to be provided should be prescribed by national laws or regulations, and drawn up after consulting the competent health authority and representative organizations of employers and workers concerned.

- Where the work involves risk of drowning, asphyxiation or electric shock, first aid personnel should be proficient in the use of resuscitation and other life-saving techniques and in rescue procedures
- Suitable rescue and resuscitation equipment, as required, including stretchers should be kept readily available at the construction site.
- First-aid kits or boxes, as appropriate, should be provided at the workplaces,including isolated locations such as maintenance gangs, and on motor vehicles,locomotives, boats and floating equipment, and be protected against contamination bydust and moisture.
- First- aid kits and boxes should be simple with clear instructions provided, and bekept under the charge of a responsible person qualified to render first aid and beregularly inspected and stock properly maintained.

2) Fire Prevention and Fire Fighting

- All the appropriate measures should be taken by the contractor to avoid the risk of fire control quickly and efficiently any outbreak of fire and bring about a quick and safe evacuation of persons.
- Secured storage areas should be provided for flammable liquids, solids and gases such as liquefied petroleum gas cylinder, paints and other such materials in order to deter trespassers.
- Smoking should be prohibited and NO SMOKING notices be prominently displayed in all places containing readily combustible or flammable materials

In confined spaces and other places in which flammable gases, vapors and dust can cause danger:

- Only suitably protected electrical installations and equipment, including portable lamps, should be used.
- Oil rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place.
- Adequate ventilation should be provided.
- Combustible materials such as packing materials sawdust, greasy/oily waste and scrap wood or plastic should not be allowed to accumulate in work places and should be kept in closed metal containers in a safe place.
- Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations, and conductors, stores of flammable and combustible material, hot welding and cutting operations.
- Places where workers are deployed should, if necessary to prevent the danger of fire, be provided as far as practicable with:
  - Suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible
  - An adequate water supply at ample pressure.
  - Fire-extinguishing equipment should be properly maintained and inspected at suitable intervals by a competent person.
  - Where necessary to guard against danger, workers should be suitably trained in the appropriate actions to be taken in the event of fire, including the use of means of escape.
  - Where appropriate, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.

- Means of escape should be kept clear at all times.

3) Sanitary Facilities

- The provision of toilet or sanitary facilities, and the construction and installation of water flush toilets, privies, chemical closets, plumbing or other toilet fixtures should comply with the requirements specified by the competent authority.
- No toilets other than a water flush toilet should be provided and they should be adequately ventilated and not open directly into occupied rooms.
- Adequate washing facilities should be provided as near as possible to toilet facilities.

4) Housekeeping

A suitable housekeeping program should be established and continuously implemented on construction camp site which should include:

- The proper storage of materials and equipment
- The removal of scrap, waste and debris at appropriate intervals.
- Loose materials which are not required for use should not be placed or allowed to accumulate in the site so as not to obstruct access to and egress from workplaces and passageways.
- Workplaces and passageways that are slippery, owing to oil or other causes should be cleaned up or strewn with sand, saw dust, ash or the like.
- Special housekeeping staff would be in charge of each work section.
- Each section will maintain the site reasonably clean and keep from obstruction, and properly store any construction equipment, tools and materials. Any wreckage and/or rubbish should be temporarily stored in wreckage and rubbish bins. These rubbish bins and wreckage should be cleaned at frequent intervals.
- General housekeeping should be carried out and ensured at all times at work sites, labour camps, stores and offices.
- Full height fence, barriers *etc.* should be installed at the site in order to preserve the surrounding area from excavated soil, rubbish *etc*.
- Arrangements to control dust pollution including silica dust through provision of wind screens, water sprinklers, and dust extraction systems should be provided at all site, likely crushers, concrete batching plants, quarry area and sand sites
- The contractor will ensure that all sub contractors maintain the site reasonably clean through sub contractor provision related to housekeeping.
- All staff and supervisors and engineers working at the site will also be educated on the necessity of good housekeeping.
- Immediate disposal of the weeds, trash and debris resulting from site clearing.
- The garbage should be separated into biodegradable and inert material and disposed of separately. The food items should be collected in trash cans with a firm lid.
- Oil and grease dripping from machinery should be collected in a drip pan of suitable size. The area should be cleared after the repair and maintenance of the construction equipment.
- Efficient drainage and leveling of the low lying areas should be done at all construction site to prevent the creation of stagnant pools or puddles of water.
- Empty oil drums, cans and other receptacles, which may retain water should be disposed of regularly.

In addition, the contractor must provide and maintain adequate working and living conditions and ancillary facilities that must be included in the contract documents provided to the contractors. The following are major actions to be undertaken at construction yards or camps for adequate working and living conditions:

- Sufficient supply of potable water must be provided at yards and camps. If the drinking water is obtained from an intermittent public water supply, then storage tanks must be provided. All water supply storage must be at least 15m away from the toilets or drains.
- Adequate washing and bathing facility must be provided in clean and drained condition. Separate bathing and changing areas must be provided for women.
- Adequate sanitary facilities must be provided within the areas of each yard and camp. Water flush toilets are desired which should be adequately ventilated and washing facilities should be provided near toilet facilities. The facilities should comply with the requirements specified by the competent authority.
- Collection of domestic waste and its suitable disposal must be carried out on a regular basis.
- Adequate supply of fuel in the form of kerosene or LPG must be provided to construction labours to avoid the felling of trees or collection of firewood for cooking and other household activities. No open fires should be allowed in the camps.
- Construction equipment, and petroleum, oil and lubricant (POL) products should be stored 500 m away from the local settlements and workers living areas and it should be away from the water resource.
- Adequate trainings on good work practices including handling of hazardous materials, housekeeping and emergency response *etc.*
- There should be provision of adequate health care arrangements including first aid facilities and personnel (qualified first aid personnel or a nurse) for workers who suffer an accident or sudden illness. The manner in which first aid facilities and personnel are to be provided should be prescribed by national laws or regulations, and drawn up after consulting the competent health authority and representative organizations concerned.
- Suitable rescue and resuscitation equipment, as required, including stretchers should be kept readily available at the construction site.
- First-aid kits or boxes, as appropriate, should be provided at the work places and be protected against contamination by dust and moisture.
- Workers should be required to undergo pre-employment medical screening and treatment (if required) and periodic health checks thereafter.

Furthermore, a suitable housekeeping program should be established and continuously implemented on each construction site which should include:

- General housekeeping should be carried out and ensured at all times at worksites, construction camps, stores and offices.
- All staff and supervisors and engineers working at the site should be educated on the necessity of good housekeeping.
- The contractor should maintain the site reasonably clean through sub-contractor provision related to housekeeping.
- Special housekeeping staff would be in charge of each work section.
- Loose materials, which are not required for use should not be placed or allowed to accumulate in the site so as not to obstruct access to workplaces and passageways.
- Workplaces and passageways that are slippery, owing to oil or other causes should be cleaned up or strewn with sand, sawdust, ash or the like.

- Each section shall maintain the site reasonably clean and keep from obstruction, and properly store any construction equipment, tools and materials. Any wreckage and/or rubbish should be temporarily stored in wreckage and rubbish bins. These rubbish bins and wreckage should be cleaned at frequent intervals.
- Full height fence and barriers should be installed at the site in order to preserve the surrounding area from excavated soil, rubbish etc.
- Arrangement to control dust pollution including silica dust through provision of wind screens, water sprinklers, and dust extraction systems should be provided at all site, likely crushers, concrete batching plants, quarry area and sand sites
- Immediate disposal of the weeds, trash and debris resulting from site clearing.
- Oil and grease dripping from machinery should be collected in a drip pan of suitable size. The areas should be cleared after the repair and maintenance of the construction equipment.
- Efficient drainage and leveling of the low lying areas should be done at all construction sites to prevent the creation of stagnant pools or puddles of water.
- Empty oil drums, cans and other receptacles which may retain water should be disposed of regularly.

As for fire prevention and fire fighting, the following actions should be done by the contractors:

- All the appropriate measures should be taken to avoid the risk of fire control quickly and efficiently any outbreak of fire and bring about a quick and safe evacuation of persons.
- Secure storage areas should be provided for flammable liquids, solids and gases such as liquefied petroleum gas cylinder, paints and other such materials in order to deter trespassers.
- Smoking should be prohibited and no smoking notices be prominently displayed in all places containing readily combustible or flammable materials.
- In confined spaces and other places in which flammable gases, vapors and dust can cause danger:
  - Only suitably protected electrical installations and equipment, including portable lamps, should be used.
  - Oil rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place.
  - Adequate ventilation should be provided.
- Combustible materials such as packing materials sawdust, greasy/oily waste and scrap wood or plastic should not be allowed to accumulate in work places but should be kept in closed metal containers in a safe place.
- Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations, and conductors, stores of flammable and combustible material, hot welding and cutting operations
- Suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible
- Fire-extinguishing equipment should be properly maintained and inspected at suitable intervals by a competent person.
- Where necessary to guard against danger, workers should be suitably trained in the appropriate actions to be taken in the event of fire, including the use of means of escape.
- Where appropriate, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.
- Means of escape should be kept clear at all times.

The contractors are required to prepare, submit and obtain approval for a safety, health and environment (SHE) plan which contains the above measures, but not limited to them, prior to the commencement of the construction works.

9.5 NATURAL ENVIRONMENT MANAGEMENT

It is standard practice within an EIA to incorporate a greenbelt development plan which is discussed in the subsequent section.

1) Green Belt Development

Urban green belts are considered the lungs of the cities as they act as a sink for some of the harmful gases released by vehicles and industries operating in the city area. Whether sprawling over a large area or a small belt, these green belts are found in all cities and play a very important role.

In alignment with National Sustainable Habitat Mission, DMRC shall encourage augmentation of green cover on the proposed plot by following:
The Urban Greening Guidelines, 2014 and other provisions as given below -

- Provision of minimum 1 tree / every 80sqmt of plot area and planted within the setback of the plot.
- Approximately 76 trees may be planted in the PD Complex. The number of trees may vary and all the available vacant space shall be converted into the green belt.
- Choice of species for plantation in site and abutting the road to be adopted as per Section 8 of the Urban Green Guidelines, 2014.
- The unpaved area shall be more than or equal to 20% of the recreational open spaces.

A number of measures are proposed for greenbelt creation, reestablishment and restoration as below:

i) Firstly where there is a pre-existing hedgerow or tree line it should be preserved wherever possible;
ii) The plantation of trees should be completed in the construction stage so that substantial growth is achieved when the project is commissioned.
iii) Greenbelt creation and re-establishment includes the plantation of trees as well as shrubs and grasses/herbs. A mix of native species should be preferred. Appropriate species should be relatively quick-growing (in order to rapidly be able to absorb pollutants, act as an effective screen and perform all the functions of a greenbelt) and hardy (for survival in a harsh, arid climate). A list of suggested species is provided below but competent authorities should be consulted prior to investment.
iv) Tree planting and groundcover restoration work should be undertaken early-on in the monsoon season (July).
v) Saplings should be procured from local nurseries in close proximity to the plantation areas (but they should also be carefully checked for diseases and quality).
vi) Different planting techniques are required for different species of trees/shrubs.

2) Selection of Tree Species

The selection of plant species for the development depends on various factors such as climate, elevation and soil. The native and plants with high value of Air Pollution Tolerance Index (APTI) like (*Caesalpinia sappan*), shisham (*Dalbergia sissoo*), shirish (*Albizia lebbeck)* followed by semi-deciduous trees such as neem (*Azadirachta indica*), gulmohar (*Delonix regia*) and guava (*Psidium guajava*) shall be planted under green belt development plan. The plants should exhibit the following desirable characteristics in order to be selected for plantation. The plant species should be planted those are already planted in the green belt, parks and gardens in the vicinity/surroundings.

- The species should be fast growing and providing optimum penetrability;
- The species should have high APTI value;
- The species should be wind-firm and deep rooted;
- The species should form a dense canopy;
- As far as possible, the species should be indigenous and locally available;
- Species tolerance to air pollutants like PM, SO_2 and NOx should be preferred;
- The species should be permeable to help create air turbulence and mixing within the belt;
- There should be no large gaps for the air to spill through;
- Trees with high foliage density, leaves with larger leaf area and hairy on both the surfaces;
- Ability to withstand conditions like inundation and drought;
- Soil improving plants (Nitrogen fixing, rapidly decomposable leaf litter);
- Attractive appearance with good flowering and fruit bearing;
- Bird and insect attracting tree species;
- Sustainable green cover with minimal maintenance.

Chapter 10
Summary and Conclusions

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10.1 RATIONALE AND BACKGROUND

The DMRC has been established with the principal object of planning, designing, developing, constructing, maintaining operating and financing Mass Transit and other urban transport and people mover system of all types and descriptions in the National Capital Territory of Delhi and other areas of the National Capital region.

The Delhi Metro Railway (Operation and Maintenance) Act, 2002 has been enacted by the Parliament to provide for the operation and maintenance, and to regulate the metro railway in the metropolitan city of Delhi and for matters connected therewith and incidental thereto.

Delhi Metro Rail Corporation Limited (DMRC), a joint venture of the Government of India (GOI) and the Government of the National Capital Territory of Delhi (GNCTD) has been mandated by the Ministry of Housing and Urban Affairs (MoHUA), Government of India to undertake value capture from property development initiatives for sustainable revenue generation for the DMRC vide its Policy Circular No. K-14011/8/2000-MRTS (Pt.) dated 30/03/2009. The DMRC has been mandated to develop real estate and other commercial facilities in the Metro Stations and standalone(other) places in the Territory and to generate revenues and with the aim of part supporting the project cost and subsidising the charges for the passengers and promoting the use of the Metro Rail.

In pursuance of the above, DMRC decided to offer Property Development Complex of (Area) 6109 Sq. M. of space above u/g Bhikaji Cama Place Metro Station to a Selected Agency for development, operation, maintenance and management of the spaces (hereinafter referred to as "PD Complex Project"). The proposed Property Development Project shall be located on the Line-7 (Mukundpur to Yamuna Vihar Corridor of Phase-III) of Delhi Metro Rail Project above the underground Bhikaji Cama Place Metro Station on the Ring Road (Mahatma Gandhi Road) opposite to Bhikaji Cama Place District Centre, RK Puram, New Delhi.

This Summary and Conclusions has been prepared as a stand-alone extract of the EIA but also includes references to relevant sections in the EIA report. The information presented in this chapter as well as the EIA report is based on the findings of the study team[1].

10.2 IMPLEMENTING AGENCY

As described in the preceding section, the proposed Property Development Complex Project shall be implemented by the Delhi Metro Rail Corporation Limited (DMRC) through a selected agency for development, operation, maintenance and management of the PD Complex.

[1] The study team comprising the following organizations:

- GPS Technologies Pvt. Ltd: S-EIA Report, collection and assessment of primary / secondary environmental data
- DMRC: Project Specifications / Data / Maps / Project Drawings

10.3 NEEDS AND IMPORTANCE OF THE PROJECT TO THE COUNTRY AND REGION

Investment

An investment of ~ INR 80 Crore has been budgeted for the project. The investment will go into the local economy.

Direct Employment

Approximately 150 people will get direct employment in the restaurant and maintenance by setting up of this PD Complex project during its operational lifecycle.

Indirect Employment

Approximately 150 people will get indirect employment in different activities by setting up of this PD Complex project during its operational lifecycle.

During the construction phase about 150 workforce shall be deployed for 2-years.

10.4 PROJECT LOCATION

The project site is located at the junction of two important Master Plan Roads, *i.e.* Mahatma Gandhi Marg, also known as Inner Ring Road and Africa Avenue, the life lines of Delhi Transportation network. The project site is just opposite to the Engineers India Bhawan (EIL Office Building) in the Bhikaji Cama Place District Centre and Hayat Regency, a prominent 5-star hotel. The site is surrounded by many important office premises and commercial hubs like Sarojini Nagar Market.

The proposed project site is located between the geo-coordinates:

S.No	Point	Geo Co-ordinates
1	A	28°34'12.40"N, 77°11'14.14"E
2	B	28°34'12.11"N, 77°11'18.50"E
3	C	28°34'13.94"N, 77°11'18.55"E
4	D	28°34'14.46"N, 77°11'12.89"E
5	E	28°34'13.93"N, 77°11'12.87"E
6	F	28°34'13.78"N, 77°11'14.24"E

Source: Study Team

Orientation

The proposed building is oriented in EAST-WEST AXIS, which is an ideal condition for harnessing the natural light as the building is facing NORTH and SOUTH direction. This orientation will enable to achieve green rating for the tower.

Cardinal Direction	Context
North	Netaji Nagar Residential Colony

South	Bhikaji Cama Place District Centre
East	Green Space beyond Africa Avenue
West	Petrol Pump

10.5 PREPARATION OF EIA

DMRC appointed M/s GPS Technologies Private Limited, New Delhi to conduct an EIA study to identify the environmental impacts anticipated due to the construction and operation of the proposed PD Complex project and associated facilities and propose mitigation measures along with an environmental management and monitoring plan.

10.6 OBJECTIVE OF THE EIA STUDY

Schedule of the Environmental Impact Assessment (EIA) Notification issued by the Ministry of Environment Forests and Climate Change (MoEFCC), Government of India, New Delhi on 14th September, 2006, and subsequent amendment therein, under the Environment (Protection) Act, 1986, emphasizes on the requirement of prior Environmental Clearance. Under Schedule, Item 8 (a) Building and Construction project having built up area >20000 sq. m. and <1,50,000 sq. m. requires prior Environmental Clearance.

Since the proposed project is having built up area of 18436.84 sq. m. on the plot area of 6109 sq. m., prior Environmental Clearance is not required.

Since the project is located in the middle of the dense population, an Environment Impact Assessment study is required to be taken for better planning and judicious implementation of the PD Complex project. In view of this, the present EIA study has been taken up and EIA Report has been prepared.

10.7 PROJECT PROFILE

The proposed PD Complex shall be established above the U/G metro station Bhikaji Cama Place, New Delhi on the land parcel allocated by the Ministry of Housing and Urban Affairs, Govt. of India to DMRC. The proposed project shall be developed by the selected agency on build, operate and maintain basis. The salient features of PD Complex project are given in ***Table 10.7.1***

Table 10.7.1: Salient Feature of PD Complex Project

Project Component	Description
Nature	Building and Construction Project (Commercial Multi-storey Building)
Size	Plot Sixe: 6109 Sq. M.,
Built up Area	18436.84 Sq. M.
Location	Above underground Metro Station, Bhikaji Cama Place, District- South West Delhi, Tehsil- Vasant Vihar, New Delhi
Altitude	224 m ABMSL
No of Floors	Basement+Ground+4 Floors+Terrace
Height of the Building	23.70 m
Approved Zoning Plan	Zone D of Master Plan of Delhi-2021
Project Cost	INR 80 Crores

Project Component	Description
Cost of the land	INR 15.55 Crores
Residing Population	1623 Nos
Floating/visitors	100 Nos.
Security Guard	30 Nos.
Parking Proposed	263 ECS
Total Power Requirement	2530 kW
Water Requirement (operational phase)	112 KLD
STP Capacity	70 KLD
Area Breakup of each floor (in Sq. M.)	
Plot Area	6109
Basement built up area for Parking facilities	3292.15
Ground floor built up area to be used for Restaurant and retails	2995.83
First Floor Built up area	3077.09
Second Floor Built up area	2852.06
Third Floor Built up area	2852.06
Fourth Floor Built up area	2436.37
Terrace Floor built up area	931.28
Other Features	
Rain Water Harvesting	4 No. of Recharge well
Direct Employment (Operation Phase)	150 Nos.
Indirect Employment (Operation Phase)	150 Nos.
Employment in Construction Phase	100 Workers for Two years

Source: Study Team

10.8 BENEFITS OF THE PROJECT

Overall, following benefits are envisaged out of the proposed project:

- Indirect employments in transportation and construction allied sectors;
- During operation phase, long-term job opportunities will be created in terms of security, housekeeping and gardening personnel which will lead to increase their living standard;
- Exposure of modernized infrastructural & technological facilities due to proposed project activities will helpful to boost knowledge of employees, workers, locals.
- Increase in income of local population;
- 30% of the plot area shall be developed as landscape area /green belt, which will enhance the beauty and aesthetics of the project area;
- Adequate parking space for occupants and visitors;
- Good solid waste management system consisting of proper collection, designated storage, provision of composting facility for bio degradable waste disposal;
- Effective site security with separate entry-exit checks;

- Project will set a good example for surrounding area about good solid waste management system consisting of proper collection, storage and disposal facility.

10.9 DESCRIPTION OF THE ENVIRONMENT

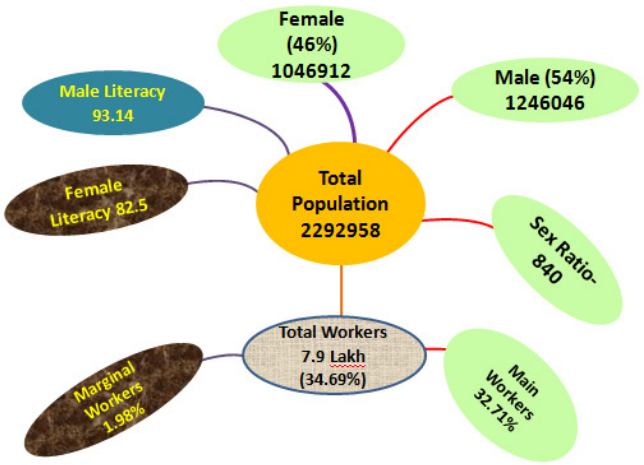
The status of the existing environmental baseline in the study area is described below:

Environmental Attributes	Finding of the EIA Study
Study Period	March 01, 2020-May 31, 2020
Physical Environment	
Topography	The topography of the project is flat. The study area is generally plain with slight undulation. The topography of the proposed project site is fairly plain land having an average elevation of 224 m-amsl and leveling work may be required to be dressed up.
Physiography	The physiographic unit of the study area can be described in 3-categories. ◯ Masudpur-Wazirabad Ridge; ◯ Older Alluvial Plain; ◯ Yamuna Flood Plain.
Drainage	The drainage pattern of the study area is mainly controlled by the River Yamuna which enters Delhi at Palla and runs about 25-Km to Wazirabad and from there traverses a similar distance to the Okhla Barrage, where it exits to Haryana.
Soil	The major part of Delhi is covered by the alluvial soils of Yamuna. Fourteen soil series are observed in Delhi. Majority of the area is covered by fine to coarse loamy soils with different levels of moisture-retention capacity. The soil is slightly alkaline in nature, pH ranging from 6.6 to 7.5.
Geology and Seismology	Geologically, Delhi is located on folded crustal ramp with basement rocks of Delhi Supergroup, bounded by two regional faults *viz* Mahendragarh-Dehradun Fault in the west and Great Boundary Fault in the East. Delhi and its surroundings are seismically active. It falls in Seismic Zone IV. Earthquakes of magnitude from 3 to 7.4 have been observed in and around Delhi during the past 3 centuries.
Landscape	The landscape of the study area is flat with slight undulation and forests in the ridge area. Otherwise,the entire study area is occupied by the high rise buildings.
Land Use	The land use pattern indicates that 55.7 % of the zone of influence is occupied with built-up area followed by 22.35% with miscellaneous.
Climate	The climate of the region is semiarid type, with three well defined seasons. Winter starts in November and peaks in January. In December, visibility is reduced to nearly zero disrupting road, air and rail traffic in the city. Every year, the heat wave in summer claims several lives in Delhi. The temperature is usually between 21.1°C to 40.5°C during these months. The city, however, has a pleasant climate from February to April and from August to November. The climatic parameters have been discussed individually further. The details are explained in Section 3.6 of Chapter 3 of the Report.
Water Use/Demand	In Operational Phase – approximately **112 KLD** water demand is envisaged which shall be met from the Delhi Jal Board.
Water Quality	**Ground Water** On perusal of the results presented in the ***Table 3.5.2***, it may be inferred that the pH varied from 7.0 to 9.2. TDS content varied between 385 to 524 mg/l. Degree of hardness ranged from 110 to 253 mg/l. The chloride level (22 to 398

Environmental Attributes	Finding of the EIA Study
	mg/l) was observed to be higher. The result of physico-chemical analysis of ground water samples indicates marginal variation among the sampling locations. However, most of the parameters are within the permissible limits for Drinking Water Standards and many parameters are within the desirable limits.
Ambient Air Quality	Ambient Air Quality monitoring was carried out at 4 locations during the study. The results indicate that the air pollutants were well within the prescribed NAAQS standards due to comp0lete lock down in pandemic COVID 19. **PM_{10}:** The average concentration of PM_{10} varied from 74 to 82 µg/m^3 in the study period. **$PM_{2.5}$:** The average concentration of $PM_{2.5}$ varied from 64 to 72 µg/m^3 in the study period. **SO_2 and NOx:** were found to be lower than NAAQS standards at all the locations. **CO:** The average concentration of CO varied from 8 to 26 mg/m^3 in the study period.
Ambient Noise	The noise levels were measured at 5 locations. Perusal of the measured values (***Refer Table 3.8.2***) shows that the overall L_{eq} value varied between 57.8 dB(A) to 70.8 dB(A) among all locations. L_{Day} and L_{Night} value varied between 52.1 dB(A) to 67.8 dB(A) and 49.6 dB(A) to 61.2 dB(A) respectively. The highest L_{eq} value 70.8 dB(A) was recorded at Project site due to proximity of plying vehicles and running of various equipment while the lowest L_{eq} 54.7 dB(A) was recorded at Sulekha Vihar. The highest L_{Day} 67.8 dB(A) was recorded again at project site again and the lowest value of L_{Day} 52.1 dB(A) at Sulekha Vihar. The existing ambient noise levels were higher than prescribed standards at multiple locations.
Ecology	**Ecosystem** Three types of ecosystem exists in the study area- Agro Ecosystem, grassland Ecosystem and Groves. Vegetation of Delhi is typical Northern Tropical Thorn Forest Type (Champion & Seth 1968). Among trees, species of Acacia such as *A. nilotica*, *A. leucophloea*, *A. catechu*, *A. modesta*, *Butea monosperma* (Dhak), *Cassia fistula* (Amaltas), *Salvadora persica*. Good patches of *Anogeissus latifolia* and abundance of *Prosopis juliflora* are observed. **Flora** The field investigation shows the dominance of members of *Dalbergia sissoo, Mangifera indica, Butea monosperma, Ficus racemosa, Cynodon dactylon, Acacia catechu* and *Acacia nilotica, Azadirachta indica* are commonly observed. Grasses like *Adhatoda spp., Bougainvillea* spp. within the study area. The lists of tree species observed in the study area are given in ***Table 3.9.1.*** List of shrubs/grass species are given in ***Table 3.9.2.*** **Fauna** There is no unique faunal community within the study area, except most common ones like toad, frog, crow, sparrow and myna *etc.* ***Table 3.9.3***. In absence of natural forest there is a dearth of wild animals in the study area. A

Environmental Attributes	Finding of the EIA Study
	list of avifauna, reptiles, amphibians and rodents based on information gathered from local enquiries and State Forest Department is presented in the ***Table 3.9.4, Table 3.9.5 and Table 3.9.6.***
Sensitive Locations	There is no any notified Eco Sensitive Area (ESA) within 10-Km radius of the study area. However, in NCT region there are two prominent wildlife Sanctuaries. 1) The Asola Wildlife Sanctuary, Delhi is located at a distance of 10.12-Km in Southeast direction 2) The Okhala Bird Sanctuary, Noida, (UP), is located at a distance of 12.90 km in the Southeast.
Socio-Economic Environment	
District within the project area	South West Delhi
The overall socio-economic feature of the project district is depicted in the ***Exhibit 10.1*** based on the Census Records of 2011.	

Exhibit 10.1: Socio-economic Feature of the Project District



Labour Welfare and Health	During the construction phase, about 100 workers will be deployed at the project site. The construction period is assumed to be 2 years. It is reasonable to expect the workers to bring their family. A construction camp/housing camp for the workers is proposed at the project site. There will be necessity of providing welfare and health care facilities to the workforce including emergency care. Regular health checkup of the deployed workforce shall be undertaken to see any degradation in health. This facility can be provided through the construction contractors under the BOCW regulation.
Protected Monuments	There are no archaeologically or historically important monuments or heritage sites located within core zone of the project.

Source: Study Team

10.10 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The establishment and operation of the Property Development Complex project is expected to generate adverse environmental impacts (long term or short term, reversible or irreversible). The

potential adverse impacts and proposed mitigation measures for the project are presented below:

Project Activities	Environmental Attributes	Potential Adverse Impacts	Proposed Mitigation Measures
A) Long Term Impacts (Operation Phase)			
Land	Topography	• Permanent change in the local topography of certain areas.	• None
	Landscape	• Visual / landscape impact due to construction of multi-storey building	• Landscape development within site.
Operation of PDC	Energy Consumption and GHG Emissions	• Consumption of electrical energy. • Associated indirect GHG emissions	• Solar energy shall be harnessed to meet the reasonable share of the electric load • Energy star rated equipment and fixtures will be used to minimize the energy consumption.
	Traffic	• Increase in traffic volume • Random parking of vehicles	• Traffic diversion shall be encouraged by proposing alternate route • Comprehensive traffic and travel surveys shall be conducted every 5 years
	Water Use	• Stress on the Competing users	• Recycle and reuse of recycled water for gardening and flushing
	Solid Waste	• Inadequate collection and treatment of municipal solid waste • The accumulation of waste along streets	• An integrated solid waste management will be put in place • Municipal Solid Waste Management and Handing Rules, 2016 shall be adhered. • The e-waste generated shall be sold to authorised recyclers in accordance with e- waste Management Handling Rules, 2016 • The recyclable waste like glass, metal, plastics, paper etc. shall be collected separately and sold to authorized recyclers/ vendors.
B) Short Term Impacts (Construction phase)			
Site clearing and Leveling (cutting, stripping, excavation, earth movement, compaction)	Local Air Quality	• Fugitive Dust Emissions • Gaseous Emissions from construction equipment & machinery.	• Use of suitable dust suppressants (e.g. water sprays). • Equipment and construction vehicles will be inspected and maintained suitably, for controlling emissions.
	Water Quality	• Run-off from vegetation stripped project area. • Construction activities may cause change in the natural drainage pattern.	• Plantation on the slope • Care shall be taken to avoid or mitigate any changes in the course of natural drainage.
	Soil Quality	• Loss of fertile top soil • Temporary loss of agricultural produce in farmlands.	• The top soil be preserved and reclaimed back.

Project Activities	Environmental Attributes	Potential Adverse Impacts	Proposed Mitigation Measures
	Noise	• Increase in noise levels due to running of heavy construction equipment. • Noise propagation due to running of heavy construction vehicles at the construction sites.	• All the deployed equipment shall have inbuilt noise enclosure. • Noise abatement measures shall be adopted. • Noise barriers of suitable specifications shall be erected in locations of sensitive receptors.
Transport, Storage and Operation of Construction Material / Equipment	Air Quality	• Gaseous emissions from construction vehicles. • Fugitive Dust Emissions due to Traffic Movement. • Spillage and fugitive emissions arising out of construction materials.	• All the vehicles shall have Pollution Under Check (PUC) certificate. • Regular sprinkling of water on unpaved ways / access roads. • The material shall be transported in covered condition.
	Water Quality	• Spillage of construction material and flow into streams particularly during the monsoon months. • Run-off from Storage Areas of Construction Material.	• Small bunds and garland drains shall be created along the stock piles. • Proper enclosure shall be created.
	Soil Quality	• Spillage of materials, concrete slurry, fuel / oil on soil during construction.	• Material stock piles shall not be stored directly on ground. • Spillages shall be avoided through management practices and controlled / disposed appropriately.
	Traffic on Public Roads	• Increased flow of traffic. • Congestion on roads.	• Alternate routes for construction vehicle shall be considered where possible to avoid congested / residential areas. • Proper road signage and traffic marshals shall be provided to regulate / divert traffic during construction activities.
Civil Construction Activities	Air quality	• Gaseous Emissions from Construction Machinery • Fugitive Dust Emissions due to Movement of Traffic on the unpaved way. • Fugitive dust emission from the batching, mixing and concreting plant.	• All the vehicles deployed at construction site shall have the valid Pollution under Check (PUC) certificate. • An enclosure or barricading shall be created at such locations.
	Water quality	• Run-off from Construction Areas during curing and also from the storage area of the construction materials.	• Small bunds and garland drain shall be created along the stock piles. • Stock piles will not be situated directly on open ground.

Project Activities	Environmental Attributes	Potential Adverse Impacts	Proposed Mitigation Measures
	Noise Emissions	• High noise emissions from construction equipment. • Noise generated from the running of heavy vehicles deployed in the construction activities.	• Adequate enclosures shall be created around the stationary equipment. • Noise barriers of suitable specifications shall be erected in locations of sensitive receptors. • All the equipment shall be fitted with exhaust mufflers. • Appropriate personal protective equipment (PPE) shall be provided to the workers working near the high noise area.
Mechanical & Electrical Installation Activities	Air quality	• Air Emissions from running of construction machineries due to fuel.	• Adequate enclosures shall be created around the stationary equipment.
	Water quality	• Run-off from erection areas containing spent oils, paints.	• Small bund and garland drain shall be created along the stock pile.
Influx of Labour & Construction of Temporary Houses and Operation of Construction Camps	Socio-economic	• Stress on infrastructure. • Stress on social relations. • Social conflict due to inflow of workforce.	• Construction camps will be sited 1 km away from the habitation preferably in the downwind direction to avoid conflicts and stress on the local community and environment. • Local persons shall be preferred for the construction work in the un-skilled category.
	Land use	• Temporary change in land use pattern of the area due to coming up of labour camps.	• Labour camp structures shall be built in a manner such that they could be handed over to the RWA for common use (primary health care centre, school, crèche *etc*.) in consultation with the local authority.
	Water Quality	• Domestic effluent discharge from the labour camp and construction camp .	• Sanitation and sewage treatment facility shall be provided at the labour camps as per applicable norms. • Only treated effluents shall be discharged to municipal sewers.
	Waste Generation and Management	• Generation of municipal solid waste and Hazardous waste from Construction camps.	• Efforts shall be taken to minimize the waste generation to the extent possible, segregate and dispose /recycle to appropriate agencies as per regulatory requirement and guidance from urban local bodies.

Project Activities	Environmental Attributes	Potential Adverse Impacts	Proposed Mitigation Measures
Generation, Transport & Disposal of Construction & Demolition (C&D) Waste	Air quality and Noise emissions	• Noise and Air Emissions from Transport Vehicles. • Fugitive Dust Emissions due to Movement of Traffic on the unpaved way. • Spillage and fugitive emissions during handling of C&D waste. • Fugitive emission from the pile of C&D waste.	• C&D waste shall be handled as per the Guidelines of C&D Waste Management Rules 2016.
	Water and Soil Quality	• Spillage/ spread/ deposition of debris along transport routes. • Run-off from Disposal Areas. • Leaching effect from the debris disposal area. • Potential conversion of land into waste land.	• Proper bund shall be created to avoid run-off of spills. • Spillage shall be avoided by using covered transport vehicles. • The excavated land shall be restored, as applicable.
	C&D Waste Generation	• C&D waste will be generated from excavation, casting activity, pile heads, demolition, *etc.* in the construction camps as well as along the alignment.	• C&D waste shall be handled as per the Guidelines of C&D Waste Management Rules 2016.

Source: Study Team

10.11 ENVIRONMENT MANAGEMENT PLAN

The EMP has been prepared based on a hierarchy of impact avoidance, minimization, mitigation and control of residual impacts, for both, construction and operation phases for all the relevant environmental attributes. It describes administrative aspects of ensuring that mitigatory measures are implemented and their effectiveness is monitored over the life of the project. Kindly refer ***Table 9.1.1, Table 9.1.2*** **and** ***Table 9.1.3*** of Chapter 9, summarize the main management activities for significant adverse impacts in Planning/Design, Construction and Operation stages respectively. They provide mitigation/management measures for significant impacts and an estimated budget provision for their implementation. They also identify the parties to incur the costs and implement the measures.

10.12 DISASTER MANAGEMENT PLAN

The proposed PD building shall house the lives of a large number of people. It also involves installation of various structures and machineries that meet the comfort and needs of its population but may also pose serious threat to the occupants in case of an accident. It is thus considered necessary to carry out a risk assessment and disaster management plan for the project.

It is attempted to plan and construct the buildings following all safety norms. However, it is not always possible to totally eliminate such eventualities and random failures of equipment or human errors. An essential part of major hazard control has, therefore, to be concerned with mitigating the effects of such emergency and restoration of normalcy at the earliest (***Details are presented in the Table 7.3.1 in Chapter 7***).

10.13 ENVIRONMENTAL MONITORING PROGRAM (EMoP)

A comprehensive Environment Monitoring Program (EMoP) has been developed to monitor the surrounding environment and check the effectiveness of the EMP implementation during the construction as well as the operational stages of the project. Performance indicators have been identified which include parameters on ambient air quality, noise, vibration, surface and ground water quality, soil quality, survival rate of compensatory plantations, borrow area rehabilitation. Monitoring parameters, frequency and sampling protocols have been outlined in the Environment Monitoring Program for construction and operational phase of the project (***Refer Table 6.2.1 and Table 6.2.2, Chapter 6***).

10.14 CONCLUSION

Based on the findings of the EIA study and recommendations on regulatory compliance, mitigation measures and management plan, it is concluded that the proposed PD Complex project is in compliance with National, State and local environmental regulation. Also, the effective implementation of the proposed mitigation measures, environmental management and monitoring plan should be adequate to minimize and control the adverse environmental impacts likely, due to the project. The proposed PD Complex shall conform to Green Building Norms in accordance with '***IGBC Green New Buildings Rating System'*** and shall comply with the Energy Conservation Building Code (ECBC) as per ECBC-2017.

Chapter 11

Disclosure of Consultants Engaged

Chapter 11
Disclosure of Consultants Engaged

11.0 GPS TECHNOLOGIES PVT. LIMITED

GPS Technologies Pvt. Limited (GPSTPL), a multi disciplinary engineering consultancy organization, having its registered office at 1210-Hemkunt House, Rajendra Place, New Delhi has carried out the EIA Study. .

The EIA Study has been carried out by duly accredited EIA Co-coordinator and Functional Area Experts by NABET and also experts of national repute in their field. The details of EIA Coordinator, FAEs and other study team involved are as given below:

Team Leader- Sh. Indu Shekhar Singh, Ex. Member Secretary, Bihar State Pollution Control Board.

Dy Team Leader- Sh. Vimal Kumar Singh, A NABET Accredited EIA Coordinator with more than 28-years of experience

EIA Coordinator- i) Dr D K Pandey

Sl. No.	Functional Area	Name of the Experts	Remarks
1	Ecology and Biodiversity	Indu Shekhar Singh	A NABET Accredited Expert with more than 40 years of experience, Ex. Member Secretary, Bihar State Pollution Control Board
2.	Land Use	Akshay Tripathi	Expertise in GIS Application, Trained at ISRO, Hyderabad
3.	Geology	Dr R K Singh	NABET Accredited Expert
4.	Solid Waste	B B Uppal	M. Tech (Env) Ex. Dy. Adviser, CPHEEO, Ministry of Urban Development, Govt. of India
5.	Legal Expert	Dr. Deepak Juneja	MBBS, MPH (Houston Texas University), L.L. B.,Delhi University
6.	Water Pollution and Control	B B Uppal	M.Tech. (Env) Ex. Dy. Adviser, CPHEEO, Ministry of Urban Development, Govt. of India
7.	Hydrology	Milind Kumar	B. Tech, IIT Roorke More than 30 years of international & national experience in infrastructure project.
8.	Soil Conservation and Ground Subsidence	Milind Kumar	B. Tech, IIT Roorke More than 30 years of international & national experience in infrastructure project
9.	Noise and Vibration	Vishal Shrivastav	B.Tech.(Mech. Engg) Expertise in Noise and vibration
10.	Meteorology, Air Quality Modeling	Asif Husain	NABET Accredited Expert

Sl. No.	Functional Area	Name of the Experts	Remarks
	& Prediction		
11.	Public Health & Occupational Safety	Dr. Deepak Juneja	MBBS, MPH (Houston Texas University), L.L. B., Delhi University

11.1 PROFILE – GPS TECHNOLOGIES PVT. LIMITED

GPS Technologies Pvt. Limited (GPSTPL) is a multi-disciplinary firm of international consultants, providing comprehensive professional consultancy services, for all facets of planning, preliminary and detailed engineering design and construction supervision of infrastructure projects. Founded in 2008, GPSTPL's operations have grown to be a major engineering force within India also in overseas, with an outstanding record in planning and design for railways, highways, roads, bridges, water supply, urban infrastructure development and other skilled engineering works.

Since its inception, GPS has participated in several national large infrastructure projects. The capital costs (at 2018 Price Index) of projects are worth more than **Rs 5.5 lakh Crore (US$ 80 Billion).** These include projects such as High Speed Railway Line – 1, Line – 5, Line – 6 (Total - 2,150 km), Chardham alignment (327Km), Leh – Srinagar Railway Alignment (550Km). GPSTPL has successfully carried out many Environmental studies including the EIA study of MAHSR at Feasibility Stage in 2014 which is duly approved by JICA and Ministry of Railway. **GPSTPL is the first** in India to acquire license of **Quantum software** for alignment optimization for Railways and Highways. We have extensive experience of working on satellite imagery (NRSC – ISRO, CartoDEM & Cartoset data) and DEM for development of Base maps in different Layers, with latest licensed software such as **QUANTM, CIVIL3D, MAP3D, ERDAS, NAVIS WORK, RASTER** etc. and equipments such as **UAV, LIDAR, DGPS, TS** *etc*. GPS has expertise in undertaking **complex and intricate projects** which transcend geographical boundaries and technical frontiers wherein expertise and coordination with multiple agencies is required.

The corporate office of the Company is located at New Delhi, India. GPSTPL has successfully completed assignments in many countries including Cambodia, Laos, Oman and Djibouti – Ethiopia.

GPSTPL is working on projects with International Funding since 2012, namely where Institution like Japan International Cooperation Agency (JICA) is involved.

GPSTPL is also working with various national, central, state and provincial governments and infrastructure departments such as roads authorities, PWD, Northern Railways, Ministry of Railways, Leh Autonomous Hill Development Council, WAPCOS, IRCON International Limited, RVNL *etc*.

GPSTPL KEY DATA	
Legal Name of the Company	GPS Technologies Pvt. Limited
Contact Person	Madan Nath
Registered Office/ Corporate Office	1210-Hemkunt House, Rajendra Place, New Delhi-110 008

Telephone Number	+91 11 25811229, 25816389
FAX	+91 11 25816389
E-mail	contact@gpstpl.com
Website	www.gpstpl.com

दिल्ली विकास प्राधिकरण
योजना ज़ोन-डी
दूसरी मंज़िल, विकास मिनार, नई दिल्ली

संख्या. F.20(11)2019/MP/D-11 दिनांक: 17.01.2020

To,

Chief Engineer/ General,
Delhi Metro Rail Corporation Ltd.
Metro Bhawan, Fire Brigade Lane,
Barakhamba Road, New Delhi-110001

Sub: Regarding change of land use of land measuring 13332 sq.m. from 'Recreational' (District Park) to 'Transportation' allotted to DMRC at Bhikaji Cama Place, New Delhi.

Ref: Hon'ble NGT order dated 07.11.2019 in the matter of Residents of Delhi Through Shobha Agarwal Vs Delhi Metro Rail Corporation & Ors. (O.A. No. 651/2019) forwarded by Conservator of Forests, GNCTD vide letter dated 06.01.2020. (**Copy Enclosed**)

Sir,

May kindly refer the above mentioned Hon'ble NGT order dated 07.11.2019 (O.A. No. 651/2019) in the matter of Residents of Delhi Through Shobha Agarwal Vs Delhi Metro Rail Corporation & Ors vide which the site visit was held under Principal Chief Conservator of Forests, GNCTD in which representation of DMRC and DDA were also present. In the above referred Hon'ble NGT order dated 07.11.2019 following is mentioned: (**copy enclosed**)

> *"In view of allegation that the area was an open land and the open area was to be redeveloped after completion of the construction by the DMRC,* ***any permission for land-use has to be based on an expert study whether open area was required to be preserved as per master plan or in the interest of environment.***
>
> ***Let the PCCF Delhi furnish an expert opinion by email at judicial-ngt@gov.in before the next date.***"

In view of above, I am directed to mention the following:

i. DMRC to submit NOC of Principal Chief Conservator of Forests, GNCTD / Hon'ble NGT order in the above referred Court matter before placing the agenda regarding change of land use before Technical Committee of DDA. Next date of hearing of Hon'ble NGT is on 27.01.2020.

ii. Moreover, it is observed that the site under reference is abutting the major roads i.e. Ring Road and Africa Avenue Road which has RoW of 90 M and 45 M, respectively. Accordingly, DMRC to take necessary clearance from the road owning agency i.e. PWD, GNCTD etc.

iii. The site under reference (three pockets) are to be shown on the approved Layout plan of L&DO.

In view of above, DMRC is requested to furnish the above mentioned details, so that matter could be further examined.

Regards,

Sr DGM/PD/DA End: AA

Pl. provide remarks.

17/01/2020

Director (Plg.)
Zone-D

30.1.20.
Adv/PD

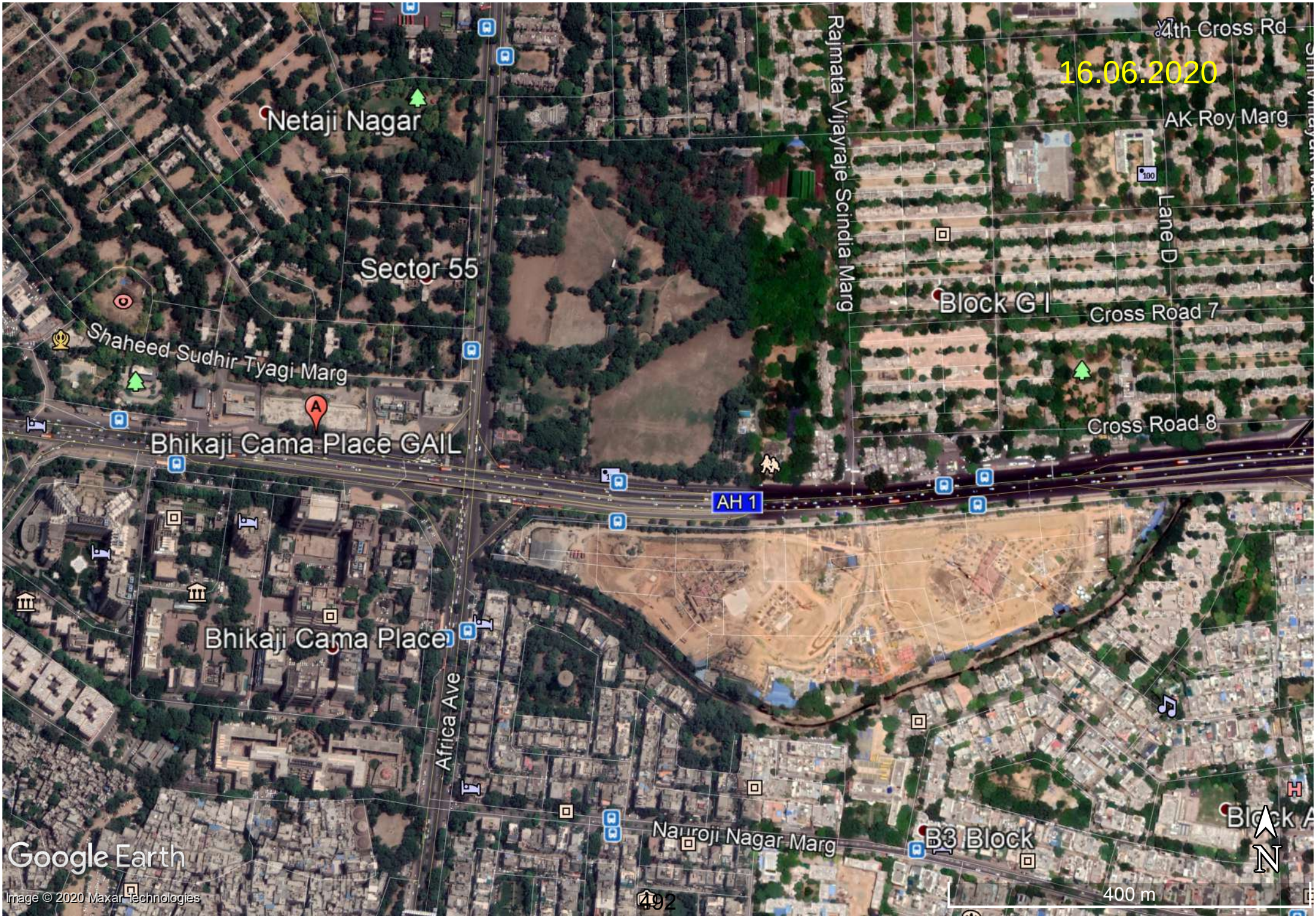
Advisor/PD
CA

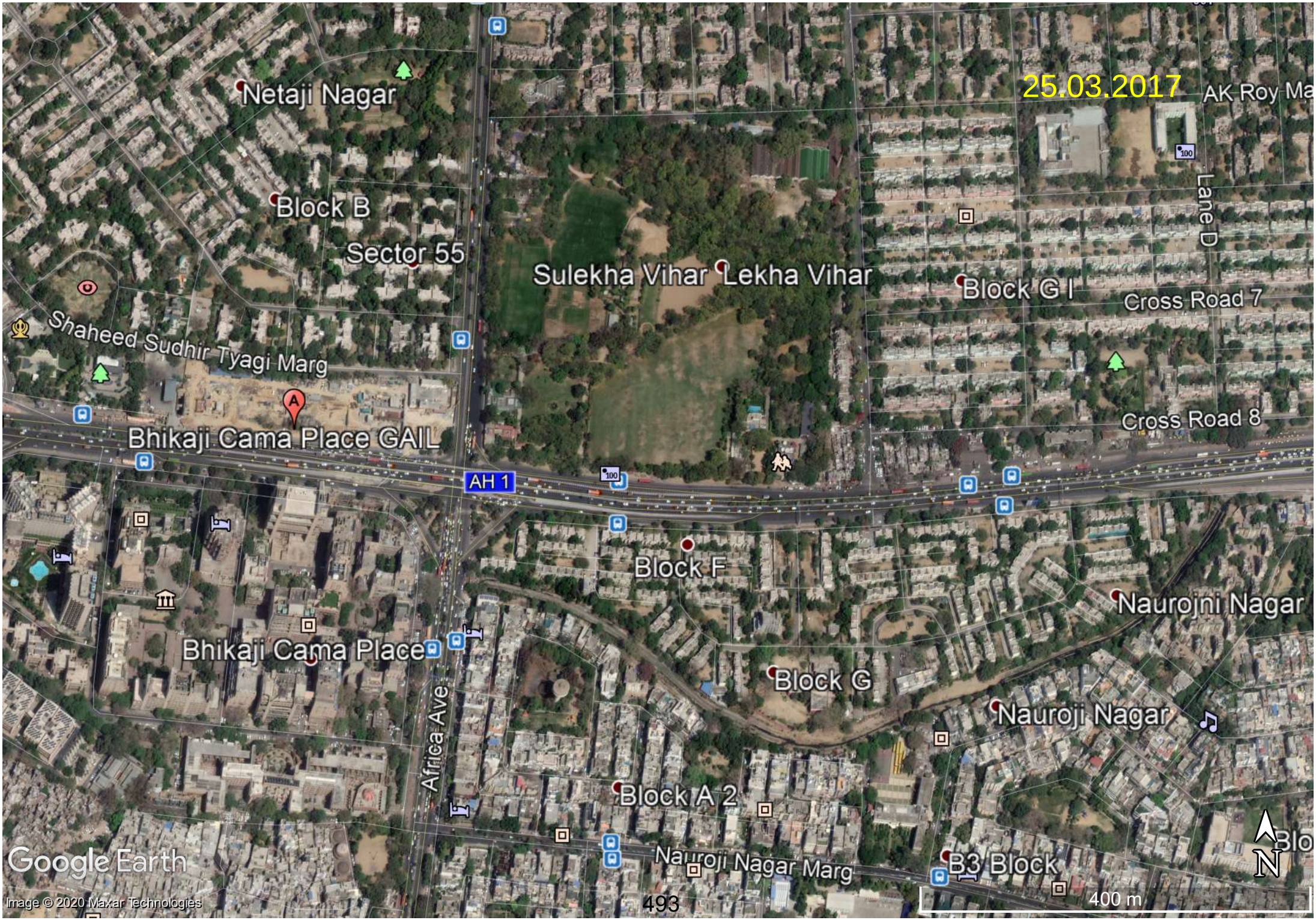
S.NO.	STATION NAME	BUILT UP AREA (IN SQ.M.)							
		ENTRY STRUCTURE	SUBWAY	GROUND	CONOURSE	PLATFORM	TRACK	ANCILLARY BUILDINGS OUTSIDE STATION BOX	TOTAL
1	BHIKAJI CAMA PLACE	460	1481	131	6114	4107	2399	851	**15543**

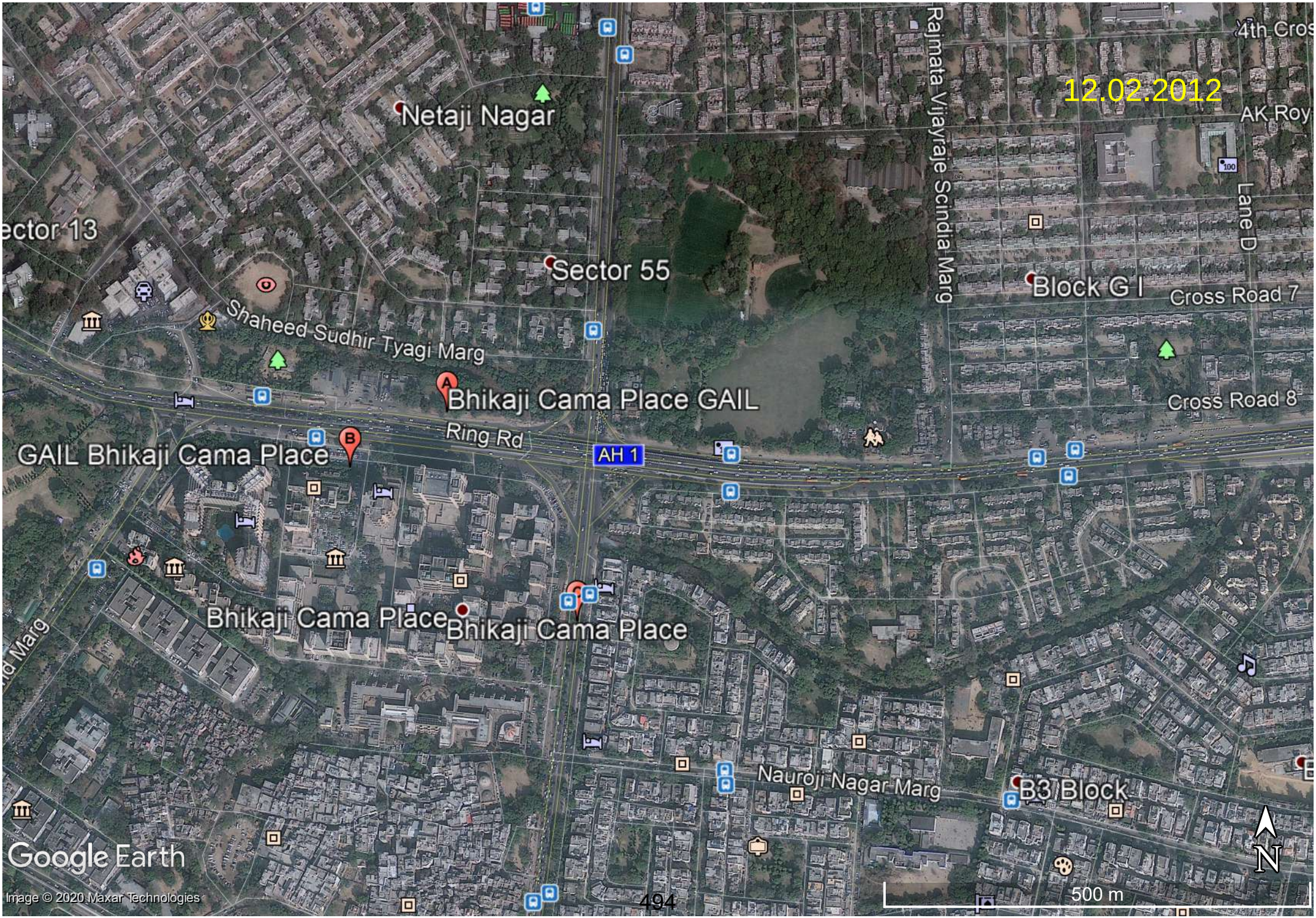
S.NO.	Area	BUILT UP AREA (IN SQ.M.)		TOTAL
		BASEMENT	G+4	
1	Bhikaji Cama Place (Basement + Proposed PD)	3544	13332	**16876**

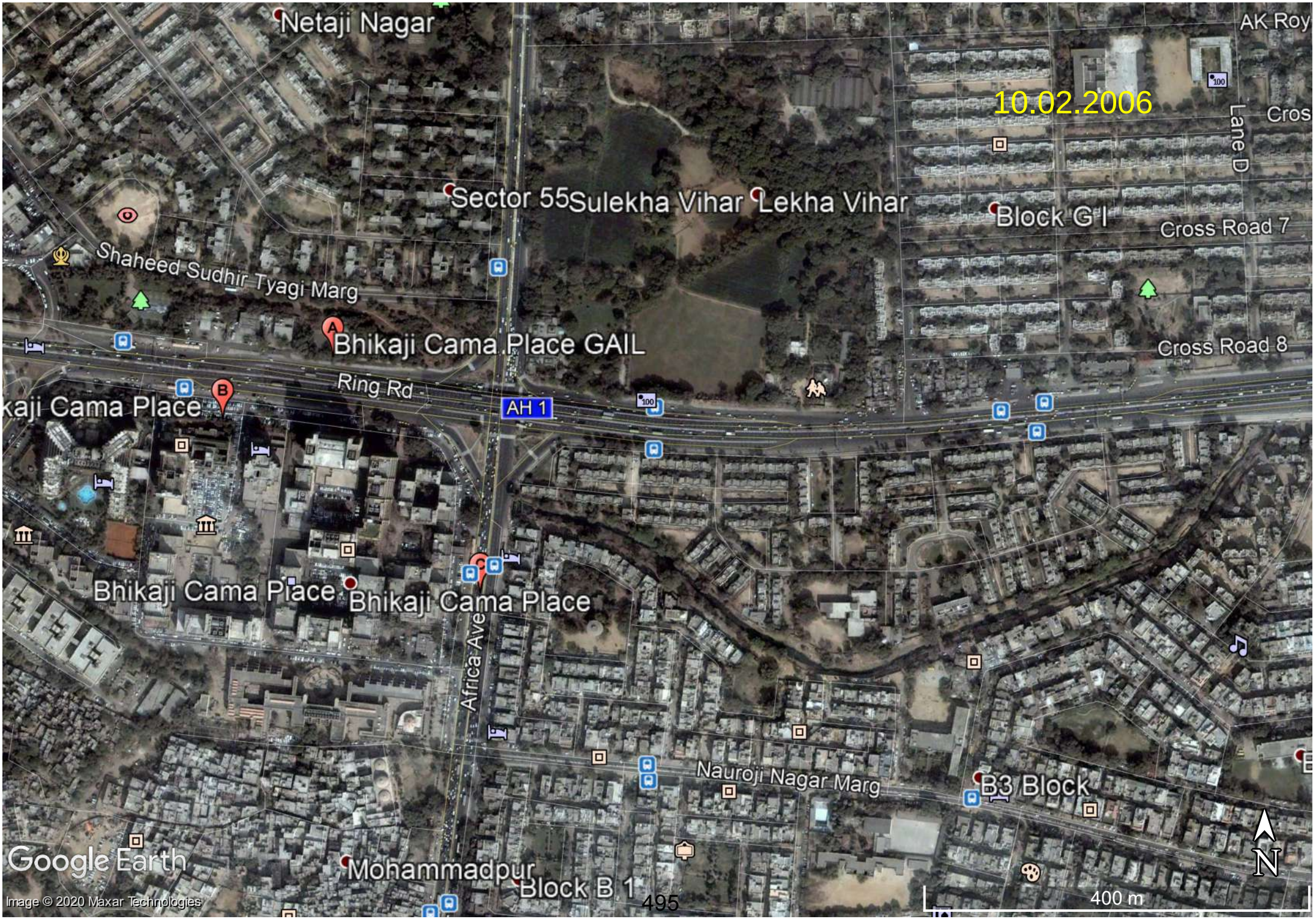
(13332 sqm land has been allotted to DMRC on permanent basis by L&DO)

Total built-up Area (Station + Basement + Proposed PD) (in sqm)	**32419**


16.06.2020
Netaji Nagar
Sector 55
Shaheed Sudhir Tyagi Marg
Bhikaji Cama Place GAIL
Bhikaji Cama Place
Rajmata Vijayraje Scindia Marg
4th Cross Rd
AK Roy Marg
Lane D
Block G I
Cross Road 7
Cross Road 8
AH 1
Africa Ave
Nauroji Nagar Marg
B3 Block
Google Earth
Image © 2020 Maxar Technologies
400 m
N


25.03.2017
Netaji Nagar
Block B
Sector 55
Sulekha Vihar
Lekha Vihar
Block G I
Cross Road 7
Lane D
AK Roy Ma
Shaheed Sudhir Tyagi Marg
Bhikaji Cama Place GAIL
Cross Road 8
AH 1
Block F
Naurojni Nagar
Bhikaji Cama Place
Block G
Nauroji Nagar
Africa Ave
Block A 2
Nauroji Nagar Marg
B3 Block
N
Google Earth
Image © 2020 Maxar Technologies
493
400 m


12.02.2012
Netaji Nagar
Sector 55
Block G I
Rajmata Vijayraje Scindia Marg
Lane D
Cross Road 7
Cross Road 8
Shaheed Sudhir Tyagi Marg
Bhikaji Cama Place GAIL
GAIL Bhikaji Cama Place
Ring Rd
AH 1
Bhikaji Cama Place
Bhikaji Cama Place
Nauroji Nagar Marg
B3 Block
Google Earth
Image © 2020 Maxar Technologies
500 m
N
494


Netaji Nagar
AK Roy
10.02.2006
Cros
Lane D
Sector 55
Sulekha Vihar
Lekha Vihar
Block G I
Cross Road 7
Shaheed Sudhir Tyagi Marg
Bhikaji Cama Place GAIL
Cross Road 8
Ring Rd
AH 1
kaji Cama Place
Bhikaji Cama Place
Bhikaji Cama Place
Africa Ave
Nauroji Nagar Marg
B3 Block
Google Earth
Mohammadpur
Block B 1
495
Image © 2020 Maxar Technologies
400 m
N