EON KHARADI
INFRASTRUCTURE PVT. LTD.

To
The Member Secretary
Expert Appraisal Committee (2) in the Infrastructure Sector
Ministry of Environment and Forests & Climate Change
Indira Paryavaran Bhavan,
Jor Bagh Road, New Delhi - 110003
India.

Date: 23.01.2017

Subject : Submission of compliance raised for Proposed EON IT Park at Sr.no 72/2/1,At Kharadi, Taluka-Haveli, District Pune, State-Maharashtra by M/s EON Kharadi Infrastructure Pvt. Ltd.

Ref : Minutes of the 12th Expert Appraisal Committee(Infra-2) for Item no 11.4.14
F. No. 21-73/2016-IA-III

Dear Sir,

This is reference to the above mentioned subject, we are thankful for giving us an opportunity to present our case in the 12th Expert Appraisal Committee (Infra-2).

We are submitting herewith the compliance against the queries raised in the 12th Expert Appraisal Committee (Infra-2) meeting for Item no 11.4.14.

Requesting you to kindly consider our project in the upcoming Expert Appraisal Committee (Infra-2) meeting.

Thanking you,
Yours Faithfully,
For EON Kharadi Infrastructure Pvt Ltd.

Authorised Signatory

Enl : Minutes of the 12th Expert Appraisal Committee(Infra-2) for Item no 11.4.14

(xi) Prediction of ground level concentration of emissions from stack due to DG set (2x 1250 kVA).

(xii) Efforts shall be made to reduce capacity of DG set to (1x1250 KVA) and remaining standby power shall be met from solar energy.

(xiii) Calculation on sizing of solar water heating systems to be furnished.

(xiv) At least 2 solar powered lights and one fan shall be provided in each flat. Solar generation shall be connected to the grid.

(xv) Solid waste management plan alongwith area earmarked for solid waste management scheme.

(xvi) Details of rain water harvesting.

(xvii) Management of excavated soil. Pollution control measures to be taken to control fugitive emission during construction phase including marble /stone cutting.

(xviii) Details energy conservation measures to be taken. taken (all points mentioned in the proposal such as orientation to support reduced heat gain, use of ASHRAE 90.1, use of ECBC compliant envelope measures to be supported through drawings and details in the proposal

(xix) Layout plan indicating Greenbelt alongwith area earmarked to be provided.

The proposal was deferred till the desired information is submitted. The above information shall be provided with the uploading of minutes on the website.

12.4.14 **EON IT PARK" At Sy.No 72/2/1 At Kharadi, Taluka – Haveli, District Pune, Maharashtra by M/s Eon kharadi Infrastructure Pvt. Ltd. – Environment Clearance reg** (IA/MH/NCP/60119/2016; F. No. 21-73/2016-IA-III)

M/s Eon kharadi Infrastructure Pvt. Ltd. has proposed for construction of EON IT PARK" At Sy.No 72/2/1 At Kharadi, Taluka – Haveli, District Pune, Maharashtra. PP has obtained Environment Clearance from SEIAA, Maharashtra vide letter No SEAC-III-2015/CR-57/TC-3, Dated 6th Oct 2015 for 2 FSI. Now, built up area of the project will be increased from 144241.43 m^2 to 256265 m^2. Plot area is 48600 m^2. As per previous EC, Project configuration is as given below:

Building Type	Configuration	Height (m)
Tower A	Basement 1 + Basement 2 +Basement 3 + Podium + 10 floors	46
Tower B	Basement 1 + Basement 2 +Basement 3 + Podium + 10 floors	46

Project configuration of expansion project is as given below:

Building Type	Configuration	No of offices	Height (m)
Tower A	Basement 3 + Basement 2 (Partly above ground) + Basement 1 (Partly above ground) + Ground + 17 floors	32	67.2
Tower B	Basement 2 (Partly above ground) + Basement1 (Partly above ground) + Ground + 17 floors	32	67.2
Recreational Block	1^{st}+2^{nd} Floor	--	9.00
Total		**64**	

	It is reported that Mula-Mutha River is flowing at a distance of 0.70 km. Wagholi lake, Vishrantwadi lake, SRPF lake are located within 10 km distance. Reserved forest is located at the periphery of 10 km. TOR was granted by SEAC-III, Maharashtra in the 54th SEAC-III meeting dated 20.09.2016. Total water requirement is 1199 m^3/day. Out of which, fresh water requirement from Puna Municipal Corporation water supply will be 469 m3/day and remaining water requirement (949 m3/day) will be met from treated sewage. Sewage generation will be 1055 m^3/day and treated in the STP. Treated sewage will be used for flushing (703 m^3/day) and gardening (27 m^3/day).Total solid waste generation is 3240 Kg/day. DG sets (7 x 2000 KVA) will be installed. Predicted GLC of the pollutants during operation phase has been reported to be o.4 □g/m3, 3 □g/m3 and 40 □g/m3 for PM2.5, NOx and CO respectively. Solid waste generation from the proposed project is estimated to be 3240 kg/day. Biodegredable waste will be treated in OWC. The Committee suggested them to re-estimate the quantity of e-waste and also proposed action plan to manage and dispose e- waste. After detailed deliberation, the Committee sought following additional information: **(i)** Certified compliance report issued by the Regional Office, Nagpur on the environment conditions stipulated in the existing EC. **(ii)** Give details of the past history of the project related to submission of application at the SEIAA Maharashtra. **(iii)** Give a conformity status to conditions stipulated in Annexure XIV of the amended EIA notification of 09-12-2016. **(iv)** Action plan for management of E- waste generated from the IT building. **(v)** Layout plan indicating road, greenbelt, drainage, sewer line, STP, solid waste handling area, rain water harvesting structure, etc. in different colour to be furnished. **(vi)** Layout of parking plan indicating entry and exit points of vehicular movement as well as traffic management plan. Highlight the fire tender pathway. **(vii)** Details of source of water supply alongwith permission to be submitted. **(viii)** Excess treated sewage disposal plan/scheme to be submitted. **(ix)** Efforts shall be made to reduce capacity of DG set and remaining standby power shall be met from solar energy. **(x)** Calculation on sizing of solar water heating systems to be furnished. **(xi)** Solid waste management plan alongwith area earmarked for solid waste management scheme. **(xii)** Details of rain water harvesting. **(xiii)** Management of excavated soil. Pollution control measures to be taken to control fugitive emission during construction phase including marble /stone cutting. **(xiv)** Details energy conservation measures to be taken. taken (all points mentioned in the proposal such as orientation to support reduced heat gain, use of ASHRAE 90.1, use of ECBC compliant envelope measures to be supported through drawings and details in the proposal **(xv)** Layout plan indicating Greenbelt alongwith area earmarked to be provided. The proposal was deferred till the desired information is submitted. The above information shall be provided with the uploading of minutes on the website.

Point wise compliance to points raised during 12th Expert Appraisal Committee – (Infra-2)

For

"EON IT Park"

Item no 12.4.14

File no 21-73/2016-IA-III

At

S. No 72/2/1 Village-Kharadi, Taluka – Haveli, District- Pune, Maharashtra

By

M/s EON Kharadi InfrastructurePvt.Ltd.

Point no 1

Certified compliance report issued by the Regional Office, Nagpur on the environment conditions stipulated in the existing EC.

Reply

Site visit has been conducted by Regional officer, Nagpur for our proposed EON IT Park on Saturday 21/01/2017.Schedule for the site visit is enclosed as **Enclosure-1.**Certified compliance report issued by the Regional Office, Nagpur will be submitted shortly.

Point no 2

Give details of the past history of the project related to submission of application at the SEIAA Maharashtra.

Reply

1. EON IT Park is a proposed project with expansion and amendment in EC.
2. We have obtained Environment Clearance from SEIAA, Maharashtra vide letter No SEAC-III-2015/CR-57/TC-3, Dated 6th Oct 2015 for 2 FSI enclosed as **Enclosure -2A**
3. Now we have applied for Amendment in Environmental Clearance with expansion due to increase in FSI to 3 FSI as per Maharashtra Govt.GR dated 16.07.2016 on 3-09-2016 to SEAC-III Maharashtra enclosed as **Enclosure -2B**
4. In the 54th SEAC-III meeting dated 20.09.2016 we have been granted ToR. Same is enclosed as **Enclosure -2C**
5. As SEAC-III Maharashtra is dissolved due to completion of their tenure, we have submitted EIA report to EAC (Infra- 2) instead of SEAC-III Maharashtra for appraisal on 3-11-2016.
6. Our project was listed in the 12th EAC-(Infra-2) meeting as Item no 11.4.14.

Point no 3

Give a conformity status to conditions stipulated in Annexure XIV of the amended EIA notification of 09-12-2016.

Reply

The total construction built up is 2,56,265.09 m^2 which includes the FSI and the Non-FSI. The conditions stipulated in Annexure-XIV are for the projects having construction built-up up to 1,50,000 m^2

Point no 4

Action Plan for management of E-waste generated from the IT building.

Reply

As per the committee suggestion we have re-estimated the e-waste quantity. E-waste generated 13 kg/day. E-Waste generated will be collected Tower wise and will be stored at a pre-designated place in the respective tower. Further, it will be handed over to M/s.Hi-Tech Recycling India Pvt.Ltd. for recycling and necessary action will be taken by them. The frequency

of handing over the E-waste will be quarterly as described in the bilateral agreement. The reusable computers will be donated to the educational and other institutes. E-waste calculations along with the agreement copy is enclosed as **Enclosure-3.**

Point no 5

Layout plan indicating road, greenbelt, drainage, sewer line, STP, solid waste handling area, rain water harvesting structure etc .in different colour to be furnished.

Reply

Master layout plan indicating road, greenbelt, drainage, sewer line, STP, solid waste handling area, rain water harvesting structure etc .in different colour is enclosed as **Enclosure-4**

Point no 6

Layout plan indicating entry and exit points of vehicular movement as well as traffic management plan. Highlight the fire tender pathway.

Reply

Layout plan indicating entry and exit points of vehicular movement along with the highlighted fire tender pathway is enclosed as **Enclosure-5**

Traffic management Plan is enclosed as **Enclosure-5a**

Point no 7

Details of source of water supply along with permission to be submitted.

Reply

Assured source of water supply is from Pune Municipal Corporation**.** Permission for the same is enclosed as **Enclosure-6.**

Point no 8

Excess treated sewage disposal plan/scheme to be submitted.

STP is of capacity 1230 m3/day having two modules each of 615 KL. These STP's will be receiving the raw sewage by gravity so there is no requirement of pumping raw sewage. When the sewage sullage is treated methodically to a good standard of BOD/ SS it is taken for recycling /reuse.

Scheme of Treatment:

Sewage treatment plant scheme will be based on FAB Process.

Expected Treatment

The Sewage Treatment Plant shall be designed for average flow of 1055 m^3 / day. The treated sewage shall be reclaimed and used for Flushing and Landscaping within Project area. The Treatment Plant shall be based on the Extended aeration principle.

The Treatment Plant shall broadly consist of the following;

1. Raw Sewage Pumps for Treatment – To pump sewage into FAB reactors.
2. Screen Chamber in R.C.C, with M.S screens –To remove floating and big size matters in the sewage.
3. Equalization tank with air-grid in R.C.C. – To collect the excess flow during peak hours and feed sewage in lean hours.
4. Air blowers. – To provide air (oxygen) to equalization tank / FAB reactors for aerobic process.
5. FAB (Fluidized Aerobic Bio) reactors in R.C.C. – Storage tanks with media along with aeration grid mixes biomass with feed and gives degradation of organics.
6. Tube Settlers in R.C.C. – This secondary clarifier is an equipment in which the bio-mass is removed and suspended solids are settled under action of gravity.
7. Filter feed tank. – Tank to store water after secondary treatment.
8. Filter Feed Pumps. – Pumps to feed water to sand filter and activated carbon filter.
9. Sand Filter. – To remove fine suspended solids.
10. Activated Carbon Filter. – To polish treated water in terms of reduction in BOD, colour, odour etc.
11. UF feed tank. – To store water for further disinfection.
12. Ultra filtration pumps.- To feed water to ultra filtration membranes.
13. Ultra filtration units. – This unit consists of membranes fine enough to retain colloidal particles, viruses etc.
14. Ozonator. – It is a chemical water treatment technique based on infusion of ozone into water.
15. Sludge holding tank. – The sludge from the FAB reactor and tube settler is removed from bottom of tank and is transferred to sludge holding tank for further digestion.
16. Centrifuge feed pumps. – Feed sludge to centrifuge.
17. Centrifuge. – The wet sludge is dewatered in the centrifuge and converted into dry form.
18. Treated Sewage Tank in R.C.C. – Stores final treated water.
19. Interconnecting pipe work complete with valve, fittings etc., and interconnection between pumps, tanks and filters.

20 Instruments such as Pressure Gauges, Rotameters, Auto Level Controllers, Level electrodes / probes, Flow Indicators, pH meter, etc.

21. Motor control panel complete with starters, push buttons, indicating lamps, isolating switches, fuse unit, single phase preventer, overload protection, all cabling and wiring.
22. Walkways and ladders in Hot Dip galvanised sections.
23. Exhaust Ducts and Vents at suitable locations.
24. Raw Sewage Pumps for Treatment – To pump sewage into FAB reactors.
25. Screen Chamber in R.C.C, with M.S screens –To remove floating and big size matters in the sewage.
26. Equalization tank with air-grid in R.C.C. – To collect the excess flow during peak hours and feed sewage in lean hours.

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45. Walkways and ladders in Hot Dip galvanised sections.
46. Exhaust Ducts and Vents at suitable locations.

Process Description:

The sewage will be first passed through a **Bar Screen Chamber & an Oil & Grease Trap** where any extraneous / floating matter would get trapped.

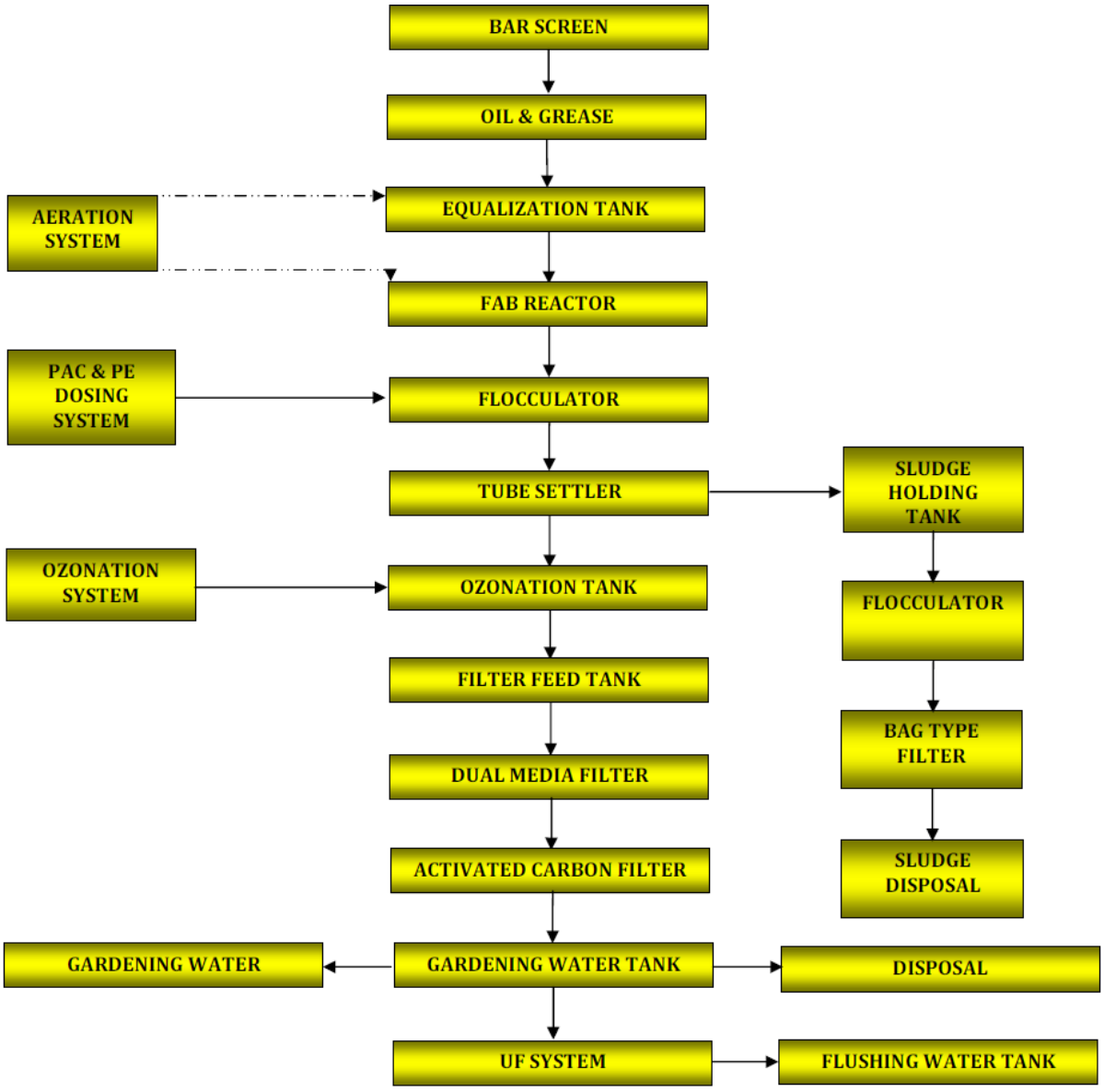
The sewage would then be collected in **Equalization Tank** where the variations in flow and Characteristics are dampened, which otherwise can lead to operational problems and Moreover it allows a constant flow rate downstream. Here the sewage is kept in mixed Condition by means of coarse air bubble diffusion

The equalized sewage will then be pumped to the **Fluidized Aerobic Bio Reactors (FAB)** where BOD/COD reduction is achieved by virtue of aerobic microbial activities. The FAB reactors would be running in series. The oxygen required will be supplied through coarse air bubble grid and the excess bio-solids formed in the biological process will be separated in the downstream **Tube Settler.** Prior to tubesettler a flocculator Tank is provided for dosing PE & PAC.

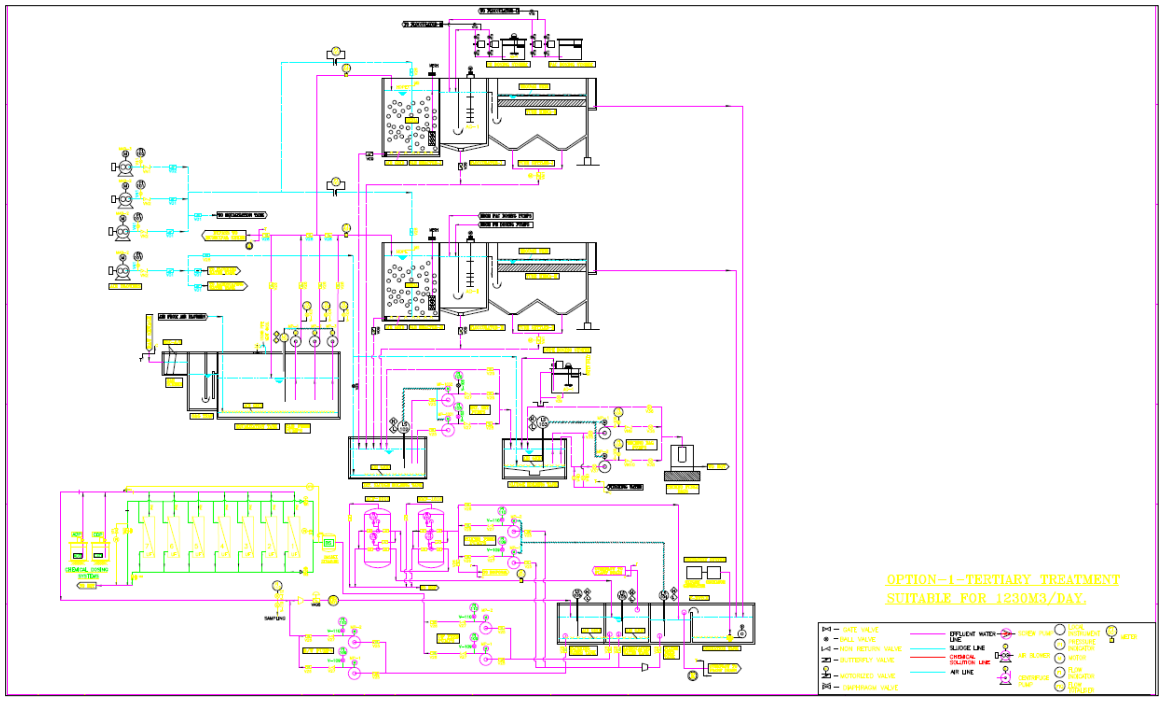
Treated Sewage from Tube settler collected in Ozonation Tank for disinfection. From here, the treated sewage will flow into Filter Feed tank and will be pumped to DMF and ACF for further polishing. Also UF is provided for the water used in flushing.

The biological sludge generated from the FAB and Tube Settler, will be collected in a sludge holding tank from here it will be pumped to Teckno Bags for dewatering of sludge.

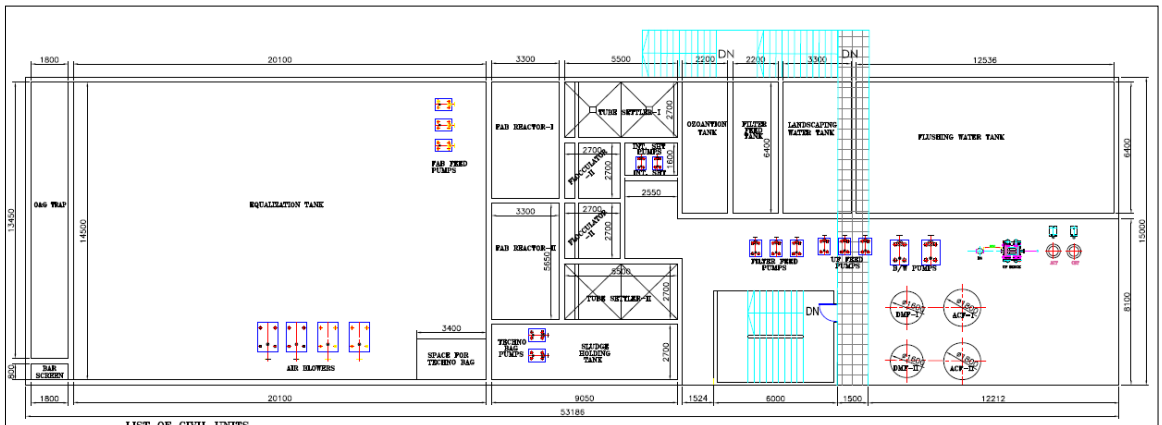
PROCESS BLOCK DIAGRAM:



STP Process block diagram



P&I Diagram



LIST OF CIVIL UNITS

DESCRIPTION	SIZE/CAP.	QTY.
BAR SCREEN CHAMBER	0.8 x 1.8 x 0.8M SWD	1NO.
OIL AND GREASE TRAP	13.45x1.8 x 1.0M SWD	1NO.
EQUALIZATION TANK	20.1x 14.5x 2.1M SWD	1NO.
FAB REACTOR-I&II	3.3 x 5.65x 5.0M SWD	2NOS
FLOCCULATOR TANK-I&II	2.7 x 2.7 x 1.5M SWD	2NOS
TUBE SETTLER-I&II	5.5 x 2.7 x 2.7M SWD	2NOS
OZOANTION TANK	6.4 x 2.2 x 2.0M SWD	1NO.
FILTER FEED TANK	6.4 x 2.2 x 1.9M SWD	1NO.
LANDSCAPING WATER TANK	6.4 x 3.3 x 5.0M SWD	1NO.
FLUSING WATER TANK	6.4x 12.53 x 5.3 M SWD	1NO.
INT.SLUDGE HOLDING TANK	2.55x 1.6 x 2.0M SWD	1NO
SLUDGE HOLDING TANK	9.05 x2.7 x 1.7M SWD	1NO
SPACE FOR TECHNO BAGS	SUITABLE	–
SPACE FOR UF SYSTEM	SUITABLE	–

NOTES:
1) ALL DIMENSIONS ARE IN m.m.
2) FOUNDATION PLAN SUPERCEDES PLOT PLAN.
3) VENTILATION OF 15-20 AIR CHANGES PER HOUR TO BE PROVIDED IN STP BY CLIENT.

BASEMENT PLANT:-
F.F.L OF THE PLANT EL-4.5M
I.L OF THE PLANT EL-2.2M

OPTION-2-TERTIARY TREATMENT SUITABLE FOR 2 x 615M3/DAY.

REV. NO.	DATE	DESCRIPTION	DRAWN BY	CHKD. BY	APPD. BY
00	11.11.16	ONLY FOR REFERENCE	MRD	PDK	

CAD FILE NO. | CODE NO.
APPD. BY
CHKD. BY: PDK
DRAWN BY: MRD
DATE: 23.09.16 | SCALE: 1:1

CLIENT:- EON KHARADI INFRASTRUCTURE PVT.LTD.
CONSULTANT:-

THERMAX LIMITED
WATER & WASTE SOLUTIONS
ENVIRONMENT HOUSE,
PLOT NO. 90-92, BG BLOCK,
M.I.D.C. BHOSARI, PUNE-411 026.(INDIA)
THERMAX

PROJECT:- PROPOSED IT BUILDING AT S.NO. 72/2 /1 AT KHARADI, PUNE
TITLE:- PLOT PLAN FOR SEWAGE TREATMENT PLANT FOR CAPACITY 2 x 615M3/DAY

O.C.NO.	DRG.NO.	SHEET NO.	REV.NO
EP2109	EP2109W3B1	2 OF 2	0

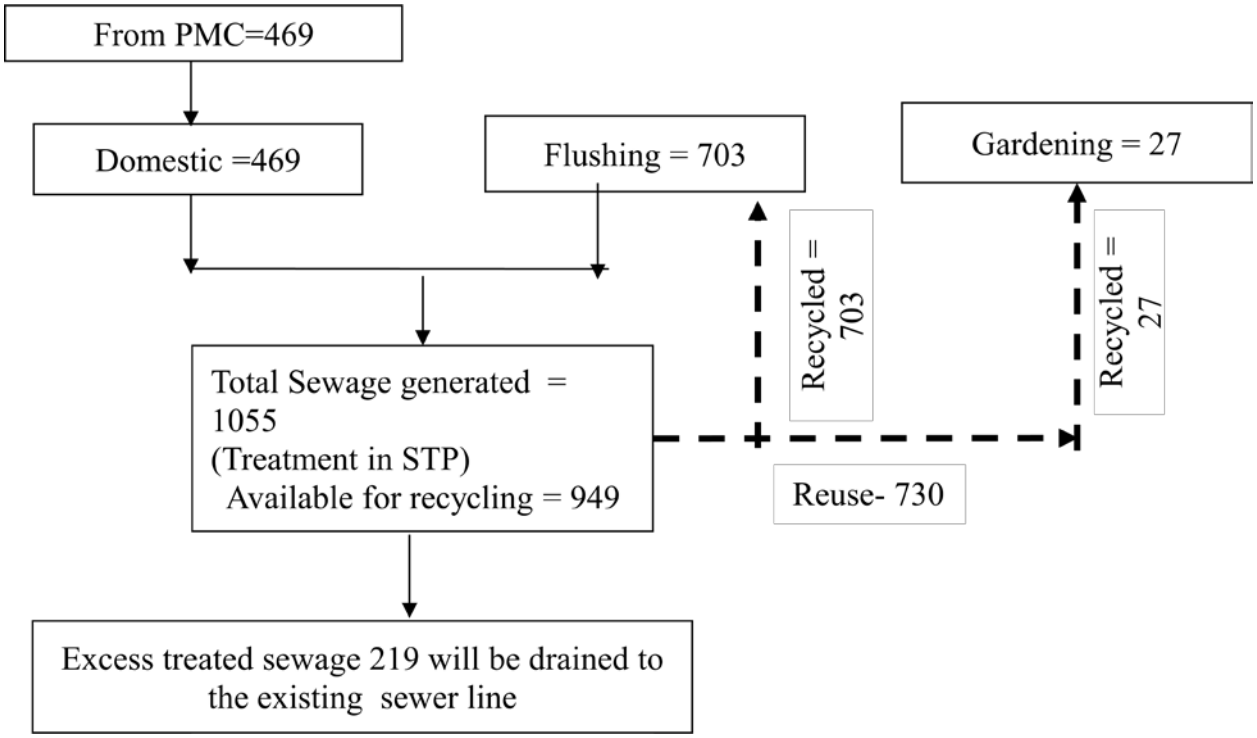
STP Layout

Advantages

- Compact Design
- Lower Operating Power Requirements
- Simplicity in Operation and Maintenance
- Nutrients and E-coli removal
- Sludge Generated is totally digested
- Media is self cleansing.

Disposal Plan :

Water requirement for the project during Non-Monsoon



All the figures are in m^3/day.

Total sewage generated will be 1055 m^3/day. After treatment in STP 949 m^3/day will be available for recycling.730 m^3/day treated water will be used for flushing and gardening respectively. Remaining 219 of the excess treated sewage will be disposed off to the existing sewer line.

Point no 9

Efforts shall be made to reduce capacity of DG set and remaining standby power shall be met from solar energy.

Reply

We will try to reduce capacity of DG. However all multinational companies need stand by backup power form DG sets. Clients have high load requirement such as Data Centre, server rooms, UPS and related AC are operational 24 x 7 and hence especially in the night times

and rainy seasons it is not possible to provide standby from Solar system.

Point no 10

Calculation on sizing of solar water heating systems to be furnished.

Reply

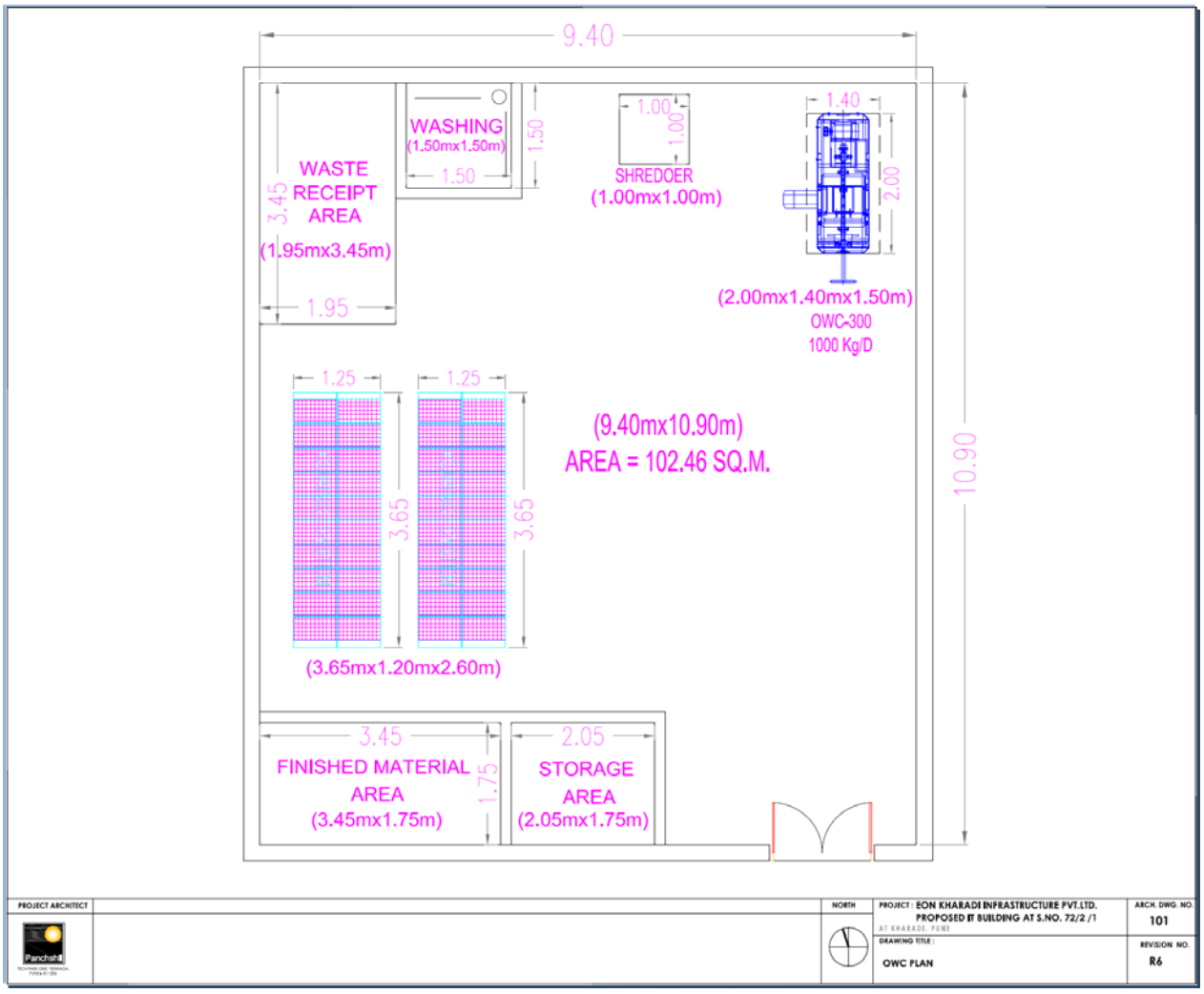
As this is a commercial proposed IT Project, no solar water heating system is proposed.

Point no 11

Solid waste management plan along with area earmarked for solid waste management scheme

Reply

Solid waste management plan is enclosed as **Enclosure -7**



SOLID WASTE MANAGEMENT FACILITY LAYOUT

Point no 12

Details of Rain water harvesting.

Reply

As per the hydrogeological survey report we have proposed 07 recharge pits of size 2 m x 2.7m x 3m depth (Till shallow aquifer). We have not proposed storage of the rain water. Layout indicating the locations and connectivity to the external storm water drain is enclosed as **Enclosure-8** and hydrogeological survey report is enclosed as **Enclosure-8A.**

Point no 13

Management of excavated soil. Pollution control measures to be taken to control fugitive emission during construction phase including marble /stone cutting.

Reply

Management of excavated soil will be carried out as follows;

Sr.no	Item	Units	QUANTITY			Management
			Work Initiated (75%)	Work to be Initiated (25%)	Total	
1	Excavation soft rock	m^3	26,250	8,750	35,000	Will be used for back filling
2	Excavation Hard rock	m^3	45,000	15,000	60,000	Will be used for back filling
	Total Excavation	m^3	71,250	23,750	95,000	Out of this 35,000 will be used within the site for backfilling and the remaining quantity will be used in other construction sites.

Pollution control measures to be taken to control fugitive emission during construction phase are listed as follows;

- Site barricades will be provided along with the tree planting at the site boundary;
- Excavation and transport will be done during off peak hours along with material loading from site minimize to about 15-20mins;
- During windy conditions, dust suppression measures will be adopted (dampening with water, tire washing facility at the entrance of the project site, etc.;
- The vehicles hired for transportation of material and labor shall have PUC certificate in order to reduce air emissions;
- Dust covers will be provided on trucks used for transportation of materials prone to fugitive dust emissions;

- If small volumes of concrete are to be mixed (manually), mixing is to be undertaken on a hard surface covered in plastic sheeting so that concrete waste and runoff can be contained;
- Traffic Management - vehicular movement to be regulated with proper parking facility and internal road system;
- The generators used on the site for energy backup will be CPCB norms complied for air emissions.

There will be no marble/stone-cutting on site. Pre-cut material will be used.

Point no 14

Details energy conservation measures to be taken (all points mentioned in the proposal such as orientation to support reduced heat gain, use of ASHRAE 90.1, use of ECBC compliant envelope measures to be supported through drawings and details in the proposal.

Reply

Section No.	Requirement	Compliance
4.2	Envelope	U value of Wall 1.53 W/Sq.m K.
	Fenestration	We have considered SGG – Cool Light Steel Gray: DGU ST – 108 U value of glazing 1.87 W/ Sq.m K & SHGC of glazing 0.12
	Roof	U value of Roof 0.58 W/Sq.m K.
5.2	HVAC	
	Natural Ventilation	We are proposed natural ventilation for Podium parking area with 2.5 % opening of floor area on exposed wall as per NBC 2005.
	Minimum Equipment Efficiencies	9.5 EER 9.7 IPLV
	Controls	We have proposed Temperature control & Time Control.
	Piping and Ductwork	Ducting Insulation Exterior Supply R-1.4 Sq.m.K/W Exterior Return R-0.6 Sq.m.K/W Ventilated Attic R-1.4 Sq.m.K/W Ventilated Attic R-0.6 Sq.m.K/W Unconditioned Space R-0.6 Sq.m.K/W Piping Insulation > R-0.35 Sq.m.K/W

Section No.	Requirement	Compliance

7.2	Lighting	LPD shall be as per ECBC norms.
	Lighting control	Timer shall be provided for energy saving as per ECBC
	Interior Lighting Power	LPD shall be as per ECBC norms. Refer enclosed calculation Sheet as **Enclosure-9**

Section No.	Requirement	Compliance
8.2	Electrical power	Load List .enclosed as **Enclosure-10**
	Transformers	Transformer losses shall be as per ECBC norm. Please refer to **Enclosure-11**
	Energy efficient motors	Energy efficient motors are considered
	Power factor correction	Power factor correction system is considered. Please refer **Enclosure-10**
	Check-Metering and Monitoring	Metering and monitoring is considered Refer enclosed Single line diagram enclosed as **Enclosure-12**
	Power distribution systems	Refer enclosed Single line diagram. enclosed as **Enclosure-12**

Point no 15

Layout plan indicating Greenbelt along with area earmarked to be provided.

Reply

We have provided 10% mandatory RG area on virgin land. Additional green area is also provided for environmental and aesthetic reasons. Calculations and layout explaining the same is presented herewith.

Particulars	**Area in m^2**
Required Open space area 10% on ground	4499.77
Provided area	
Open space 1	2386.88
Open space 2	790.90
Open space 3	744.69
Open space 4	577.30
Total	4499.77
Additional green area on ground	1030.00
Grand Total	5530.00

Proposed Tree List:

Sr.No.	NAME	SYMBOL	NO.
1.	ASHOKA		113
2.	NEEM		26
3.	LAXMI TARU		21
4.	KARANJ		21
5.	NANDRUK		73
6.	BAHAVA		21
TOTAL NO. OF TREES			275

PLANTATION DETAIL –ADDITIONAL PROVIDED			
Sr.No.	NAME	SYMBOL	NO.
1.	RED FLAG BUSH		15
2.	WHITE CHAFA		15
3.	AWALA		10
4.	SHIRISH		20
5.	GULABIKANCHAN		07
6.	KADAMB		12
7.	NEEM		15
7.	UMBER		19
8.	PALAS		12
9.	ROYSTONEA REGIA (ROYAL PALM)		22
10.	BAHAVA		19
11.	KARANJ		20
12.	NANDRUK		20
TOTAL NO. OF TREES			206

We have proposed 481 nos. of trees.

Layout plan indicating greenbelt along with area earmarked is enclosed as **Enclosure-13**

List of Enclosures		
Point no	**Enclosure**	**Enclosure no**
Point no 1	RO site visit schedule	Enclosure no-1
Point no 2	EON Kharadi EC	Enclosure no-2
	Maharashtra Govt.GR dated 16.07.2016	Enclosure no-2A
	54^{th} SEAC-III ToR	Enclosure no-2B
Point no 4	Hi-Tech Recycling (India)NOC	Enclosure no-3
Point no 5	Master layout	Enclosure no-4
Point no 6	Parking Layouts	Enclosure no-5
	Traffic Management plan	Enclosure no-5a
Point no 7	Water NOC	Enclosure no-6
Point no 11	Solid waste management Plan	Enclosure no-7
Point no 12	RWH Layout	Enclosure no-8
	Hydrogeological survey Report	Enclosure no-8A
Point no 14	Calculation sheet	Enclosure no-9
	Load list	Enclosure no-10
	Transformer Losses	Enclosure no-11
	Power factor correction system	Enclosure no-10
	Single line diagram	Enclosure-12
Point no 15	Landscape Layout	Enclosure-13

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE

Regional Office (WCZ)
Ground Floor, East Wing
New Secretariat Building
Civil Lines, Nagpur - 440001
E-mail: apccfcentral-ngp-mef@gov.in

F.No:EC-263/RON/2017-NGP/ Date: 18/01/2017

To,
J.P. Infra (Mumbai) Private Limited
4th Floor, Viraj Towers,
Western Express Highway
Near WEH Metro Station, Andheri (East)
Mumbai-400093

Sub: Tour Programme of Suresh Kumar Adapa, Scientist'D', MoEFCC, Regional Office, Nagpur

Sir,

I am directed to invite your kind attention to the subject matter. Following is tour programme of the undersigned for carrying out site inspection of the projects located in Mumbai and Pune:

Date	Program
18/01/2017 (Wednesday) 20:40	Leaving for Mumbai from Nagpur by AI-630
19/01/2017 (Thursday)	Inspection of 1. Pinnacle construction Project, Borivali by Keystone Realtors, Mumbai 2. Celeste construction project, Godbunder, Thane, by J.P. Infra, Mumbai
20/01/2017 (Friday)	Inspection of Swar Ganga Housing Project, M/s. Goel Ganga Developers at Pimpri, Wagire, Tal.Haveli, Pune District, Maharashtra (Original Application no. 163/2016 before NGT, Pune)
21/01/2017 (Saturday)	Inspection of 1. La Montana residential cum commercial at village Vadgaon, Taluka Maval, Pune District by M/s. Smart Value Homes Ltd. (M/s. Tata Value Homes Ltd.) 2. Nyati Elan housing project by M/s. Nyati Developers, Village Wagholi, Taluka Haveli, Pune District
22/01/2017 (Sunday)	Inspection of EON IT Park of M/s. EON Kharadi Infrastructure Pvt. Ltd. located at Kharadi, Pune
22/01/2017 (Sunday)	Leaving for Nagpur from Pune

It is requested to make necessary arrangements for carrying out the site inspection.

A. Suresh/Cum 18/01/17

Suresh Kumar Adapa
Scientist 'D'
0712-2526828
09049350409

1/2

Copy to:

1. EON Kharadi Infrastructure Pvt.Ltd., Tech Park One, Tower 'E', S.No. 191/A/2A/1/2, Next to Don Bosco School, Off Airport Road, Yerwada, Pune-411006
2. Smart Value Homes Limited, 12th Floor, Times Tower, Kamala Mills Compound, Senapati Bapat Marg, Lower Parel, Mumbai-400013
3. Dr. J.Y.Hote, Executive Director & CEO, M/s. P Square Builders LLP, Nyati Unitree, Nagar Road, Yerawada, Pune- 411006
4. Revelation Realty Private Limited,702, NATRAJ, M.V.Road Junction, Western Express Highway, Andheri(East), Mumbai-400069
5. Mr.Amit Goyal, Director, M/s. Goel Ganga Construction, 3rd Floor, San Mahu Complex, Opposite Poona Club, 5 Bund Garden Road, Pune-411001
6. The Member Secretary, Maharashtra Pollution Control Board, Kalpataru Point, 3rd and 4th floor, Opp. Cine Planet, Sion Circle, Mumbai-400 022.
7. The Regional Officer, Jog Center, 3rd floor, Mumbai Pune Road, Wakdewadi, Pune - 411003.

A. Suresh Kum
18/01/13

Suresh Kumar Adapa
Scientist 'D'

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY

SEAC-III-2015/CR-57/TC-3
Environment department
Room No. 217, 2nd floor,
Mantralaya Annexe,
Mumbai- 400 032.
Dated: 6th October, 2015.

To,
M/s. Eon Kharadi Infrastructure Pvt. Ltd.
Tech Park One, Tower'E',
S.No.191/A/2A/1/2,
Next to Don Bosco School,
Off Airport Road,Yerwada,
Pune- 411 006.

Subject: Environment clearance for prior environmental clearance for proposed IT Park at S. No. 72/2/1, Kharadi, Dist. Pune by M/s. Eon Kharadi Infrastructure Pvt. Ltd.

Sir,

This has reference to your communication on the above mentioned subject. The proposal was considered as per the EIA Notification - 2006, by the State Level Expert Appraisal Committee-III, Maharashtra in its 27th meeting and recommend the project for prior environmental clearance to SEIAA. Information submitted by you has been considered by State Level Environment Impact Assessment Authority in its 86th meetings.

2. It is noted that the proposal is considered by SEAC-III under screening category 8(a) B2 as per EIA Notification 2006.

Brief Information of the project submitted by you is as-

Name of Project	IT Building "EON IT Park"
Project Proponent	Mr. Anand Sanghavi
Consultant	M/s. Ultra-Tech Environmental Consultancy & Laboratory
Accreditation of consultant(NABET Accreditation)	S. No. 157 of list of Consultants with Provisional Accreditation* (Rev.27) of dated 5th Feb 2015.
Type of project: Housing project /Industrial Estate/SRA scheme/ MHADA /Township or others	IT PROJECT
Location of the Project	S. No 72/2/1 Village – Kharadi, Taluka Haveli, Dist – Pune, Maharashtra
Whether in Corporation /Municipal/other area	Pune Municipal Corporation (PMC)

<table>
<tr><td>Applicability of the DCR</td><td>DCR by Pune Municipal Corporation (PMC)</td></tr>
<tr><td>IOD/IOA/Concession document or any other form of document as applicable(Clarifying its conformity with local planning rules & provision)</td><td>Obtained – CC No 2308/14, Dt 03.11.2014</td></tr>
<tr><td>Note on the initiated work (If applicable)</td><td>NA</td></tr>
<tr><td>LOI/ NOC from MHADA /Other approvals(If applicable)</td><td>No DIC/Pune/LOI-159 I.T Park/2015/15 Dated 17.01.2015</td></tr>
<tr><td>Total Plot Area (sq. m.)
Deductions
Net Plot area</td><td>Total plot area : 48,600 sq.mt.
Deductions : 16,356.54 sq mt.
Net plot area : 32,243.46 sq mt.</td></tr>
<tr><td>Permissible FSI (including TDR etc.)</td><td>65,679.26m^2</td></tr>
<tr><td>Proposed Built-up Area(FSI &Non-FSI)</td><td>FSI: 65,678.76 sq mt.
Non FSI: 78,562.67 sq mt.
Total BUA: 1,44,241.43 sq mt.</td></tr>
<tr><td>Ground-coverage Percentage(%)(Note: Percentage of plot not open to sky)</td><td>Proposed Podium Coverage : 16,120.10 m^2
42.54%</td></tr>
<tr><td>Estimated Cost of the Project</td><td>Rs. 310 Cr</td></tr>
<tr><td>No. of building & its configuration(s)</td><td>IT BUILDING
<table>
<tr><td colspan="3">BUILDING CONFIGRATION</td></tr>
<tr><td>Particulars</td><td>Tower-A</td><td>Tower-B</td></tr>
<tr><td>No of Floors</td><td>B1+B2+B3 + Podium + 10</td><td>B1+B2+B3 + Podium + 10</td></tr>
</table></td></tr>
<tr><td>Number of tenants and shops</td><td>Total no. of Tenements:-
“Commercial”
<table>
<tr><td>Tower-A</td><td>5,615Nos</td></tr>
<tr><td>Tower-B</td><td>5,562Nos</td></tr>
<tr><td>Total</td><td>11,177Nos</td></tr>
</table>
Shops: -NIL</td></tr>
<tr><td>Number of expected residents/users</td><td>Commercial/ IT Users: -11,177 Nos</td></tr>
<tr><td>Tenant density per hector</td><td>NA</td></tr>
<tr><td>Height of the building(s)</td><td>Maximum Height : 46 mt</td></tr>
<tr><td>Right of way(Width of the road from the nearest fire station to the proposed building(s))</td><td>Nearest Fire Station: Yerwada

Fire Station: 8 Km & Width of the road from the nearest fire station to the proposed building 30 m.</td></tr>
<tr><td>Turning radius for easy access of fire tender movement from all around the building excluding the width for the plantation</td><td>Width of road is 6 m and turning radius for easy access of fire tender movement from all around the building is 9 m.</td></tr>
<tr><td>Total Water Requirement</td><td>Commercial:
Source: PMC
Dry season:
Fresh Water Requirement: 237 cu.m/day</td></tr>
</table>

	Recycled water (Flushing): 365 cu.m/day Recycled water(Gardening) : 50 cu.m/day HVAC Makeup: NA (VRV Air cooled system.) Total water Requirement : 652 cu.m/day Excess treated water: 57 cu.m/day Swimming Pool: NIL Fire fighting* (m^3): 500 cu. m/day Wet Season: Freshwater requirement: 237 cu. m/day Recycled water(Flushing): 365 cu. m/day Recycled water(Gardening): Nil HVAC Makeup: NA Total water Requirement : 602 cu. m/day Excess treated water: 107 cu. m/day Swimming Pool: NA Fire fighting: 500 cu. m/day
Rain Water Harvesting(RWH)	Commercial: Capacity of RWH tanks: 16 m^3 Location of the RWH tank(s): Ground No of recharge pits: 7 nos RWH pit size – 2 m x 2.7 m x 3 m depth Budgetary allocation (Capital cost and O&M cost): Capital cost: Rs.16,61,800/- O &M Cost: Rs. 80,000/-Annum
UGT tanks	Commercial / IT Domestic UG tank Capacity: 284 m3 Flushing UG tank Capacity: 219 m3 Fire UG tank Capacity: 500 m3
Storm water drainage	Natural water drainage pattern: Sloping towards east to west Quantity of storm water: 34.11 cu. m per min (2047 m3/hr) Size of SWD: 2 nos of 600mm dia for RFI of 75mm/hr at 1:250 slope.
Sewage and Wastewater	Residential: NA Commercial / IT Sewage generation : 555 m^3 / day Capacity of STP: 590 m3 / day STP technology: MBR Location of STP: Open to sky aeration tank & Equalization tank & rest of STP below Ground. Budgetary allocation (Capital cost and O&M cost): Shall be submitted in EIA Capital Cost: Rs. 163.60 Lakhs O &M Cost: Rs. 16.50 Lakh/annum
Solid waste Management	Waste generation in the pre-construction and construction phase:

	Waste generation: Negligible waste generation due to precast construction Quantity of the topsoil: Murum & Hard Strata. No top Soil Waste generation in the operation phase Commercial: Bio-degradable waste: 280.75 Kg/day Non-Bio-degradable waste: 2526.71 kg/day E-waste: 23 kg/Day Hazardous waste: Negligible Bio-medical waste (Kg/month) (If applicable): NA STP sludge: 80 kg/day Mode of Disposal of waste: Dry waste:- Will hand over to SWACH . (Agreement made on dated 08.02.2015) Wet waste: Installation of OWC 60. Capacity of 300 kg/day and manure will be used as manure for landscape development E-waste: Storage space will be allocated and E-waste will be handed over to authorized vendor on regular basis. Hazardous waste: Negligible quantities will be handed over to authorized vendor on regular basis Biomedical waste(Kg/month) (If applicable): NA STP sludge: Used as manure for landscape development after treatment Area requirement: Location of OWC: Basement 1 Area for the storage and treatment of the solid waste: 45.05 sq.m. Budgetary allocation (Capital cost and O&M cost) Capital Cost: 7.17 Lakhs O & M Cost:1.66 Lakhs/annum

Green Belt Development

Total RG area: 4,458.11 sq m
Total landscape area- 4458.11 Sq M + additional green on Ground = 1328.14 Sq m+Podium = 7555 Sq M
Number & list of trees species to be planted in the ground RG: 403 No.

Sr.No	Common name	Botanical name	Nos
1	Ashoka	*Saraca indica*	30

2	Sita Ashok	*Saraca asoca*	25
3	Neem	*Azardirachta indica*	30
4	Maharukh	*Ailathus excelsa*	10
5	Coconut	*Cocos Nucifera*	6
6	Royal Palm	*RoystoneaRegia*	5
7	Bhava	*Cassia fistula*	20
8	Parijatak	*Nyctanthes arbor-tristis*	25
9	Mango	*Mangifera Indica*	15
10	Jamun	*Syzygium cumini*	10
11	Awala	*Phyllanthus emblica*	30
12	Karanj	*Pongamia pinnata*	20
13	Umber	*Ficus glomurata*	20
14	Palas	*Butea monosperma*	20
15	Chickoo	*Manilkara zapota*	20
16	Shirish	*Albizzia lebek*	15
17	Gulabikanchan	*Bauhinia purpurea*	20
18	Shisav	*Dalbbergia sisoo*	25
19	Kadamb	*Anthocephalus kadamba*	30
20	Nandruk	*Ficus retusa*	10
21	Pangara	*Erythrina Variegata*	17
	Total No of Trees		403Nos

Sr.No	Podium Land Scape	Nos
1	Son Chafa	15
2	Palm	15
	Total No of Plants	30 Nos

Total no. of trees: 433
Budgetary allocation:
Capital Cost- Rs. 1.05 Cr
O&M Cost: Rs 1.5 Lakhs /annum

Energy
Power Supply:

Connected load : 16,358.45 kW
Maximum demand : 10,331.65 kW

Total DG power consumption for IT buildings: 9 DG set of 1500 kVA
Total DG power consumption for club house: NA
Energy saving by non-conventional method:
ECBC compliance: YES (ECBC-2007)

Sr. No.	Section No	Requirement	Compliance
1.	7.2.1.4	Exterior lighting to be controlled by photo sensor or time switch	Shall be control by timer switch.
2.	7.3	Interior lighting power to be within specified limits	All light in common open area will be ceiling mounted. It illuminates the required area only.
3.	7.4	Exterior lighting power to be within specified limits	All lights will be with bracket, so no extra light will be cross the boundary limit.
4.	8.2.1.1	Maximum allowable power loss from transformer	Shall be used energy efficient transformers as per ECBC Norms.
5.	8.2.2	Energy efficient motors	For the common area all motors will be energy efficient as per ECBC.
6.	8.2.3	Power factor be maintained between 0.95 and unity	we will use capacitor bank for common areas load
7.	8.2.5	Power distribution system losses to be maintained less than 1%	We will consider low watt loss type MCB in all distribution system.

Budgetary allocation (capital Cost & O& M Cost)
Capital Cost – Rs. 248 lac /-
O & M Cost – Rs. 1.50 lac yearly
DG Set: 9 no. of 1500 kVA

Environmental Management plan Budgetary Allocation:
During Construction Phase: Rs. 35.04 lakhs/annum

Attributes	Parameter	Cost Rs. (In lacs)
Air Environment	Water For Dust Suppression	1.08
	Air & Noise monitoring	0.48
Water Environment	Tanker water for construction	0.54
	Water monitoring	0.6
Land Environment	Toilets	3.5
	Maintenance	0.035
Biological Environment	Gardening	10
Socio- Economic Environment	Disinfection Pest Control	1.8
	First Aid facilities	0.23
	Health Check Up	0.5
	Creche for children	6
	Personal protective equipment	2.45
	Total	27.22

During Operation Phase: Rs. 620.38 lakhs/annum

Sr. No.	Parameter	Set up cost (Rs in In Cr)	Operational & Maintenance Cost(Rs in In Lakhs. per annum)
1	STP Cost	1.63	16.50
2	Rain Water Harvesting	0.16	0.80
3	Gardening	1.05	1.5
4	Solid waste	0.7	1.66
5	Solar street light	0.12	0.50
6	Strom water & drainage line network	3.2	0.32
	Total	6.86	21.28

Capital cost - Rs. 6.86 Cr
O & M Cost – Rs. 21.28 lakhs/annum

Traffic Management
Residential-NA
Parking details: IT

Parking for (Tower - A & B)						
	Parking Required			Parking Provided		
Description	*Cars*	*Scooters*	*Cycles*	*Cars*	*Scooters*	*Cycles*
200 Sq.m. Carpet area or fraction there of (5 : 12 :	1315	3157	1052	1315	3157	1052

4)						
Area Required Per No	12.50	2	1.40	12.50	2	1.40
Total	16,437.50	6,314.00	1,472.80	16,437.50	6,314.00	1,472.80
Total Area Required	24,224.30		Sq M	24,224.30		Sq M

Area per car including driveway provided for car parking:

Parking efficiency statement					
Level	Required Equivalent Car Space as per MoEF norms	Proposed car parking nos. 4W	Required area for proposed park as per MoEF norms	Proposed Parking Area (Sq.mt.)	Provided Equivalent Car Space (Sq.mt.)
A	B	C	D	E	F
Basement	35	1315	46025	46551	35.40

2W parking area : 6,314 Sq. mt
Total parking area: 24,224.30 Sq. mt.
Type of parking: (Open/Stilt/Basement): Basement
Width of all Internal roads (m): Internal road 6m wide and 6m wide driveway

3. The proposal has been considered by SEIAA in its 86th meeting & decided to accord environmental clearance to the said project under the provisions of Environment Impact Assessment Notification, 2006 subject to implementation of the following terms and conditions :

General Conditions for Pre- construction phase:-

(i) This environmental clearance is issued subject to utilization of excess treated water.

(ii) This environmental clearance is issued subject to land use verification. Local authority / planning authority should ensure this with respect to Rules, Regulations, Notifications, Government Resolutions, Circulars, etc. issued if any. Judgments/orders issued by Hon'ble High Court, Hon'ble NGT, Hon'ble Supreme Court regarding DCR provisions, environmental issues applicable in this matter should be verified. PP should submit exactly the same plans appraised by concern SEAC and SEIAA. If any discrepancy found in the plans submitted or details provided in the above para may be reported to environment department. This environmental clearance issued with respect to the environmental consideration and it does not mean that State Level Impact Assessment Authority (SEIAA) approved the proposed land use.

(iii) PP to provide at least two cut outs in the podium at Central Aisle for natural light & ventilation.

(iv) Occupation certificate shall be issued to the project only after ensuring availability of drinking water and connectivity of the sewer line to the project site.

(v) STP capacity shall be increased appropriately considering waste water generation.

(vi) This environmental clearance is issued subject to obtaining NOC from Forestry & Wild life angle including clearance from the standing committee of the National Board for Wild life as if applicable & this environment clearance does not necessarily implies that Forestry & Wild life clearance granted to the project which will be considered separately on merit.

(vii) PP has to abide by the conditions stipulated by SEAC & SEIAA.

(viii) The height, Construction built up area of proposed construction shall be in accordance with the existing FSI/FAR norms of the urban local body & it should ensure the same along with survey number before approving layout plan & before according commencement certificate to proposed work. Plan approving authority should also ensure the zoning permissibility for the proposed project as per the approved development plan of the area.

(ix) "Consent for Establishment" shall be obtained from Maharashtra Pollution Control Board under Air and Water Act and a copy shall be submitted to the Environment department before start of any construction work at the site.

(x) All required sanitary and hygienic measures should be in place before starting construction activities and to be maintained throughout the construction phase.

General Conditions for Construction Phase-

(i) Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche and First Aid Room etc.

(ii) Adequate drinking water and sanitary facilities should be provided for construction workers at the site. Provision should be made for mobile toilets. The safe disposal of wastewater and solid wastes generated during the construction phase should be ensured.

(iii) The solid waste generated should be properly collected and segregated. dry/inert solid waste should be disposed off to the approved sites for land filling after recovering recyclable material.

(iv) Disposal of muck during construction phase should not create any adverse effect on the neighboring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.

(v) Arrangement shall be made that waste water and storm water do not get mixed.

(vi) All the topsoil excavated during construction activities should be stored for use in horticulture / landscape development within the project site.

(vii) Additional soil for leveling of the proposed site shall be generated within the sites (to the extent possible) so that natural drainage system of the area is protected and improved.

(viii) Green Belt Development shall be carried out considering CPCB guidelines including selection of plant species and in consultation with the local DFO/ Agriculture Dept.

(ix) Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.

(x) Construction spoils, including bituminous material and other hazardous materials must not be allowed to contaminate watercourses and the dumpsites for such material must be secured so that they should not leach into the ground water.

(xi) Any hazardous waste generated during construction phase should be disposed off as per applicable rules and norms with necessary approvals of the Maharashtra Pollution Control Board.

(xii) The diesel generator sets to be used during construction phase should be low sulphur diesel type and should conform to Environments (Protection) Rules prescribed for air and noise emission standards.

(xiii) The diesel required for operating DG sets shall be stored in underground tanks and if required, clearance from concern authority shall be taken.

(xiv) Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.

(xv) Ambient noise levels should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB/MPCB.

(xvi) Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September 1999 and amended as on 27th August, 2003. (The above condition is applicable only if the project site is located within the 100Km of Thermal Power Stations).

(xvii) Ready mixed concrete must be used in building construction.

(xviii) The approval of competent authority shall be obtained for structural safety of the buildings due to any possible earthquake, adequacy of fire fighting equipments etc. as per National Building Code including measures from lighting.

(xix) Storm water control and its re-use as per CGWB and BIS standards for various applications.

(xx) Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other best practices referred.

(xxi) The ground water level and its quality should be monitored regularly in consultation with Ground Water Authority.

(xxii) The installation of the Sewage Treatment Plant (STP) should be certified by an independent expert and a report in this regard should be submitted to the MPCB and Environmenent department before the project is commissioned for operation. Discharge of this unused treated affluent, if any should be discharge in the sewer line. Treated effluent emanating from STP shall be recycled/refused to the maximum extent possible. Discharge of this unused treated affluent, if any should be discharge in the sewer line. Treatment of 100% gray water by decentralized treatment should be done. Necessary measures should be made to mitigate the odour problem from STP.

(xxiii) Permission to draw ground water and construction of basement if any shall be obtained from the competent Authority prior to construction/operation of the project.

(xxiv) Separation of gray and black water should be done by the use of dual plumbing line for separation of gray and black water.

(xxv) Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.

(xxvi) Use of glass may be reduced up to 40% to reduce the electricity consumption and load on air conditioning. If necessary, use high quality double glass with special reflective coating in windows.

(xxvii) Roof should meet prescriptive requirement as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfill requirement.

(xxviii)Energy conservation measures like installation of CFLs /TFLs for the lighting the areas outside the building should be integral part of the project design and should be in place before project commissioning. Use CFLs and TFLs should be properly collected and disposed off/sent for recycling as per the prevailing guidelines/rules of the regulatory authority to avoid mercury contamination. Use of solar panels may be done to the extent possible like installing solar street lights, common solar water heaters system. Project proponent should install, after checking feasibility, solar plus hybrid non conventional energy source as source of energy.

(xxix) Diesel power generating sets proposed as source of back up power for elevators and common area illumination during operation phase should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. Use low sulphur diesel. The location of the DG sets may be decided with in consultation with Maharashtra Pollution Control Board.

(xxx) Noise should be controlled to ensure that it does not exceed the prescribed standards. During nighttime the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.

(xxxi) Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.

(xxxii) Opaque wall should meet prescriptive requirement as per Energy Conservation Building Code, which is proposed to be mandatory for all air-conditioned spaces while it is aspirational for non-air-conditioned spaces by use of appropriate thermal insulation material to fulfill requirement.

(xxxiii) The building should have adequate distance between them to allow movement of fresh air and passage of natural light, air and ventilation.

(xxxiv) Regular supervision of the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings.

(xxxv) Under the provisions of Environment (Protection) Act, 1986, legal action shall be initiated against the project proponent if it was found that construction of the project has been started without obtaining environmental clearance.

(xxxvi) Six monthly monitoring reports should be submitted to the Regional office MoEF, Bhopal with copy to this department and MPCB.

General Conditions for Post- construction/operation phase-

(i) Project proponent shall ensure completion of STP, MSW disposal facility, green belt development prior to occupation of the buildings. As agreed during the SEIAA meeting, PP to explore possibility of utilizing excess treated water in the adjacent area for gardening before discharging it into sewer line No physical occupation or allotment will be given unless all above said environmental infrastructure is installed and made functional including water requirement in Para 2. Prior certification from appropriate authority shall be obtained.

(ii) Wet garbage should be treated by Organic Waste Converter and treated waste (manure) should be utilized in the existing premises for gardening. And, no wet garbage will be disposed outside the premises. Local authority should ensure this.

(iii) Local body should ensure that no occupation certification is issued prior to operation of STP/MSW site etc. with due permission of MPCB.

(iv) A complete set of all the documents submitted to Department should be forwarded to the Local authority and MPCB.

(v) In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by this Department.

(vi) A separate environment management cell with qualified staff shall be set up for implementation of the stipulated environmental safeguards.

(vii) Separate funds shall be allocated for implementation of environmental protection measures/EMP along with item-wise breaks-up. These cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year-wise expenditure should reported to the MPCB & this department.

(viii) The project management shall advertise at least in two local newspapers widely circulated in the region around the project, one of which shall be in the Marathi language of the local concerned within seven days of issue of this letter, informing that the project has been accorded environmental clearance and copies of clearance letter are available with the Maharashtra Pollution Control Board and may also be seen at Website at http://ec.maharashtra.gov.in.

(ix) Project management should submit half yearly compliance reports in respect of the stipulated prior environment clearance terms and conditions in hard & soft copies to the MPCB & this department, on 1st June & 1st December of each calendar year.

(x) A copy of the clearance letter shall be sent by proponent to the concerned Municipal Corporation and the local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.

(xi) The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM. SO_2, NOx (ambient levels as well as stack emissions) or critical sector parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

(xii) The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.

(xiii) The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MoEF by e-mail.

4. The environmental clearance is being issued without prejudice to the action initiated under EP Act or any court case pending in the court of law and it does not mean that project proponent has not violated any environmental laws in the past and whatever decision under EP Act or of the Hon'ble court will be binding on the project proponent. Hence this clearance does not give immunity to the project proponent in the case filed against him, if any or action initiated under EP Act.

5. In case of submission of false document and non compliance of stipulated conditions, Authority/ Environment Department will revoke or suspend the Environmental Clearance without any intimation and initiate appropriate legal action under Environmental Protection Act, 1986.

6. The Environment department reserves the right to add any stringent condition or to revoke the clearance if conditions stipulated are not implemented to the satisfaction of the department or for that matter, for any other administrative reason.

7. **Validity of Environment Clearance**: The environmental clearance accorded shall be valid for a period of 7 years as per MoEF&CC Notification dated 29th April, 2015.

8. In case of any deviation or alteration in the project proposed from those submitted to this department for clearance, a fresh reference should be made to the department to assess the adequacy of the condition(s) imposed and to incorporate additional environmental protection measures required, if any.

9. The above stipulations would be enforced among others under the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and rules there under, Hazardous Wastes (Management and Handling) Rules, 1989 and its amendments, the public Liability Insurance Act, 1991 and its amendments.

10. Any appeal against this environmental clearance shall lie with the National Green Tribunal (Western Zone Bench, Pune), New Administrative Building, 1st Floor, D-, Wing, Opposite Council Hall, Pune, if preferred, within 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

(Malini Shankar)
Member Secretary, SEIAA

Copy to:

1. Shri. R. C. Joshi, IAS (Retd.), Chairman, SEIAA, Flat No. 26, Belvedere, Bhulabhai desai road, Breach candy, Mumbai- 400026.

2. Shri. Jagdish Joshi, Chairman, IAS (Retd.). SEAC-III, Flat no. 3, Tahiti chs. Juhu Vers Ova Link Road, Andheri (W), Mumbai- 400 053.

3. Additional Secretary, MOEF, 'MoEF & CC, Indira Paryavaran Bhavan, Jorbagh Road, Aliganj, New Delhi-110003.

4. The CCF, Regional Office, Ministry of Environment and Forest (Regional Office, Western Region, Kendriya Paryavaran Bhavan, Link Road No- 3, E-5, Ravi-Shankar Nagar, Bhopal- 462 016). (MP).

5. IA- Division, Monitoring Cell, MoEF & CC, Indira Paryavaran Bhavan, Jorbagh Road, Aliganj, New Delhi-110003.

6. Managing Director, MSEDCL, MG Road, Fort, Mumbai

7. Collector, Pune.

8. Commissioner, Municipal Corporation, Pune.

9. Member Secretary, Maharashtra Pollution Control Board, with request to display a copy of the clearance.

10. Regional Office, MPCB, Pune.

11. Select file (TC-3)

(EC uploaded on 15|10|2015)

महाराष्ट्र प्रादेशिक नियोजन व नगर रचना अधिनियम, १९६६
चे कलम ३७(१ककक)(ग) अन्वये सूचना प्रसिध्द करण्याबाबत...
राज्यातील महानगरपालिकांच्या व सिडकोच्या विकास नियंत्रण नियमावलीतील माहिती तंत्रज्ञान धोरण २०१५ च्या अनुषंगाने मंजूर फेरबदल

महाराष्ट्र शासन
नगर विकास विभाग,
मंत्रालय, मुंबई-३२
दिनांक : १५ जुलै २०१६.

शासन निर्णय क्र.टिपीबी ४३१६/प्र.क्र.१६७/२०१६/(३)/नवि-११

शासन निर्णय :- सोबतची अधिसूचना महाराष्ट्र शासनाच्या **साधारण** राजपत्रामध्ये राज्यस्तरावर प्रसिध्द करण्यात यावी.

महाराष्ट्राचे राज्यपाल यांचे आदेशानुसार व नांवाने,

(किशोर द.गिरोल्ला)
अवर सचिव, महाराष्ट्र शासन.

प्रत,
१) मा.मुख्यमंत्री यांचे सचिव, मंत्रालय, मुंबई.
२) मा.राज्यमंत्री, (नगर विकास) यांचे खाजगी सचिव, मंत्रालय, मुंबई.

प्रति,
१) संचालक, नगर रचना, महाराष्ट्र राज्य, पुणे.
२) संचालक, नगर रचना तथा सह सचिव, नगर विकास विभाग, मंत्रालय, मुंबई.
३) सह संचालक, नगर रचना तथा सह सचिव, नगर विकास विभाग, मंत्रालय, मुंबई.
४) सह संचालक, नगर रचना, अंमलबजावणी कक्ष / मुल्यांकन / पुणे / कोकण / नाशिक / नागपूर / औरंगाबाद / अमरावती विभाग.
५) सहायक संचालक, नगर रचना / नगर रचनाकार, सर्व शाखा कार्यालये, नगर रचना विभाग.
६) अवर सचिव, नवि-१३/नवि-३० / कक्ष अधिकारी, नवि-९/नवि-१२, नगर विकास विभाग, मंत्रालय, मुंबई.
७) व्यवस्थापक, शासकीय मध्यवर्ती मुद्रणालय, चर्नी रोड, मुंबई.
त्यांना विनंती करण्यात येते की, सोबतची शासकीय अधिसुचना महाराष्ट्र शासनाच्या, साधारण राजपत्रामध्ये राज्यस्तरावर प्रसिध्द करुन त्याच्या प्रत्येकी ५० प्रती नगर विकास विभागास तसेच ५०० प्रती संचालक, नगर रचना, महाराष्ट्र राज्य, मध्यवर्ती इमारत, पुणे, यांना पाठवाव्यात.
८) आयुक्त, महानगरपालिका (सर्व)
९) व्यवस्थापकीय संचालक, सिडको.
१०) कक्ष अधिकारी (नवि-२९) नगर विकास विभाग, मंत्रालय, मुंबई.
त्यांना विनंती करण्यात येते की, सोबतची अधिसूचना या विभागाच्या संकेतस्थळावर प्रसिध्द करावी.
११) निवड नस्ती (कार्यासन-११).

556.PTD

Maharashtra Regional & Town Planning Act, 1966.

Sanctined Modification to Development Control Regulations for Municipal Corporations in Maharashtra state & CIDCO in respect of IT/ITES Policy-2015 under Section 37(1AA) (c) of the Act.

GOVERNMENT OF MAHARASHTRA
Urban Development Department,
Mantralaya, Mumabi 400 032.
Dated : 15th July, 2016.

NOTIFICATION

No. TPB 4316/CR-167/2016/(3)/UD-11:

Whereas, the State Government has sanctioned the Development Plans and the Development Control Regulations for the Municipal Corporations in the state of Maharashtra and City Industrial & Development Corporation (hereinafter referred to as "CIDCO") as a New Town Development Authority for Navi Mumbai Notified area under the provisions of the Maharashtra Regional and Town Planning Act, 1966 (Mah. XXXVII of 1966) (hereinafter referred to as "the said Act")which are in force in the limits of the respective Municipal Corporations and the CIDCO respectively:

And whereas, most of Municipal Corporations and CIDCO have provisions regarding Information Technology Establishments in respect of additional F.S.I. for Information Technology /Information Technology Enabled Service units (hereinafter referred to as "IT/ITES"), permissible uses in IT/ITES units and payment of premium for additional F.S.I in their Development Control Regulations(hereinafter referred to as"the said Regulations"):

And whereas, the State Govt. in the Industry, Energy and Labour Department, vide Notification of ITP-2013/(CR-265)/Ind-2 Dated 25th August 2015, has declared new Maharashtra's IT/ITES Policy-2015:

And whereas, after considering the above facts, in the public interest it was necessary to urgently carry out suitable modification to the said Regulations, the State Government, in exercise of the powers conferred under sub-Section (1AA) of Section 37 of the said Act, had issued Notice No. TPB 4315 /CR-146/2015/(3)/UD-11, dated 10th December 2015 (hereinafter referred to as "the said Notice") for inviting suggestions/objections from the general public with regard to the modification to the said Regulations of Municipal Corporations and CIDCO, appended to the said Notice there (hereinafter referred to as "the proposed modification") and appointed the Joint Director of Town Planning of concerned Divisions as the Officers wherein the Municipal Corporations are located(hereinafter referred to as "the said Officers"), to submit a Report on the suggestions/objections received in respect of the proposed

modification to the Govt. after giving hearing to the concerned persons and the Planning Authorities:

And whereas, the said Notice dated 10th December 2015 was published in the Maharashtra Government Gazette dated 7-13th January 2016 (hereinafter referred to as "the Official Gazette ")and the said Officers have submitted their Report through the Director of Town Planning, Maharashtra State, after completing the legal procedure stipulated under Section 37(1AA) of the said Act. In case of the Municipal Corporations in Amravati Division, it is found that the legal procedure is yet to be completed :

And whereas, after considering the Reports of the said Officers and after consulting the Director of Town Planning, Maharashtra State, the Government is of the opinion that the proposed modification is required to be sanctioned with some changes in the said Regulations for following Municipal Corporations and CIDCO ;

Sr.No.	**Division**	**Name of the Municipal Corporation/Development Authority**
1)	Konkan	1)Greater Mumbai 2)Navi Mumbai 3)Thane 4)Kalyan-Dombivali 5)Bhivandi-Nizampur 6)Mira Bhainder 7)Ulhansnagar 8) Vasi-Virar
		CIDCO Navi Mumbai Notified Area
2)	Pune	1)Pune 2)Pimpari Chinchavad 3)Sangali-Miraj-Kupwad 4)Kolhapur 5)Solapur
3)	Nashik	1)Nashik 2)Malegaon 3)Jalgaon 4)Ahmadnagar 5) Dhule
4)	Aurangabad	1)Aurangabad 2)Nanded Waghala 3)Parbhani 4)Latur
5)	Amravati	1)Amravati (kept in abeyance) 2)Akola (kept in abeyance)

6)	Nagpur	1)Nagpur 2)Chandrapur

Now, therefore, in exercise of the powers conferred upon it under Section 37(1AA)(c) of the said Act, the Government hereby:-

A) Sanctions the proposed modification as described more specifically in the Schedule appended hereto.

B) Fixes the date of publication of this Notification in the Official Gazette as the date of coming into force of this modification.

C) Directs the Municipal Corporations/Authority that in the Schedule of Modifications sanctioning the said Regulations, after the last entry, the Schedule appended hereunder shall be added.

This Notification shall also be available on the Govt. of Maharashtra website : www.maharashtra.gov.in

By order and in the name of the Governor of Maharashtra,

(Kishor D. Girolla)
Under Secretary to Government.

SCHEDULE

(Accompaniment to Notification No. TPB 4316/CR-167/2016/(3)/UD-11, Dated 15th July 2016.)

Buildings of Information Technology Establishments

1) The Commissioner may permit additional FSI upto 200 % over and above the basic permissible F.S.I. to all registered Public and Private IT/ITES Parks/AVGC Parks /IT SEZs or IT Parks in SEZs / Stand-alone IT/ITES units in public IT Park (including IT/ITES units located in Residential / Industrial/No Development/ Green/Agriculture Zone or any other land-use zone in which such users are permissible), which have been approved by the Directorate of Industries, proposed to be set up or already set up under present / previous IT/ITES policies. (hereinafter referred to as the "said unit") by charging premium of 30% of the land rate for the said land as prescribed in Annual Statement of Rates for the relevant year of granting such additional F.S.I. for Pune,Pimpri-Chinchwad, Navi Mumbai Notified Area. Municipal Corporations in Mumbai Metropolitan Region and 10% of the land rate for the said land as prescribed in Annual Statement of Rates for the relevant year of granting such additional F.S.I .for other Municipal Corporations.

In case of the Navi Mumbai Notified Area, the CIDCO as land owner may recover lease premium for additional F.S.I., if applicable under land disposal policy of CIDCO.

Provided that additional FSI above 100% and upto 200% shall be permissible only on plots having an access road of minimum 18 meters width.

Provided further that, the premium so collected shall be shared between the Planning Authority and the Government in the proportion of 50 : 50. The share of the Government shall be paid to the concerned Branch office of the Town Planning Department.

(Explanation :- Premium charges shall be calculated on the value of lands under such zones, determined by considering the land rates of the said land as prescribed in Annual Statement of Rates (ASR). These charges shall be paid at the time of permitting additional F.S.I. by considering the ASR for the relevant year without applying the guidelines)

2) No premium shall be chargeable in Municipal Corporation areas, if they are covered under No Industry Districts and Naxalism affected areas of the State

(as defined in the " Package Scheme of Incentives-2013" of the Industries, Energy & Labour Department of the State).

3) The total maximum permissible F.S.I. shall not exceed limit of 3.00.

4) Maximum 20% of total proposed Built-up area (excluding parking area) inclusive of such additional F.S.I. may be permitted for support services as defined in IT/ITES Policy 2015, in IT Parks in Pune, Pimpri-Chinchwad, Navi Mumbai Notified area, Municipal Corporations in Mumbai Metropolitan Region and remaining built-up area shall be utilized for IT/ITES..

5) Maximum 40% of total proposed Built-up area (excluding parking area) inclusive of such additional F.S.I. may be permitted for support services in IT Parks in Municipal Corporations which are not covered under Serial No.4 above and remaining built-up area shall be utilized for IT/ITES.

6) New said unit shall allocate at least 2% of the total proposed built-up area. for providing incubation facilities for new units. This area would be treated as a part of the Park to be used for IT activities and eligible for additional FSI benefits accordingly.

7) Premium to be received by the Planning Authority as per provisions in this regulation shall be deposited in a separate fund viz. "Critical Infrastructure Fund for IT/ITES Industries" and this fund shall be utilized only for creation of Critical Infrastructure for IT/ITES Industries:

Provided that in the event, the developer come forward for providing such off site infrastructure at his own cost, instead of paying premium as prescribed above, then the Planning Authority may determine the estimated cost of the work by using rates prescribed in District Schedule of Rates (DSR) of the relevant year, in which order for commencement of such work is issued. The Planning Authority shall also prescribe the standards for the work. After completion of the works, the Planning Authority shall verify and satisfy itself that the same is developed as per prescribed standards and thereafter, by deducting the cost of works, the balance amount of premium shall be recovered from such developer before issuing Occupancy Certificate.

Provided that, in case the cost of work is more than the premium to be recovered, such additional cost to be borned by such developer.

8) Permission for erecting towers and antenna upto height permitted by the Civil Aviation Department shall be granted by the Commissioner as per the procedure followed for development permission or otherwise as may be decided by the Government.

9) While developing site for IT/ITES with additional FSI, support services as defined in the IT Policy 2015, shall be allowed.

10) The sanctioned existing regulations in respect of I.T.Establishments, are proposed to be replaced suitably and for the Planning Authorities, which have no provisions in respect of I.T. Establishments, these regulations shall be proposed to be inserted as new regulations.

11) Notwithstanding anything contained in the Development Control Regulations of Planning Authorities, no amenity space is required to be left for development of plot/land upto 2.00 Hect. for IT/ITES.

12) Notwithstanding anything mentioned in these Regulations, special provisions mentioned in the existing Regulations of respective Planning Authority, which areas are not covered under these regulations shall continue to prevail unless otherwise specified.

13) The Directorate of industries will develop a web portal on which the developer of every IT park will be bound to provide / update detailed information about names of the units in the park, utilization of built-up area and activities being carried out, manpower employed in the It Park for IT/ITES and support services on yearly basis.

If a private IT park has availed additional FSI as per the provisions of IT/ITES policy and subsequently it is found that the built-up space in the park is being used for non IT/ITES / commercial activities / any other activity not permitted as per the IT/ITES policy under which the said park was approved, a penal action as below will be taken, the payment shall be shared between the concerned Planning Authority and the Government in the ratio of 3:1.

a) The misuse shall be ascertained by physical site verification of the said private IT park by a team of officers from the Directorate of industries and the Planning Authority which has approved the building plans of the said private IT park.

b)) A per day penalty equal to 0.3% of the prevailing ready reckoner value of the built-up area that has been found to be used for non- IT/ITES activities.

c) The penalty will be recovered from the date of commencement of unauthorized use till the day non IT use continues.

After payment of the penalty to the concerned Planning Authority which has sanctioned the building plans of the concerned private IT park, the said private IT Park will restore the use of premises to the original purpose for which LOI/ Registration was granted. If the private IT Park fails to pay penalty and / or

restore the use to its original intended use. the concerned Planning Authority will take suitable action under the Maharashtra Regional and Town Planning Act 1966. against the erring private IT Park under intimation to the Directorate of Industries. This provision will also be applicable to existing IT Parks.

These provisions will be over and above the penal provisions of the MRTP Act. 1966.

(Kishor D. Girolla)
Under Secretary to Government.

23. PP to submit waste management plan with its transport, collection, storage and disposal for all types of wastes like hazardous waste, non-hazardous waste, solid waste, e – waste, bio medical waste ,carcinogenic waste and debris/excess earth etc.
24. PP to clarify whether any natural water courses passing through the plot; if yes then include steps taken to preserve the same.
25. PP to submit phase wise development plan considering wind rose diagram.
26. PP to submit internal storm water and sewer line arrangements up to final disposal point.
27. PP to submit total run off calculations before development and after development.
28. PP to include fire safety management as a separate chapter.
29. PP to explore possibility to install air modelling station on site during construction as well as operation phase for ambient air quality monitoring.

PP to include above information in the EIA report along with the given TOR and submit the same to the committee for appraisal of the proposal.

Item No.14 Eon Kharadi Infrastructure Pvt Ltd.

Application for amendment in Environmental clearance for proposed expansion project "EON IT PARK" at S.No. 72/2/1, Kharadi, Taluka Haveli, Distt. Pune. **(TOR)**

PP submitted their application for prior Environmental clearance for total plot area of 48,600.00 Sq. Mtrs, BUA of 2,55,486.10 Sq. Mtrs and FSI area of 98,567.56 Sq. Mtrs. PP proposes to construct 2 nos. of IT buildings and 1 no. of recreational block having maximum height of 67.2 Mtrs.

PP has obtained earlier EC no. SEAC-III-2015/CR-57/TC-3 dated 6.10.2015 for total plot area of 48,600.00 Sq. Mtrs, BUA of 1,44,241.43 Sq. Mtrs and FSI area of 78,562.71 Sq. Mtrs. comprising of 2 nos. of IT buildings. Now PP has applied for amendment in EC.In the light of EIA Notification 2006 and amendment thereof issued by MoEF, SEAC III is required to give TOR's to the proposals in the category 8(B) B1. The proposal was discussed on the basis of draft TOR as presented by the PP. All issues related to environment, including air, water, noise, soil, ecology and biodiversity and social aspects were discussed.

The committee appraised the project under 8(b) B1 category of EIA Notification, 2006 . PP to use model TOR available on the web site of MoEF in addition to the points mentioned below and TOR attached as Annexure - I.

During discussion following points emerged:

1. PP to submit IOD/IOA/Concession Document/Plan Approval or any other form of documents as applicable clarifying its conformity with local planning rules and provisions there under as per the Circular dated 30.01.2014 issued by the Environment Department, Govt. of Maharashtra.

2. PP to submit an indemnity bond indemnifying Environment Department, Government of Maharashtra from any legal consequences arises on account of disputes in respect of ownership of the land.
3. PP to submit condition wise compliance report of earlier EC conditions.
4. PP to ensure that all environmental services are accessible.
5. PP to submit architect certificate of work initiated on site as per earlier EC.
6. PP to submit comparative statement of components approved and components constructed as per earlier EC and proposed development.
7. PP to submit 6 monthly compliance report of earlier EC.
8. PP to submit details of rain water harvesting plan as per hydro geological survey report.
9. PP to provide mandatory RG area on virgin land and submit the drawing with calculations.
10. PP to obtain and submit following NOC's:
    a) CFO NOC,
    b) Water supply NOC with quantity,
    c) Drainage NOC,
    d) Non-biodegradable waste disposal.
11. PP to include carbon footprint estimations in EIA report.
12. PP to mention in EIA if any ancillary services provided in basement with it's mitigation measures.
13. PP to carry out Traffic Impact Study in detail including,
    a) Traffic Management Plan for the development – Internal circulation with road width.
    b) Traffic Volume Counts and Turning Movement Counts on all the external surrounding roads of the proposed project.
    c) Topographic details of roads and intersections.
    d) Traffic generation per day/peak hour V/c ratio with reference to present capacity of roads, V/c Ratio with reference to future capacity of widened roads.
    e) Inventory of open spaces for parking as per DCR/area provided/car as per MoEF construction manual.
    f) Proper drawings and sketches showing road geometry and traffic volume diagrams etc.
14. PP to include site specific executable EMP along with implementation plan and environmental management cell provision for construction and operation phase in EIA.
15. PP to prepare consolidated report on traffic and vehicular pollution as a single chapter in EIA.
16. PP to carry out fugitive dust monitoring by using local meteorological data.
17. PP to prepare separate chapter on renewable energy along with conservation of resources.
18. PP to submit socio-economic infrastructure details including public transport arrangements.

19. PP to provide required amenities within layout as per the planning standards if the existing amenities within the vicinity of plot are inadequate to cater the need of the locality.
20. PP to submit waste management plan with its transport, collection, storage and disposal for all types of wastes like hazardous waste, non-hazardous waste, solid waste, e – waste, bio medical waste ,carcinogenic waste and debris/excess earth etc.
21. PP to clarify whether any natural water courses passing through the plot; if yes then include steps taken to preserve the same.
22. PP to submit phase wise development plan considering wind rose diagram.
23. PP to submit internal storm water and sewer line arrangements up to final disposal point.
24. PP to submit total run off calculations before development and after development.
25. PP to include fire safety management as a separate chapter.
26. PP to explore possibility to install air modelling station on site during construction as well as operation phase for ambient air quality monitoring.

PP to include above information in the EIA report along with the given TOR and submit the same to the committee for appraisal of the proposal.

Item No.15 M/s. Clover Buildtech .

Application for prior Environmental clearance for Proposed residential development at S.NO.39,40,41of Village Pisoli Tal. Haveli Dist. Pune. **(EIA Case)**

PP submitted their application for total plot area of 1,49,837 Sq. Mtrs, BUA of 2,65,273.62 Sq. Mtrs and FSI area of 1,53,328.76 Sq. Mtrs. PP proposes to construct 24 nos. of residential buildings, having maximum height of 51m, 12 nos of row houses and 2 nos of club house.

The case was earlier considered in 43rd meeting of the SEAC - III held from 23rd to 27th February 2016 when In the light of EIA Notification 2006 and amendment thereof issued by MoEF, SEAC III has given TOR's to the project. Now PP has submitted the EIA report.The case was discussed on the basis of the documents submitted and presentation made by the proponent. All issues relating to environment, including air, water, land, soil, ecology, biodiversity and social aspects were examined. The proposal is appraised as category 8 (B) B1.

During discussion following points emerged:

1. PP informed that they have obtained full potential sanction.

2. PP informed that they have proposed basement parking. The committee is of the opinion that the basement shall not be recommended in residential area for the following reasons,
   a. The ventilation by mechanical equipment's results in high noise in the area. Mitigation measures to achieve standard parameters of noise levels as per CPCB norms are difficult to achieve.

HI-TECH RECYCLING
India Pvt. Ltd.

Address :
Gat No.42, P.No. 657, Near Federal Bank, Pirangut Rd.
AP.: Bhukum Tal. Mulshi Dist - Pune - 412 115, Maharashtra, India.
Tel: +91 20 6652 1000 Fax: +91 95 9507 9654
Web: www.hitechrecycling.in | info@hitechrecycling.in

SERVICE AGREEMENT

The Agreement is entered into on this **14 day of September 2016**, at Pune

By and Between

Hi-Tech Recycling India Pvt. Ltd. having its office at Bhukum, Pune (**Therein after referred to as First party**" which expression shall unless contrary to and or repugnant to the context mean and include successors representatives and permitted assigns) through Mr. Manish Patil to enter into and sign this agreement for and on behalf of the first party.

AND

Eon Kharadi Infrastructure Pvt. Ltd., a company incorporated under the provisions of the Companies Act 1956, having its Registered Office at, having registered office at Tech Park One Tower 'E', Next To Don Bosco School, Off Airport Road, Yerwada, Pune – 411006, thereinafter referred to as "**Second party**" Which expression shall unless contrary to and or repugnant to the context mean and include its successors representative and permitted assigns through **Mr. Anand Sanghavi** to enter into and sign this agreement for and on behalf of the first party.

WHEREAS

The first party is registered as Approved E Waste, Copper and Cable Recycler by the SPCB under Lic No. MPCB/RO(HQ)/Reg/16/EW/HWMD-288-(B) and MPCB/RO(HQ)/Reg/16/HW/HWMD-288-(A) of the Hazardous Waste Management & Handling Rules, 1989 as amended in 2003 and is operating a facility for the collection, Reception, Transportation, Treatment and Disposal of E Waste at Bhukum, Pune

The Second party in compliance of the Hazardous Waste Management & Handling Rules 1989 as amended in 2003 desires to have services for project situated at S. No 72/2/1 Village – Kharadi, Taluka Haveli, Dist – Pune, for disposal of their Electronic Waste Except liquid waste for which the first party is authorized facility of MPCB.

NOW THIS AGREEMENT witnesses the following terms & condition to be performed by both the parties to the agreement.

1. The First Party will require the second party staff representative to sign its Hazardous Waste collection document in acknowledge of E-Waste handed over. The First Party will sign the record book to be maintained by second party as a statutory requirement and has to be compiled with.

2. The second party will arrange collection quarterly basis and ensure proper segregation of Electronic Waste generated from its various sections as per Hazardous Waste (Management & handling Rules 1989) as amended in 2003. The second party shall also ensure that all the E-Waste is handed over to First party.

3. First Party will take data destruction responsibility for the data storage devices coming from second party, which in turn will issue a data destruction certificate to second party after complete recycling. First party will make sure all the data is destroyed and will not be used in any way.

4. The second party's responsibility will cease once the segregated electronic waste duly packed labeled and signed has been handed over to the first party. It is specifically agreed and under stood that compliances of the Hazardous Waste (Management & Handling) Rules 1989 as amended in 2003 during transportation and disposal of electronic waste shall be exclusive responsibility of the first party.

5. The second party will be solely responsible for compliance of Hazardous Waste (Management & Handling) Rule, 1989 in respect of their E- waste.

6. The First Party will be e waste recyclers for the Second Party.

7. This agreement will be in force for a period of four years and can be renewed at the end of four years.

8. (a) Notwithstanding the aforesaid term this Agreement may be terminated by either party by giving 30 days written notice only upon the occurrence of any of events specified in Clause 9(i) (ii) & (iii).

   i) The First Party will be at liberty to discontinue the service to the Second Party in the event the Second Party does not comply with the norms.

   ii) The First Party will be within their right to suspend the services to the Second Party in the event of the Second Party handing over un-segregated Electronic Waste.

   iii) The second party shall be at liberty to discontinue the services of the First Party in the event that the First Party commits two successive defaults in taking delivery of the Electronic Waste from the Second Party within 15 Days.

IN WITNESS WHEREOF, the parties have signed this Agreement on the 14th day of September 2016

M/s. EON Kharadi Infrastructure Pvt. Ltd.

Through Mr. Anand Sanghavi
Authorised Signatory

(Developer)

M/s. Hi-Tech Recycling India Pvt. Ltd.

Through Mr. Mr. Manish Patil
Authorised Signatory

(Service Provider)

PROJECT ARCHITECT	**ISSUES**									**REVISIONS**	
Panchshil TECH PARK ONE, YERWADA, PUNE - 411 006		SITE	R.C.C	H.V.A.C.	ELECTRICAL	PLUMBING	LANDSCAPE	INTERIOR	CLIENT	R1	25-2-16	R.C.C. UPDATED AND ALL THE SERVICES INCORPORATED THAT ARE RECEIVED TILL DATE.LOCATION OF SUMP BELOW THE RAMP REVISED.
	02	19-01-16								R2	26-4-16	THE CENTRAL PORTION FIRE STAIRCASE AND LIFTS ARE REVISED.
	02	26-02-16										
	02	21-07-16										

NOTES.

1/ WRITTEN DIMENSIONS TO BE FOLLOWED.

2/ ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METER UNLESS OTHERWISE SPECIFIED.

3/ ALL LEVELS / DIMENSIONS ARE FROM UNFINISHED ARCHITECTURAL SURFACES.

4/ FOR STRUCTURAL, SERVICES, LANDSCAPE & INTERIOR DETAILS REFER RELEVANT CONSULTANTS DRAWINGS.

5/ DISCREPANCIES IF ANY TO BE BROUGHT TO THE NOTICE OF THE ARCHITECTS BEFORE EXECUTION.

JOB NO. 114

SCALE A1- 1:500

DATE 25-02-2016

DRAWN BY AMRUTA

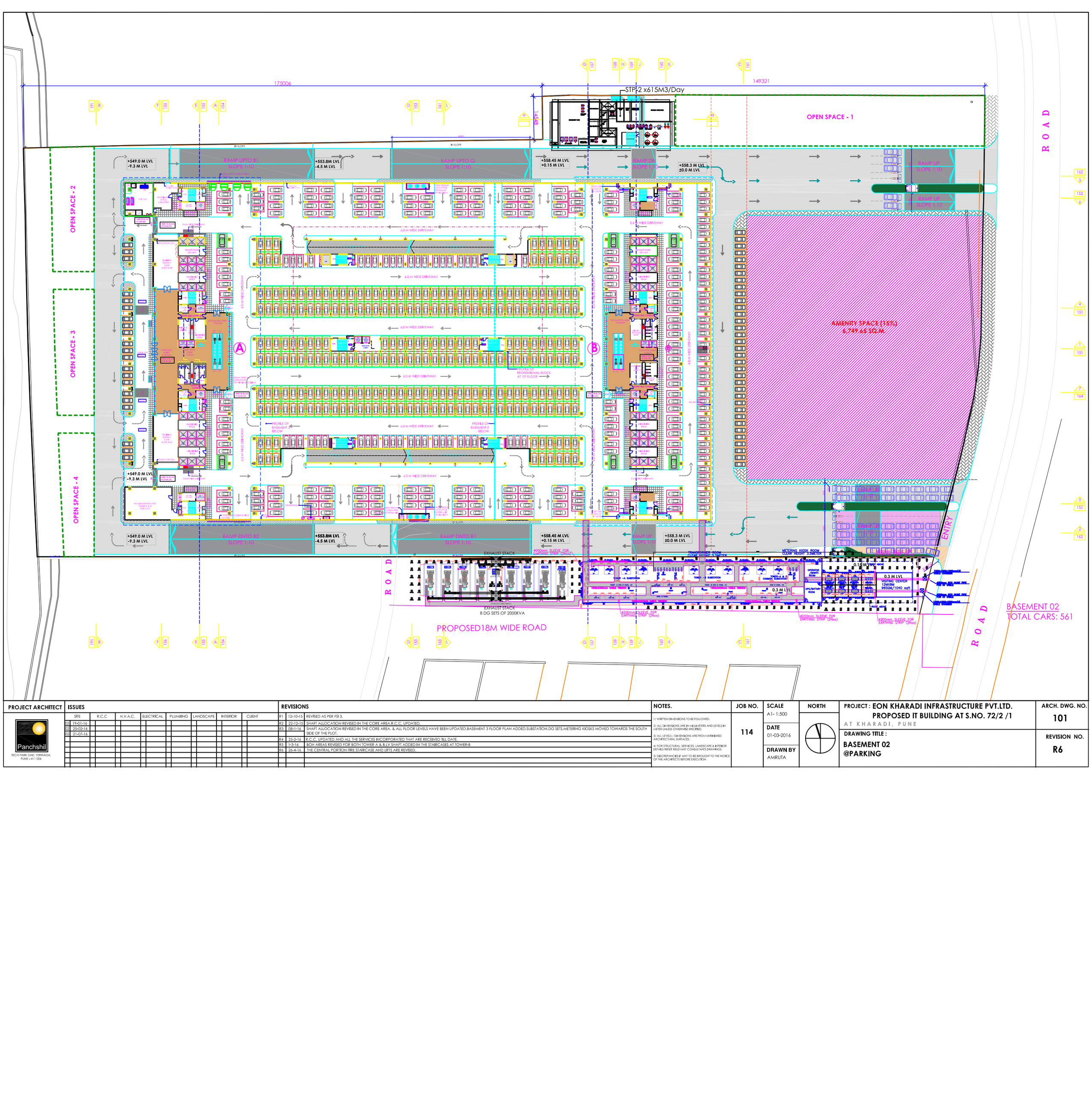
NORTH

PROJECT : EON KHARADI INFRASTRUCTURE PVT.LTD.
PROPOSED IT BUILDING AT S.NO. 72/2 /1
AT KHARADI, PUNE

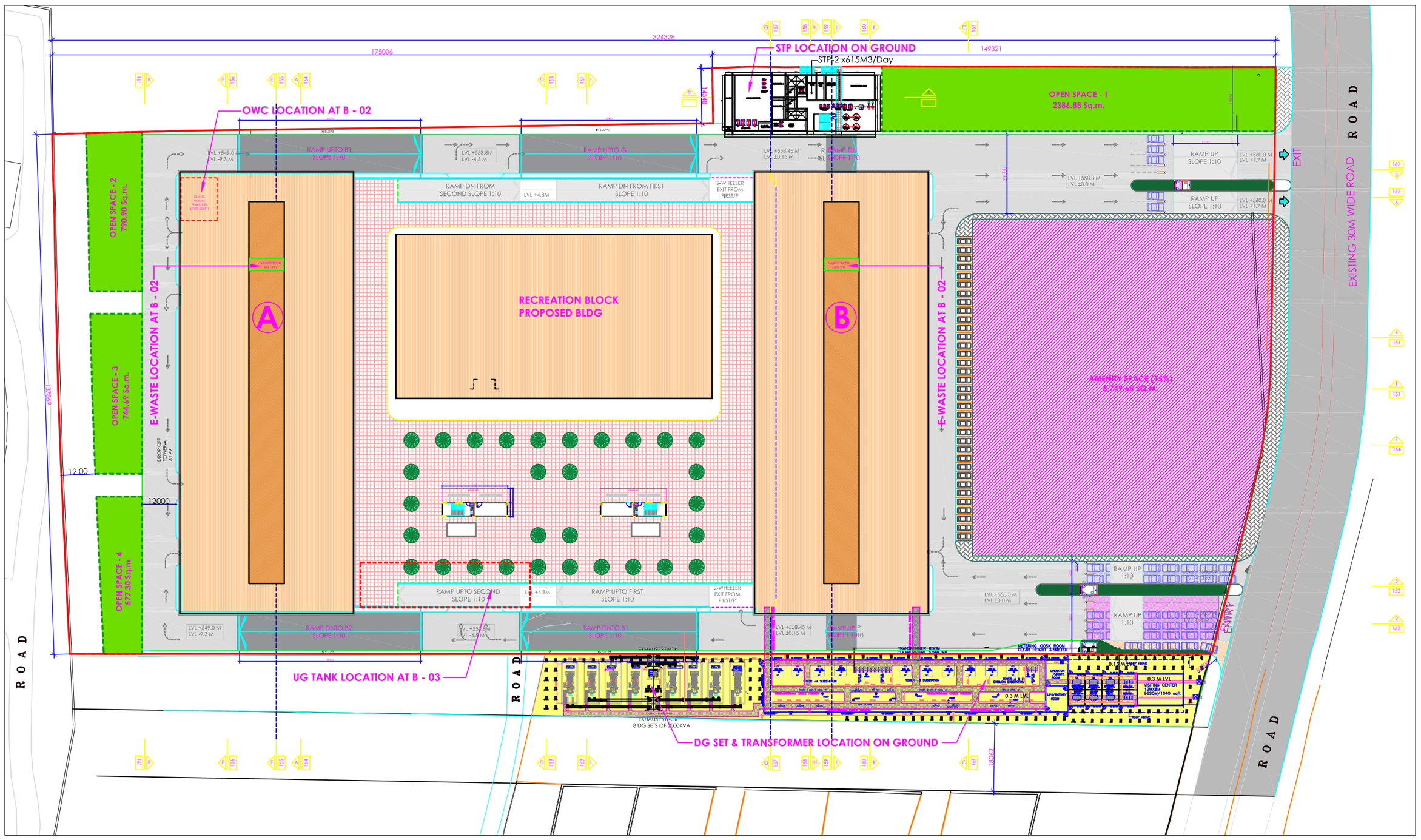
DRAWING TITLE :
BASEMENT 03
@ PARKING

ARCH. DWG. NO. 100

REVISION NO. R2



PROJECT ARCHITECT	ISSUES								REVISIONS			NOTES.	JOB NO.	SCALE	NORTH	PROJECT : EON KHARADI INFRASTRUCTURE PVT.LTD. PROPOSED IT BUILDING AT S.NO. 72/2 /1 AT KHARADI, PUNE	ARCH. DWG. NO.
Panchshil TECH PARK ONE, YERWADA, PUNE - 411 006	SITE	R.C.C	H.V.A.C.	ELECTRICAL	PLUMBING	LANDSCAPE	INTERIOR	CLIENT	R1	12-10-15	REVISED AS PER FSI 3.	1/ WRITTEN DIMENSIONS TO BE FOLLOWED.	114	A1- 1:500		DRAWING TITLE : BASEMENT 02 @PARKING	101
	02 19-01-16								R2	22-12-15	SHAFT ALLOCATION REVISED IN THE CORE AREA,R.C.C. UPDATED.	2/ ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METER UNLESS OTHERWISE SPECIFIED.		DATE 01-03-2016			REVISION NO. R6
	02 25-02-16								R3	08-11-16	SHAFT ALLOCATION REVISED IN THE CORE AREA. & ALL FLOOR LEVELS HAVE BEEN UPDATED.BASEMENT 3 FLOOR PLAN ADDED.SUBSTATION,DG SETS,METERING KIOSKS MOVED TOWARDS THE SOUTH SIDE OF THE PLOT.	3/ ALL LEVELS / DIMENSIONS ARE FROM UNFINISHED ARCHITECTURAL SURFACES.		DRAWN BY AMRUTA			
	02 21-07-16								R4	25-2-16	R.C.C. UPDATED AND ALL THE SERVICES INCORPORATED THAT ARE RECEIVED TILL DATE.	4/ FOR STRUCTURAL, SERVICES, LANDSCAPE & INTERIOR DETAILS REFER RELEVANT CONSULTANTS DRAWINGS.					
									R5	1-3-16	BOH AREAS REVISED FOR BOTH TOWER A & B.LV SHAFT ADDED IN THE STAIRCASES AT TOWER-B.	5/ DISCREPANCIES IF ANY TO BE BROUGHT TO THE NOTICE OF THE ARCHITECTS BEFORE EXECUTION.					
									R6	26-4-16	THE CENTRAL PORTION FIRE STAIRCASE AND LIFTS ARE REVISED.						



PROJECT ARCHITECT	ISSUES								REVISIONS		
Panchshil TECH PARK ONE, YERWADA, PUNE - 411 006	SITE	R.C.C	H.V.A.C.	ELECTRICAL	PLUMBING	LANDSCAPE	INTERIOR	CLIENT	R1	12-10-15	REVISED AS PER FSI 3.
	02 19-01-16								R2	22-12-15	SHAFT ALLOCATION REVISED IN THE CORE AREA,R.C.C. UPDATED.
	02 25-02-16								R3	08-1-16	SHAFT ALLOCATION REVISED IN THE CORE AREA, & ALL FLOOR LEVELS HAVE BEEN UPDATED,BASEMENT 3 FLOOR PLAN ADDED,SUBSTATION,DG SETS,METERING KIOSKS MOVED TOWARDS THE SOUTH SIDE OF THE PLOT.
	02 21-07-16								R4	25-2-16	R.C.C. UPDATED AND ALL THE SERVICES INCORPORATED THAT ARE RECEIVED TILL DATE.
									R5	1-3-16	BOH AREAS REVISED FOR BOTH TOWER A & B,LV SHAFT ADDED IN THE STAIRCASES AT TOWER-B.
									R6	26-4-16	THE CENTRAL PORTION FIRE STAIRCASE AND LIFTS ARE REVISED.

NOTES.

1/ WRITTEN DIMENSIONS TO BE FOLLOWED.

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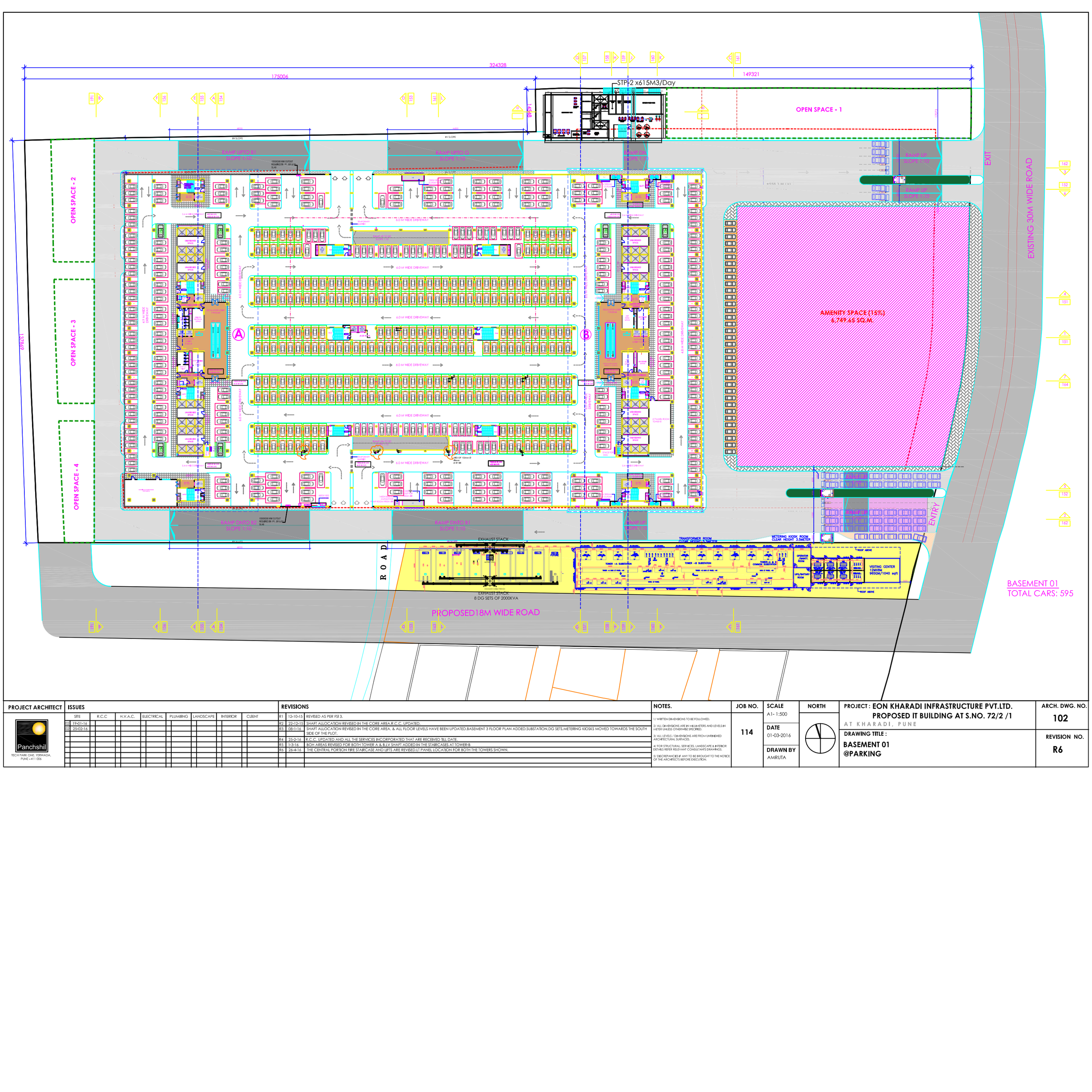
JOB NO.	SCALE	NORTH	PROJECT :	ARCH. DWG. NO.
114	A1- 1:500		EON KHARADI INFRASTRUCTURE PVT.LTD. PROPOSED IT BUILDING AT S.NO. 72/2 /1 AT KHARADI, PUNE	103
	DATE 01-03-2016		DRAWING TITLE : MASTER LAYOUT PLAN	REVISION NO. R6
	DRAWN BY AMRUTA			



PROJECT ARCHITECT	ISSUES								
	SITE	R.C.C	H.V.A.C.	ELECTRICAL	PLUMBING	LANDSCAPE	INTERIOR	CLIENT	
	02 19-01-16								
	02 25-02-16								

REVISIONS		
R1	12-10-15	REVISED AS PER FSI 3.
R2	22-12-15	SHAFT ALLOCATION REVISED IN THE CORE AREA.R.C.C. UPDATED.
R3	08-1-16	SHAFT ALLOCATION REVISED IN THE CORE AREA. & ALL FLOOR LEVELS HAVE BEEN UPDATED.BASEMENT 3 FLOOR PLAN ADDED.SUBSTATION,DG SETS,METERING KIOSKS MOVED TOWARDS THE SOUTH SIDE OF THE PLOT.
R4	25-2-16	R.C.C. UPDATED AND ALL THE SERVICES INCORPORATED THAT ARE RECEIVED TILL DATE.
R5	1-3-16	BOH AREAS REVISED FOR BOTH TOWER A & B.LV SHAFT ADDED IN THE STAIRCASES AT TOWER-B
R6	26-4-16	THE CENTRAL PORTION FIRE STAIRCASE AND LIFTS ARE REVISED.LT PANEL LOCATION FOR BOTH THE TOWERS SHOWN.

Panchshil
TECH PARK ONE, YERWADA, PUNE - 411 006

NOTES.
1/ WRITTEN DIMENSIONS TO BE FOLLOWED.
2/ ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METER UNLESS OTHERWISE SPECIFIED.
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JOB NO. 114

SCALE A1- 1:500

DATE 01-03-2016

DRAWN BY AMRUTA

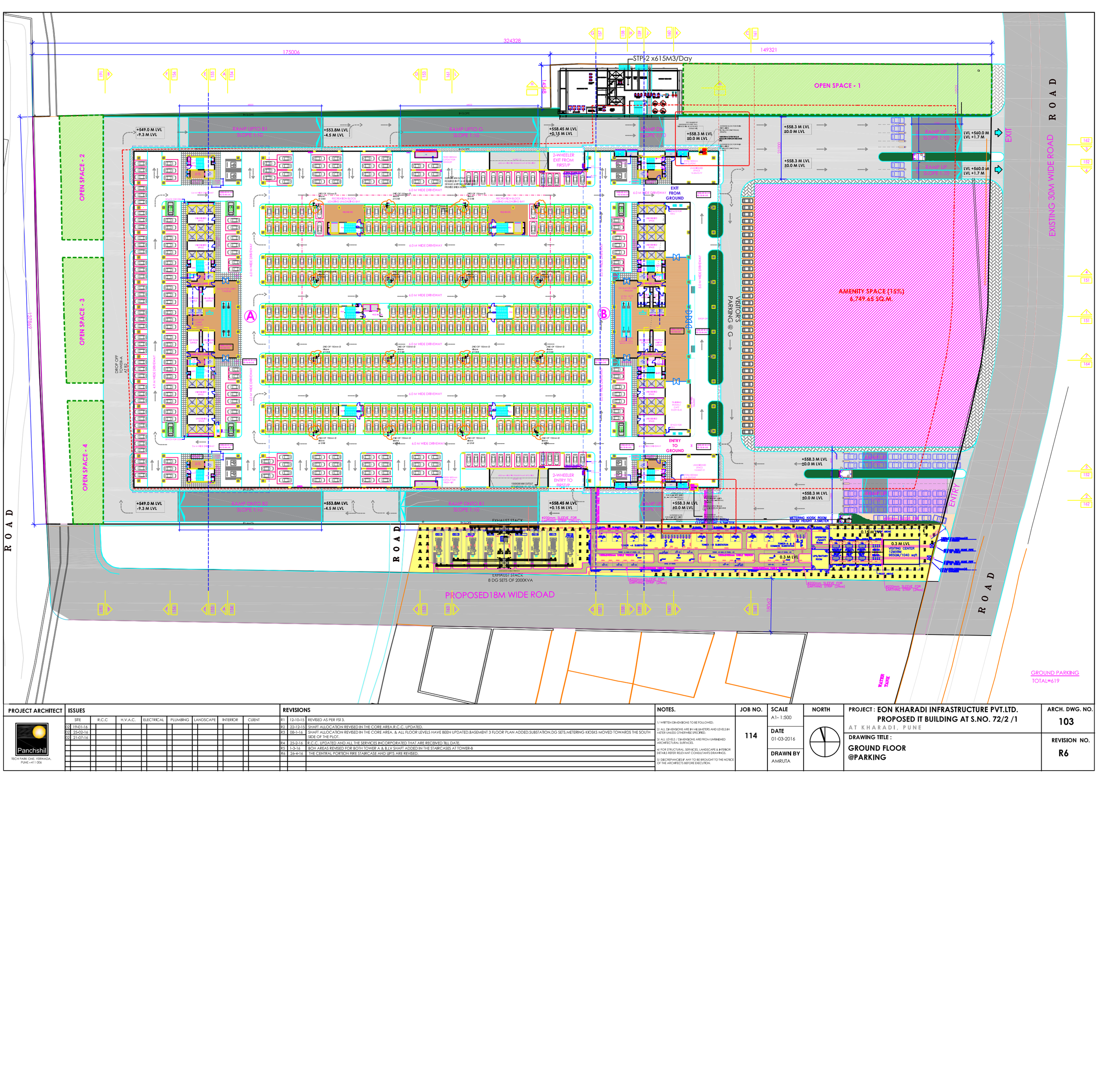
NORTH

PROJECT : EON KHARADI INFRASTRUCTURE PVT.LTD.
PROPOSED IT BUILDING AT S.NO. 72/2 /1
AT KHARADI, PUNE

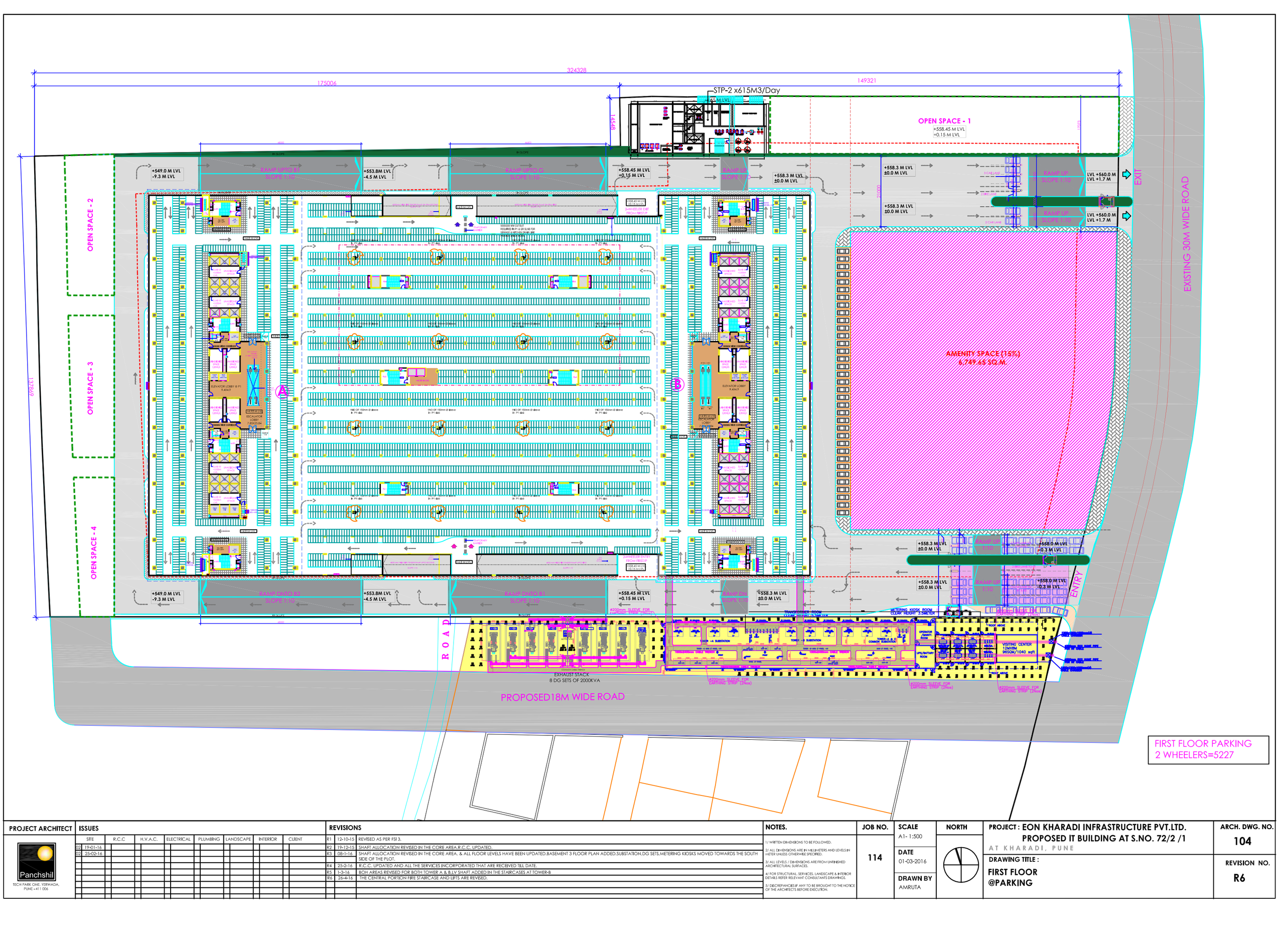
DRAWING TITLE :
BASEMENT 01
@PARKING

ARCH. DWG. NO. 102

REVISION NO. R6



PROJECT ARCHITECT	ISSUES								REVISIONS			NOTES.	JOB NO.	SCALE	NORTH	PROJECT : EON KHARADI INFRASTRUCTURE PVT.LTD. PROPOSED IT BUILDING AT S.NO. 72/2 /1 AT KHARADI, PUNE	ARCH. DWG. NO.
Panchshil TECH PARK ONE, YERWADA, PUNE - 411 006	SITE	R.C.C	H.V.A.C.	ELECTRICAL	PLUMBING	LANDSCAPE	INTERIOR	CLIENT	R1	12-10-15	REVISED AS PER FSI 3.	1/ WRITTEN DIMENSIONS TO BE FOLLOWED.	114	A1- 1:500			103
	02 19-01-16								R2	22-12-15	SHAFT ALLOCATION REVISED IN THE CORE AREA.R.C.C. UPDATED.	2/ ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METER UNLESS OTHERWISE SPECIFIED.		DATE 01-03-2016		DRAWING TITLE : GROUND FLOOR @PARKING	REVISION NO. R6
	02 25-02-16								R3	08-1-16	SHAFT ALLOCATION REVISED IN THE CORE AREA. & ALL FLOOR LEVELS HAVE BEEN UPDATED,BASEMENT 3 FLOOR PLAN ADDED,SUBSTATION,DG SETS,METERING KIOSKS MOVED TOWARDS THE SOUTH SIDE OF THE PLOT.	3/ ALL LEVELS / DIMENSIONS ARE FROM UNFINISHED ARCHITECTURAL SURFACES.		DRAWN BY AMRUTA			
	02 21-07-16								R4	25-2-16	R.C.C. UPDATED AND ALL THE SERVICES INCORPORATED THAT ARE RECEIVED TILL DATE.	4/ FOR STRUCTURAL, SERVICES, LANDSCAPE & INTERIOR DETAILS REFER RELEVANT CONSULTANTS DRAWINGS.					
									R5	1-3-16	BOH AREAS REVISED FOR BOTH TOWER A & B.LV SHAFT ADDED IN THE STAIRCASES AT TOWER-B	5/ DISCREPANCIES IF ANY TO BE BROUGHT TO THE NOTICE OF THE ARCHITECTS BEFORE EXECUTION.					
									R6	26-4-16	THE CENTRAL PORTION FIRE STAIRCASE AND LIFTS ARE REVISED.						



PROJECT ARCHITECT	ISSUES									REVISIONS			NOTES.	JOB NO.	SCALE	NORTH	PROJECT : EON KHARADI INFRASTRUCTURE PVT.LTD. PROPOSED IT BUILDING AT S.NO. 72/2 /1 AT KHARADI, PUNE	ARCH. DWG. NO.
Panchshil TECH PARK ONE, YERWADA, PUNE - 411 006	SITE	R.C.C	H.V.A.C.	ELECTRICAL	PLUMBING	LANDSCAPE	INTERIOR	CLIENT		R1	12-10-15	REVISED AS PER FSI 3.	1/ WRITTEN DIMENSIONS TO BE FOLLOWED.	114	SCALE A1- 1:500			104
	02 19-01-16									R2	19-12-15	SHAFT ALLOCATION REVISED IN THE CORE AREA.R.C.C. UPDATED.	2/ ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METER UNLESS OTHERWISE SPECIFIED.		DATE 01-03-2016		DRAWING TITLE : FIRST FLOOR @PARKING	REVISION NO. R6
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										R6	26-4-16	THE CENTRAL PORTION FIRE STAIRCASE AND LIFTS ARE REVISED.						

TRAFFIC STUDY

Proposed EON IT Park

(Property bearing Survey No. 72/2/1 Khardi)

Pune, MS

BY

EON KHARADI INFRASTRUCTURE PVT. LTD.

Prepared for:

Eon Kharadi Infrastructure Pvt. Ltd.
Tech Park One, Tower E,
Off Air Port Road,
Yerwada, Pune - 06
Maharashtra, India

Prepared By:

SINCRONO SOLUTIONS
7, Vrindavan Co-op Housing Society,
Sector - 15, CIDCO,
New Panvel, Navi Mumbai 410206
Maharashtra, India.

WWW.SINCRONO-TTES.COM

FINAL Report
December 21, 2016

A Traffic Study of

Proposed Eon IT Park

(Property bearing Survey No. 72/2/1 Khardi)

Located in

Khardi, Pune, Maharashtra

Prepared for:

Eon Kharadi Infrastructure Pvt. Ltd.
Tech Park One, Tower E,
Off Air Port Road,
Yerwada, Pune - 06
Maharashtra, India

Prepared by:

SINCRONO SOLUTIONS

7, Vrindavan CHS,
Sector – 15, CIDCO
New Panvel, Navi Mumbai 410206
Maharashtra, India

December, 2016

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The analysis was prepared by :

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Advanced Traffic Control Design (USA)
ME Const Mgmt, BE Civil, DCE (India)

Mr. Malhar A. Mane
MSc Transportation (USA)
BE Civil (India)

Sincrono Solutions
7, Vrindavan Co-op Hsg Soc
Sector – 15, CIDCO
New Panvel 410206
Tel: 9920477708 / 9920265115

1. INTRODUCTION

a) Project Background

The plot measuring 46,680.97 SQM identified as survey no. 72 of Khardi, Pune is being developed by **Eon Kharadi Infrastructure Pvt. Ltd**. The entire project comprises of one multistoried IT Office building and associated amenities for building users. The proposed 16 storied IT Office building structure is planned to have 1,663,047 SF of office spaces along with other amenities. Parking facility is planned for two-wheelers and cars within the plot boundary. Car parking is planned on Ground and 3 Basement Levels (B1 to B3). Two wheeler parking is proposed on 1st floor of the building. Parking facility will have in total 8 vehicular ramps strategically located to handle vehicular movements from parking levels. Separate ramps are provided for inbound and outbound movements from respective floor. For the traffic analysis purposes, it is assumed that project will be constructed and fully occupied/ operational by Year 2021 (+5 Year Scenario). This proposed development would generate new vehicular traffic, which would have an impact on the traffic conditions in the nearby roadway network and at the access points. Hence, there is a need to address the traffic impacts of the proposed IT Office Building with respect to vehicular traffic along with accessibility and circulation. Also it is essential to address other components of the traffic study such as Retrieval Analysis and Swept Path Analysis of multilevel parking facility of the proposed project.

b) Purpose of Report & Study Objective

Sincrono Solutions has been appointed by the project proponent, Eon Kharadi Infrastructure Pvt. Ltd., to provide a Traffic Study for the proposed IT Office project located in Khardi, Pune, MS. As part of the Traffic Study, Sincrono has performed a Traffic Impact Analysis (TIA) to look into the traffic aspect of the project and gauges its impact it will have on the existing major roadways in the vicinity and traffic conditions in future years. It looks to understand the vehicular contributions the project will have to the existing roadways and its capacity analysis. This traffic study analyzes the following scenarios:

- 2016 Existing Year Conditions
- Base Traffic Conditions (**without** proposed building) for
  Future Year 2021 (+5 Year Scenario)
  Future Year 2026 (+10 Year Scenario)
  Future Year 2036 (+20 Year Scenario)

- Total Traffic Conditions (**with** proposed building) for
  Future Year 2021 (+5 Year Scenario)
  Future Year 2026 (+10 Year Scenario)
  Future Year 2036 (+20 Year Scenario)

The growth of mid-rise and high-rise towers in high-density urban areas continues to cause a parking dilemma in major cities across India. The proposed development's master plan is designed with a multilevel parking facility with a total 8 vehicular ramps within building premises. This traffic study has addressed the parking and other traffic analysis aspects of the proposed development as mentioned below:

- Swept Path Analysis
- Retrieval Analysis
- Traffic Management Plan

c) Methodology

Transportation modeling is the process of analyzing the pattern in which a zone's transport network would be used by traffic based upon distribution and characteristics of the zone's population, employment and other land uses. The output of traffic study will be the number forecast of vehicles using each road segment within the study area network. Traffic forecast is best achieved by transportation modeling. The conventional transportation modeling is a four stage process and same is utilized for this project. **Figure 1-1** is provided to give an overview about a four-stage transportation model. The roadway segments capacity and Level of Service (LOS) were computed based upon Indian Roads Congress (IRC) standards sourced from IRC 106-1990, Guidelines for Capacity of Urban Roads in Plain Areas.

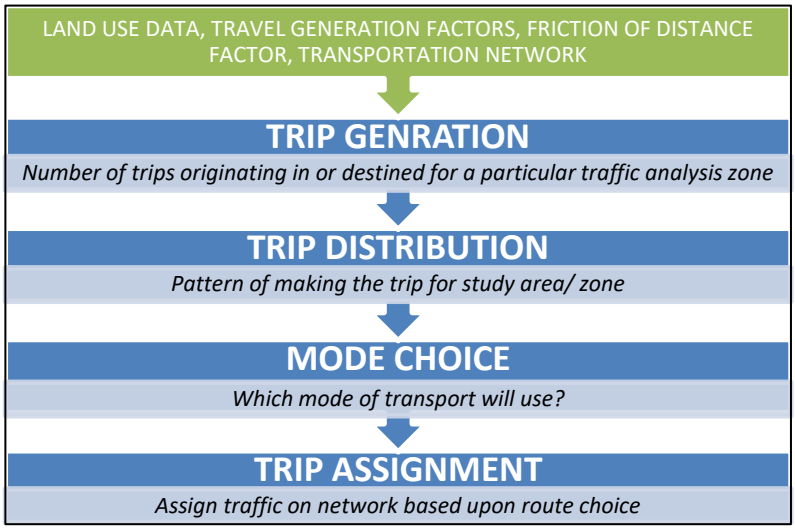


Figure 1-1 : Four-Stage Transportation Model

d) Transportation Terminology

This section describes some general transportation related terms which have been used in this traffic impact analysis report.

Passenger Car Units (PCU): Based upon traffic survey it is observed that traffic in the vicinity has different types of the vehicle modes/ classes (Cars, Two Wheeler, Three Wheelers, Taxi, Buses, Light Commercial Vehicles, Trucks, etc.). The traffic on any road is characterized as mixed traffic condition, resulting in complex interaction between different types of vehicles. IRC recommends conversion of different types of traffic into a common unit called Passenger Car Units (PCU) or Passenger Car Equivalents (PCE). For this traffic impact analysis, Passenger Car Units (PCU) of different types of vehicles are utilized to convert a mixed traffic stream into a homogeneous equivalent, and thereby expressed the mixed traffic flow in terms of equivalent number of passenger cars. Passenger car is considered as the base unit and every other mode is expressed in a multiple of a passenger car unit. This traffic analysis has referred "IRC-SP-41-1994, Guidelines for the Design of At-Grade Intersections in Rural & Urban Areas" and "IRC-106-1990, Guidelines for Capacity of Urban Roads in Plain Areas" to derive PCU factors to use in the study. Accordingly, following mentioned PCU factors are utilized in this traffic analysis.

Table 1-1 : PCU FACTORS

Vehicle Type	Equivalent PCU Factors
Passenger Cars / Taxi / Jeep	1.0
Two Wheelers	0.5
3 Wheelers	0.75
Light Commercial Vehicle (LCV)	1.4
Buses	2.2
Mini Buses	1.5
Heavy Commercial Vehicle (HCV)	3.0
Multi Axle Vehicle (MAV)	4.0
Bicycle	0.4
Other Slow Moving Vehicles (OSMV)	3.0

Level of Service (LOS): Performance of a study area roadway is generally measured in terms of its level of service. Accordingly, this TIA has analyzed the study area roadway for its capacity and results LOS. According to Indian Road Congress (IRC) practice, Level of

Service of a roadway or junction is generally indicated as LOS "A" to "F" as described below;

Level of Service A: Represents conditions of free flow with average travel speed usually about 90 percent of the free flow speed. The general level of comfort and convenience provided to the road users is excellent.

Level of Service B: Represents a zone of stable flow, with the drivers still having reasonable freedom to select their desired speed and maneuver within traffic steam. Average travel speed usually about 70 percent of the free flow speed.

Level of Service C: This also represents a zone of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interaction with others in the traffic stream. Average travel speed usually about 50 percent of the free flow speed.

Level of Service D: Represents the limit of stable flow, with conditions approaching close to unstable flow. Due to high density, the drivers are severely restricted in their freedom to select desired speed and manoeuver within the traffic stream. Average travel speed usually about 40 percent of the free flow speed.

Level of Service E: Represents operating conditions when traffic volumes are at or close to the capacity level. The speeds are reduced to low, but relatively uniform values, average value being one-third the free flow speed. Freedom to manoeuver within the traffic stream is extremely difficult, and is generally accomplished by forcing a vehicle to give way to accommodate such manoeuvers.

Level of Service F: Represents zone of forced or breakdown flow. This condition occurs when the amount of traffic approaching a point exceeds the amount which can pass it. Average travel speeds are between 25 percent and 33 percent of the free flow speed.

Table 1-2 below shows the Level of Service (LOS) based upon Volume to Capacity (V/C) ratio of the road.

Table 1-2 : Level of Service & V/C Ratio

Level of Service (LOS)	Volume/Capacity Ratio	Level of flow/ comfort
A	0.0 to 0.3	Highest
B	0.3 to 0.5	Above Average
C	0.5 to 0.7	Average
D	0.7 to 0.9	Threshold
E	0.9 to 1.0	Lower
F	> 1.0	Lowest

e) Codes, Manuals and Reports

Following codes and manuals are referred for design guidelines in this traffic impact analysis,

- ✓ Design codes by Indian Roads Congress (**IRC**)
- ✓ Urban and Regional Development Plans Formulation and Implementation (**URDPFI**) Guidelines
- ✓ A Policy on Geometric Design of Highways and Streets by American Association of State Highway and Transportation Officials (**AASHTO**)
- ✓ Trip Generation and Parking Generation handbooks by Institute of Transportation Engineers (**ITE**)
- ✓ Comprehensive Mobility Plan (**CMP**) for Pune City, by Wilbur Smith & Assc. and ILF&S, November 2008, prepared for Pune Municipal Corporation

f) Existing Road Network & Connectivity

The subject IT Office Building is planned to be constructed on a plot in Khardi area, Pune. The subject plot is located on south side of existing Gera Emerald City Road and west of Grant Road in Khardi area. Khardi is one of the oldest and currently developing in major residential and commercial zone in north-eastern side of the Pune and is well connected to Magarpatta City, Koregaon Park, Viman Nagar, Wagholi and other parts of the Pune. There are several housing and commercial projects are under construction or being planned in Khardi, Wagholi area in recent times by leading developers. Demand for property in Khardi has always up naturally with infrastructural progress and better connectivity. The Pune-Nagar Road / Magarpatta Road are easily accessible from site location via internal arterial and local collector roads.

As mentioned earlier, the subject site is located along south corridor (Khardi area) of Pune-Nagar Road. This **Pune-Nagar Road** is envisioned as the "***Mobility Corridor and PMC Growth Corridor***" by "Comprehensive Mobility Plan for Pune City" of Pune Municipal Corporation (PMC). Areas of Kharadi, Kalyani Nagar, Parnakuti, Bund Garden along Pune-Nagar Road are attracting IT and BPO investments. This area has a proximity advantage to existing airport at Lohgaon while the proposed international airport at Chakan can be easily be accessed from Pune-Alandi Road. Along with these developments, Pune-Nagar Road has witnessed high commercial developments along it and expected to have more. The Pune Airport is located at approximately 9.5 km distance via Samrat Ashok Road and New

Airport Road from the site vicinity. The driving distance to airport is approximately 25-30 min from the site location.

Pune BRTS is observed along Pune-Nagar Road from Yerwada Chowk to Grant Road junction in Khardi area. It is observed that, buses are plying in the BRTS route but other passenger/commercial vehicles are also seen using it thus not fulfilling the primary purpose of the BRTS.

The proposed Pune Ring Road – Eastern Alignment will also help to boost road connectivity to the Khardi and Wagholi area. The Pune Ring Road is planned to intersect at Pune-Nagar Road near Lonikand area (appx. 8 km northeast of the Wagholi).

Figure 1-2 is provided to illustrate the location of the proposed project site with respect to the surrounding roadway network in Khardi, Pune. For successful completion of the TIA, Sincrono has identified and analyzed the following roadways which are in the immediate vicinity of the site and will serve as major access points.

- Grant Road (Site Access Road, North-South)
- Fountain Road (Arterial, North-South in immediate vicinity of the site)
- Gera Emerald City Road (Sub-Arterial, East-West)

Figure 1-2 : Site Location Map

g) Proposed Land Uses Statement

As per information provided by project proponent, Sincrono has considered following proposed land uses for subject traffic study:

Table 1-3 : PROPOSED LAND USE STATEMENT

Structure	Land Use	Size (BUA)
Building	IT OFFICE	2,56,265 SQM

Note: Please refer to the Architectural plans for more details about area statement.

h) Proposed Parking Statement

As per architectural plans, car parking is planned on Ground Floor and 3 Basement Levels (B1 to B3) within plot boundary. In additions to car parking, two wheeler parking is proposed on 1ST Floor Level. No on street parking is proposed for the site-generated traffic. The detailed parking statement is provided below in **Table 1-4**.

Table 1-4 : Proposed Parking Statement

Floor Level	CARS	2 WHEELERS
1st Floor	-	5227
Ground Floor	619	-
Basement 1	595	-
Basement 2	561	-
Basement 3	275	-
Total	**2050**	**5227**

2. 2016 EXISITNG TRAFFIC CONDITIONS

a) Traffic Survey

To assess the existing traffic pattern in the immediate vicinity of the site, Sincrono has collected traffic data on major roadways surrounding the site. Sincrono has conducted Weekday manual Classified Traffic Volume (CTV) counts on Friday, 16th December 2016, at the following roadways surrounding the site in immediate vicinity:

- **Road Link 1**: Grant Road (Site Access Road)
- **Road Link 2**: Fountain Road (Arterial)
- **Road Link 3**: Gera Emerald City Road (Sub-Arterial)

Study area roadway and traffic survey locations as mentioned above are also shown in the **Figure 2-1**. Proposed development has access from two major roads and a well-connected network of local roads exists in the vicinity.

Figure 2-1 : Study Area Network & Traffic Survey Locations

Following section will give details about observations made during traffic survey and traffic pattern on the study are roadway network.

i. Grant Road:

Functional Use & Connectivity: It is one of the major arterial roads running in north-south directions in Khardi area. Its north ends connects to Pune - Nagar Road and south end connects to Khardi South Main Road. As per Draft DP of Khardi area, in future south end of this road will be extended towards Mundhwa area. It traverses approximately 2.3 km of length from Pune-Nagar Road to Khardi Gaon area.

Observations for Road Section & Features: A total roadway width of 28 to 30 meter is observed along this stretch in the vicinity with a 1.2 meter wide median. Actual carriageway carrying the traffic is measured as 9.8 meter in each direction. Shoulder type area of around 2.0-3.5 meter width is also observed beyond carriageway in each direction. Footpath is observed along both side of the road measuring 1.5 to 2.1 meter in width. **Figure 2-2** is provided to show the sectional observations made on Grant Road in the immediate vicinity of the site.

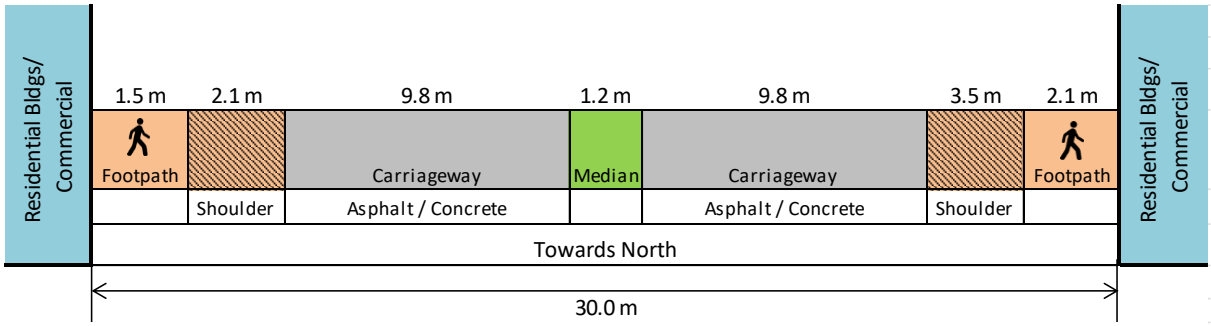


Figure 2-2 : Observed Road Section – Grant Road

Traffic Conditions: As mentioned in earlier section that Sincrono has conducted traffic count survey on this road in immediate vicinity of the site to assess the current traffic volume. **Table 2-1** is provided below to show the existing (Year 2016) Classified Traffic Volume (CTV) counts of Grant Road for 12 hour period. **Figure 2-3** and **Figure 2-4** are provided to show the existing modal split and traffic pattern, respectively, observed for 12-hour period on a weekday on Grant Road (Site Access Road) in the vicinity of the site. Existing traffic data shows 2-Wheeler users are predominant in the traffic mix contributing around 55% of traffic. Next major road users are private cars and taxi traffic contributing around 30% of traffic stream. Light commercial vehicles (LCV) and heavy commercial vehicles (HCV) contribute around 9% of the traffic stream.

Table 2-1 : Classified Traffic Volume (CTV) Counts – Grant Road

Road Name:	Garnt Road (Site Access Road)						Link: Near Site						
Type:	4-Lane Divided						Traffic Direction: NB + SB						
Time Period	Car	Taxi / Yellow Plate	3 Wheelers	2 Wheelers	Bus	Mini Bus	LCV	HCV	MAV	Bicycle	OSMV	Total Vehicles	Total PCU
8:00 to 9:00	73	36	5	176	4	5	11	14	0	10	0	334	278
9:00 to 10:00	74	32	11	307	1	7	23	14	2	11	0	482	367
10:00 to 11:00	65	39	7	255	2	1	13	16	0	10	1	409	316
11:00 to 12:00	78	35	5	199	1	2	15	22	0	6	2	365	317
12:00 to 13:00	75	48	6	194	1	4	17	10	0	12	0	367	291
13:00 to 14:00	73	52	27	181	2	2	16	8	0	8	0	369	293
14:00 to 15:00	71	27	7	207	3	8	12	23	0	9	0	367	315
15:00 to 16:00	80	34	7	188	2	4	17	21	0	9	0	362	314
16:00 to 17:00	67	41	8	222	3	4	15	17	0	11	0	388	314
17:00 to 18:00	87	45	6	184	3	3	15	17	0	14	0	374	317
18:00 to 19:00	87	30	9	189	0	6	15	28	0	8	0	372	335
19:00 to 20:00	75	24	8	158	2	8	20	15	0	13	0	323	279
Total (12 hours)	**905**	**443**	**106**	**2460**	**24**	**54**	**189**	**205**	**2**	**121**	**3**	**4,512**	**3,736**

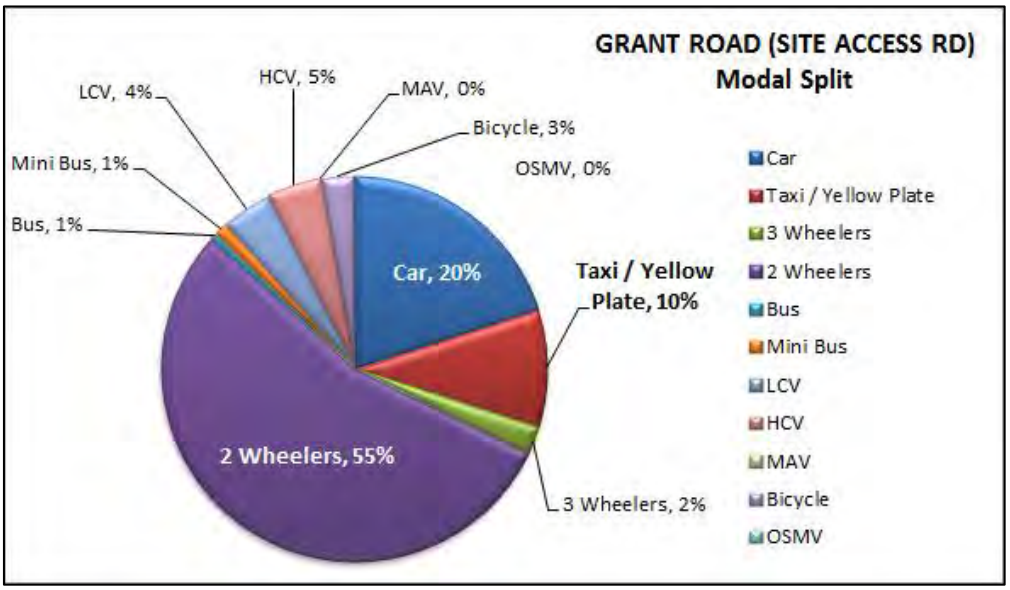


Figure 2-3 : Modal Split – Grant Road (2016)

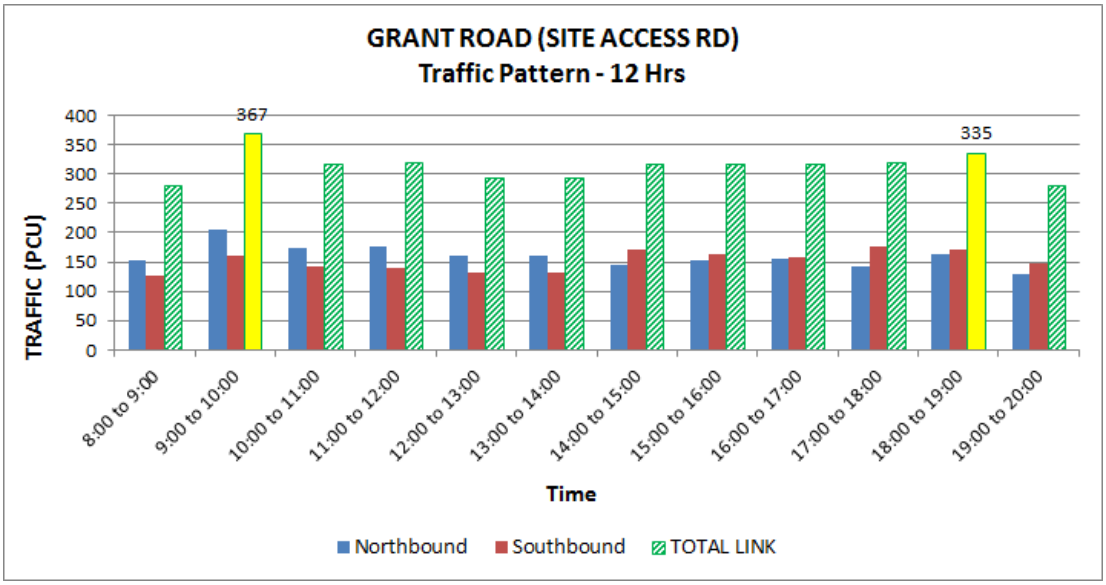
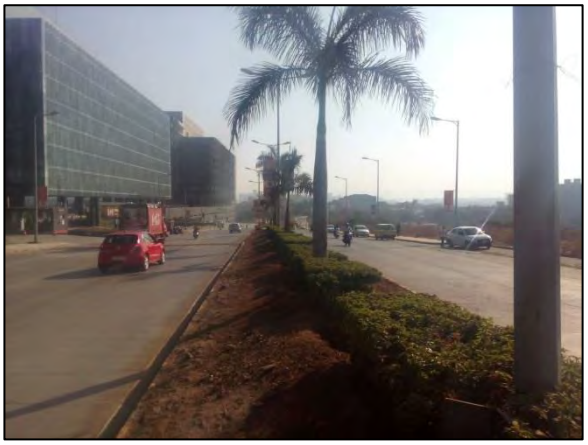


Figure 2-4 : 12 Hr Traffic Pattern – Grant Road (2016)

ii. Fountain Road



Functional Use & Connectivity: It is a major arterial road running north-south and connecting other major arterials in vicinity. It connects to Pune-Nagar Road on north side and Khardi South Main Road on south side while traversing through residential and commercial area of Khardi. As per Draft DP of Khardi area, this road will be constructed beyond Khardi South Main Road and will connect to Magarpatta Road while traversing through Khardi Gaon.

Road Section & Other Features: A total roadway width of 35-36 meter is observed along the study area link. It is observed that road has 7.5 to 11.00 meter of carriageway for motorized traffic use in each direction with a wide median. Footpaths of varying width 3.0 to

3.5 meter width are observed on both sides of the road. Beyond carriageway, a 3.0 meter shoulder type section of road is observed in both directions. **Figure 2-5** is provided to show the sectional observations made on Fountain Road near proposed site.

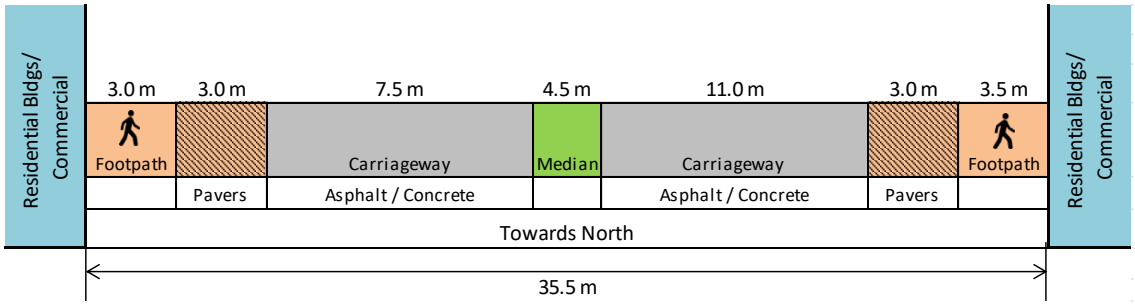


Figure 2-5 : Observed Road Section – Fountain Road

Traffic Conditions: Table 2-2 is provided below to show the existing (Year 2016) Classified Traffic Volume (CTV) counts of Fountain Road for 12 hour period. **Figure 2-6** and **Figure 2-7** are provided to show the exiting modal split and 12-hour traffic pattern, respectively, observed on the Fountain Road link. Existing traffic data shows 2-Wheeler users are predominant in the traffic mix contributing around 46% of traffic. Next major road users are private cars and taxi traffic contributing around 43% of traffic stream. Light commercial vehicles (LCV) and heavy commercial vehicles (HCV) contribute around 4% of the traffic stream

Table 2-2 : Classified Traffic Volume (CTV) Counts – Fountain Road

Road Name:	Fountain Road					Link: Near Site							
Type:	4-Lane Divided					Traffic Direction: NB + SB							
Time Period	Car	Taxi / Yellow Plate	3 Wheelers	2 Wheelers	Bus	Mini Bus	LCV	HCV	MAV	Bicycle	OSMV	Total Vehicles	Total PCU
8:00 to 9:00	148	37	26	277	14	14	13	15	0	8	0	552	461
9:00 to 10:00	426	199	32	630	32	23	17	21	0	1	0	1381	1156
10:00 to 11:00	421	270	43	670	12	32	27	13	0	3	0	1491	1211
11:00 to 12:00	281	211	29	592	6	31	27	12	0	8	0	1197	946
12:00 to 13:00	238	126	29	454	5	7	19	6	0	21	0	905	687
13:00 to 14:00	208	137	16	449	5	3	14	17	0	24	0	873	677
14:00 to 15:00	204	108	19	348	4	3	17	22	1	26	0	752	618
15:00 to 16:00	186	131	25	360	4	16	30	28	0	21	0	801	683
16:00 to 17:00	256	172	28	388	10	24	26	13	0	10	0	927	780
17:00 to 18:00	303	267	29	491	19	33	15	10	0	23	0	1190	989
18:00 to 19:00	265	190	28	501	5	26	16	16	0	26	0	1073	857
19:00 to 20:00	245	152	28	466	5	12	16	20	0	27	0	971	773
Total	3181	2000	332	5626	121	224	237	193	1	198	0	12,113	9,839

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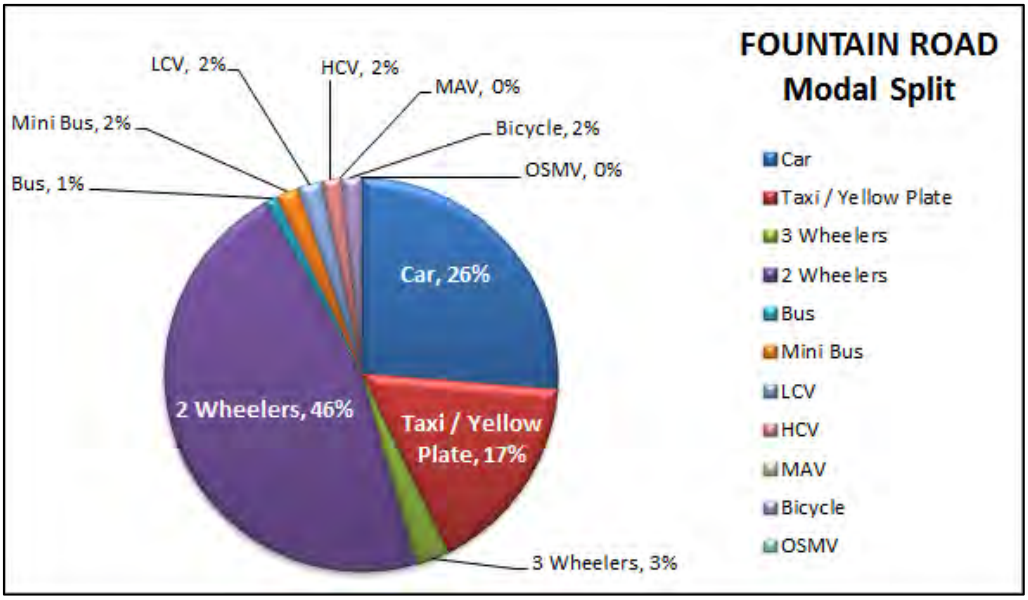


Figure 2-6 : Modal Split – Fountain Road (2016)

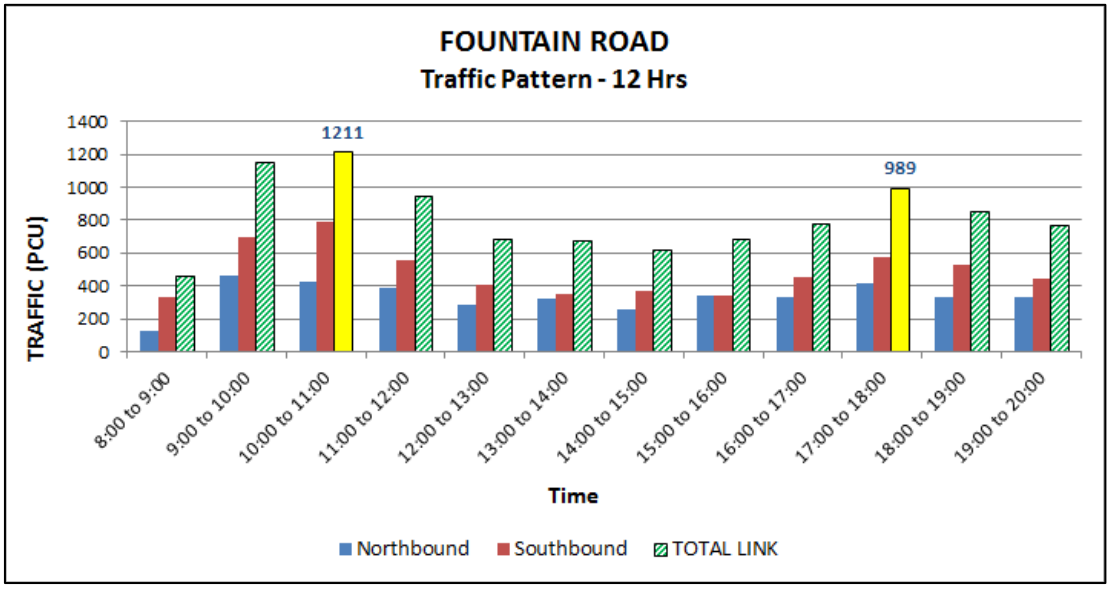


Figure 2-7 : 12 Hr Traffic Pattern – Fountain Road (2016)

iii. Gera Emerald City Road

Functional Use & Connectivity: It is a sub-arterial type road running east-west and connecting other major arterials in the area. It connects to Grant Rodd on east side and Magarpatta Road on west end. As per Draft DP of Khardi area, this road is planned for 1n 18.0 meter wide section for its entire length.

Road Section & Other Features: A roadway width of 18.0 meter is observed along the study area link. It is observed that road has 9.0 meter of paved carriageway for motorized traffic use in both directions with no median. Wide area of 4.5 meter width is observed along both sides of the road as multifunctional zone. Road section on north side of the subject plot is observed as 12.0 meter of carriageway. **Figure 2-8** is provided to show the road sectional observations made on Gera Emerald City Road in the vicinity of the site.

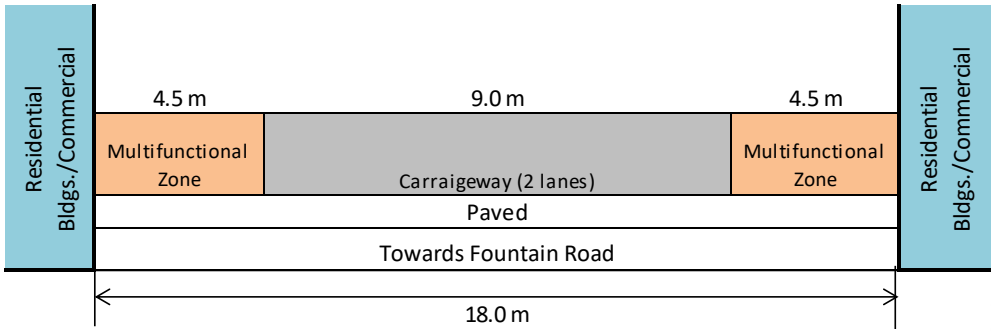


Figure 2-8 : Observed Road Section – Gera Emerald City Road

Traffic Conditions: Table 2-3 is provided below to show the existing (Year 2016) Classified Traffic Volume (CTV) counts of Gera Emerald City Road for 12 hour period. **Figure 2-9** and **Figure 2-10** are provided to show the exiting modal split and 12-hour traffic pattern, respectively, observed on the Gera Emerald City Road link. Existing traffic data shows 2-Wheeler users are predominant in the traffic mix contributing around 46% of traffic. Next major road users are private cars and taxi traffic contributing around 43% of traffic stream. Light commercial vehicles (LCV) and heavy commercial vehicles (HCV) contribute around 4% of the traffic stream.

Table 2-3 : Classified Traffic Volume (CTV) Counts – Gera Emerald City Road

Road Name:	Gera Emerald City Road						Link: Near Site						
Type:	2-Lane Undivided						Traffic Direction: EB + WB						
Time Period	Car	Taxi / Yellow Plate	3 Wheelers	2 Wheelers	Bus	Mini Bus	LCV	HCV	MAV	Bicycle	OSMV	Total Vehicles	Total PCU
8:00 to 9:00	192	64	7	326	18	44	11	1	0	25	0	688	558
9:00 to 10:00	343	101	17	580	10	15	11	2	0	19	0	1098	820
10:00 to 11:00	331	113	14	468	4	11	18	1	0	14	0	974	748
11:00 to 12:00	319	100	25	451	2	8	19	2	0	6	0	932	715
12:00 to 13:00	247	84	15	430	3	4	14	1	0	11	0	809	597
13:00 to 14:00	188	85	15	398	6	6	17	3	0	14	0	732	544
14:00 to 15:00	234	102	11	496	5	12	34	0	0	11	1	906	676
15:00 to 16:00	219	133	24	442	2	31	39	4	0	28	0	922	720
16:00 to 17:00	220	108	20	475	9	34	23	1	0	22	0	912	695
17:00 to 18:00	230	137	19	496	15	11	20	2	0	9	0	939	716
18:00 to 19:00	233	155	36	474	7	10	25	1	0	9	1	951	727
19:00 to 20:00	231	93	12	447	6	13	22	4	0	12	0	840	637
Total	2987	1275	215	5483	87	199	253	22	0	180	2	10,703	8,153

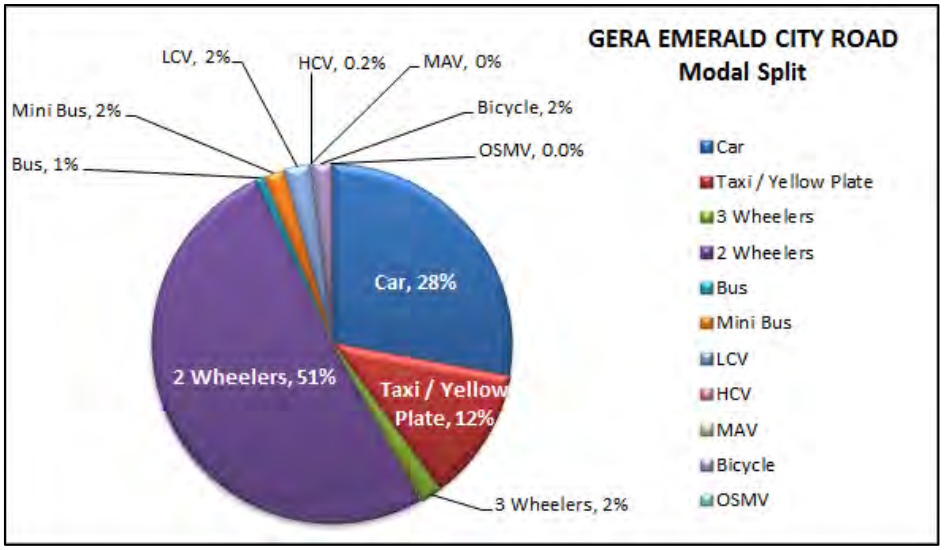


Figure 2-9 : Modal Split – Gera Emerald City Road (2016)

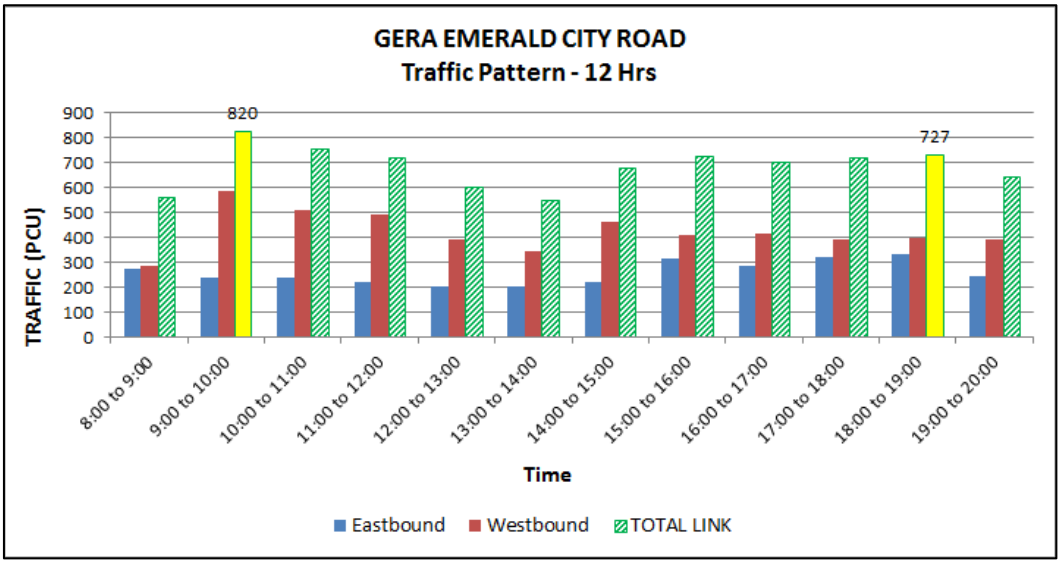


Figure 2-10 : 12 Hr Traffic Pattern – Gera Emerald City Road (2016)

The morning AM period is considered from 8.00 AM to 12.00 AM to calculate AM peak hour. PM period is considered form 4.00 PM to 8.00 PM to calculate PM peak hour trips. This TIA has analyzed AM and PM peak hours for a typical weekday considering the major vehicular traffic movements of proposed land uses of residential and commercial will occur during AM and PM peak hours. **Table 2-4** is provided below to summarize the traffic peak hours observed during the traffic data collection on study area network.

Table 2-4 : OBSERVED TRAFFIC PEAK HOUR

No.	Road Link	Traffic Peak Hours	
		AM	PM
1	Grant Road	9:00 to 10.00	6:00 to 7:00
2	Fountain Road	10:00 to 11.00	5:00 to 6:00
3	Gera Emerald City Road	9:00 to 10.00	6:00 to 7:00

Based upon road survey and available information the study area roadways are categorized into different types of roads for capacity analysis purposes. **Table 2-5** is provided below to show the study area roadways with corresponding lane configuration and maximum capacities.

Table 2-5 : ROAD CATEGORIES & CAPACITY

No.	Road Names	Carriageway	Type of Carriageway	Maximum Capacity as per IRC
1	Grant Road	4 Lane (Divided)	Arterial	5143
2	Fountain Road	4 Lane (Divided)	Arterial	5143
3	Gera Emerald City Road	2 Lane (Two Way)	Sub-arterial	1714

Note: Maximum road capacity is shown as per IRC-106-1990 guidelines. Actual available carriageway lanes for travel are utilized to determine maximum capacity.

b) Capacity Analysis

Sincrono has performed capacity analysis for the existing study area roadway for observed AM and PM peak hours on a weekday. Peak hour existing traffic on study area roadway

links was compared with their capacity. The ratio of peak traffic volume and capacity (V/C) is used as an index to determine level of congestion on link under existing conditions. This study has analyzed study area roadway links in the vicinity of the site based upon maximum road capacity values given in IRC. **Table 2-6** is provided to show the AM and PM peak hour traffic volume (PCU) and LOS for the study area roadways under 2016 existing conditions.

Table 2-6 : EXISTING TRAFFIC VOLUME & LOS

				ANALYSIS YEAR	Existing 2016					
				PEAK PERIOD	AM			PM		
Sr. No.	Road Name	Carriageway	Code / Method	Maximum Traffic Capacity (PCU/hr)	Observed Traffic Volume (PCU/hr)	V/C Ratio	LOS	Observed Traffic Volume (PCU/hr)	V/C Ratio	LOS
1	Grant Road	4 Lane (Divided)	IRC	5143	367	0.07	A	335	0.07	A
2	Fountain Road	4 Lane (Divided)	IRC	5143	1211	0.24	A	989	0.19	A
3	Gera Emerald City Road	2 Lane (Two Way)	IRC	1714	820	0.48	B	727	0.42	B

3. FUTURE BASE TRAFFIC CONDITIONS (WITHOUT PROPOSED SITE)

a) DP Road Improvements:

Figure 3-1 is provided below to show the extract from Khardi Draft Development Plan of Wadgaon Sheri, Khardi, Pune Municipal Corporation (PMC) layout for site vicinity. As per DP remarks, an 18.0M wide road on south side, an 18.0M wide road on north side and 30.0M wide road on east side of the plot are planned. During survey it is observed that, north and east side roads are currently constructed and in operation with light traffic volume.

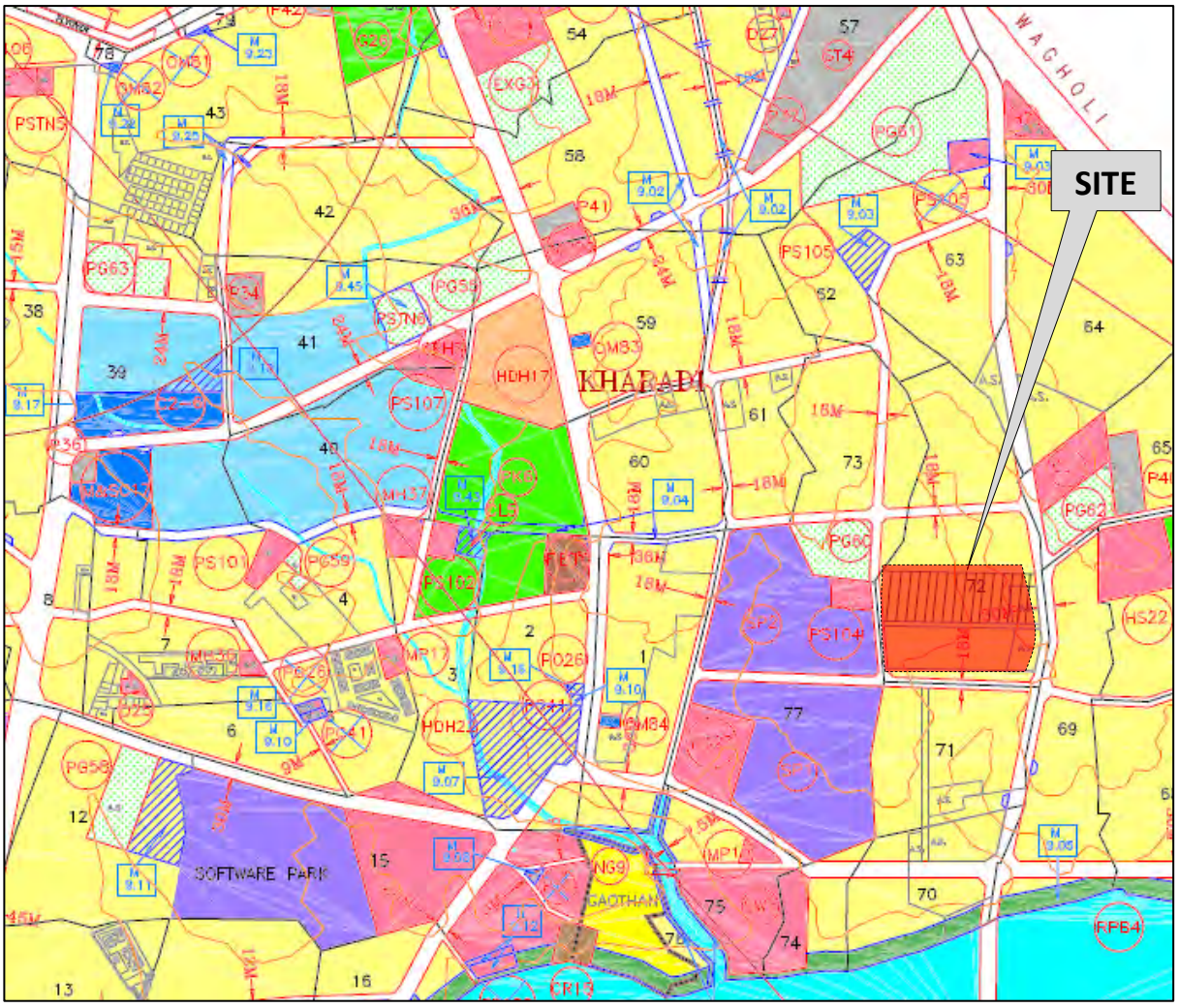


Figure 3-1 : Draft 2034 DP Road Layout (Site Vicinity)

b) Traffic Volume Projection

This TIA has analyzed the future conditions for 2021 as build-out and full occupancy year of the project, plus 10 year scenario as Year 2026 and plus 20 year scenario as Year 2036. Accordingly base traffic is projected for Year 2021, 2026 and 2036 by applying growth factor to existing traffic data collected on study area network. The proposed project is located in Khardi area of Pune, MS. This area is going through many residential and

commercial developments in recent years and real estate market is constantly growing because of good connectivity of the area to other part of the Pune city and Wagholi. Also all these factors have led to a consistent growth in the traffic pattern of the area, especially on north-south arterials. The area still has potential to develop residential and commercial buildings on empty plots available in the vicinity. This TIA has assumed that this area will still see the residential and commercial developments in upcoming years. Considering the potential for further development, a 10% compounded traffic growth is applied to existing traffic to take into effect the traffic associated with the other developments which are anticipated to be constructed in the vicinity and general traffic growth on major roads in the vicinity for Year 2021. Beyond Year 2021, a modest growth of 5% is considered to estimate future year traffic for "+10 year scenario - Year 2026" and "+20 year scenario - Year 2036". With this methodology this TIA has projected the Base Traffic Conditions for Year 2021, 2026 and 2036 on the surrounding study area network (without proposed site traffic). Following table shows the growth percentages assumed for future year and estimated traffic percentages in respect to current year traffic.

Table 3-1 : TRAFFIC GROWTH

YEAR		*Cummulative Growth Rate*	Increase on Existing Traffic	
From	**To**		***%***	***multiple***
2016	2021	**10%**	61%	1.6
2021	2026	**5%**	106%	2.1
2026	2036	**5%**	235%	3.3

c) Capacity Analysis

In a general context, roads are designed for handling adequate capacity of vehicles so as to avoid congestion and delay under average conditions which is generally based upon Average Daily Traffic (ADT). With the capacity designed only for average conditions, it is inevitable that congestion occurs in peak hour situations or worst case scenarios. Sincrono has performed capacity analysis for AM and PM peak hours with projected base year 2021, 2026 and 2036 traffic volumes. Peak hour projected traffic on study area roadway links was compared with their capacity. The ratio of peak traffic volume and capacity (V/C) is used as an index to determine level of congestion on link for future base year conditions (without site). From background base year analysis (without site traffic), it is observed that all study area roads will operate with satisfactory LOS during future years with existing lane

geometry, except Gera Emerald City Road. With anticipated increased traffic growth beyond five years, Gera Emerald City Road can be marked with 4-lane carriageway within exiting road ROW. This would help to increase the road capacity in future years. **Table 3-2, Table 3-3** and **Table 3-4** are provided to show the projected AM/PM peak hour traffic volume-V/C ratio-LOS for the study area roadways during Base Year 2021, 2026 and 2036 conditions (without site traffic), respectively.

Table 3-2 : 2021 BASE YEAR TRAFFIC CONDITIONS & LOS

				ANALYSIS YEAR	"Build Year Scenario - Yr 2021" WITHOUT Proposed Project					
				PEAK PERIOD	AM			PM		
Sr. No.	Road Name	Carriageway	Code / Method	Maximum Traffic Capacity (PCU/hr)	Estimated Traffic Volume (PCU/hr)	V/C Ratio	LOS	Estimated Traffic Volume (PCU/hr)	V/C Ratio	LOS
1	Grant Road	4 Lane (Divided)	IRC	5143	591	0.11	A	540	0.11	A
2	Fountain Road	4 Lane (Divided)	IRC	5143	1950	0.38	B	1592	0.31	B
3	Gera Emerald City Road	2 Lane (Two Way)	IRC	1714	1321	0.77	D	1171	0.68	C
3	*Gera Emerald City Road*	*4 Lane (Divided)*	*IRC*	*4143*	*1321*	*0.32*	*B*	*1171*	*0.28*	*A*

Table 3-3 : 2026 BASE YEAR TRAFFIC CONDITIONS & LOS

				ANALYSIS YEAR	"+10 Year Scenario - Yr 2026" WITHOUT Proposed Project					
				PEAK PERIOD	AM			PM		
Sr. No.	Road Name	Carriageway	Code / Method	Maximum Traffic Capacity (PCU/hr)	Traffic Volume (PCU/hr)	V/C Ratio	LOS	Traffic Volume (PCU/hr)	V/C Ratio	LOS
1	Grant Road	4 Lane (Divided)	IRC	5143	754	0.15	A	690	0.13	A
2	Fountain Road	4 Lane (Divided)	IRC	5143	2488	0.48	B	2032	0.40	B
3	Gera Emerald City Road	2 Lane (Two Way)	IRC	1714	1686	0.98	E	1494	0.87	D
3	*Gera Emerald City Road (with 4-lanes)*	*4 Lane (Divided)*	*IRC*	*4143*	*1686*	*0.41*	*B*	*1494*	*0.36*	*B*

Table 3-4 : 2036 BASE YEAR TRAFFIC CONDITIONS & LOS

				ANALYSIS YEAR	"+20 Year Scenario - Yr 2036" WITHOUT Proposed Project					
				PEAK PERIOD	AM			PM		
Sr. No.	Road Name	Carriageway	Code / Method	Maximum Traffic Capacity (PCU/hr)	Traffic Volume (PCU/hr)	V/C Ratio	LOS	Traffic Volume (PCU/hr)	V/C Ratio	LOS
1	Grant Road	4 Lane (Divided)	IRC	5143	1229	0.24	A	1123	0.22	A
2	Fountain Road	4 Lane (Divided)	IRC	5143	4053	0.79	D	3310	0.64	C
3	Gera Emerald City Road	2 Lane (Two Way)	IRC	1714	2746	1.60	F	2434	1.42	F
3	*Gera Emerald City Road (with 4-lanes)*	*4 Lane (Divided)*	*IRC*	*4143*	*2746*	*0.66*	*C*	*2434*	*0.59*	*C*

4. FUTURE TOTAL TRAFFIC CONDITIONS (WITH PROPOSED SITE)

a) Site Access & Base Circulation

As per master plan prepared by Project Architect following has access points are proposed on Site Access Road (Grant Road) for subject building;

Gate 1: Entry for building users including visitors

Gate 2: Exit for building users including visitors

Site access road is an existing 30 meter wide road located on east side of the plot boundary. Entry gate is proposed with 25 meter width. Total 5 lanes are reserved for cars and 2 lanes are reserved for 2 wheelers. Similarly Entry gate is proposed with 22 meter width section consisting of total 5 lanes reserved for cars and 2 lanes reserved for 2 wheelers.

Car parking is provided on ground as well as 3 basement levels and 1st floor. Separate access points (entry and exit) are provided to the ground floor parking. Basement floor parking can be access via 6 meter wide ramps located on north and south side of the plot. Similarly, 1st floor parking of 2 wheelers can be accessed via 6.0 meter wide ramps provided on north and south side of the plot. Total eight (8) vehicular ramps are proposed for parking facility to handle inbound and outbound vehicle movements. One way maneuvering is proposed on all ramps which aids in having smooth flow and avoid any conflicts within parking facility. All internal driveways are of adequate width to accommodate one-way or two-way maneuvering of the vehicles.

Overall, entry/ exit gates, drop-off locations and ramps are strategically located and designed in such a way that it adds efficacy to circulation and accessibility. Circulation proposed in the parking plan is acceptable from traffic maneuvering point of view. **Figure 4-1** is provided to show the access points (entry/exit) and basic circulation pattern for entire plot as described above.

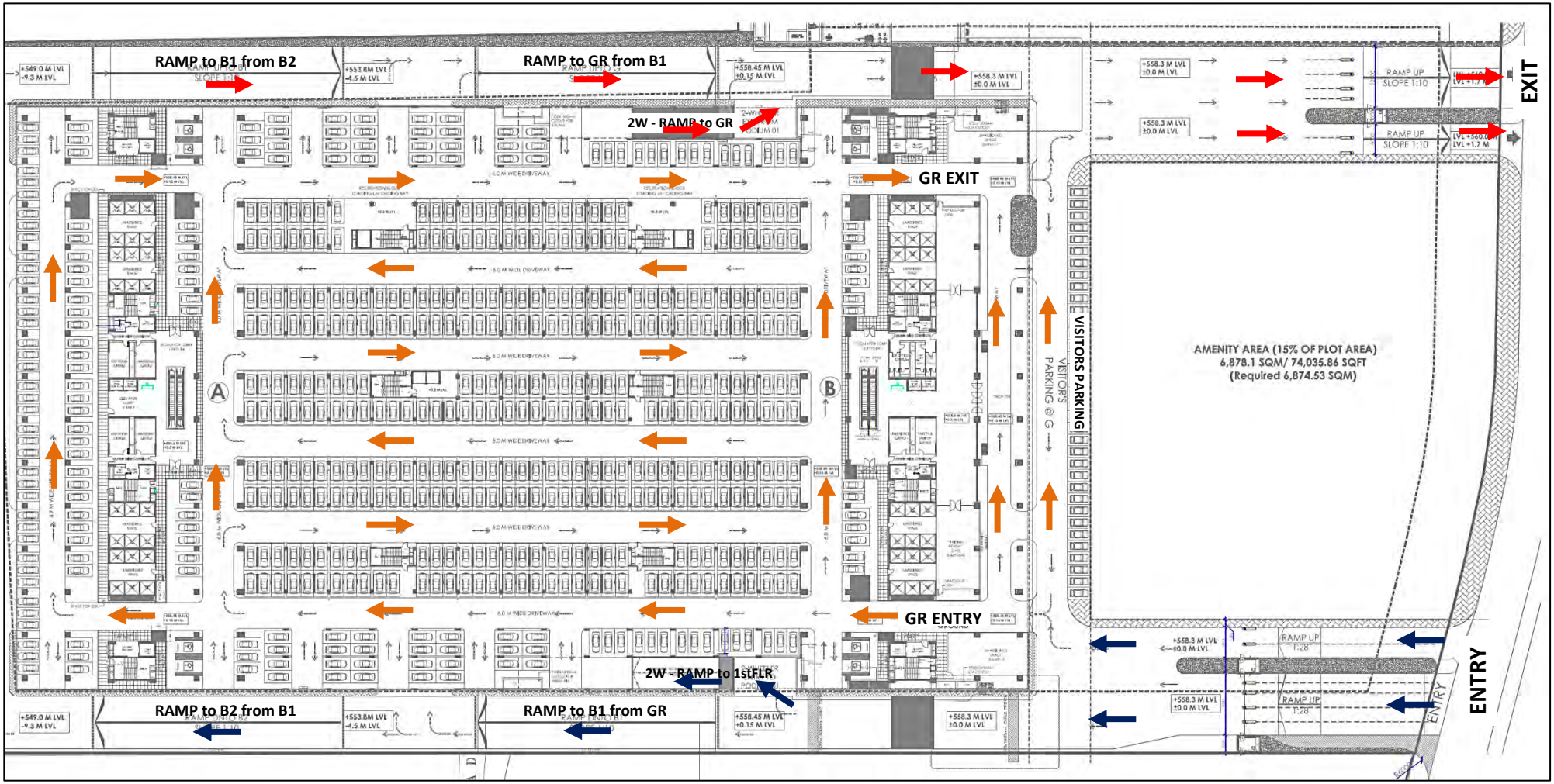


Figure 4-1 : Proposed Site Access & Circulation Plan

b) Trip Generation & Modal Split

Trip Generation is the first step in the conventional four-step transportation forecasting process. Journey is an out way movement from a point of origin to a point of destination, whereas the word "trip" denotes an outward and return journey. If either origin or destination of a trip is the home of the trip maker then such trips are called home based trips and the rest of the trips are called non home based trips. Trip production is defined as all the trips of home based or as the origin of the non-home based trips, Office, School, Market, etc. Proposed IT Office building is anticipated to include 1,663K SF of office space with amenities for building users. Traffic data published in Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012 were referred for arriving at basic trip generation rates for proposed office spaces. Traffic generation rates are used as it is from ITE manual for Code 770 - Business Park to check the traffic impact in worst case scenario.

c) Modal Split

The proposed IT Office Building is anticipated to be occupied by lower class, middle class, upper middle class and upper class users. Considering this fact, the estimated trips are split with Cars, Taxis, 2-Wheelers and Rickshaw users to convert it in terms of PCU. Following table shows the PCUs used in calculation of total traffic conditions with full built-out of the proposed project. Please note that, as a worst case scenario this study have not considered the transit oriented trips to calculated traffic impact. Total PCU trips may further reduce if subject IT Office Building provides with the daily buses for its employees during peak hours. This will reduce the overall individual trips to/from the site and put fewer burden on the road network. **Table 4-1** is provided to show the Weekday AM peak hour and PM peak hour trips anticipated to be generated by proposed IT Office building.

Table 4-1 : PROPOSED DEVELOPMENT – TRIP GENERATION & MODAL SPLIT

PROPOSED USE	TYPE	DENSITY	Variance	AM PEAK HOUR			PM PEAK HOUR		
				IN	OUT	TOTAL	IN	OUT	TOTAL
IT Park	Office	1663.0	KSF	1,998	380	2,378	493	1,652	2,145
TOTAL TRIPS				**1,998**	**380**	**2,378**	**493**	**1,652**	**2,145**

TRIP RATE SOURCE: For vehicle trip generation calculations, Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012 is utilized.

			Effective Trip Rates					
			AM Peak Hour			PM Peak Hour		
			% In	% Out	(2-Way)	% In	% Out	(2-Way)
IT Park	Office	Per KSF	*84%*	*16%*	1.43	*23%*	*77%*	1.29

MODAL SPLIT							
Vehicle Class & PCU	% Contributions	AM PEAK HOUR			PM PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
2 Wheelers	65%	1298	247	1546	321	1074	1394
PCU @ 0.5		***649***	***124***	***773***	***160***	***537***	***697***
CARS	20%	400	76	476	99	330	429
PCU @ 1.0		***400***	***76***	***476***	***99***	***330***	***429***
Taxis / Ola / Uber	10%	200	38	238	49	165	215
PCU @ 1.0		***200***	***38***	***238***	***49***	***165***	***215***
Rickshaws	5%	100	19	119	25	83	107
PCU @ 0.75		***75***	***14***	***89***	***19***	***62***	***80***
TOTAL TRIPS (PCU)		***1,323***	***252***	***1,575***	***327***	***1,094***	***1,421***

Note: As a worst case scenario, no transit oriented trips are considered in the analysis to check traffic impact

d) Trip Distribution

This is a second stage in the transportation forecasting model. The anticipated traffic volume generated (in & out) by the proposed development will have a defined pattern of distribution. Trip distribution essentially describes that how the development generated traffic arrives and departs from the project development site to surrounding road network. For this TIA, an overall trip distribution was developed for the site-generated traffic after a review of the existing travel patterns in the area. Locations of the major roadways that will serve the development also have considerable impact of trip distribution. **Figure 4-2** is provided to show the directional trip distribution used to assign the site-generated traffic on study network. Proposed development-generated traffic is anticipated to use the study area network as described below to access the site in operational year.

- 45% site traffic anticipated to/from South on Magarpatta Road
- 45% site traffic anticipated to/from West on Samrat Ashok Road
- 10% site traffic anticipated to/from East on Pune-Nagar Road

Development-generated trips from major surrounding roads (as mentioned above) will use Grant Road to access the site via proposed entrances. Majority of the traffic is assumed via Pune-Nagar Road and surrounding area. After that point, trips will be disbursed on major arterials and local collector roads to reach the site.

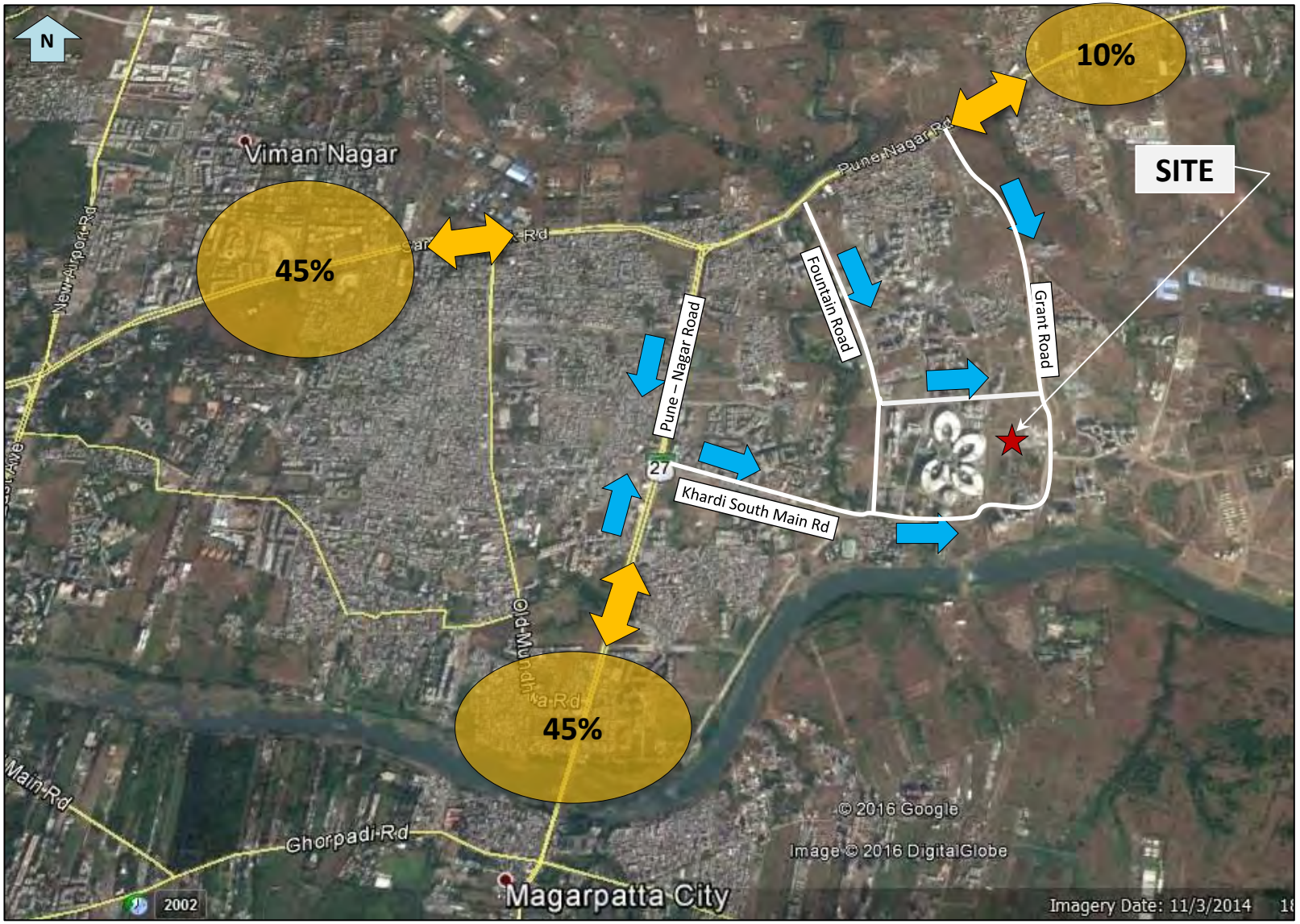


Figure 4-2 : Trip Distribution Percentages

e) Total Traffic Volume Projection with Site

The proposed development-generated traffic was added to the Base Traffic of Year 2021, Year 2026 and year 2036 to arrive at Total Traffic Conditions for future years with proposed project. Full occupancy and operation of the proposed IT Office Building is assumed for the analysis year 2021. Total traffic volume for 2021 build-out conditions, plus 10 year scenario of 2026 conditions and plus 20 years scenario of 2036 conditions with proposed site is provided in **Table 4-2** and **Table 4-3** for AM and PM peak hour, respectively.

f) Capacity Analysis & Site Impact

Total traffic, thus arrived, on various links was compared with their capacity. The ratio of peak traffic volume and capacity (V/C) is used as an index to determine level of congestion on link which is likely to occur when projected traffic is operative on link. With the well-connected internal local collector roads, the site impacts are dispersed on the arterial road network in the vicinity of site. For major arterial in the vicinity, AM and PM peak hour link volume entire project site traffic impacts are anticipated to be at 10-25 percent of future traffic. Traffic analysis shows that, traffic impact of the proposed IT office building will be around 50-75 percent of future traffic on site access road – Grant Road. This road is currently carrying very less traffic and it is anticipated that the road will see traffic growth in near future with build-out of residential and commercial projects in the vicinity. This road will accommodate the increased traffic in future year with current lane configuration of 30 meter wide road section. It is observed that with addition of anticipated site traffic LOS will not deteriorate below LOS "D". All roads will operate with LOS "D" or better in future years with site traffic. Gera Emerald City Road will operate at LOS "D" or better with recommended 4-lane carriageway within existing ROW. The summary results of the future traffic flow conditions with site traffic on study area roadway network are shown in **Table 4-2** and **Table 4-3** for AM and PM peak hour, respectively.

The summary of comparison of Level of Service (LOS) results for 2016 Existing Conditions, Base Year 2021, 2026 & 2036 *without site* and Build Year 2021, 2026, 2036 *with site* is shown in **Table 4-4**.

Table 4-2 : Future Year - Total Traffic, Site Impact & LOS (AM Peak)

AM Peak Hour Traffic Analysis

Road Name / Link	Carriageway	Maximum Traffic Capacity (PCU/hr)	without Proposed Development				Traffic from Proposed Project	Build-out Year with Proposed Development				+10 Years with Proposed Development				+20 Years with Proposed Development			
			Existing Traffic (PCU/Hr)	Base Year Trafiic (PCU/Hr)	Base Year Trafiic (PCU/Hr)	Base Year Trafiic (PCU/Hr)		Total Traffic (PCU/hr)	V/C Ratio	LOS	Site Traffic Impact	Total Traffic (PCU/hr)	V/C Ratio	LOS	Site Traffic Impact	Total Traffic (PCU/hr)	V/C Ratio	LOS	Site Traffic Impact
			2016	2021	2026	2036		2021				2026				2036			
Grant Road	4 Lane (Divided)	5143	367	591	754	1229	1575	2167	0.42	B	73%	2330	0.45	B	68%	2804	0.55	C	57%
Fountain Road	4 Lane (Divided)	5143	1211	1950	2488	4053	425	2375	0.46	B	18%	2914	0.57	C	15%	4479	0.87	D	10%
Gera Emerald City Road	2 Lane (Two Way)	1714	820	1321	1686	2746	425	1746	1.02	F	24%	2111	1.23	F	20%	3172	1.85	F	14%
Gera Emerald City Road	*4 Lane (Divided)*	*4143*						*1746*	*0.42*	*B*		*2111*	*0.51*	*C*		*3172*	*0.77*	*D*	

Table 4-3 : Future Year - Total Traffic, Site Impact & LOS (PM Peak)

PM Peak Hour Traffic Analysis

Road Name / Link	Carriageway	Maximum Traffic Capacity (PCU/hr)	without Proposed Development				Traffic from Proposed Project	Build-out Year with Proposed Development				+10 Years with Proposed Development				+20 Years with Proposed Development			
			Existing Traffic (PCU/Hr)	Base Year Trafiic (PCU/Hr)	Base Year Trafiic (PCU/Hr)	Base Year Trafiic (PCU/Hr)		Total Traffic (PCU/hr)	V/C Ratio	LOS	Site Traffic Impact	Total Traffic (PCU/hr)	V/C Ratio	LOS	Site Traffic Impact	Total Traffic (PCU/hr)	V/C Ratio	LOS	Site Traffic Impact
			2016	2021	2026	2036		2021				2026				2036			
Grant Road	4 Lane (Divided)	5143	335	540	690	1123	1421	1961	0.38	B	73%	2111	0.41	B	68%	2544	0.49	B	56%
Fountain Road	4 Lane (Divided)	5143	989	1592	2032	3310	384	1976	0.38	B	20%	2416	0.47	B	16%	3694	0.72	D	11%
Gera Emerald City Road	2 Lane (Two Way)	1714	727	1171	1494	2434	384	1555	0.91	E	25%	1878	1.10	F	20%	2818	1.64	F	14%
Gera Emerald City Road	*4 Lane (Divided)*	*4143*						*1555*	*0.38*	*B*		*1878*	*0.45*	*B*		*2818*	*0.68*	*C*	

Table 4-4 : LEVEL OF SERVICE (LOS) COMPARISON

Road Segment	2016 Existing Conditions		2021 Build Year Conditions				+10 Year Scenario				+20 Year Scenario			
			without Proposed Site		with Proposed Site		without Proposed Site		with Proposed Site		without Proposed Site		with Proposed Site	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Grant Road	A	A	A	A	B	B	A	A	B	B	A	A	C	B
Fountain Road	A	A	B	B	B	B	B	B	C	B	D	C	D	D
Gera Emerald City Road	B	B	D	C	F	E	E	D	F	F	F	F	F	F
Gera Emerald City Road	-	-	*D*	*C*	*B*	*B*	*B*	*B*	*C*	*B*	*C*	*C*	*D*	*C*

Notes:

1. Level of Service (LOS) is based upon Volume/Capacity ratio of the respective link.
2. Level of Service (LOS) is shown for study area road with existing lane configuration.

5. SWEPT PATH ANALYSIS

It is the analysis of the movement and path of the design vehicle undertaking a movement and/or a turning maneuver. It allows us to predict the path of steered vehicles in a variation of scenarios. The swept path analysis traces the path taken by each wheel, and calculates the space taken by the vehicle's body to ensure that there are no obstacles present. At a basic level this includes calculating the thread of each wheel during the turn and also calculating the maneuvering space needed by the vehicle body (front & rear overhang). Swept Path Analysis benefits Planners, Architects, Engineers, Developers and site owners as it provides them with the means to assess the turning implications of a wide variety of vehicle types on design layouts at a very early stage in the design process without the need of physically driving or undertaking the maneuvers. This study has performed swept path analysis for the ground floor and parking levels for the IT Office Building premise.

a) Objectives

The objectives of performing swept path analysis are as follows:

- To check the site layout and parking layout, if it can accommodate the movement of the design vehicle expected by the development.
- To provide Swept Path Analysis of vehicles overlaid on the proposed site layout to demonstrate that the vehicles can maneuver safely and efficiently within the site layout.

- To see if proposed layout serves the purpose, especially at turns where room for vehicle maneuvers is limited.
- To determine if the proposed emergency access lane is adequate to allow emergency response vehicles (e.g. Fire Tender) to access the site.

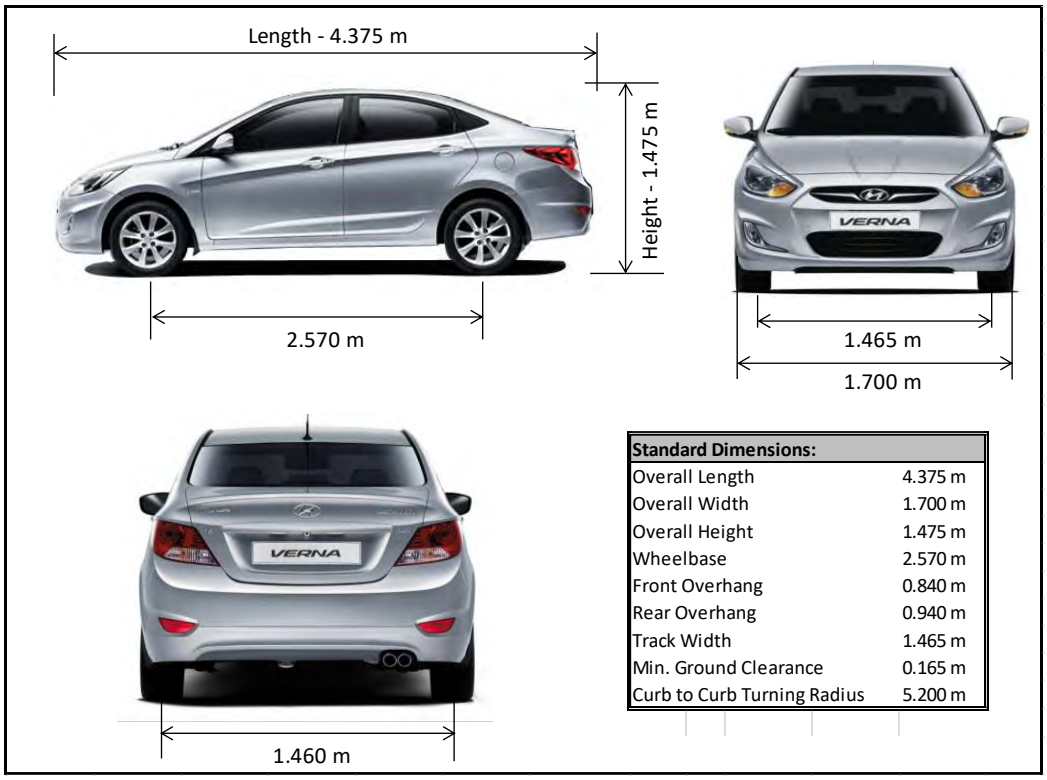
b) Design Vehicle

A design vehicle is a vehicle whose dimensions and operational characteristics are used to establish layout geometry. *From an optimal design perspective it is beneficial to select the design vehicle which is near to 85% percentile, i.e. 15% of vehicles can have larger dimensions. This helps in optimizing the space requirements.* Another factor to be considered is the socio economic profile of residents of complex. This complex is likely to be habituated by IT offices with mixed building users. It is anticipated that building users will have affordability of hatchback and sedan cars and two wheelers to travel to the office area from surrounding vicinity. As per parking plans layout prepared by Project Architect, standard parking is provided for large vehicles (5.0m X 2.4m) and small vehicles (4.5m X 2.3m). A representative large and small vehicle has been accordingly selected as below for simulating the maneuvering requirements within circulation areas specifically the turning radii, parking stalls and driveway.

In case of a fire emergency inside the premises, it is imperative that access be provided to fire fighting vehicles. Fire tender vehicle movement shall require a complete one-way movement during its operation. Assuming a standard Tata 1613 Fire Tender model and a Aerial Platform/ Turntable Ladder/ Special Appliance Fire Tender, the swept path analysis was performed within the premises on periphery road.

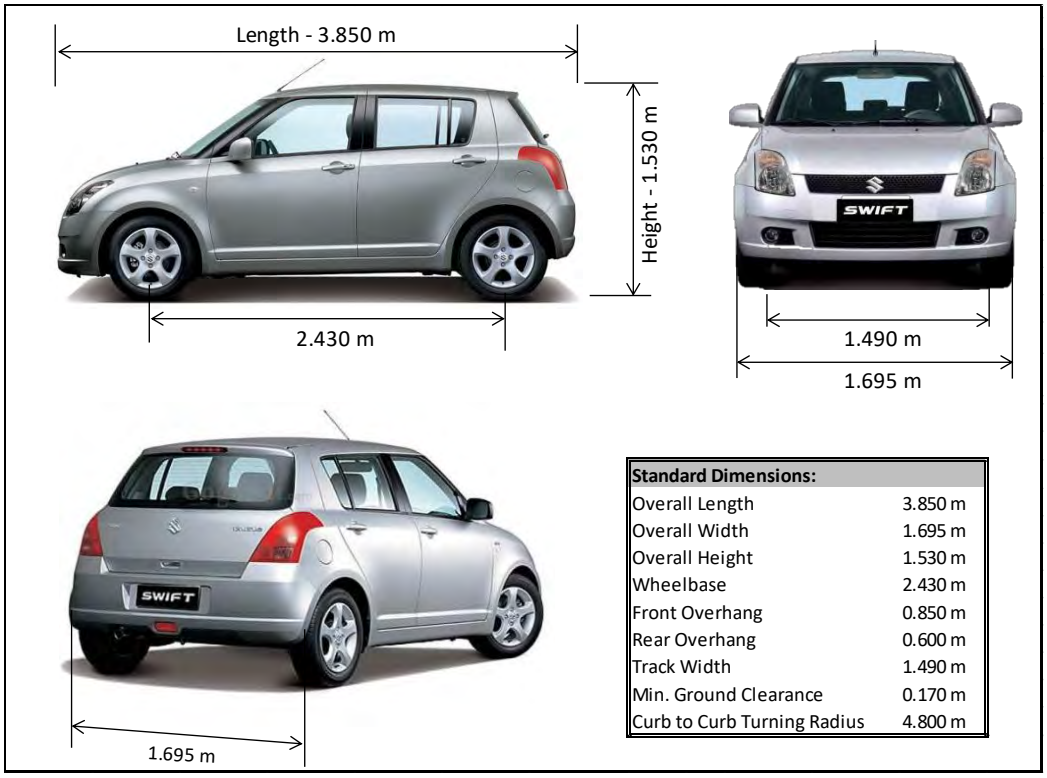
Based upon above mentioned criteria, Sincrono Solutions has utilized following design vehicles for swept path analysis:

- Large Vehicle: Hyundai Verna (Refer Figure 5-1)
- Small Vehicle: Maruti Suzuki Swift (Refer Figure 5-2)
- Fire Vehicle: Typical Fire Engine (Refer Figure 5-3)



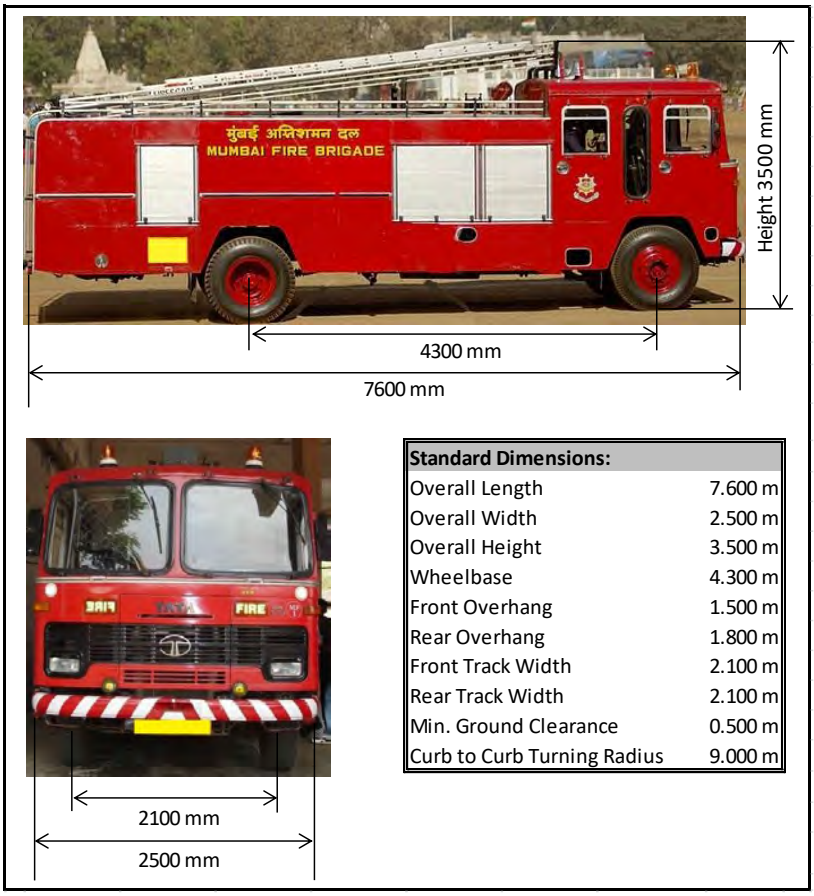
Standard Dimensions:	
Overall Length	4.375 m
Overall Width	1.700 m
Overall Height	1.475 m
Wheelbase	2.570 m
Front Overhang	0.840 m
Rear Overhang	0.940 m
Track Width	1.465 m
Min. Ground Clearance	0.165 m
Curb to Curb Turning Radius	5.200 m

Figure 5-1 : Design Vehicle (Large Sedan) – Hyundai Verna Dimensions



Standard Dimensions:	
Overall Length	3.850 m
Overall Width	1.695 m
Overall Height	1.530 m
Wheelbase	2.430 m
Front Overhang	0.850 m
Rear Overhang	0.600 m
Track Width	1.490 m
Min. Ground Clearance	0.170 m
Curb to Curb Turning Radius	4.800 m

Figure 5-2 : Design Vehicle (Small Hatchback) – Maruti Suzuki Swift Dimensions



Standard Dimensions:	
Overall Length	7.600 m
Overall Width	2.500 m
Overall Height	3.500 m
Wheelbase	4.300 m
Front Overhang	1.500 m
Rear Overhang	1.800 m
Front Track Width	2.100 m
Rear Track Width	2.100 m
Min. Ground Clearance	0.500 m
Curb to Curb Turning Radius	9.000 m

Figure 5-3 : Fire Tender Dimensions

c) Swept Path

As mentioned above the swept path analysis was carried out for all parking floors, with a design vehicle and; a standard fire tender vehicle for second floor.

Following observations are made during swept path analyses of a standard fire tender for ground floor level and entry/exit points.

Second Floor with a Standard Fire Tender -

- ✓ Sufficient turning space is available at entry and exit point from 30m access road for easy ingress of the fire tender to Ground Level.
- ✓ A standard fire tender can easily maneuver on Ground Floor driveway in one direction during emergency.
- ✓ Second floor is accessible for a Standard Fire Tender via proposed driveway on Ground floor (6m - 10m width) and 6m wide ramps.
- ✓ A standard Fire Tender can maneuver on the peripheral driveway provided on second floor in one direction during emergency.
- ✓ **Figure 5-4** is provided to show the swept path for the Standard Fire Engine movement.

Following observations are made during swept path analyses of a standard design vehicle for Parking Levels.

Parking Layout with Design Vehicle -

- ✓ Sufficient turning space is available at entry and exit point from 30m access road for easy ingress of the vehicles.
- ✓ Vehicle can comfortably maneuver in the provided driveway at entrance lobby and at turning points on ground level
- ✓ Driveways of minimum 6.0 meter width are provided for two-way vehicle movements
- ✓ Driveways of minimum 4.5 meter width are provided for one-way vehicle movements
- ✓ Vehicles can comfortably maneuver on provided internal driveways on all parking levels
- ✓ Sufficient turning radius (space) is provided on all driveways at turning portions to accommodate two-way or one-way movement, as the case may be, of design vehicles
- ✓ Ramps are provided with minimum 1:10 slope and 4.5-6.0 meter width
- ✓ Vehicles can comfortably maneuver on the provided ramps.
- ✓ Sufficient turning radius (space) is provided at all turning portions on ramps to accommodate one-way or two-way movement of design vehicle
- ✓ **Figure 5-5**, **Figure 5-6**, **Figure 5-7** and **Figure 5-8** are provided to show the swept path of design vehicles at typical podium levels.

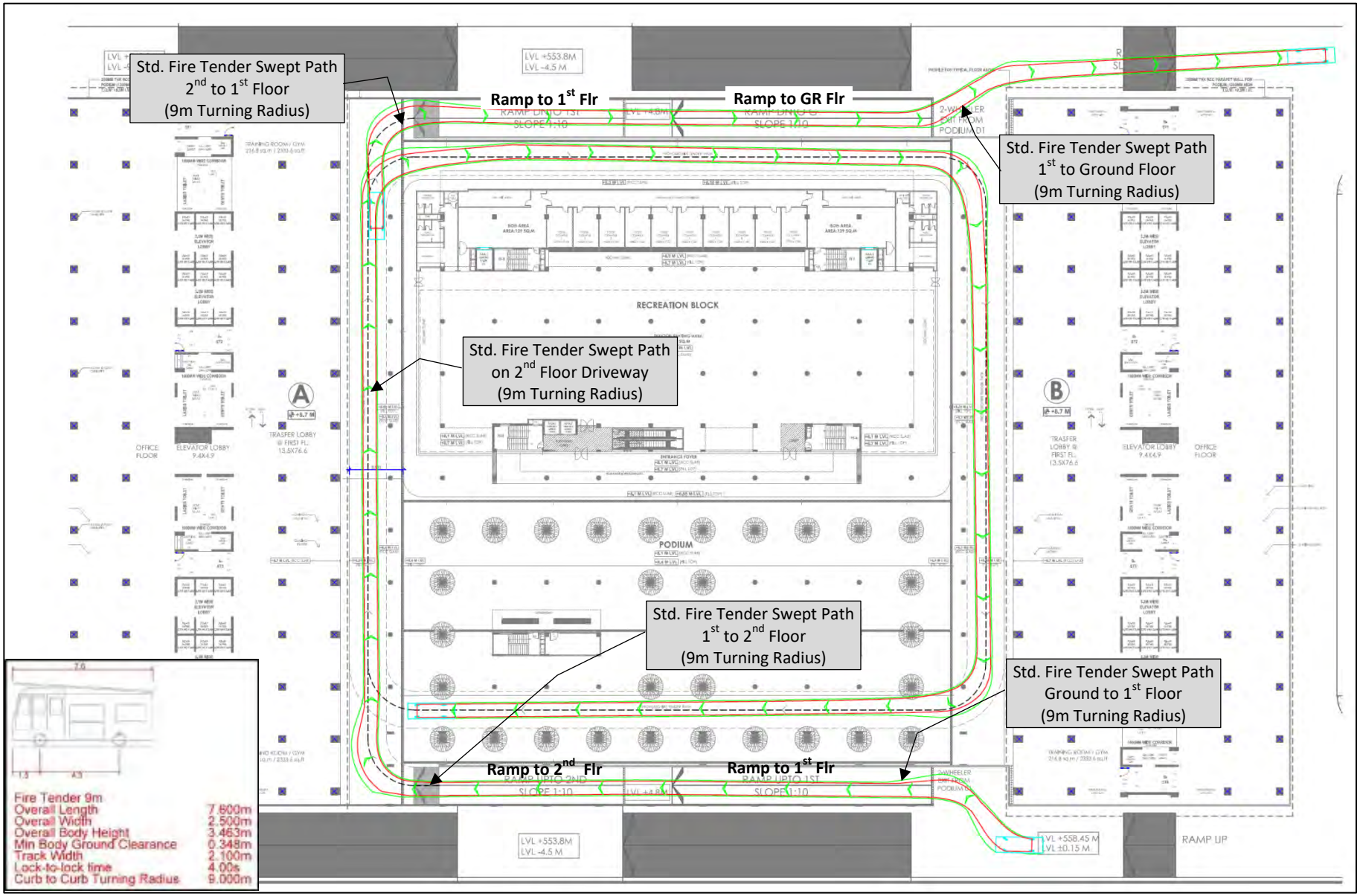


Figure 5-4 : Swept Path – Standard Fire Tender

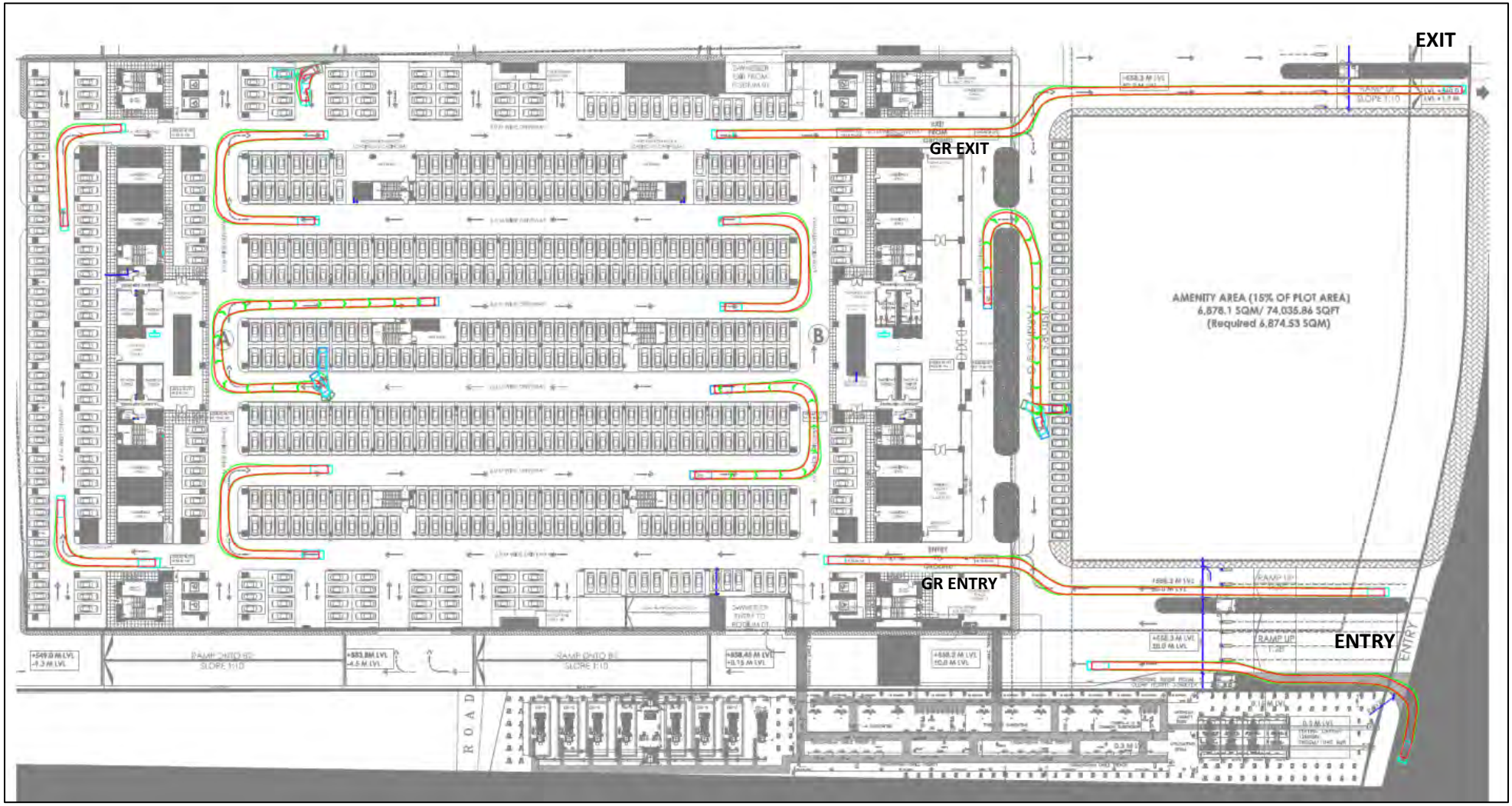


Figure 5-5 : Swept Path– Design Vehicle at Ground Floor

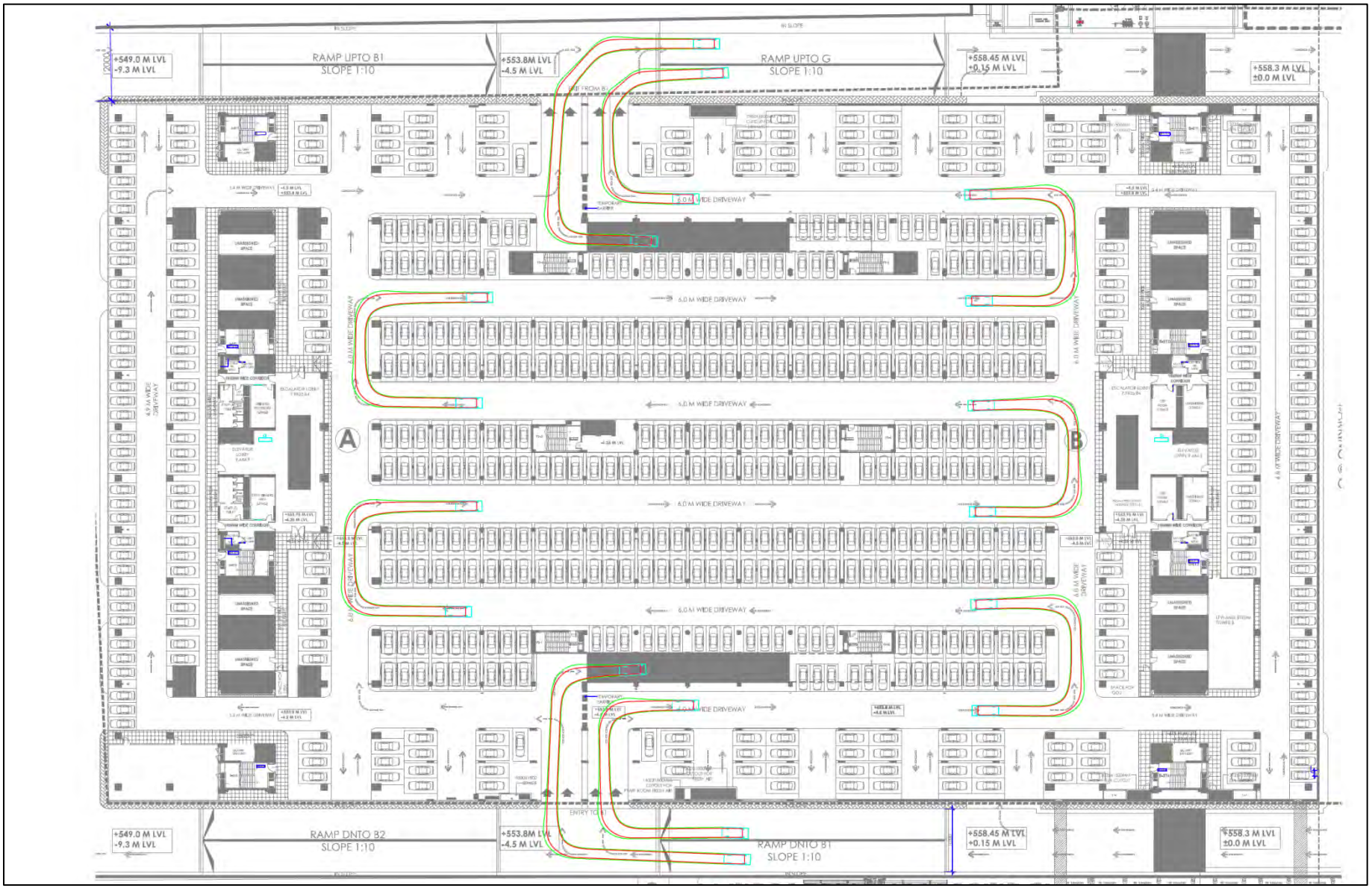


Figure 5-6 : Swept Path– Design Vehicle at Basement 1

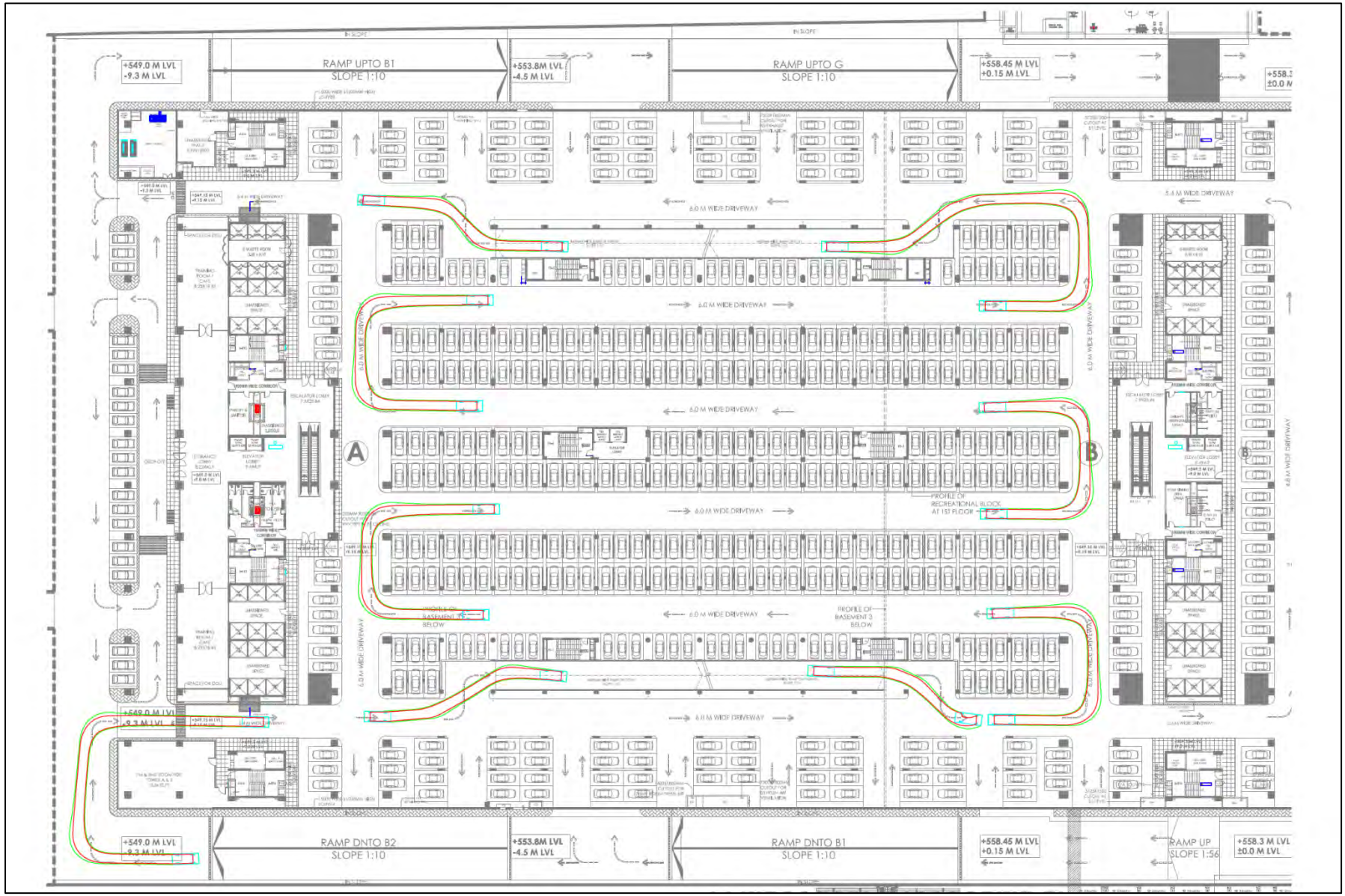


Figure 5-7 : Swept Path– Design Vehicle at Basement 2

Figure 5-8 : Swept Path– Design Vehicle at Basement 3

6. RETRIEVAL ANALYSIS

This study has performed retrieval analysis to find out the retrieval time for multilevel parking facility of the proposed ***IT Building at 72/2/1, Kharadi, Pune***. Retrieval time is the total time required to evacuate the entire parking structure of the proposed IT office building during an emergency situation. As per proposed master plan, parking area is planned on total 5 floor levels. Parking facility will be provided on Ground Floor and 3 Basement Levels (B1 to B3) with total 2050 car parking spaces while First Floor will accommodate 5227 two wheelers for the project. It is important to ensure the safety of each of the occupant of the proposed building during an emergency via a disaster management plan. In addition to this safety aspect of residents, the vehicles from each parking level should also be retrieved in a systemic and planned manner. The planning of vehicle retrieval is necessary for the proposed multilevel car parking facility to ensure smooth evacuation of vehicles in shortest possible time. In this study, retrieval is proposed to be executed via the only ramp for all parking levels. Vehicle ramp is available from Basement levels to ground level and from first floor level to ground. Proper planning of sequence of retrieval is equally important as the actual retrieval. The parking facility is provided with ramps at strategic locations which would allow vehicles to be retrieved sequentially with simultaneous retrieval of ground floor, basement 1 and first floor level, as explained in following sections. This study has looked into number of different possibilities of sequential or simultaneous retrieval sequence of the parking levels and has presented the best suitable option for Retrieval Plan to get shortest possible time. The maximum overall time required for retrieval will be the maximum of retrieval times required for evacuating vehicles from these parking levels. Following sections describe in detail about typical floor circulation and proposed retrieval plan for evacuating the parking facility of proposed IT Office building during an emergency situation.

a) Typical Floor Circulation

Typical ground floor and podium level circulation is provided in earlier section.

b) Basic Specifications & Assumptions

- **Table 6-1** is provided below to show the technical assumptions considered in calculating the retrieval time for the parking facility of proposed high-rise building.

Table 6-1 : Retrieval Analysis Assumptions

No.	Details	Value
1.	Parking Occupancy	90%/80%/70%
2.	Maximum Speed on Circular Driveway at Ground Level (km/hr)	10
3.	Maximum Speed on Aisle (km/hr)	12
4.	Maximum Speed on Curves (km/hr)	8
5.	CARS - Average Speed for Retrieval Calculations (km/hr)	~10
6.	CARS - Average Headway (meter)	6
7.	Time to pull out car from parking bay (sec)	15-20
8.	CARS - Average Headway (meter)	6
9.	2W - Average Speed for Retrieval Calculations (km/hr)	~12
10.	2W - Average Headway (meter)	3

In addition to the above mentioned items following ***assumptions*** are also considered while deriving a plan for the retrieval of the parking facility.

- Intimation will be sent to each occupant with centralized system during an emergency to evacuate the parked vehicles.
- All occupants will react to the emergency alert and drivers/owners of parked vehicle will be able to reach their respective vehicles within average 15 minutes after alert.
- Every driver of the vehicle on that particular floor level is on the seat and ready to move the car once evacuation has begun.
- Vehicle retrieval operation will be managed by trained personnel or emergency response coordinators as per evacuation plan. Traffic discipline will be maintained during the evacuation operation.
- It is assumed that all access points; Entry and Exit will operate as "Exit Only" during emergency. The access points are referred to as E1 and E2 for Retrieval analysis purposes. No private vehicles should enter the premises during emergency, except fire engine and ambulance.
- Higher occupancy (90%) is considered as a worst case scenario assuming an evening or night time during parking lot is expected to occupy near its capacity. A parking statement is shown in **Table 6-2** for 90% occupancy of the parking on each level of proposed IT Office building.

Table 6-2 : Parking Statement - 90% Occupancy

Sr. No.	Floor	Parking Capacity		90% Occupancy	
		Car	2 Wheelers	Cars	2 Wheelers
1	First Floor		5227	0	4704
2	Ground Floor	619		557	0
3	Basement 1	595		536	0
4	Basement 2	561		505	0
5	Basement 3	275		248	0
	Grand Total	**2050**	**5227**	**1845**	**4704**

c) Retrieval Plan

This study has analyzed the different options for evacuating the cars and two wheelers via ramp proposed in the parking facility. This report has presented the best suitable option for the Retrieval Plan to be adopted for the parking evacuation. As mentioned above, this analysis has assumed that emergency response personnel will control the retrieval operation as per an emergency retrieval plan. This will help to avoid panic and chaos among the occupants and maintain traffic discipline to smoothen the operation. Intimation should be sent to each occupant through a centralized system to aware them of any emergency situation. For Ground Floor evacuation, principle of last in-first out has been applied to calculate the exit time for each vehicle. Accordingly, the maximum distance to exit point on ground is calculated for farthest parked car on each podium level floor.

Strategic Procedure

First Floor (FF) and Basement (B) parking floors will be evacuated via ramp. First Floor shall be evacuated simultaneously with the Ground Floor (GF) level and Basement 1 (B1) since they have separate floor exit (FE) points. The owner shall be instructed and well informed to follow the procedure during evacuation of the parking lot and use the assigned ramp and route during emergency. This operation shall be managed by trained personals during evacuation procedure.

- Each floor plate has been divided into parts for ease of reaching nearest floor exit (FE) point. Viz. Ground, First and B3 floor plates have been divided into two – Part I and Part III; while B1 and B2 have been divided into 4 parts. Each part has a dedicated FE as indicated in **Table 6-3** and figures below.
- Each floor will have dedicated lanes to exit the project premise.

- Ground Floor *(Part I), B1 (Part III) and FF (Part I)* will be evacuated simultaneously with *GF (Part II), B1 (Part IV) and FF (Part II).* They will use E1 and E2 respectively. (Refer Figure 6-1, Figure 6-2 and Figure 6-3)
- Next: B1 (Parts I and II) will be evacuated simultaneously. Refer Figure 6-3

  Next: B2 (Parts I & II) will be evacuated simultaneously with B2 (Parts III & IV). Refer Figure 6-4.
- While parts I & II will use FE 'g' & FE 'h'; the Parts III & IV will use ramps 5 & 6 up to reach B1 and exit from FE 'c' and FE 'd' exits respectively.
- Next B3 (Part I) will be evacuated simultaneously with B3 (Part II). Refer **Figure 6-5**.

Table 6-3 : Retrieval Analysis strategy

Level	Part of floor	Floor Exit	via	Using Project Exit
First Floor	I	m (Ramp 7)	Ramp 7	E1
Ground Floor	I	a	Driveway to Exit	E1
Basement 1	I	c	Ramp 1	E1
Basement 1	III	e	Ramp 1	E1
Basement 2	I	g	Ramp 1	E1
Basement 2	III	i (Ramp 5)	Ramp 5 + Ramp 1	E1
Basement 3	I	k (Ramp 5)	Ramp 5 + Ramp 1	E1
First Floor	II	n (Ramp 8)	Ramp 8	E2
Ground Floor	II	b	Driveway to Exit	E2
Basement 1	II	d	Ramp 2	E2
Basement 1	IV	f	Ramp 2	E2
Basement 2	II	h	Ramp 2	E2
Basement 2	IV	j (Ramp 6)	Ramp 6 + Ramp 2	E2
Basement 3	II	l (Ramp 6)	Ramp 6 + Ramp 2	E2

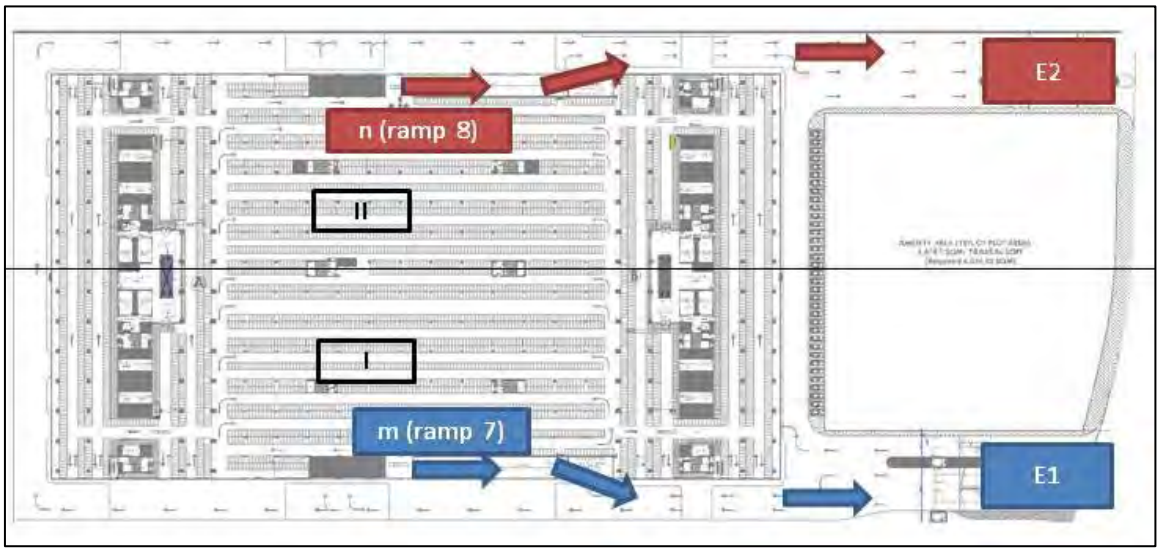


Figure 6-1 : Retrieval Plan – First Floor

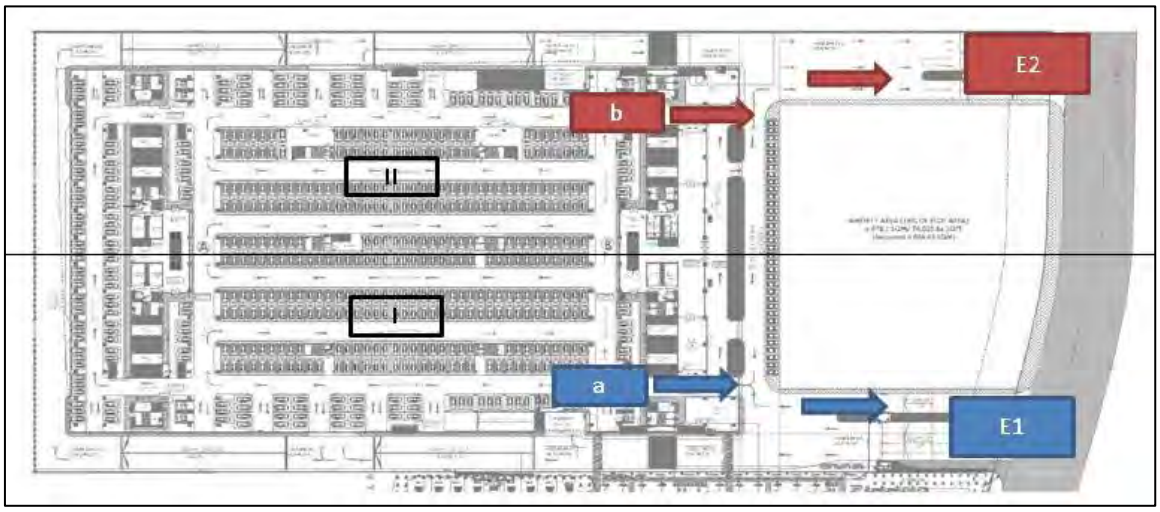


Figure 6-2 : Retrieval Plan – Ground Floor

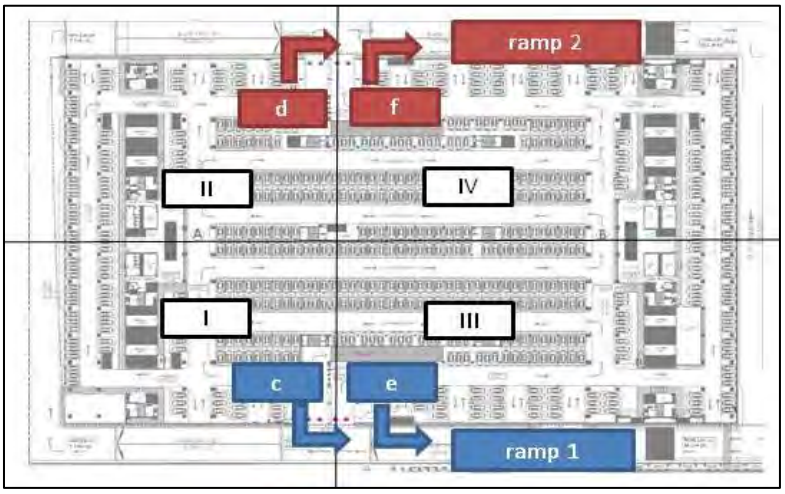


Figure 6-3 : Retrieval Plan – Basement 1

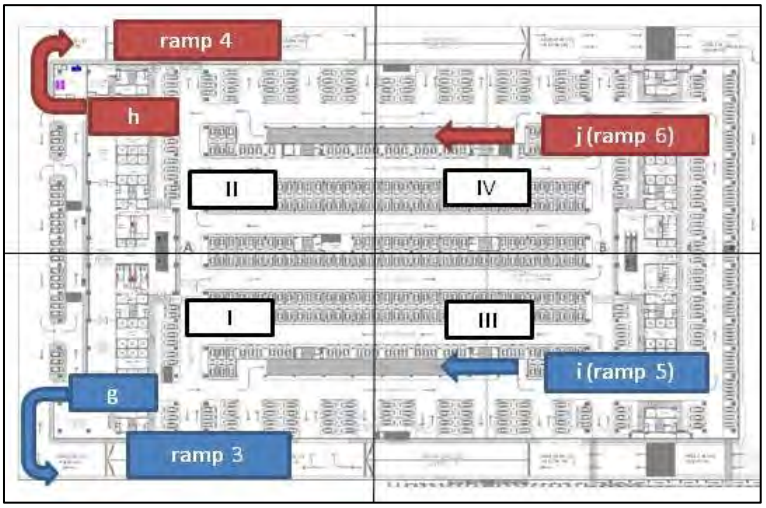


Figure 6-4 : Retrieval Plan – Basement 2

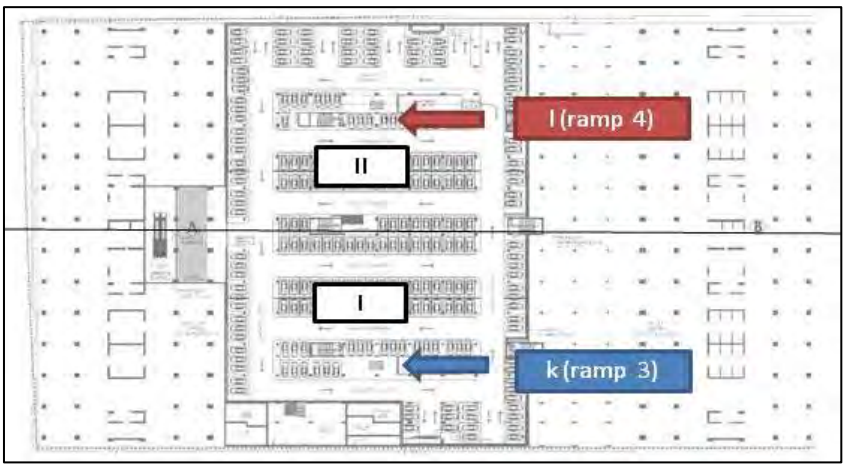


Figure 6-5 : Retrieval Plan – Basement 3

d) Retrieval Time

The path of retrieval for all floors is indicated in previous section. For all floors, time taken by the farthest parked car is calculated based upon distance and average speed. Maximum distance required to travel from parking bay to exit point for farthest car on each floor is calculated. An average travel speed of 10 km/hr for cars and 12 km/hrs for 2 wheelers is utilized considering different speeds on driveways, ramps, curves and aisle. With an average car speed and distance, the retrieval time i.e. time required by the first vehicle to exit the development via ground level exits is calculated. The remaining cars on that floor will follow the first car with a headway distance of 6 meter (i.e. ~3 seconds headway). All parking floors will be retrieved simultaneously or sequentially as mentioned in the earlier section. As soon as the last car on that particular level/step is being retrieved, the next level/step is intimated to descend down via assigned ramp as mentioned in the strategic procedure section. **Table 6-4** is provided to show the retrieval time calculations for each parking level and total retrieval time required to evacuate all parking levels. Initial average delay would vary depending upon time which might require responding after emergency intimation and to arrive at the car parking location as well as arranging for evacuation procedure. **Based upon the analysis, it observed that the retrieval time will be 43 minutes for 90% occupancy under proposed retrieval plan, which less than 120 minutes is and are within fire ratings and emergency evacuation limits.**

Table 6-4 : Retrieval Plan - Time Calculations

FROM				VIA	Farthest Car / 2W Distance (meter)	Avg. Speed (km/h)	Time required by 1st Car/ 2W to exit (seconds)	For "90% Occupancy " Total Cars / 2W on floor	Cars / 2W Exited in 1 Minute	Time for Remaining Cars /2W to exit (min)	Clearing Time (min)	Clearing Time for each Part (min)	Maximum Clearing Time per side (min)	TOTAL Clearing Time (min)
Level	Part	Floor exit	Project Exit											
CARS														
Ground Floor	I	a	E1	Driveway to Exit	340	10	122	279	20	14	16	16	43	**43**
Basement 1	I	c	E1	Ramp 1	413	10	149	134	20	7	9			
Basement 1	III	e	E1	Ramp 1	413	10	149	134	20	7	9	9		
Basement 2	I	g	E1	Ramp 1	457	10	165	126	20	6	9	9		
Basement 2	III	i (ramp 5)	E1	Ramp 5 + Ramp 1	457	10	165	126	20	6	9	9		
Basement 3	I	k (ramp 5)	E1	Ramp 5 + Ramp 1	498	10	179	124	20	6	9			
Ground Floor	II	b	E2	Driveway to Exit	340	10	122	279	20	14	16	16	43	
Basement 1	II	d	E2	Ramp 2	413	10	149	134	20	7	9			
Basement 1	IV	f	E2	Ramp 2	413	10	149	134	20	7	9	9		
Basement 2	II	h	E2	Ramp 2	457	10	165	126	20	6	9	9		
Basement 2	IV	j (ramp 6)	E2	Ramp 6 + Ramp 2	457	10	165	126	20	6	9	9		
Basement 3	II	l (ramp 6)	E2	Ramp 6 + Ramp 2	498	10	179	124	20	6	9			
2 WHEELERS														
First Floor	I	m (ramp 7)	E1	Ramp 7	342	12	103	2352	60	39.2	41	41	41	
First Floor	II	n (ramp 8)	E2	Ramp 8	342	12	103	2352	60	39.2	41	41	41	

Notes:

1. First Floor, Ground Floor and Basements will have dedicated lanes to reach Project exit.
2. Ground Floor Part 1, B1 (Part 1 & II) and FF (Part I)will be retrieved simultaneously with its Part II counterpart
3. Next: B1 (Part III & IV) will be retrieved simultaneously via Basement dedicated lanes
4. Next: B2 (Parts I & III) will be retrieved simultaneously with B2 (Parts II & IV)
5. Next: B3 (Part I) will be retrieved simultaneously with B3 (Part II)

e) Pendulum Analysis

As mentioned earlier, this report has presented the best suitable option for the Retrieval Plan for the parking facility. The proposed plan has assumed that emergency response personnel will control the retrieval operation as per an emergency retrieval plan. This will help to avoid panic and chaos among the occupants and maintain traffic discipline to smoothen the operation. Intimation should be sent to each occupant through a centralized system to aware them of any emergency situation. Considering the different scenarios of the parking occupancy during evacuation, following **Table 6-5** is provided to show the observations made for clearance time.

Table 6-5 : Retrieval Plan - Time Comparison

Parking Occupancy	Nos. of Cars	Nos. of 2-W	Nos. of Ramp	Total Clearance Time (min)
90%	1845	4704	8	**43 min**
80%	1640	4182	8	39 min
70%	1435	3659	8	36 min

7. TRAFFIC MANAGEMENT PLAN (TMP)

Traffic Management Plan (TMP) indicates traffic routes and the measures for traffic regulation. It indicates the roads for use of certain classes of traffic, the location of traffic control i.e. signage and markings and the directions in which traffic should move. These are necessary for safe and efficient movement of vehicles and pedestrians.

Road Signs & Markings:

A better traffic management can be achieved with a combination of education and enforcement of traffic rules. Road signages, markings and way-finding signs can be implemented to educate the motorist. Proper driveway markings (directional arrows) and signages (circulation pattern – one way, direction, speed, parking and enforcement) shall be installed and maintained in the building premise. Also road signages and markings shall be implemented as per IRC codes on existing and DP roads for better traffic management.

Signages: **Table 7-1** is provided to show the proposed signs which can be installed along the peripheral road and internal driveways of the parking lot for motorist guidance and wayfinding. Apart from internal signages it will be advisable to provide signage and traffic control measures such as speed limit, silence zone, pedestrian crossings, etc. along adjacent DP road near entrance/ exit.

Table 7-1 Proposed Internal Signs

No.	Signage	Description
1	Speed Limit	
2	One Way (Left)	
3	One Way (Right)	

4	One Way (Straight)	
5	Visitors Parking	
7	Motorcycle Parking	

Table 7-2 Proposed External Signs (Indicative)

No.	Signage	Description
1	Speed Limit	
2	Silence Zone	
3	Pedestrian Crossing	

Markings: **Figure 7-1** is provided to show the sample pavement marking for directional arrows in the parking lot. All line markings for a parking bay and driveway markings depicting carriageway shall be 50 to 100 mm wide. Arrows can be painted to show the one way direction/ circulation of the traffic along peripheral and internal driveways. Wherever feasible the hot applied thermoplastic paints are recommended for parking lot markings for better visibility and longer service life. Improved night visibility is obtained by the use of minute glass beads embedded in the pavement marking material to produce a retroreflective surface which appears luminous at night under normal head lights. Pre-fabricated tape markings with an adhesive backing can also be used for marking of parking bays and driveway markings.

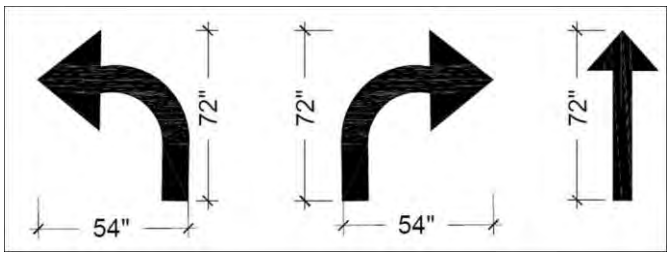
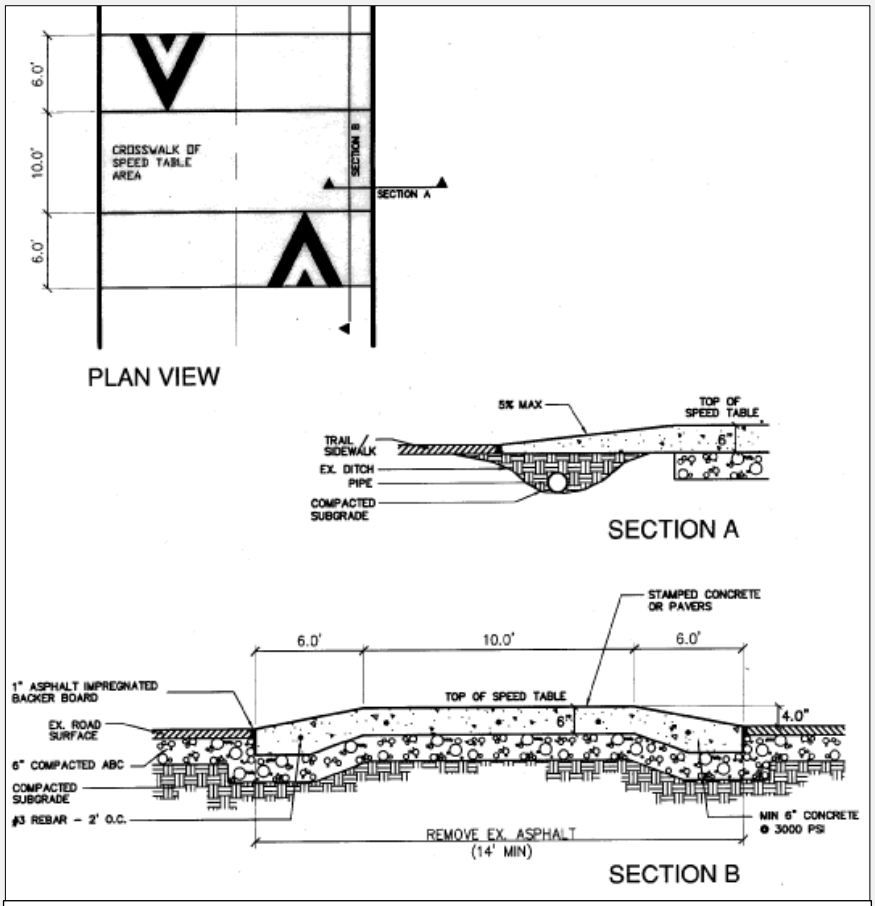


Figure 7-1 Arrow Marking Details

Traffic Calming: Traffic calming is intended to slow or reduce motor-vehicle traffic in order to improve safety for pedestrians and bicyclists. Traffic calming measures are of various types like speed tables, speed humps, rumble strips, guiding cones etc. These are mitigation measures to ensure safety. Traffic management plan for the proposed development has shown recommended locations for installing traffic calming on the periphery driveway and adjacent access road. An illustrative diagram is provided in **Figure 7-2** to show the details of a typical speed table and speed hump. Considering safety aspect, speed humps are proposed on internal driveway within project premises. Also speed humps are recommended at all drop-off and pick-up locations near lobby area of the building. Speed bumps shall be 3-4 inch high to reduce the speed to 0-5 km/h on driveway at pedestrian/ building user's activity areas/ crossing points.

A Traffic Management Plan indicating traffic circulation, traffic calming and traffic control for site frontage roads, internal driveways and at access points are is shown in **Figure 7-3** and **Figure 7-4**.



Typical Speed Table Details

Speed Table Example

Speed Hump Example

Figure 7-2 : Traffic Calming Details

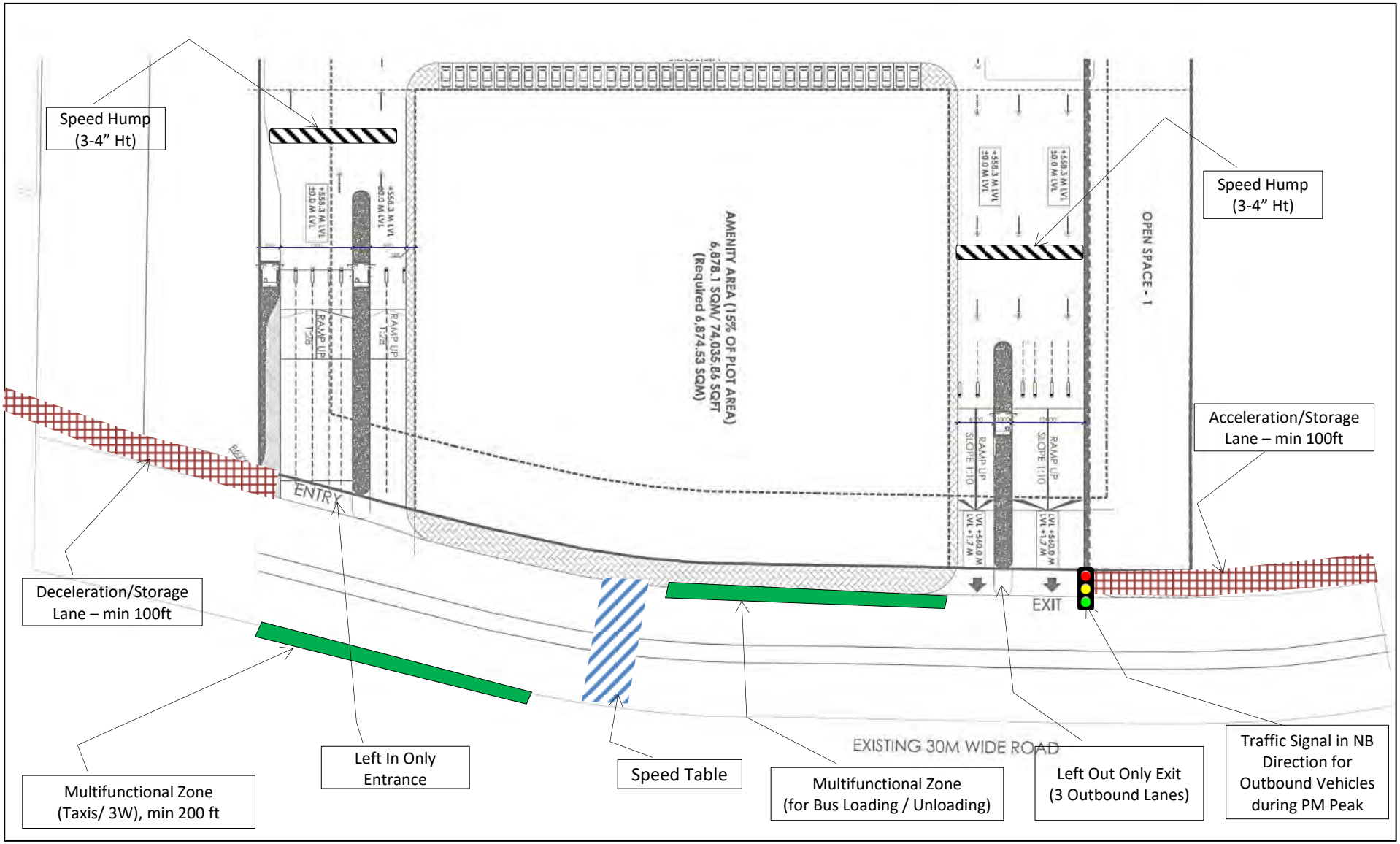


Figure 7-3 : Traffic Management Plan - 1

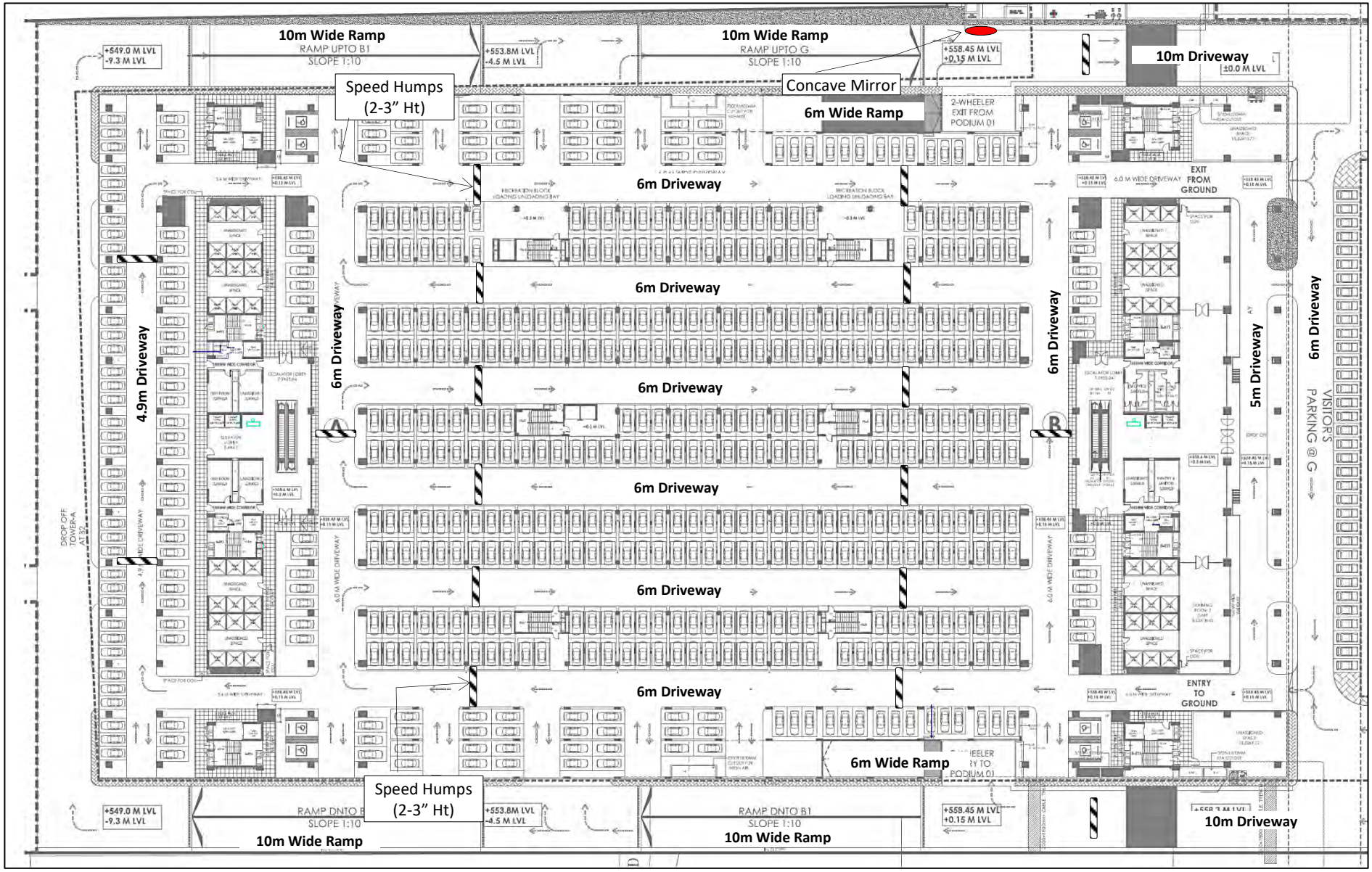


Figure 7-4 : Traffic Management Plan - 2

8. CONCLUSION & RECOMMENDATIONS

This Traffic Study including parking analysis have been offered only and purely from traffic operation and maneuvering point of view, without any prejudice to the status of structures, if any, and without reference to the ownership if applicable, and without reference agreement/power of attorney for development if any. Traffic Impact Analysis (TIA) is prepared based upon actual traffic counts (manual method) conducted on study area roadways in December 2016. A conservative growth is applied to estimate future year traffic conditions. ITE trip rates with modification as per Indian conditions for modal split are utilized to estimate site-generated vehicle trips. Parking Layout is analyzed considering location of structural members as shown on respective parking floor plans prepared and provided by the Project Proponent/ Architect. The conclusions and recommendations of this Traffic Study are summarized as below:

A. Site Traffic and Access

i. The existing traffic data on neighboring study area roads were collected in December 2016. The site-generated traffic has been calculated for Year 2021 and this has been superimposed along with projected future base traffic to arrive at total traffic conditions when the project is expected to be built and fully commissioned in Year 2021. Also future traffic is calculated for "plus 10 year scenario- Year 2026" and "plus 20 years scenario – Year 2036".

ii. Based upon ITE Trip Generation Manual, it is estimated that the proposed IT Office Building will generate 1,575 AM peak hour PCU trips (1,323 in & 252 out) and 1,421 PM peak hour PCU trips (327 in & 1,094out). Please note that there is no standard or published data for trip rates for Indian cities conditions. In lieu of this information, this traffic study has utilized the ITE Trip Rates which are mainly based upon car depended cities in USA. This study has utilized the trip rates considering the worst case scenario of more dependency on using motorized vehicles for commute. No transit trips are deducted from the estimated trips to consider the worst case scenario of site traffic impact.

iii. Site access is proposed via existing 30M wide Grant Road located on east side of the plot. Separate entry and exit gates are proposed considering the high volume to be handled during peak hour. Also separate car lanes and motor bike lanes are provided at entry and exit gates.

iv. It is recommended to maintain "Left In Only" operation at Entry Gate and "Left Out Only" operation at Exit Gate of the building premises.

v. It is recommended to provide separate gates (Wicket Gates) for pedestrian access only.

vi. It is recommended to post trained traffic staff at Entry Gate to handle inbound movements efficiently during peak hours to avoid spilling of queue on access road.

vii. It is recommended to post trained traffic staff at Exit Gate to handle merging operation of outbound vehicles during peak hours to avoid any conflict with traffic on access road. It is also recommended to install a traffic signal device at exit gate on Grant Road in northbound direction and operate during PM peak hour to ease the outbound vehicle movements. It is recommended to reassess the traffic conditions during PM peak period once the project gets fully operational. If actual outbound traffic in future year matches or exceed with estimated traffic in this traffic analysis then it is recommended to install the traffic signal at exit gate for better operation and safety purposes.

viii. It is recommended to provide transit bus facility to the employees of the office spaces to reduce the individual use of 2-wheelers or cars. This will help to significantly reduce the vehicular traffic to be generated by proposed site. It is recommended to provide a multifunctional zone near site area on existing access road for loading and unloading of the bus users of the building. It is anticipated that necessary permissions can be obtained from local jurisdiction to use space for multifunctional zone within road section or ROW.

B. Site Impact

The site-generated traffic impact on the surrounding major arterial road, Fountain Road, is around 10-20% of the future anticipated traffic during peak hours. Site traffic impact on Gera Emerald City Road is estimated at around 14-25% of future traffic. Site traffic impact on access road, Grant Road, is estimated at 56-73% of the future anticipated traffic during peak hours. This road is currently carrying very less traffic and many projects are under construction along this road in the vicinity. This 30.0 meter wide access road has capacity to handle the estimated traffic for future years with current lane geometry. Overall it was observed that there is no significant adverse impact of project traffic on existing major roads and are no concerns of any traffic related issues on account of development of project in immediate vicinity of the site. Study area roads with current road section/ ROW can handle the estimated traffic in future years.

C. Capacity Analysis & Suggested Improvements

i. Based upon link capacity analysis it is observed that the traffic associated with the proposed development will not significantly change the levels–of-service from "Base Conditions Without Site" during weekday peak hours at any of the study area roadways.

ii. Based upon Existing Conditions analysis (IRC recommended road capacities), it is observed that Grant Road (Site Access Road) operates at LOS "A/A" during peak hours. Fountain Road operates at LOS "A/A" during peak hours. It is observed that motorist is using the road in 3-4 virtual lanes in each direction thus maintaining continuous traffic flow during peak periods. Wide carriageway is available for motorized traffic. Gera Emerald City Road is operating with LOS "B/B" during peak hours. Some of the road stretch is observed with illegal parking on side of the road thus reducing the usable road width. It is encouraged that enforcement shall be in place to avoid any illegal parking and standing to keep intended road width for motorized traffic as carriageway on all these roads. Also note that these roads are currently carrying very less traffic since many of the projects in the area are under construction stage or not fully occupied.

iii. In future conditions without site traffic, Grant Road will continue to operate at LOS "A" with increased base traffic for Year 2021, 026 and 2036 conditions. Traffic on this road has seen reduced in past years with build-out and opening of Eastern Freeway. This road is expected to operate under capacity in future years with existing road section. Fountain Road will continue to operate with LOS "D/C" or better in peak hours during future year conditions. Gera Emerald City Road will operate at LOS "D/C" during Year 2021. For Year 2026 and beyond conditions, this road will operate with deteriorated LOS if functions as a 2-lane road. It is recommended to use the available carriageway/ road width to allow motorist to ply in 4 lanes thus increasing the capacity of the road.

iv. In future conditions with site traffic, no significant change in LOS is observed *from base traffic conditions* on study area network as mentioned above. Study area roads can accommodate the increased traffic in future with current lane configuration within ROW.

D. Parking Plan

Parking facility is provided on Ground, Basement and First Floor Level for building users within project plot boundary. No on-street parking is proposed for subject site. Total 2050

nos. of Car parking spaces are provided on Ground and 3 Basement levels. Total 5227 nos. of Two Wheeler parking spaces are provided on First Floor of the building. Internal driveways are proposed with minimum 4.5 meter and 6.0 meter width for one-way and two-way maneuvering, respectively. Total 8 vehicular ramps are proposed with minimum 6.0 meter width and 1:10 slope. One-way traffic maneuvering is proposed on most part of the parking facility for easy ingress and egress of vehicles. Visitor parking is proposed on ground floor only.

E. Swept Path Analysis

Based upon Swept Path Analysis performed for the proposed project layout, it is observed that Entry / Exit Gates and its corresponding driveways at Ground Floor are accessible for a standard Fire Tender and adequate to accommodate the one-way movement of fire tender during emergency. Sufficient turning space (min. 9.0 m radius) is provided on ground floor for easy access of the fire tender at entry and exit. Also Standard Fire Tender can access the Second Floor of the building via provided driveways and 6.0 meter wide ramps. Design vehicles can maneuver on proposed internal driveways, turning points, ramps and aisle space provided in parking area on each parking level.

F. Retrieval Analysis

Parking facility of the proposed IT Office Building is planned on Ground, 3 Basement Levels and 1st Floor with total eight (8) vehicular ramps. This study has analyzed different options of evacuation plans for parking facility during an emergency situation. Based upon retrieval analysis, it is observed that in case of 90% occupancy (i.e. 10% diversity), total clearing time would be **43 minute** to evacuate entire parking facility of the building via all ramps under proposed retrieval plan. Initial average delay would vary depending upon time which might require responding after emergency intimation and to arrive at the car parking location. The analyzed retrieval time is less than 120 minutes and is within fire ratings and emergency evacuation limits. Traffic operation and evacuation sequence as indicated with arrows in earlier sections shall be maintained and monitored by trained personnel only during emergency evacuation.

G. Traffic Control, Circulation & Safety

The proposed development has one vehicular entry gate and one exit gate along 30 meter wide Grant Road located on east side of the plot. Safety is of paramount importance while planning for circulation of vehicles and pedestrians. Vehicle safety has been built in road

geometry in form of adequate turning movements and sight distances. Pedestrian safety also needs to be considered with due importance. Controlling traffic and incorporating safety measures are proposed at site entrances and along access roads with implementation of:

- ✓ Design with sufficient turning radius and sight distances
- ✓ Entry Gate design with deceleration lane to ease the ingress of vehicles during peak hours to avoid spilling of queue
- ✓ Exit Gate design with merging lane to ease the outbound movements of the vehicles during peak hours.
- ✓ Wicket gates (minimum 1.2m wide) for pedestrians
- ✓ Maintain wide sidewalks along existing & future roads
- ✓ Dedicated road space as multifunctional zone
- ✓ Signage and pavement markings
- ✓ Traffic calming measures – speed tables and speed bumps

-X-X-X-

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Superintending Engineer Office
Lashkar Water Supply
Pune Municipal Corporation,
Outward No. 1109
Date: 2/9/2015

To,
Ms. EON kharadi Infrastructures Pvt. Ltd.
Mr. Atul Chordia
C/o Arch Samir Murari Valimbe
Erandavana, Pune.

Subject: For giving opinion of Water Supply Department for new planned commercial project on S. No. 72/2/1 part, Kharadi, Pune.
Reference: Bandgarden Water Supply Center, Inward No. 2180, Dt. 08.10.2014

As per the proposal mentioned in the reference above, for getting Environmental No Objection Certificate for the proposed project on S. No. 72/2/1 part, Kharadi, Pune, you have asked for the opinion of Water Supply Department.

Land survey is conducted in person for the land mentioned above. After completion of the work of the residential project in the above property, after getting the Occupancy Certificate of the project, after submitting a regular proposal to this office with all necessary documents for water connection, water connection will be provided according to the availability of water supply and policies of Municipal Corporation at that time and apart from the water supplied according to the availability, the extra water arrangement is to be done by the developers themselves.

-Sd-
Superintent Engineer
Lashkar Water Supply
Pune Municipal Corporation,
-Sd- **-Sd-**

Enclosed: Total matter

This is to certify that this is the true and correct English translation of the original Certificate in Marathi. The signed and stamped copy of the original is attached herewith.

For LANGUAGE SERVICES BUREAU
For Language Services Bureau
Devaki Kunte
22 /12/2016

LANGUAGE SERVICES BUREAU * TRANSLATION INTERPRETATION TRAINING SINCE 1979 * PUNE-411030 (INDIA)

Waste management is considered during two phases;

1. Construction Phase
2. Operation Phase

CONSTRUCTION PHASE

Sr. No	Particulars	Responsible Care
1	Debris, Waste Concrete, Waste Plaster	Remove every week or reuse for backfilling & road making.
2	Food waste	Composting
3.	Non biodegradable waste	Will be collected by PMC Ghantagadi

CONSTRUCTION WASTE MANAGEMENT PLAN

SR.NO	ITEM	Units	QUANTITY			MANAGEMENT
			Work Initiated (75%)	Work to be Initiated (25%)	Total	
1	Excavation soft rock	m^3	26,250	8,750	35,000	Will be used for back filling
2	Excavation Hard rock	m^3	45,000	15,000	60,000	Will be used for back filling
	Total Excavation	m^3	71,250	23,750	95,000	Out of this 35,000 will be used within the site for backfilling and the remaining quantity will be used in other construction sites.
3	Cement bags	nos	377,095.95	700,321	1,077,417	Sold to recycler
4	Steel Metal	Tons	96.60	179	276	Will be sold as scrap for re-use
5	Bricks	nos	49,082.25	91,153	140,235	Waterproofing at floor level for wet area
6	Tiles Granite/ Marble	nos	52,592.75	97,672	150,265	Mosaic at terrace level
7	Plaster	kgs	546	1,014	1560	will be used as filler material in paving, soling at stilt level

OPERATION PHASE

(B) Operational Phase

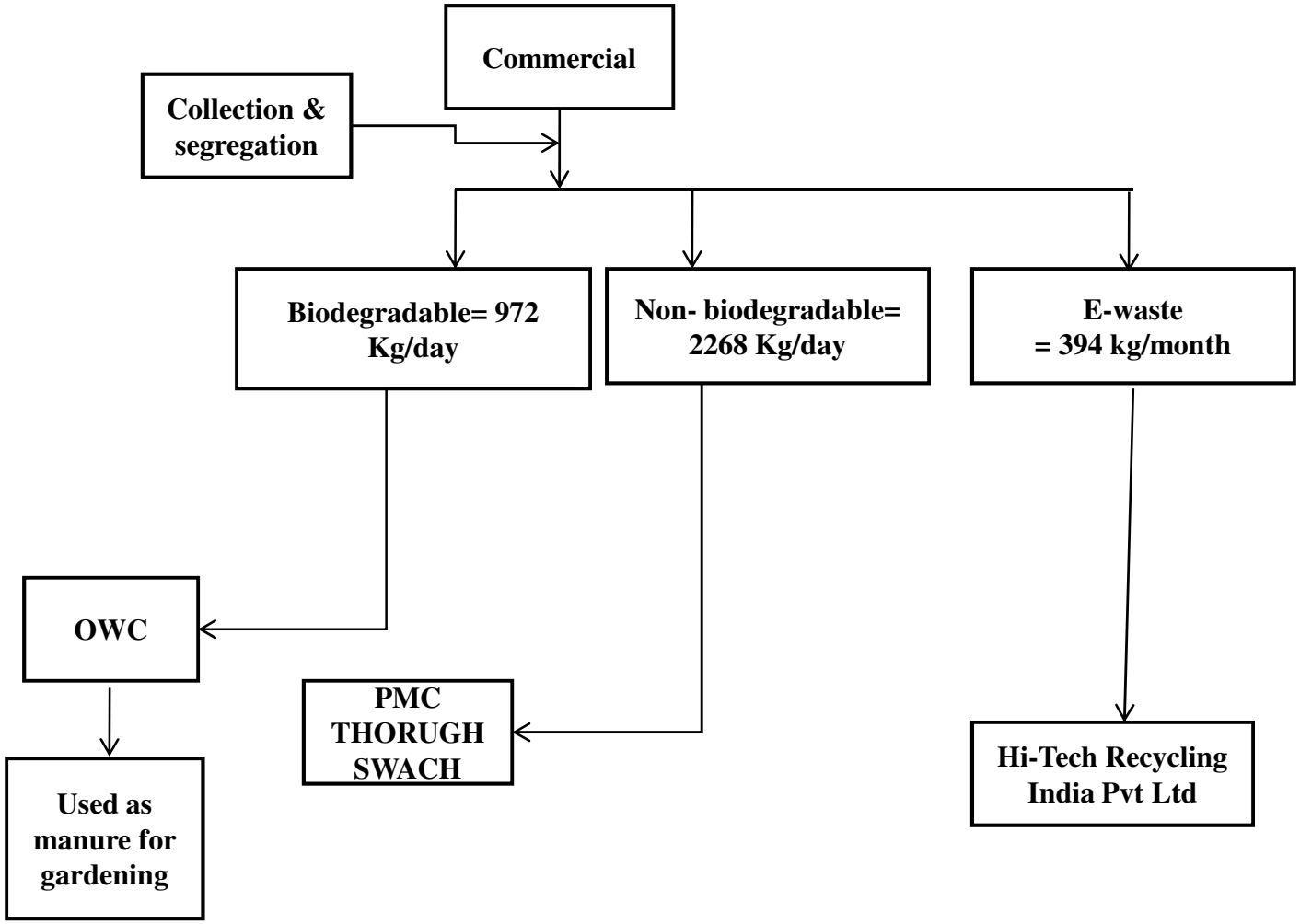
Sr. no	Particulars	Responsible Care
1	Handling	Source Segregation. Dry-Wet. Dry waste will be handed over to PMC through SWACH
2	Food Waste	Biodegradable will be treated in OWC
3	Tree Leaves	Mulching, composting, no open burning
4	Glass, Plastic, Paper, Rubber	Will be handed over to PMC through SWACH

Quantities :

A. Municipal Solid Waste

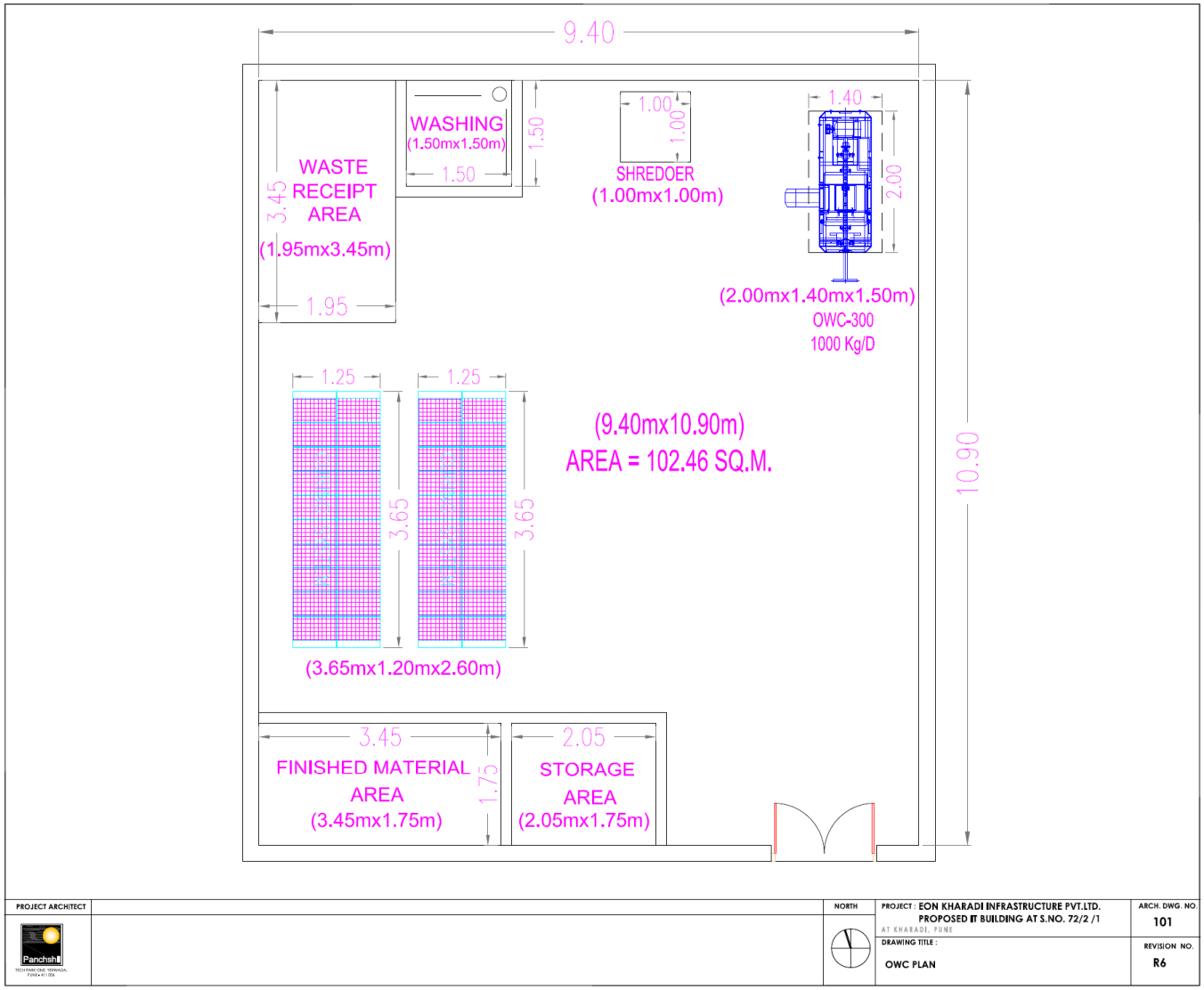
- Solid Waste generation from the proposed project is estimated to be 3240 kg/day
- Biodegradable waste: 972 kg/day
- Non-Biodegradable: 2268 kg/day
- E-waste: Approx 18 kg/day

MANAGEMENT OF MUNICIPAL SOLID WASTE WITHIN THE PROJECT



The waste management personnel will collect the garbage from individual towers along with the recreational block and send it to an OWC location wherein separate segregation area is provided for final screening. The non-biodegradable component of the segregated waste will be handed over to PMC through SWACH and bio-degradable component will be treated in OWC machine.

SOLID WASTE MANAGEMENT FACILITY LAYOUT



Capacity – 1000 Kg / day

PROCESS - ORGANIC WASTE CONVERTER

Eggs

Fruit Waste

Vegetable Waste

Bread & Roti

Cheese & Milk Products

Coffee-Tea Waste

Flower & Plant Waste

Bio-degradable Waste Food

Composting Machine

Fogging Curing System

Waste Crusher

for

Chicken, fish, meat and pork

Used specifically for non vegetarian food wastes. Its robust design ensures crushing of bones and other hard material. This equipment is also suggested when proportion of hard and big fruit peels like banana, pomegranate, watermelon, lemon, banquet flower waste etc. form a major part of food waste.

Composting Machine

Powerful gear drive: Gear box transmission gives sturdier design. Reduces power consumption by about 50% compared to other such systems. Control panel ensures easy and hassle free operation. Waterproof bearings ensure longer life of the moving parts.

Fogging Curing System

A rack system to put crates of pre-compost. Pre-compost is kept for 8-10 days with intermitten spraying of water mist required to speed up the composting process as well as pH correction of the pre-compost.

HAZARDOUS WASTE

Since it is an IT project, negligible amount of hazardous waste is expected to generate from the project. We have anticipated hazardous waste that is expected to generate from the project and is presented in tables given below:

Domestic hazardous waste (construction phase)

.

#	Cat	Description	Quantity	Precautions	Disposal
1	21.1	Waste from use of paints-pigments	Negligible, only while painting	Only during construction phase. Inventory will be kept minimum and JIT (just in time) principle shall be followed in purchasing.	Handed over to the manufacturer

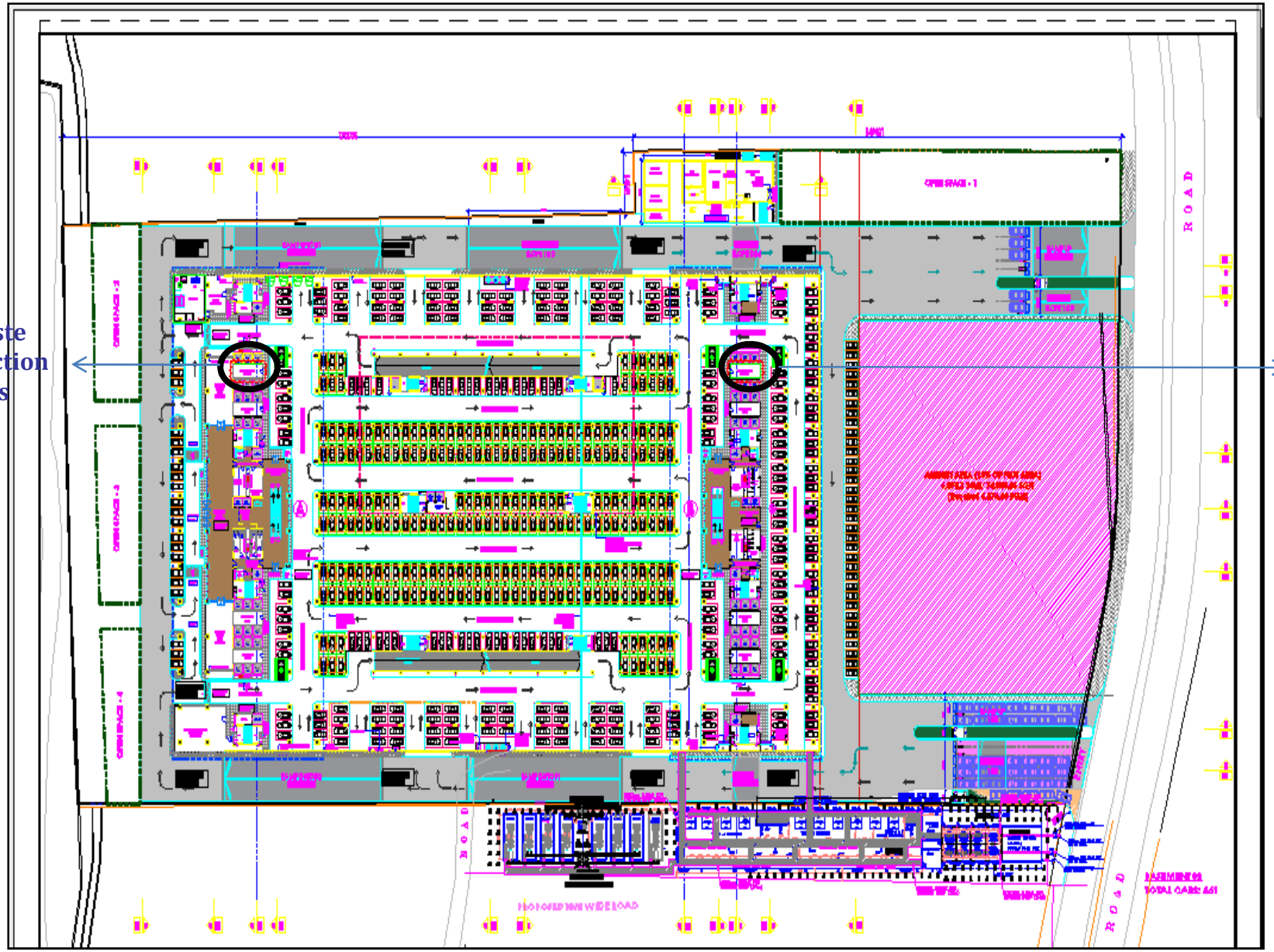
Domestic hazardous waste (Operational phase)

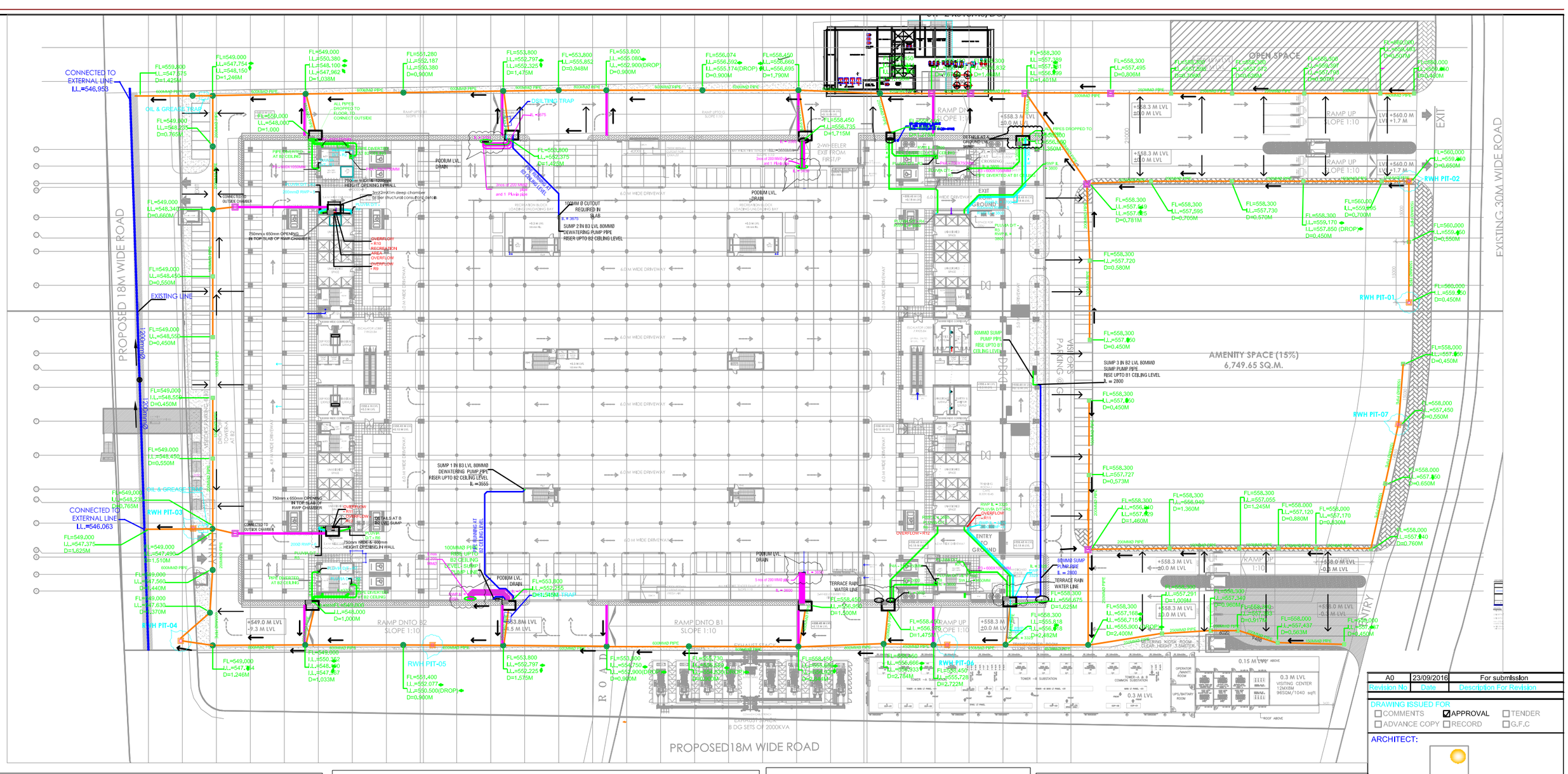
#	Cat	Description	Quantity	Precautions	Disposal
1	3.1	Oily residue in barrels, tanks used for DG	Negligible	This will arise from Diesel storages tanks, & barrels in the premises of DG Sets, Shop-lanes etc.	Carefully removed & sent to reprocesses

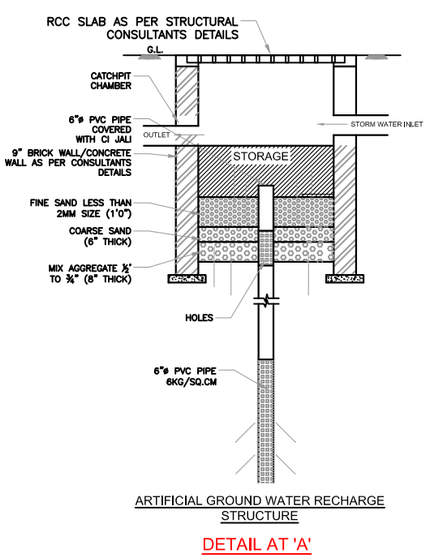
E-WASTE

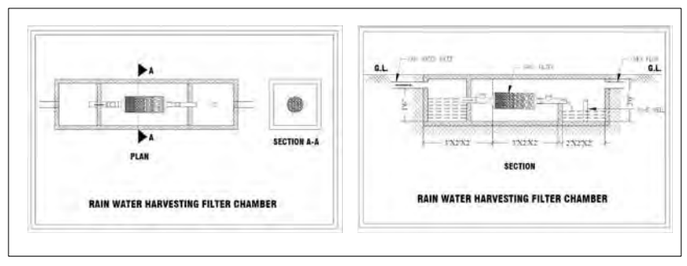
- E- waste generated (538kg/month) will be collected Tower wise and will be stored at a pre-designated place in the respective tower.
- It will be handed over to M/s. Hi-Tech Recycling India Pvt. Ltd for recycling and necessary action will be taken by them.
- The frequency of handing over the E-waste will be quarterly as described in the bilateral agreement.
- The reusable computers will be donated to the educational and other institutes.

E-WASTE COLLECTION POINTS



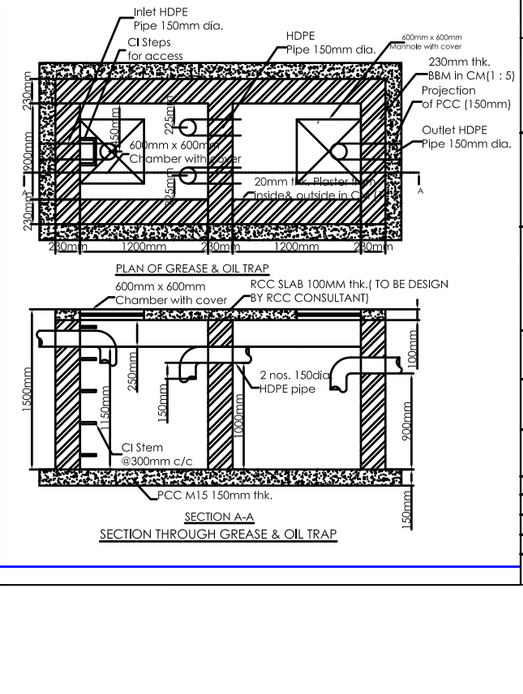






STORM LEGEND

	600 X 600MM CHAMBER WITH PERFORATED RCC COVER SHOWN AS
	900 X 900MM CHAMBER WITH PERFORATED RCC COVER SHOWN AS
	1.4 M Ø MANHOLE WITH 0.6 M Ø PERFORATED RCC COVER SHOWN AS
	RCC HUME PIPE EXTERNAL STORM DRAIN LINE
	TRENCH WITH M.S. GRATING
	ROAD DRAIN SLOPE
	STORM DRAIN FLOW
	RAIN WATER HARVESTING PIT SHOWN AS
	DSILTING TRAP SHOWN AS
	OIL & GREASE TRAP SHOWN AS



A0	23/09/2016	For submission
Revision No.	Date	Description For Revision

DRAWING ISSUED FOR
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CLIENT: EON KHARADI INFRASTRUCTURE PVT.LTD.

PROJECT: PROPOSED IT BUILDING AT S.NO. 72/2 /1
AT KHARADI, PUNE

DRAWING TITLE
EXTERNAL STORM WATER LAYOUT

DRAWING.NO. EK72/MEP/B1

DATE : 23/09/2016	DRAWN BY : SANDIP
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Geological and Geohydrological Investigation Report for Rainwater harvesting and Water prospecting at Proposed Development "EON FREEZONE PHASE II" at Kharadi Pune, Maharashtra.

For

EON KHARADI INFRASTRUCTURE PRIVATE LIMITED, PUNE

Prepared by

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GEOTECHNCIAL CONSULTANT

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October 2015

REPORT ON

Geohydrological investigations for Rainwater Harvesting & Water Prospecting at proposed Development “Eon Freezone Phase II” at Kharadi.

1.0 INTRODUCTION:

This report is prepared as per Work Order No. 4500007944 dated 28 April 2013 issued by Eon Kharadi Infrastructure private Limited Pune for conducting electrical resistivity studies at proposed development at Kharadi, Punen Maharashtra state. The site is located at survey no. 72/2/1 Kharadi area Pune. Scope consists of performing electrical resistivity tests at the site for assessing the feasibility of groundwater exploitation and rain water harvesting. In this regard, a site visit was made to the area on 28th October 2015, which was followed by field investigations using electrical resistivity on the same day. During this visit the following studies were carried out in the field:

- Entire stretch of the area and small sections exposed around were observed to understand geological conditions.
- Observations were made in the entire area to infer the role of local geological, geomorphological and climatological factors leading to weathering of the rock.
- Electrical Resistivity Surveys (15 tests) were conducted at the site to infer subsurface geological conditions in general of different layers.

2.0 SCOPE OF THE WORK:

Hydrogeological investigations were conducted by adopting Electrical Resistivity Method. The main objectives of these investigations were to:

1. Perform horizontal profiling at the proposed area.
2. Identify probable areas in which water might be present based on resistivity data.

3. Perform resistivity Vertical Electrical Soudings (VES) at the selected locations. The results of the electrical resistivity surveys along with the strata classification and aquifer conditions are included in this report.

3.0 GEOLOGICAL SET UP AND TERRAIN CONDITIONS:

The site is gently sloping towards north (northern boundary lower than southern boundary) and towards west (eastern boundary higher than western boundary). Elevation difference between northern boundary and southern boundary is of the order of 8m while between eastern boundary and western boundary is of the order of 10m. In general the site area has sloping topography with low lying part located towards northern & western region.

There is no well within the plot. However there is well in the adjacent plot in the north-west side of the present plot. Water level in the well was about 3m below the ground surface and continuous dewatering from the well was in progress.

The surface soil prevailing in Kharadi area is mostly black cotton soil which has low to negligible permeability due to inherent mineralogical composition as the clay mineral in these soils is mostly montmorlinite which absorbs water and expands reducing the overall permeability of the soil.

The area under investigation forms the part of the volcanic sequence of basaltic rocks belonging to the Deccan Volcanic activity, which is one of the largest known geological formations in India, covering over 80 percent area of the state of Maharashtra. The flows exposed in the area are compound type and has limited thickness of 4 to 6 meters. The rock is amygdaloidal in nature; the upper flow is mantled by a soil horizon which is followed by weathered basalt (Murum). The area has undulating topography

Sub-horizontal and horizontal sheet-joints are ubiquitous in the lava flows. They are normally restricted to the amygdaloidal (top and base) portions of the flow and to the interflow horizons. Vertical and inclined cooling joints are not as prolific in the flows and

are restricted to individual flows only that are unevenly spaced. Generally, one continuous water table aquifer in the area of Deccan Basalts is rather rare, instead separate or discontinuous water table zones in different weathered vesicular units of the flow are developed. The saturated zone up to 15-20 m thus can be considered to be water table aquifer in the basaltic terrain. Beyond this, the deeper aquifer, if present and more permeable than the overlying ones, would be under confined conditions, provided that they are favorably situated to receive recharge. The entire succession of lava flows acts as a multi-aquifer system, including productive and less productive zones.

The presence of bore wells of moderate yield in and around Kharadi area indicates that the subsurface geology is conducive for the limited occurrence of groundwater. This can be enhanced further by appropriate water conservation structures.

4.0 HYDROLOGY:

In basaltic lava flows, ground water occurs under both water table and confined conditions. Its occurrence and movement in basaltic terrain are controlled by vertical and horizontal porosity and permeability owing to fractures and interconnected vesicular interstices, which permit storage and movement of ground water. Occurrence of impervious layers and presence of dykes retard movement of ground water in basalt.

Alternating sequence of permeable and compact horizons in volcanic rocks gives rise to a multi-aquifer system. The near surface weathered and jointed zone of the massive basaltic unit and the vesicular part together constitute the main water table aquifer, which is being extensively developed by dug wells. There is a hydraulic continuity between the contiguous massive and vesicular basaltic units, horizontal and other joints along with weathered mantle being responsible for this.

5.0 METHODOLOGY:

A total of fifteen Electrical Resistivity tests were in general performed at the area as per IS: 1892-1979 Appendix B clause 3.3 B-2.

By applying this method the resistance to the flow of an electric current through the subsurface materials is measured at intervals on the ground surface. The resistivity is usually defined as the resistance between opposite phases of a unit cube of the material. Each material has its own resistivity depending upon the water content, compaction and composition. The test is conducted by driving four metal spikes to serve as electrodes in to the ground along a straight line at equal distances. A direct voltage is imposed between the two outer potentiometer electrodes and the potential drop is measured between the inner electrodes. To interpret the resistivity data for knowing the nature and distribution of the subsurface formations, it is necessary to make preliminary trial on known formations. The potential 'V' thus obtained divided by the current 'I' applied gives the resistance 'R' of the ground. The product of the resistance and the spacing factor, which is depending upon the disposition of the electrodes, is the resistivity of the ground.

This method is routinely used for:

a. Determining the sub-surface strata classification and subsequent profile for water harvesting and water prospecting.

b. Determination of strong rock foundation

c. Estimation of overburden thickness and strong rock quantities

d. Determination of the suitability of the area for quarrying and excavation

A great variety of electrode arrangements have been used to measure the earth resistivity but essentially they may be grouped into three classes.

1. Arrangements in which the potential differences between two widely spaced measuring electrodes are recorded.

2. Arrangements in which a potential gradient or electric field intensity is measured using closely spaced pair of measuring electrodes.

3. Arrangements in which the curvature of the potential function is measured using a closely spaced current electrode pair as well as a closely spaced measuring electrode pair.

Any one of these arrays may be used to study variations in resistivity with depth or in lateral condition. In studying the variation of resistivity with depth, as in the case of a layered medium the spacing between the various electrodes is gradually increased. With larger spacing, the effect of material at depth on the measurements becomes more pronounced.

In studying the lateral as well as vertical variations, various electrode configurations are adopted and the array is moved as a whole along a traverse line. The first type of measurement is called as 'Vertical Electrical Sounding (VES) and the second one is 'Horizontal Profiling' (HP). In the present work both VES and HP were conducted at 6 different locations at the site. The L sections generated on the basis of values of electrical resistivity for the site have been used to depict 2-D subsurface images of the strata that are also included in this report.

6.0 LOCATION OF FIELD TESTS:

Resistivity tests were performed at a total of fifteen locations as shown in attached drawing. The locations shown in the drawing are indicative in nature. Client's representative was requested to mark those points on relevant drawing for future reference. The locations were agreed and shown to client's representative.
In the following table hand held GPS reading are tabulated.

Location No.	E	N	Elevation as per survey drawing
E1	7857-19.22	1833-10.4	98.0
E2	7857-18.34	1833-10.6	98.5
E3	785717.3	1833-10.7	95.7
E4	7857-15.13	1833-10.8	95.2
E5	7857-11.44	1833-10.29	89.0

E6	7857-9.22	1833-10.04	91.3
E7	7857-9.85	1833-5.96	98.8
E8	7857-9.95	1833-6.13	92.0
E9	7857-11.23	1833-6.26	90.0
E10	7857-12.21	1833-6.28	87.5
E11	7857-13.01	1833-6.32	93.1
E12	7857-16.72	1833-7.8	96.5
E13	7857-17.27	1833-6.626	97.2
E14	7857-18.51	1833-7.23	97.5
E15	7857-18.72	1833-7.56	98.7

7.0 DATA PROCESSING:

In the area to understand the shallow subsurface geological and aquifer conditions extending up to 90-100 meters depth, vertical electrical soundings were conducted at fifteen different locations. Using IPI2 WINDOW based software the data obtained from field was processed. This software helps in interactive semi-automated interpretation of the field data. All the sounding data were modeled for the existing sections. The VES data on apparent resistivity values was modeled by using IPI2 WINDOW based software to get different layers depicting their thickness, depth and true resistivity. In nutshell, the above interpretation gives generalized geological situation with depth-wise variations.

As discussed above the sounding points with typical curves at selected sites give point information, which was further utilized to build comprehensive picture of subsurface geological situation depth-wise by preparing 2-D geoelectrical sections.

The geoelectrical cross-sections passing through various points have been presented in the following figures. It is to be noted that these are apparent resistivity L sections, which broadly match the true resistivity of formations. The values of true resistivity have been computed and thickness, depth and true resistivity have been presented in appendix. Using IPI2 software, the values of true resistivity of strata (ρ), its thickness (h) and depth (d) have been obtained after modeling of data and are depicted in table form besides each curve.

It is important to note following while looking at the resistivity profiles

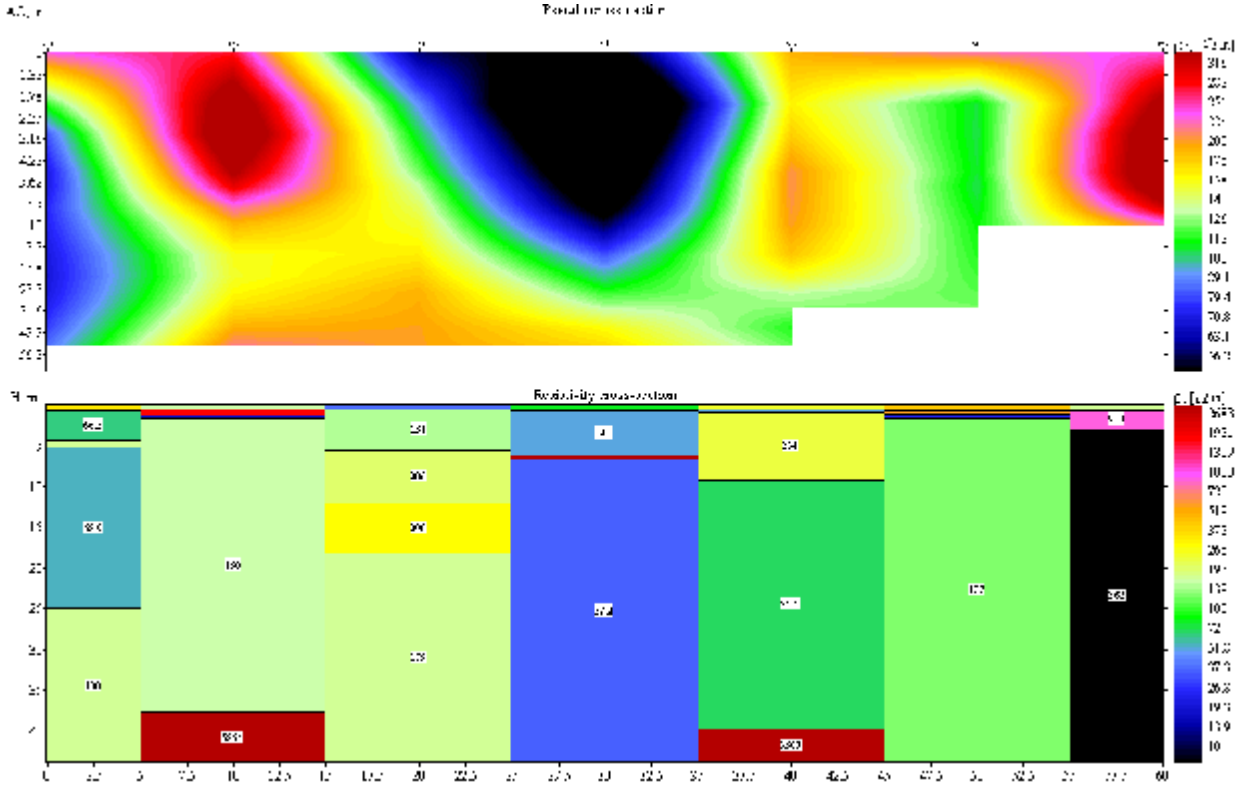
1. Soft ware chooses the color and shade (dark/ light). Hence the color coding is site specific. Generalizing it may not be appropriate.
2. Geology and geotechnique are not exact sciences. Here material engineering properties are not well defined. Typically in steel or concrete every engineering property is well defined & established. In soils and rock we are dealing with nature. If we consider one property “permeability” it will vary and important parameters influencing are its gradation, density, type of fluid, its viscosity, head of fluid in case of soils and evolution of rock and subsequent degradation in the form of weathering, fracturing etc. Hence geologists/geotechnical engineers always provide range of parameters.
3. Many times the experience of the person analyzing the data plays large role and it is observed that there is large variation between calculated values and recommended values. This difference depends on the person’s experience. Hence it may be difficult to justify the values by analytical methods.
4. Resistivity tests are field tests in which no samples are extracted for visual observations or laboratory tests.

   In the following table color coding normally used and corresponding resistivity values are mentioned.

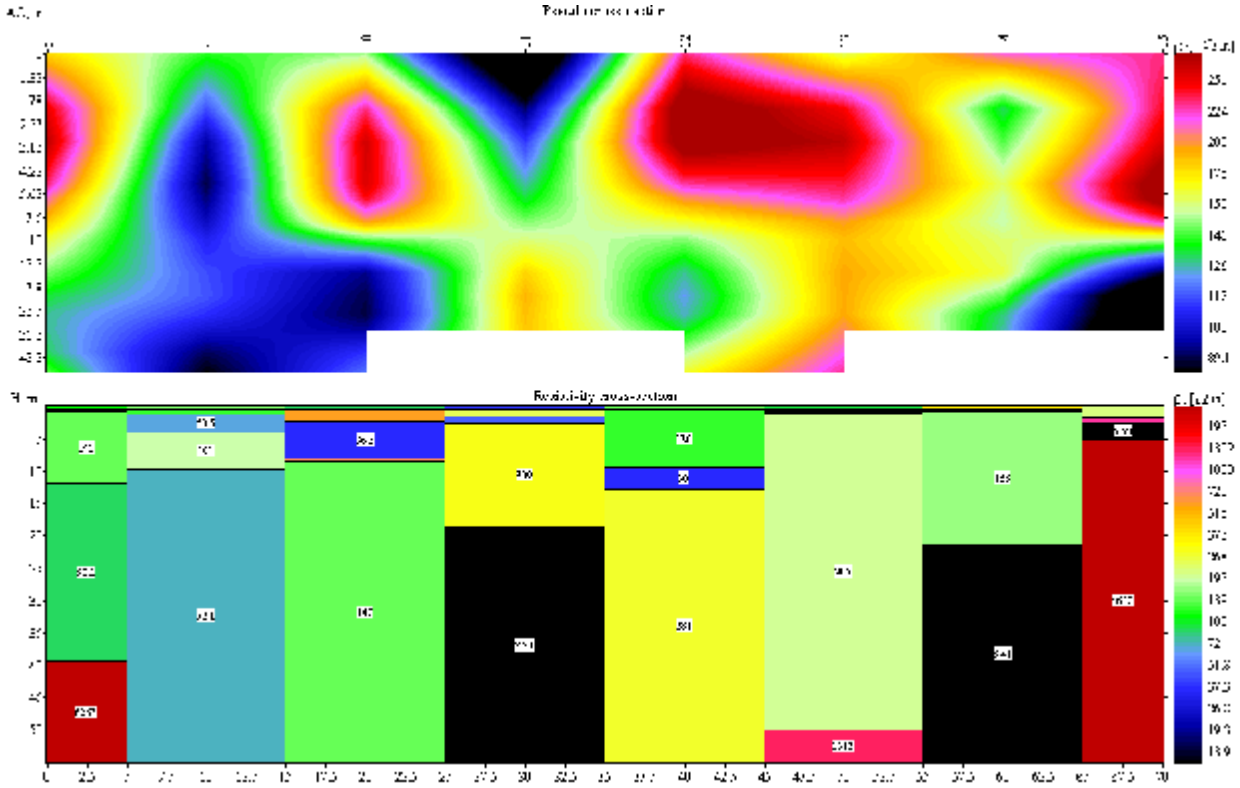
Material	Color	Resistivity range Ohm-m
Soil	Blue, black	0-60
Disintegrated murum	Yellow/ green	60-150
Fractured and disintegrated rock	Yellow/ green	150-200
Moderately Fractured rock	Diffused red/ red	200-300
Massive Rock (Basalt)	Red	300-1500

Normally when the stratification is moist the tinge of color drops.

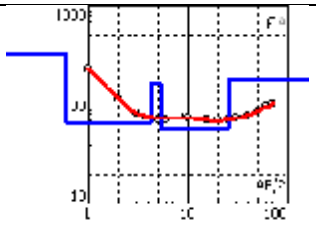
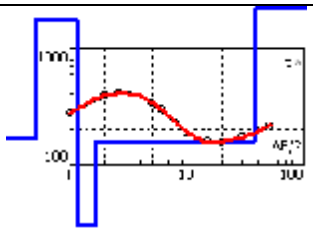
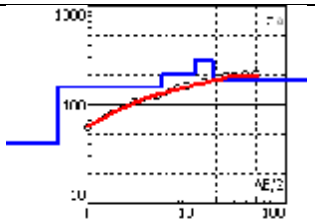
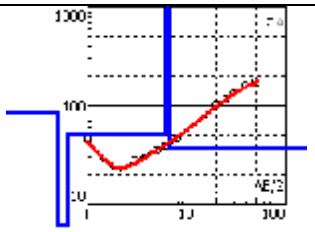
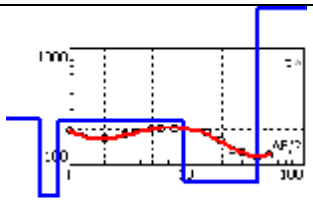
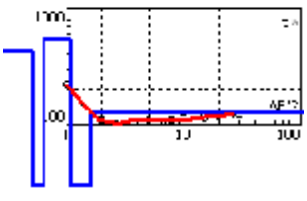
Profiles 1 to 7



Profiles 8 to 15



Electrical resistivity data output

No.	Value	Graph
1.		
2.		
3.		
4.		
5.		
6.		

N	ρ	h	d	Alt
1	332	0.601	0.601	-0.6013
2	66.3	3.65	4.25	-4.254
3	166	1.01	5.27	-5.268
4	58.8	19.7	25	-24.98
5	180			

N	ρ	h	d	Alt
1	165	0.5	0.5	-0.5
2	1757	0.674	1.17	-1.174
3	20.1	0.472	1.65	-1.646
4	158	36.1	37.8	-37.76
5	5854			

N	ρ	h	d	Alt
1	40.7	0.5	0.5	-0.5
2	151	5.01	5.51	-5.51
3	206	6.55	12.1	-12.06
4	286	6.31	18.4	-18.37
5	178			

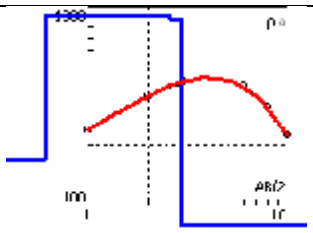
N	ρ	h	d	Alt
1	83.2	0.5	0.5	-0.5
2	1.7	0.112	0.612	-0.6122
3	52	5.46	6.07	-6.067
4	23927	0.542	6.61	-6.609
5	37.2			

N	ρ	h	d	Alt
1	252	0.543	0.543	-0.5426
2	55	0.25	0.792	-0.7922
3	234	8.44	9.24	-9.237
4	72.4	30.6	39.8	-39.79
5	3587			

N	ρ	h	d	Alt
1	422	0.5	0.5	-0.5
2	10.5	0.141	0.641	-0.6414
3	550	0.428	1.07	-1.07
4	25.6	0.566	1.64	-1.636
5	127			

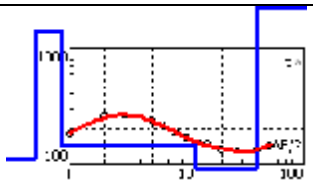
7.

N	ρ	h	d	Alt
1	171	0.611	0.611	-0.6109
2	910	1.99	2.61	-2.605
3	879	0.354	2.96	-2.959
4	2.65			



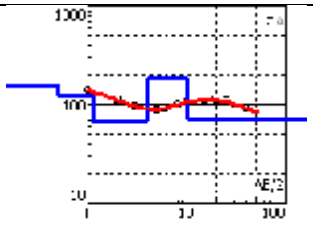
8.

N	ρ	h	d	Alt
1	112	0.5	0.5	-0.5
2	1379	0.361	0.861	-0.8611
3	142	11	11.9	-11.87
4	90	27.6	39.5	-39.45
5	6263			



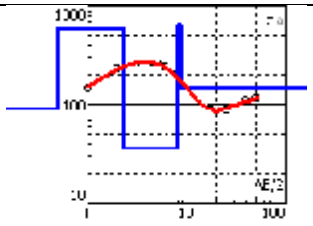
9.

N	ρ	h	d	Alt
1	158	0.5	0.5	-0.5
2	125	0.637	1.14	-1.137
3	68.3	2.79	3.93	-3.931
4	189	5.94	9.87	-9.875
5	72.1			



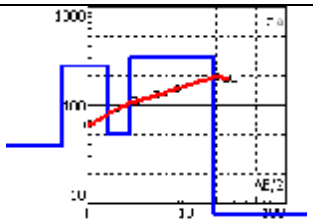
10.

N	ρ	h	d	Alt
1	92.7	0.5	0.5	-0.5
2	599	1.8	2.3	-2.298
3	36.6	5.71	8.01	-8.012
4	659	0.567	8.58	-8.579
5	148			



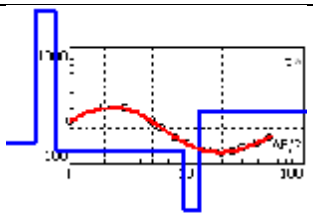
11.

N	ρ	h	d	Alt
1	40.2	0.542	0.542	-0.542
2	251	1.04	1.58	-1.581
3	50.8	1.07	2.65	-2.652
4	310	16	18.6	-18.61
5	7.71			



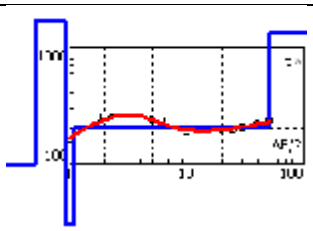
12.

N	ρ	h	d	Alt
1	149	0.5	0.5	-0.5
2	2034	0.253	0.753	-0.7533
3	130	8.6	9.35	-9.352
4	38.8	3.44	12.8	-12.79
5	282			



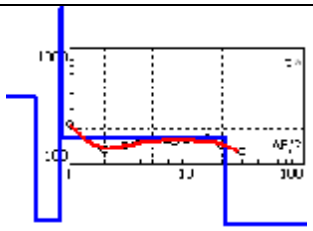
13.

N	ρ	h	d	Alt
1	98.2	0.5	0.5	-0.5
2	1713	0.401	0.901	-0.9011
3	9.67	0.169	1.07	-1.07
4	206	48.9	50	-50
5	1312			



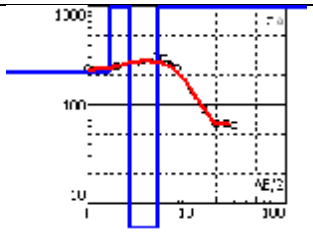
14.

N	ρ	h	d	Alt
1	379	0.5	0.5	-0.5
2	31.9	0.324	0.824	-0.824
3	4547	0.0353	0.859	-0.8593
4	165	20.4	21.3	-21.27
5	5.41			



15.

N	ρ	h	d	Alt
1	220	1.64	1.64	-1.644
2	1140	1.04	2.68	-2.683
3	5.67	2.41	5.09	-5.091
4	4622			



8.0 RESULTS AND CONCLUSIONS

The geoelectrical cross-sections passing through various points have been presented in the above figures. It is to be noted that these are apparent resistivity L sections, which broadly match the true resistivity of formations. The values of true resistivity have been computed and thickness, depth and true resistivity have been presented in appendix. Using IPI2 software, the values of true resistivity of strata (ρ), its thickness (h) and depth (d) have been obtained after modeling of data and are depicted in table form besides each curve.

It can be concluded that

- At locations 1, 2, 8, 9, 10, 12 and 15 shallow aquifer is located between 5 and 15 meters depth.
- Locations 3, 4, 5, 6, 7, 11, 13, and 14 the conditions are not suitable for exploitation as well as recharge wells as there is a continuous rise in the resistivity values indicating presence of massive strong rock and therefore is not

suitable for any purpose.

- 1, 2, 8, 9, 10, 12 and 15 are recommended for sitting rain water harvesting structures such as percolation pits or bore holes of limited depth of 15 meters.
- Location 12 can be used for both exploitation and for rain harvesting purpose of limited depth to maximum 15m. Anticipated yield shall be in the range of 300 to 500 liters per hour for maximum pumping of 8 to 10 hours. Sufficient time will be time will be required for recouping of the well.

This indicates that even on the local scale the lithological and therefore hydro geological conditions are not uniform and heterogeneous in nature.

Average thickness of the shallow aquifer seems to be 15 meters.

Normally water table and its fluctuation is determined by installing piezometers and monitoring them over long period (minimum one year). These piezometers are installed at different locations and bottom of piezometers are at different elevations within project boundary. Another important point to be noted is that “aquifer” is a misnomer in basaltic area. Here water accumulates in fractured zone and we puncture this layer and pump out water from bore well.

Permeability of basalt is low while permeability of murum layer is high (comparatively). Hence water from rain accumulates first on top of the basalt layer and depending on its fractured nature it percolates vertical downwards or depending on gradient of interface it moves in lateral direction or remains stagnant

Such fractured layer in which water accumulates and we call it “perched water table”. Actual water table is deep seated beyond 60m depth. However “perched” water table will be present post monsoon season. Perched water table shall be considered at interphase between top soil cover and murum up to top of rock.

At the present site pre monsoon water table can be considered at 15m depth while post monsoon it can be as shallow as 1m depth in the vicinity of test 7. Average value can be

considered as 4m.

9.0 WATER BUDGETING

It would be necessary to know first the nature, movement and occurrence of ground water in strong basaltic rock. Some salient characteristics of occurrence of ground water in strong basaltic rock are listed below:

1. Ground water reservoir (aquifer) in strong basaltic rock is dominantly shallow.
2. The bulk of the ground water is stored in the zone of weathering (Vadose zone).
3. Fractures and joints in rock occur as conduits for rapid transport of water as they do not provide large space for storage of ground water.
4. The width of fractures & lineaments and weak planes narrows as depth increases
5. Fairly limited aquifer water yield by wells and borewells in comparison to alluvial and sedimentary rock aquifer wells
6. Unpredictable ground water occurrence over short distances.

The principle ground water reservoir in strong rock therefore consists of two parts

1. “Vadose zone” or unsaturated zone that lies between ground surface and water table
2. The phreatic or unconfined zone that lie below the water table

The deeper ground water below water table in zone of fractures lack substantial storage unless it is connected with thick vadose zone above or else is connected to a surface water source. Exclusively from the issue of ground water storage, the “vadose zone” in strong rock is extremely important, because the pore spaces in this domain undergo resaturation during infiltration and recharge and undergo desaturation under conditions of evaporation and drainage. The volume of saturation involved in the process of change in saturation in vadose zone (zone of weathering) is far larger than the changes in volume of water involved in the elastic storage of water below the water table. It therefore may be noted, that the dynamic resource in ground water reservoir in the Strong rock areas is governed by the “vadose zone” through which water levels fluctuate. It is, therefore, imperative for any rechargeable scheme to have first hand

information obtained/required aout the water saturation and permeability of the vadose zone/weathering zone before undertaking execution of ground water recharging works. This information is very much rare in its availability. It may also be mentioned that available storage in weathered zone in strong basaltic rock is very much linked to base flow fluctuations in local streams.

The aquifers in strong basaltic rocks are characterized by low permeability and low specific yield. In Strong rock the framework of fracture system in which groundwater occurs is highly variable and aquifers are of heterogeneous nature. The feature of low permeability of Basalts, their multilayered occurrence, fractured and jointed natures, vesicular character besides topographic and other geological features are to be normally considered in the formulation and construction of recharging schemes in Plateau forming basaltic rock terrain. Broad hydraulic features for consideration with regard to water harvesting and ground water recharging in Basaltic rock regions are given in table. The success of a recharge scheme will depend on a combination of various topographic and hydrologic situations. The following factors should receive consideration in the formulation of a water harvesting & recharge scheme.
Topographic - Hydrogeological framework
Hydrologic Considerations The weathered, fractured and vesicular basalts constitute most favorable hydraulic zones which need to be delineated on large scale maps.

Topography of Watershed area

Hydrologic Considerations	The weathered, fractured and vesicular basalts constitute most favorable hydraulic zones which need to be delineated on large scale maps.
Topography of Watershed area	The piedmont slopes constitute the best topographic geologic environment followed by valley floors. Highly dissected slopes and plateau tops are less favorable.
Hydraulic conductivity of basaltic layers	The weathered, jointed and vesicular portions of basaltic rocks have high permeability and shall constitute favorable places in comparison to massive basalts that are less suitable for recharge and percolation.
Water table and fluctuation in levels	The position of water table & its value of annual fluctuation
Thickness of Soil cover and infiltration rates.	Granular soil cover will have high infiltration rate in comparison to clay / black cotton soil that would impede infiltration and deep percolation.
Rate of Recharge	In favorable zones, fractured and vesicular basalts are expected to attain a recharge of 10 – 15% whereas in non favorable zones, underlain by massive basalts the rates may be 2 to 3%.

Typically for an area around 50060 m^2 considering an annual average rainfall of 700 mm for the Pune region the total rainwater available is calculated.

Quantity estimation:

Total availability of water at the site

= Geographical area x Rainfall x Runoff Coefficient

= 50060m^2*0.70 m (700 mm)*0.6 = 21025.2m^3

Runoff coefficient for calculating flow for rainwater design is based on Central Pollution Control Board Ministry of Environment & Forests data. They are as follows.

Surface Type Runoff coefficient (Range)

Surface Type	**Runoff coefficient (Range)**
Roof (Metal, gravel, asphalt, shingle, fiber-glass, asbestos, concrete)	0.95 – 0.90
Pavement (Concrete, asphalt, Gravel, Brick)	1.00 – 0.90
Ground Surface (Hard flat ground without Vegetation)	0.75 – 0.25
Ground Surface (Hard flat ground with Vegetation)	0.60 – 0.15
Lawns (Flat, Sandy soil) (Flat , Heavy soil)	 0.10 – 0.05 0.20 – 0.15

Considering an area of influence of 25 meters (diameter) around each of the borewell of 10 meters average depth total volume of rock will be 4909m^3. Assuming porosity of rock as (2% to 5%) 2% anticipated volume of water that can be accepted will be of the order of 98 (say 100) cubic meters of annual recharge.

At project area only 6 locations (1, 2, 8, 9, 10, 12 and 15) have shown the possibility of groundwater recharging.

Considering 50% dependability of this value a total of 50m^3 is available for recharge at each location. Considering a conservative value of 50m^3 at each location suitable number of bore wells can be drilled.

Typically following arrangement is followed

- Rainwater from roof tops shall be collected through down take pipes at planned locations and will be recharged to ground through recharging pit with well.
- Surface run off can be recharged to ground through recharging pits with well at the centre of the pit. Depth of well will be upto the aquifer.
- However rain water from open courtyards, parking areas, landscaped areas shall be collected through a network of pipes & Collection chambers with desired slopes or open channel drains with grating.
- Excess water will overflow to external SWD.

9.0 Stratification based on resistivity data.

Test no	**Depth m**	**Expected Strata**
1	0- 4	Soil + Weathered basalt
	>4	Fractured basalt
2	0- 1.5	Soil + Weathered basalt
	1.5 - 36	Fractured basalt
	>36	Compact basalt
3	0- 0.5	Soil + Weathered basalt
	0.5 - 5	Fractured basalt
	>5	Moderately fractured
4	0- 6.5	Soil + Weathered basalt
	>6.5	Highly fractured basalt
5	0-0.80	Soil + Weathered basalt
	0.8 - 9	Moderately fractured
	9 - 40	Highly Fractured
	>40	Compact basalt
	>5	Compact basalt

6	0-1.6	Soil + Weathered basalt
	>1.6	Highly Fractured
7	0-0.60	Soil + Weathered basalt
	>0.60	Compact basalt
8	0- 0.90	Soil + Weathered basalt
	0.90 - 40	Highly Fractured
	>40	Compact basalt
9	~ 0.5	Soil + Weathered basalt
	0.5 - 4	Highly Fractured
	4 onwards	Moderately fractured
10	0-2.0	Soil + Weathered basalt
	2 - 8	Highly Fractured
	>8	Moderately fractured
11	0-0.5	Soil + Weathered basalt
	0.5 - 3	Highly Fractured
	>3	Moderately fractured
12	0-0.7	Soil + Weathered basalt
	0.7 - 13	Highly Fractured
	>13	Compact basalt
13	0-1	Soil + Weathered basalt
	1 - 50	Moderately fractured
	>50	Compact basalt
14	0-0.8	Soil + Weathered basalt
	>8	Moderately fractured

15	0-5	Soil + Weathered basalt
	>5	Compact basalt

It shall be noted that above classification is based on available literatures and correlating resistivity values with stratification. The depths mentioned are indicative only.

Typical permeability values are as follows

Stratification	Permeability cm/sec
Clay	10^{-5} to 10^{-7}
Sand silt mixtures	10^{-3} to 10^{-5}
Clean gravel	10^{-1} to 10^{-2}
Fractured basalt	10^{-3} to 10^{-4}
Compact basalt	10^{-5} to 10^{-6}
Hard murum	10^{-3} to 10^{-4}
Murum	10^{-2} to 10^{-3}

10.0 LIMITATIONS:

Electrical resistivity test is a non destructive, indirect method of strata classification. In this method samples are not available/ collected for inspection and hence confirmatory tests cannot be performed in laboratory. The data generated in field (resistivity values) are compared with standard values available in literatures. Based on this classification and experience of the person performing field work as well as preparing report inferences are drawn.

Water intake depends on type of stratification, presence of fractures, fissures, mineral composition of rock, porosity and absorption etc. Since no samples are available for visual identifications and classification we strongly recommend performing water intake tests during monsoon when the stratification is saturated to confirm our recommendations.

The values mentioned in the conclusions shall be considered as indicative which are to be confirmed by water intake tests or pumping out tests during summer.

The data is site specific and cannot be used for other sites in the neighborhood. The data is interpreted by experienced engineering geologist and hence it suggested that any discrepancy if found should be brought to our notice so that supplementary recommendations shall be provided.

It may also be mentioned that available storage in weathered zone in strong rock is very much linked to base flow fluctuations in local streams.

The aquifers in strong rocks are characterized by low permeability and low specific yield. In strong rock the framework of fracture system in which groundwater occurs is highly variable and aquifers are of heterogeneous nature.

The feature of low permeability of Basalts, their multilayered occurrence, fractured and jointed natures, vesicular character besides topographic and other geological features are to be normally considered in the formulation and construction of recharging schemes in Plateau forming basaltic rock terrain. Broad hydraulic features for consideration with regard to water harvesting and ground water recharging in Basaltic rock regions are given in table above. The success of a recharge scheme will depend on a combination of various topographic and hydrologic situations.

11. Typical details of Recharge Injection well:

Based on the resistivity surveys recharge injection well is suggested to be drilled through the center of the recharge pit. The surface run off is not directly led into the injection well, to avoid chances of contamination of groundwater. Instead rainwater is collected in a recharge pit which are generally 1 to 2 meters wide and two to three meters deep. After the excavation the pits are filled with pebbles, boulders as well as coarse sand which act as filter.

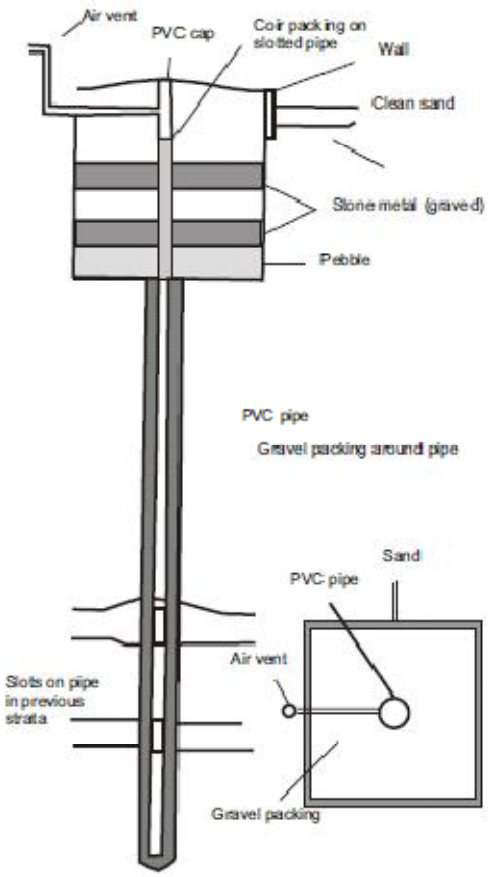
The size of the filter material is generally taken as:

Coarse sand – 1.5 to 2 mm

Gravels – 5 to 10 mm

Boulders- 5 to 20 cm

The filter material should be filled in graded manner. Boulders at he bottom, gravels in the middle and coarse sand at the top. The diameter of the well suggested is 500 mm while the depth of the tube well is variable. Inside this tube well a perforated casing of 200 mm should be inserted up to the depth where the upper loose strata give way to the Strong strata. The annular space between the tube well and the slotted casing should be filled with gravel.



Typical recharge injection well

Location of field tests

CLIENT :-EON Kharadi Infrastructure Pvt. Ltd.
PROJECT :- Proposed Office Building At S.NO.72 At Kharadi, Pune

Distribution Transformer Losses

A) Distribution Transformers - Load Loss at 100% of avg load

Sr. No.	Rating of Transformer	Estimated No. of Transformers	Total Installed Capacity	Conventional Transformer		Low Loss Transfomer (ECBC)		Savings in Unit/Year
				Load Loss/ Transformer	Estimated loss in Units/Annum	Load Loss/ Transformer	Estimated Units/Annum	
	(KVA)	(Nos)	(KVA)	(KW)		(KW)		
1	2000	8	16000	24	1681920	20	1401600	280320
2	1600	2	3200	19	332880	16	280320	52560
								332880

B) Distribution Transformers - Load Loss at 75% of avg load

Sr. No.	Rating of Transformer	Estimated No. of Transformers	Total Installed Capacity	Conventional Transformer		Low Loss Transfomer (ECBC)		Savings in Unit/Year
				Load Loss/ Transformer	Estimated loss in Units/Annum	Load Loss/ Transformer	Estimated Units/Annum	
	(KVA)	(Nos)	(KVA)	(KW.)		(KW)		
1	2000	8	16000	18	1261440	15	1051200	210240
2	1600	2	3200	14.4	252288	12	210240	42048

CLIENT: EON Kharadi Infrastructure PVT.LTD.
PROJECT: Office Building at S.No 72, at EON

DG SET CALCULATION. (For Entire Tower A+ Tower B & Common)				
Sr. No.	**Description**	**Tower A + Tower B**	**Common load & Utility**	**Total**
1	Total Demand Load.KW	11183.51	1922.56	13106.08
2	Overall Campus diversilty factor			0.80
3	Total Demand Load.KW			10484.86
4	Power factor.			0.8
5	Demand kVA on DG Set.			13106.08
6	DG Set Capacity required at 90%			14562.31
7	**DG Set Required.**			**7 x2000***
9	DG Set Loading			**93.61%**

CLIENT :-EON Kharadi Infrastructure Pvt. Ltd.
PROJECT :- Proposed Office Building At S.NO.72 At Kharadi, Pune

Distribution Transformer Losses

A) Distribution Transformers - Load Loss at 100% of avg load

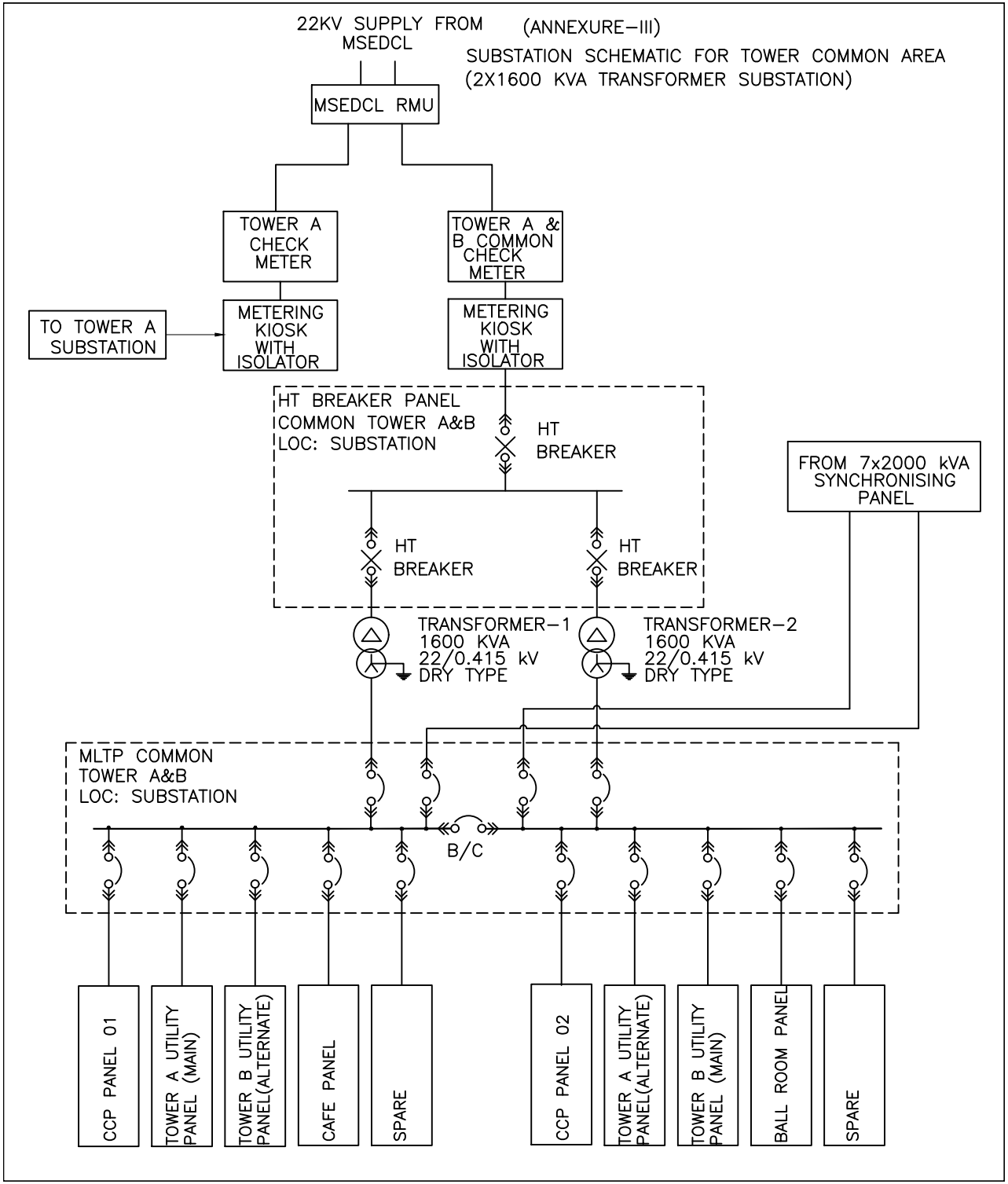
Sr. No.	Rating of Transformer	Estimated No. of Transformers	Total Installed Capacity	Conventional Transformer		Low Loss Transfomer (ECBC)		Savings in Unit/Year
				Load Loss/ Transformer	Estimated loss in Units/Annum	Load Loss/ Transformer	Estimated Units/Annum	
	(KVA)	(Nos)	(KVA)	(KW)		(KW)		
1	2000	8	16000	24	1681920	20	1401600	280320
2	1600	2	3200	19	332880	16	280320	52560
								332880

B) Distribution Transformers - Load Loss at 75% of avg load

Sr. No.	Rating of Transformer	Estimated No. of Transformers	Total Installed Capacity	Conventional Transformer		Low Loss Transfomer (ECBC)		Savings in Unit/Year
				Load Loss/ Transformer	Estimated loss in Units/Annum	Load Loss/ Transformer	Estimated Units/Annum	
	(KVA)	(Nos)	(KVA)	(KW.)		(KW)		
1	2000	8	16000	18	1261440	15	1051200	210240
2	1600	2	3200	14.4	252288	12	210240	42048
								252288

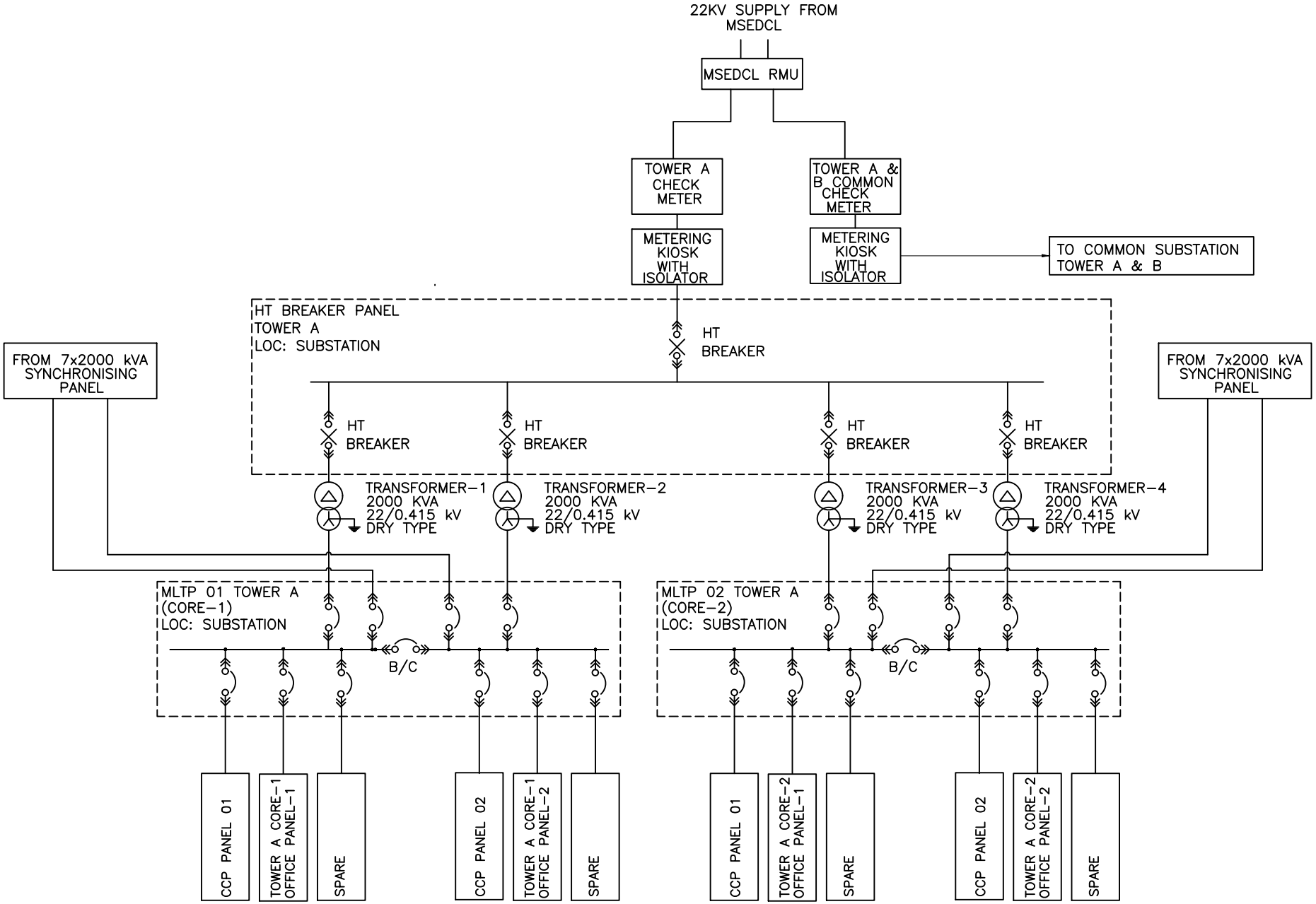
(ANNEXURE–III)

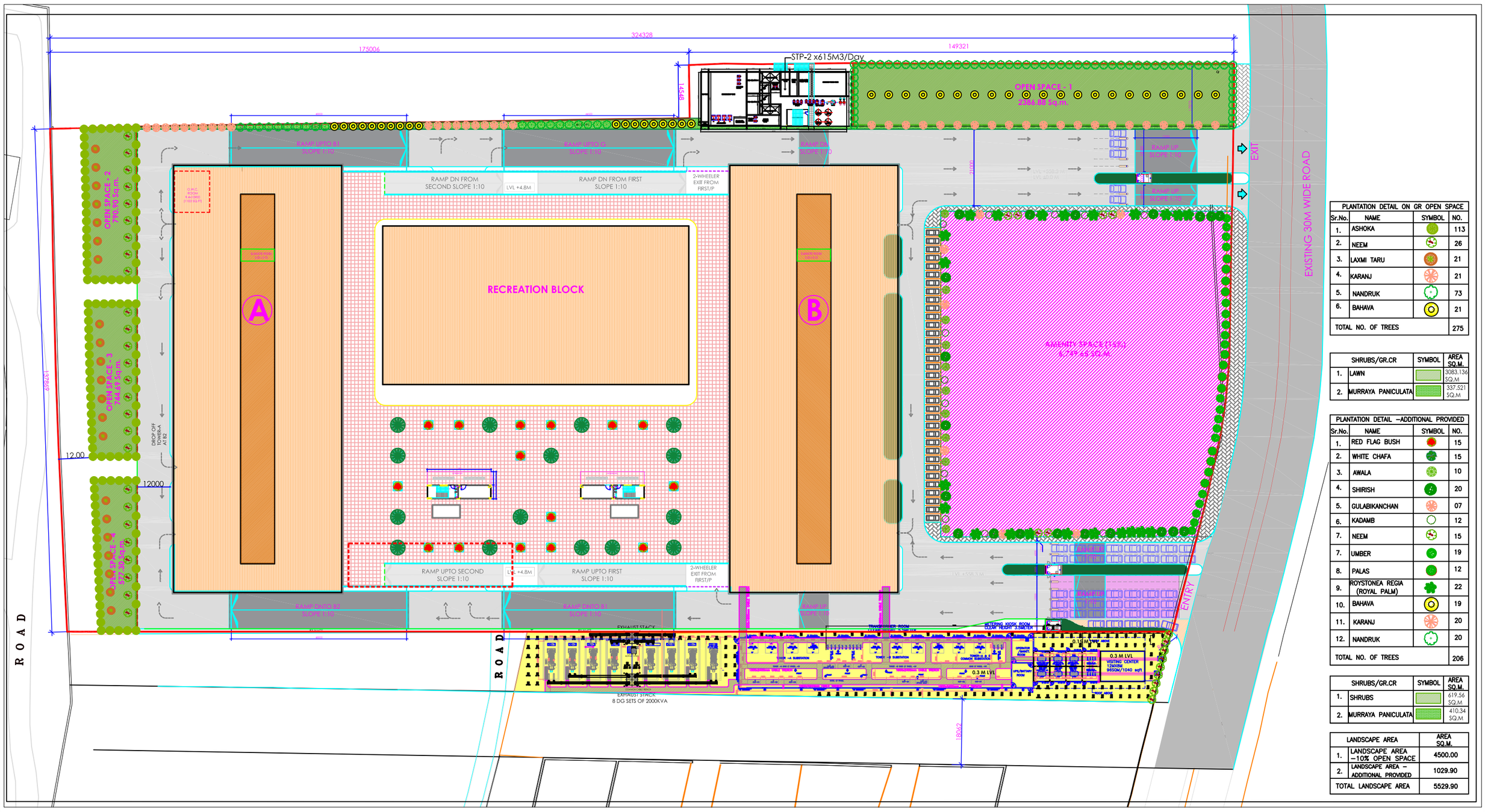
SUBSTATION SCHEMATIC FOR TOWER COMMON AREA
(2X1600 KVA TRANSFORMER SUBSTATION)



(ANNEXURE–III)

TYP. SUBSTATION SCHEMATIC FOR TOWER A & B
(4X2000 KVA TRANSFORMER SUBSTATION FOR TOWER A)





PLANTATION DETAIL ON GR OPEN SPACE			
Sr.No.	NAME	SYMBOL	NO.
1.	ASHOKA		113
2.	NEEM		26
3.	LAXMI TARU		21
4.	KARANJ		21
5.	NANDRUK		73
6.	BAHAVA		21
TOTAL NO. OF TREES			275

	SHRUBS/GR.CR	SYMBOL	AREA SQ.M.
1.	LAWN		3083.136 SQ.M
2.	MURRAYA PANICULATA		337.521 SQ.M

PLANTATION DETAIL –ADDITIONAL PROVIDED			
Sr.No.	NAME	SYMBOL	NO.
1.	RED FLAG BUSH		15
2.	WHITE CHAFA		15
3.	AWALA		10
4.	SHIRISH		20
5.	GULABIKANCHAN		07
6.	KADAMB		12
7.	NEEM		15
7.	UMBER		19
8.	PALAS		12
9.	ROYSTONEA REGIA (ROYAL PALM)		22
10.	BAHAVA		19
11.	KARANJ		20
12.	NANDRUK		20
TOTAL NO. OF TREES			206

	SHRUBS/GR.CR	SYMBOL	AREA SQ.M.
1.	SHRUBS		619.56 SQ.M
2.	MURRAYA PANICULATA		410.34 SQ.M

LANDSCAPE AREA		AREA SQ.M.
1.	LANDSCAPE AREA –10% OPEN SPACE	4500.00
2.	LANDSCAPE AREA – ADDITIONAL PROVIDED	1029.90
TOTAL LANDSCAPE AREA		5529.90

PROJECT ARCHITECT

Panchshil
TECH PARK ONE, YERWADA,
PUNE - 411 006

ISSUES

	SITE	R.C.C	H.V.A.C.	ELECTRICAL	PLUMBING	LANDSCAPE	INTERIOR	CLIENT
02	19-01-16							
02	25-02-16							
02	21-07-16							

REVISIONS

R1	12-10-15	REVISED AS PER FSI 3.
R2	22-12-15	SHAFT ALLOCATION REVISED IN THE CORE AREA.R.C.C. UPDATED.
R3	08-1-16	SHAFT ALLOCATION REVISED IN THE CORE AREA. & ALL FLOOR LEVELS HAVE BEEN UPDATED,BASEMENT 3 FLOOR PLAN ADDED,SUBSTATION,DG SETS,METERING KIOSKS MOVED TOWARDS THE SOUTH SIDE OF THE PLOT.
R4	25-2-16	R.C.C. UPDATED AND ALL THE SERVICES INCORPORATED THAT ARE RECEIVED TILL DATE.
R5	1-3-16	BOH AREAS REVISED FOR BOTH TOWER A & B.LV SHAFT ADDED IN THE STAIRCASES AT TOWER-B.
R6	26-4-16	THE CENTRAL PORTION FIRE STAIRCASE AND LIFTS ARE REVISED.

NOTES.

1/ WRITTEN DIMENSIONS TO BE FOLLOWED.

2/ ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METER UNLESS OTHERWISE SPECIFIED.

3/ ALL LEVELS / DIMENSIONS ARE FROM UNFINISHED ARCHITECTURAL SURFACES.

4/ FOR STRUCTURAL, SERVICES, LANDSCAPE & INTERIOR DETAILS REFER RELEVANT CONSULTANTS DRAWINGS.

5/ DISCREPANCIES IF ANY TO BE BROUGHT TO THE NOTICE OF THE ARCHITECTS BEFORE EXECUTION.

JOB NO. 114

SCALE A1- 1:500

DATE 01-03-2016

DRAWN BY AMRUTA

NORTH

PROJECT : EON KHARADI INFRASTRUCTURE PVT.LTD.
PROPOSED IT BUILDING AT S.NO. 72/2 /1
AT KHARADI, PUNE

DRAWING TITLE :
LANDSCAPE PLAN

ARCH. DWG. NO. 103

REVISION NO. R6