

COVER



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY(DEEMED TO BE UNIVERSITY)
(Est U/s(3) of UGC Act,1956) Accredited with Grade "A" by NAAC (A Christian Minority Institution)

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHEMMENCHERY, CHENNAI – 600119. TAMILNADU.

PHONE: 2450 1443/9941912481 INTERNET: www.sathyabama.ac.in

E-mail: archhod@sathyabama.ac.in



**SCHOOL OF BUILDING AND ENVIRONMENT
DEPARTMENT OF ARCHITECTURE
M. Arch (Building management)**

**PROFESSIONAL TRAINING (S84 INT)
DEC- JAN 2020**

Name of the Student :AGHALYA DIVYA JYOTHI

Semester : III

Reg No. :39840002

Batch : 2019-2021



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M. Arch (Building management)

VIVA-VOCE EXAMINATION

This is to certify that the Professional Training (S84 INT) is the work of _AGHALYA DIVYA JYOTHI_ who had undergone training in__CRN Architects_ and has been monitored by the continuous assessment during **Dec 2020 to Jan 2021.**

A handwritten signature in blue ink, appearing to read 'Devyani', is written over a faint circular stamp.

Dr.Devyani Gangopadhyay
HOD AND DEAN

Submitted for Viva voce Examination held on _____

Internal Examiner

External Examiner

(Annexure III)



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DECLARATION

I _AGHALYA DIVYA JYOTHI_ hereby declare that the Professional Training Report _10th Dec 2020 to 20th Jan 2021_ done by me under the guidance of Ar.K.Chandrasekaran_ is submitted in partial fulfillment of the requirements for the completion of practical training session.

DATE :20/01/2021

PLACE :Chennai

SIGNATURE OF CANDIDATE

(Annexure –IV)

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA INSTITUTE OF SCIENCE & TECHNOLOGY** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr.Devyani Gangopadhyay Dean, School of building and Environment** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to **PM --K.Chandrasekaran--** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my Training.

I would also like to express my sincere thanks to Ar. Sukirtha Suresh (Internal Co-Ordinator) for her valuable guidance, during the entire Professional Training period.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Architecture who were helpful in many ways for the completion of the project.

(Also thank Architect of the firm)_**G.Ravi , CRN Architects , New no 10 , Old no 5 , Karpagambal Nagar ,Luz , Mylapore, Chennai - 600004_**

(Family and Others) _____

CONFIRMATION LETTER & JOINING LETTER

(Annexure –V&VI)

Founder:
C. R. Narayana Rao
B.E., F.I.E., M.A.E., M.Cons.E., F.I.V.

Managing Directors:
Dr. C. N. Srinivasan
B.Tech., (Hons.), M.S. (ILL.), Ph.D., M.Am. Soc. C.E.,
F.I.E., F.I.V., Chartered Engineer-Regd. Architect
C. N. Raghavendran
B.Arch. (Hons.), M.Arch. (CALIF.), F.I.I.A.,
Intl. Assoc. A.I.A., Regd. Architect

C. R. NARAYANA RAO (CONSULTANTS) PRIVATE LIMITED



CIN: U01212TN1975PTC006890

Registered Office: No. 10, Karpagambal Nagar, Mylapore, Chennai - 600 004, India.
T: +91-44-43441100 F: +91-44-24991318 E: crn@crn.co.in W: www.crn.co.in

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Jan 22, 2021.

The Head of Department
Department of Architecture, School of Building & Environment
Sathyabama Institute of Science & Technology
No. 1, Rajiv Gandhi Salai, Jeppiar Nagar
Chennai 600 119.

Dear Sir / Madam,

This is to certify that **Ms AGHALYA DIVYA JYOTHI** (Regn. No.39840002) M Arch. 2nd Year, III Semester, student of your Sathyabama Institute of Science & Technology has successfully completed his practical training in our organization from 10th December 2020 to 20th January 2021.

During the above period, he was involved in the following project:

- 1) A project for Chennai Metro Rail Ltd, Nandanam, Chennai – Project consists of a High Raised Building, Basement + Ground + 12 levels and currently shell & core and civil works are in progress.

Ms AGHALYA DIVYA JYOTHI was actively involved the various construction management related activities in the above project during the said period.

Wishing her for success and future endeavors.

Thanking you,

Yours faithfully,

For M/s.C.R.Narayana Rao (Consultants) Private Limited


Authorized Signatory


Jan 22, 2021.

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Department of Architecture, School of Building & Environment
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MONTHLY REPORT

(Annexure –VII)



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DEPARTMENT OF ARCHITECTURE

M. Arch (Building management)

Continuous Assessment Report for Professional training

(Continuous progress report of the trainee architect/Project Manager for the period of 15 working days in the office to be submitted to HOD by the Trainee in Charge of the Organization)

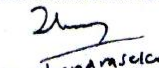
1. Name of the office / organization : CR Narayana Rao Architects
2. Address & Contact Number : no 10, Karpagambal Nagar, Luz, Mylapore, ch-600004
044 - 24991676
3. Name of the student : AGHALYA DIVYA JYOTHI VR
4. Duration : From 10.12.2020 To 24.12.2020
5. Total No. of days : 14
6. Evaluation of Performance criteria shall be on

* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted 40 marks by the department.

Description of works	Excellent	Good	Fair	Poor	NA
Understanding of office culture	✓				
Skillsets related to project management	✓				
Design Management		✓			
Understanding the Triple Constraints		✓			
Observation during Site Visits	✓				
Understanding of construction details	✓				
Understanding of Construction sequences	✓				
Site Supervision / Discussion with clients	✓				
Adherence to Time schedule	✓				
Quantitative aptitude	✓				
Documentation skills		✓			
Coordination with other consultants	✓				
Overall Grading*					

(A – 8.0, B – 7.0, C – 6.0, D – 5.5, E – 5.0, F – <5)

7. Any other Remarks :

8. Signature of the Head of the Office / Organization (With Seal) : 
(C.K. Chandrasekaran)
22/01/2021
A/P Projects



DEPARTMENT OF ARCHITECTURE

M. Arch (Building management)

Continuous Assessment Report for Professional training

(Continuous progress report of the trainee architect/Project Manager for the period of 15 working days in the office to be submitted to HOD by the Trainee in Charge of the Organization)

1. Name of the office / organization : CR Narayana Rao Architects
2. Address & Contact Number : no 10, Karpagambal Nagar, Luz, Mylapore, ch-600004
044 - 24991676
3. Name of the student : AGHALYA DIVYA JYOTHI VR
4. Duration : From 25.12.2020 To 20.1.2021
5. Total No. of days : 16
6. Evaluation of Performance criteria shall be on

* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month; which will be converted to the allotted 40 marks by the department.

Description of works	Excellent	Good	Fair	Poor	NA
Understanding of office culture	✓				
Skillsets related to project management	✓				
Design Management		✓			
Understanding the Triple Constraints		✓			
Observation during Site Visits	✓				
Understanding of construction details	✓				
Understanding of Construction sequences	✓				
Site Supervision / Discussion with clients	✓				
Adherence to Time schedule	✓				
Quantitative aptitude	✓				
Documentation skills		✓			
Coordination with other consultants	✓				
Overall Grading*					

(A – 8.0, B – 7.0, C – 6.0, D – 5.5, E – 5.0, F – <5)

7. Any other Remarks :

8. Signature of the Head of the Office / Organization (With Seal) : 
(C.K. Chandrasekaran)
22/01/2021
A/P Projects



WORK DIARY

(Annexure –VIII)

DAY	PROJECT NAME	WORK DONE	DAY	PROJECT NAME	WORK DONE
01	MHQ - Nandhanam	Site visit and site study	16	MHQ - Nandhanam	Monthly report - preparation
02	MHQ - Nandhanam	Joint inspection, checking of the plans as per execution, labour checking	17	MHQ - Nandhanam	Material inspection of LT cables
03	MHQ - Nandhanam	Labour checking and management	18	MHQ - Nandhanam	material checklist for arrival of steel bars
04	MHQ - Nandhanam	Inspection quality for reinforcement before concreting	19	MHQ - Nandhanam	Checking of reinforcement before concreting
05	MHQ - Nandhanam	Pour 4 - Shuttering and reinforcement for slab inspection and column curing checking	20	MHQ - Nandhanam	Labour checking and quality inspection
06	MHQ - Nandhanam	Tracking of daily activities and labour analysis	21	MHQ - Nandhanam	Beam bottom shuttering checking for pour 3
07	MHQ - Nandhanam	Weekly report preparation	22	MHQ - Nandhanam	Checking of site safety measures
08	MHQ - Nandhanam	Pour 3 - PT Stressing inspection Lift wall alignment and reinforcement checking	23	MHQ - Nandhanam	Labour checklist , concreting quality measurements, inspection during concreting
09	MHQ - Nandhanam	Collection of documents and tracking of daily activities	24	MHQ - Nandhanam	Concreting checking -pour 5 office area
10	MHQ - Nandhanam	Concreting of pour -4 (Quality and safety) 11 th floor	25	MHQ - Nandhanam	11th to 12th Floor Centre Tower (Pour 4) Area – Column Wall Reinforcement work in progress checking
11	MHQ - Nandhanam	11th Floor Centre Tower(Pour 3) Area – Reinforcement checking & Concrete work in checking Progress.	26	MHQ - Nandhanam	Quality checking of de shuttering works at auditorium area
12	MHQ - Nandhanam	Marking of drawing and handing over checking to JLL	27	MHQ - Nandhanam	Weekly report preparation
13	MHQ - Nandhanam	Checking of the marked drawing by JLL and tracking of activities at Pour 4 and Pour 3	28	MHQ - Nandhanam	Quality checking of concreting of 11 th floor slab , checking batching plant and quality tests
14	MHQ - Nandhanam	Tracking of daily activities - Pour 4 and 3	29	MHQ - Nandhanam	Checking of wall reinforcements
15	MHQ - Nandhanam	Collection of documents and tracking of daily activities	30	MHQ - Nandhanam	Safety inspection at JLL

Chief Architect Signature:

Office seal:

Consolidated Certificate (Experience)

Annexure – IX

Founder:
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Managing Directors:
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B.Tech., (Hons.), M.S. (ILL.), Ph.D., M.Am. Soc. C.E.,
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Authorized Signatory



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About the firm:

CRN Architects is an ISO-9001-2008 Certified firm of reputed architects and engineers in , chennai.They have done a major role in urban architecture and landscape in India and cities around the world.They provide innovative design solutions in architecture.In India each of their project stands as a unique monument. They have excecuted many ionic buildings in chennai such as (ITC Grand Chola, Aqua complex etc).

History of CRN:

CRN developed its expertise in industrial architecture,specifically the automobile, Auto Ancillary units, Textile and Sugar industries in association with pretigious names like Dunlop , Amalgamations group, TI group, Ashok leyland ,Ennore Foundries and the Rane group of industires.

It was also the perfect time to launch out into the middle east. CRN's overseas branch at UAE was an active participant in the growth of the United Arab Emirates , successfully executing several commercial , industrial and housing projects in Dubai, Abu dabi, Ras Al Khamiah.

Since the beginning of the nineties, CRN has made its presence Strongly felt in the sports Facilites sector having designed at least six sports stadium fro major sporting events , all conforming to international Standards.

Today CRN stands as a monument of trust that intergrates related areas of architecture to offer clients a superior experience at every stage in the life cycle of a project, from conceptualization through excecution to delivery.

Vision:

CRN provides a comprehensive range of services that includes planning architectural design, engineering and building services design , interior design and construction management to honor our services credo of 'concept of commissioning'. We aim to provide quality services by employing an tntgrated and innovative approach to design and project delivery. This furthur augmented to state-of-the-art computer aided design, drafting and computation.

Services:

- | | |
|--------------------------------|-----------------------------|
| ■ Architectural services | ■ Planning and urban design |
| ■ Interior design services | ■ Construction Management |
| ■ Engineering and MEP services | ■ Sustainable Design |

Awards

- Brookfields Mall - Images Shopping Centre Award 2012 in the category of Most Admired Shopping Centre of the Year: tNon - Metros - SOUTH.
- Certificate of Appreciation received from Toyota Kirloskar Motor in recognition of their Best Effort & Commitment for the successful completion of projects under the category of FACILITY FOR THE YEAR 2004.
- Mr.C.N.Raghavendran was conferred the distinction of being ONE OF INDIA'S TOP TEN ARCHITECTS AT THE CONSTRUCTION WORLD TOP ARCHITECTS AND BUILDERS AWARD - 2007
- Mr. C. N. Raghavendran was the recipient of the Indian Institute of Architects award for 'Excellence in Design' for Public Building category for the Jawaharlal Nehru Stadium at Chennai - 1995.
- Dr.C.N.Srinivasan was awarded the CNBC AWAAZ CRISIL REAL ESTATE AWARDS 2007 for Best Commercial Buildings.

Clients:

BIAL ELCOT APOLLO TIDEL PARK Ltd NIT TAFE INFOSYS WIPRO TCS TVS HCL MRF



BSNL Bangalore



NIIT



TCS



ZOHO Corp

General:



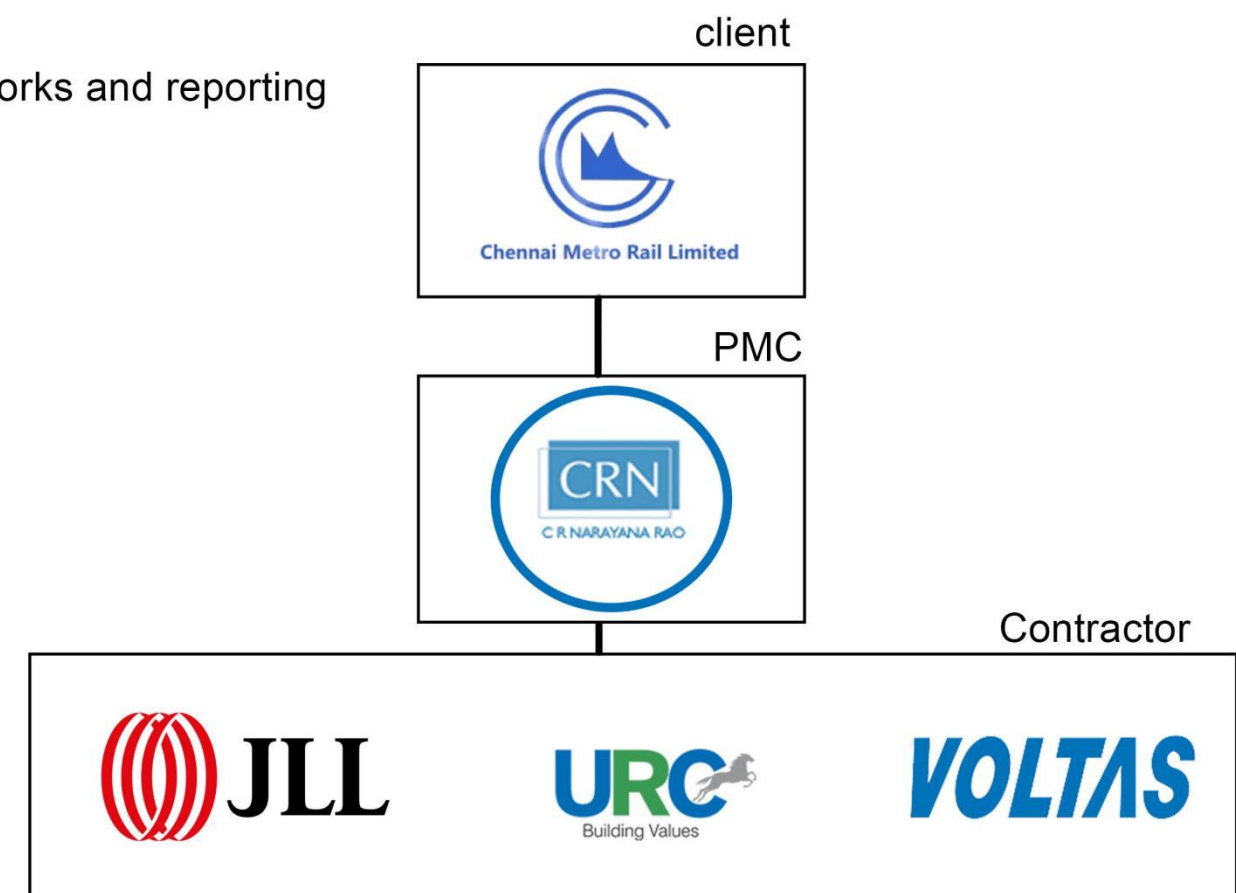
3

Responsibility as a part of CRN

- I was part of the CRN for 30 days and working with AVP.Chandersekar in the Metro headquartas building which is being constructed in Nandham
- I was working together with the site manager for managing the site works and reporting
- Was working under planning and tracking the work as per schedule

PROJECT DETAILS

METRO HEAD QUARTERS , NANDANAM , CHENNAI



Contract value Rs. 1,47,80,68,566/-

Contract type Item rate

Duration 4 years

Construction sequence

BUILT UP AREA

Residential -

Type A - 2571.54 sqm

Type B - 5340.96 sqm

Security -

Type 1 -116.96 sqm

Type 2 - 46.24 sqm

Utility

1058.62 sqm

MHQ (Metro head quarters)

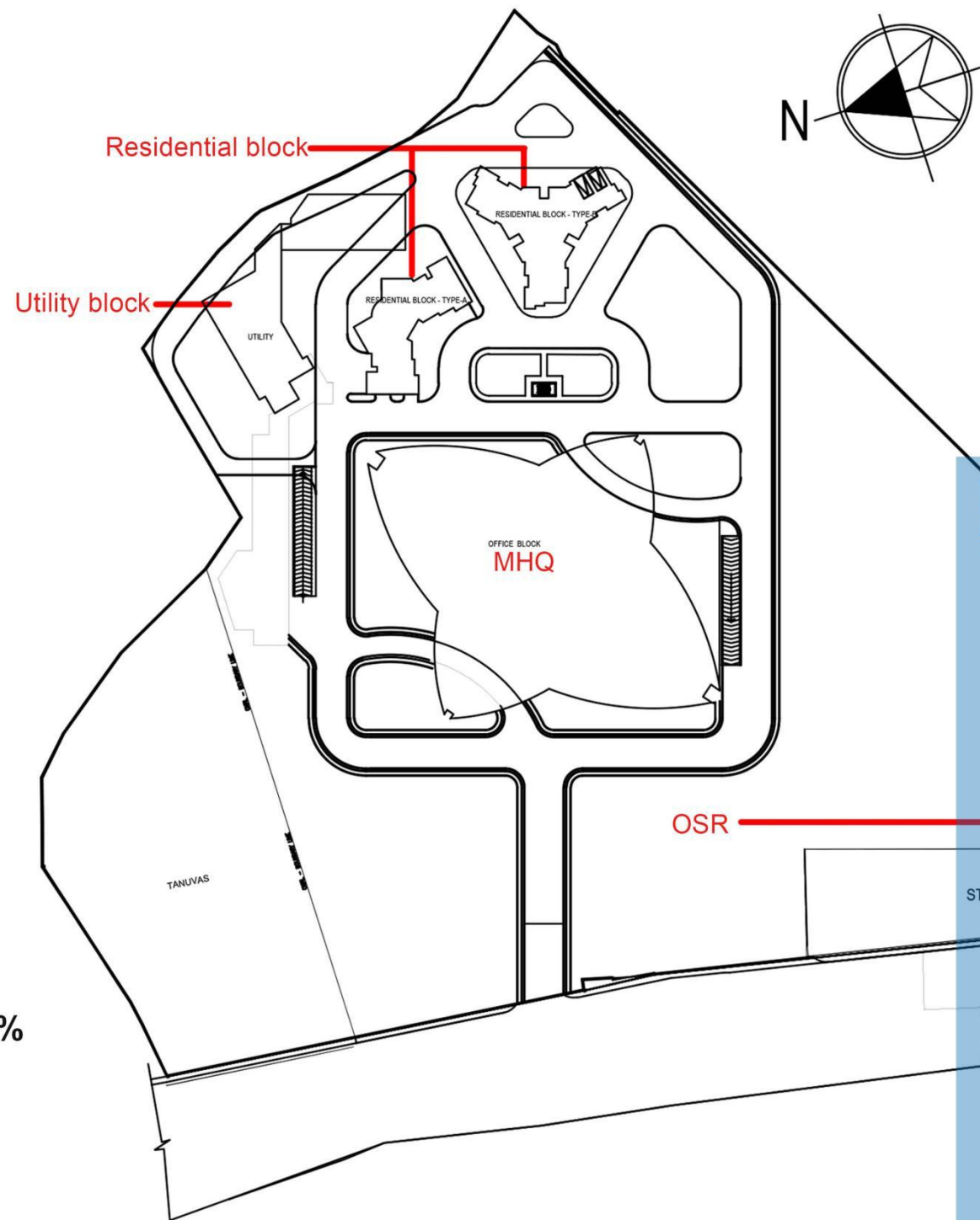
43352.97 sqm

TOTAL = 62663.99 sqm

FSI

Achieved FSI Area =
41237.79 / 36265.65 = 1.14

Plot coverage =
4061.75 / 36265.5 = 11.20 %



STATUS OF THE PROJECT

The status of the work as on 20-01-2021 is:

MHQ :

Basement, ^{OS}Shell and core development completed till 11th floor

RESIDENTIAL:

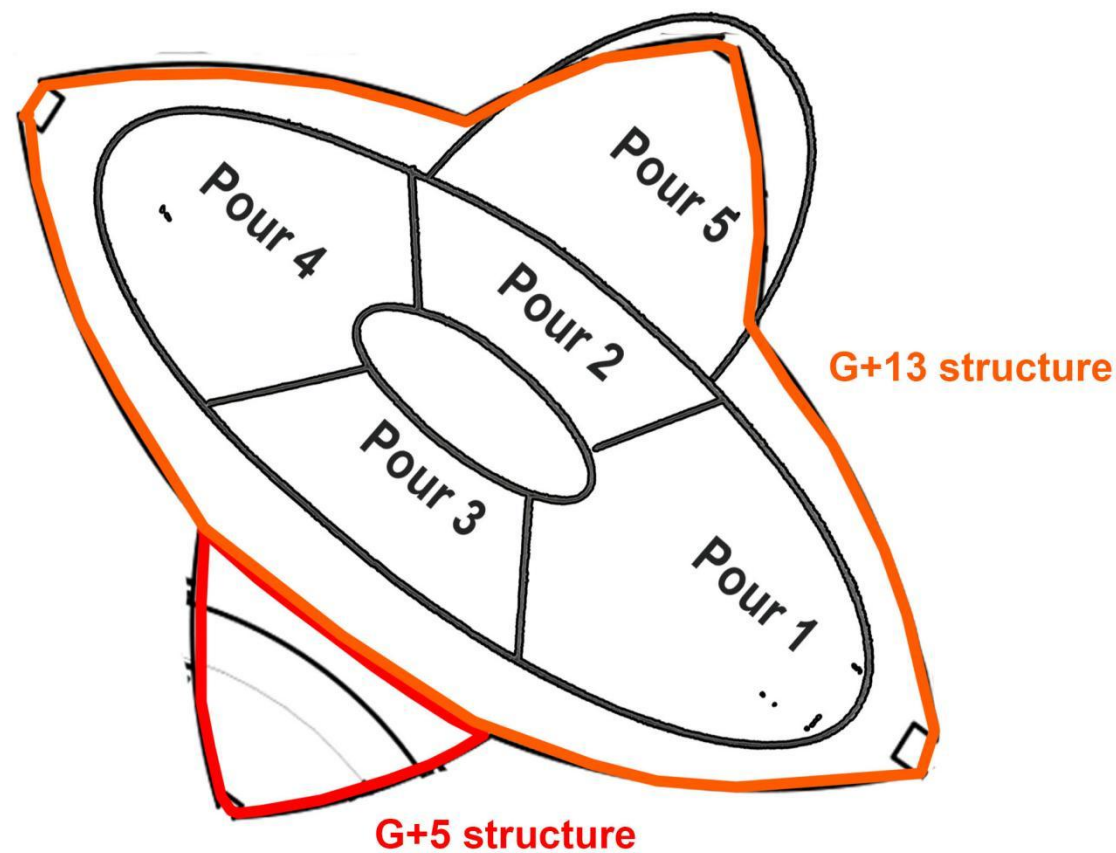
Type A : G+5 Completed in all aspects

Type B : G+9 Completed in all aspects

External development completed

Utility building G+1 completed UG Sump , sewer line and metro water connection are completed

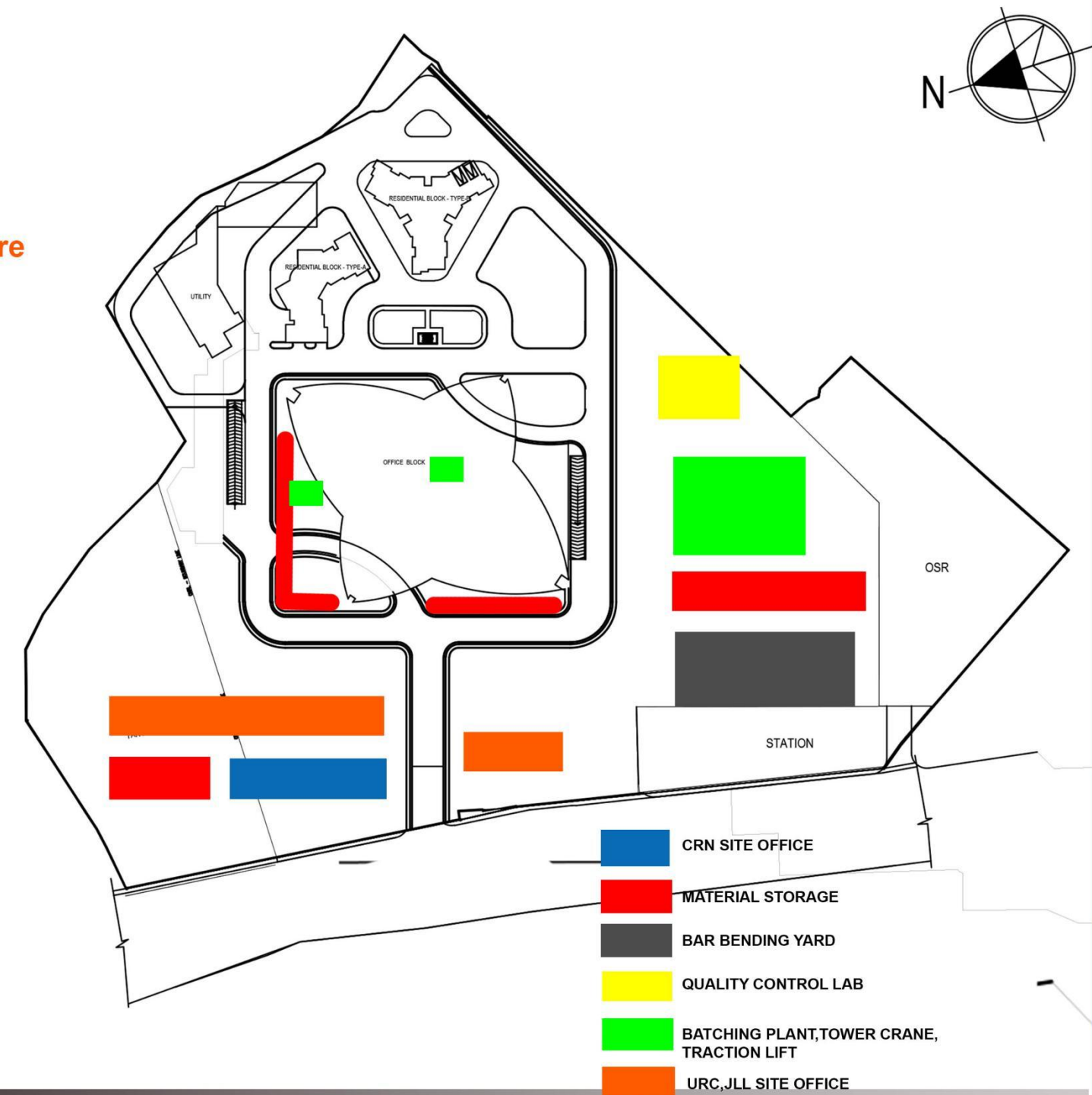
S.NO	DESCRIPTION	COMMERCIAL AREA	COMMON AREA (sqm)	PARKING AREA (sqm)	TOTAL BUILDING AREA (sqm)
1	Basement floor	—	457.6	8539.13	8996.74
2	Ground floor	3411.2	369.99	—	3781.99
3	First floor	2750.81	1010.39	—	3781.2
4	Second floor	3115	666.2	—	3781.2
5	Third floor	2535	1245.84	—	3481.18
6	Fourth floor	2657.3	1123.89	—	3781.19
7	Fifth floor	2630.26	409.85	—	3040.11
8	Sixth floor	2630.26	409.85	—	3040.11
9	Seventh floor	2630.26	409.85	—	3040.11
10	Eighth floor	2630.26	409.85	—	3040.11
11	Nineth floor	2630.26	409.85	—	3040.11
12	Tenth floor	2630.26	409.85	—	3040.11
13	Eleventh floor	2630.26	409.85	—	3040.11
14	Tweleth floor	2630.26	409.85	—	3040.11
15	Terrace floor- head room	0	88.03	—	88.03
16	Terrace floor-OHT	0	38.1	—	38.1
	TOTAL	35531.73	7821.24	8539.13	43352.97



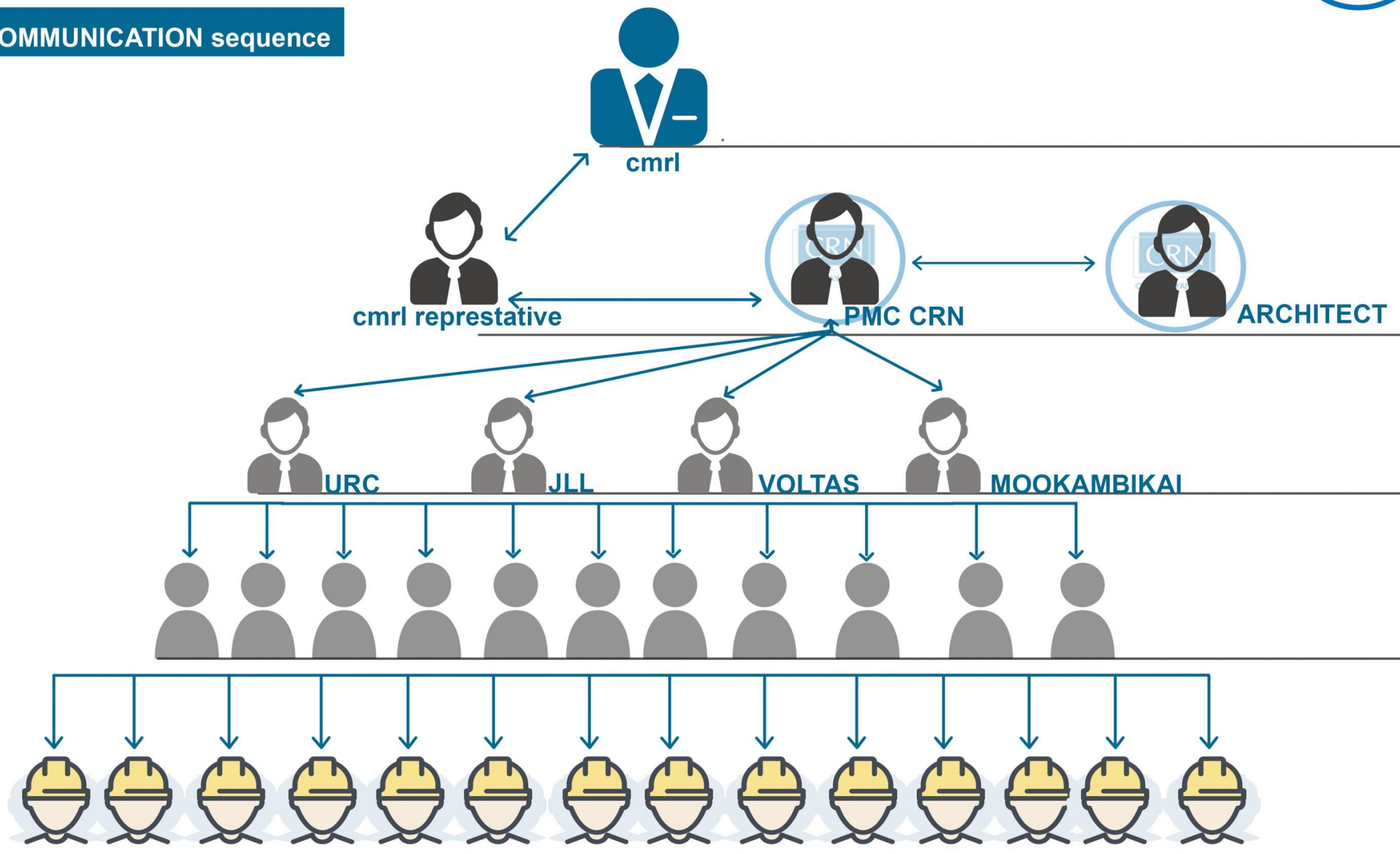
The construction of the floor plate is divided into 5 pours
Since it a typical floors, the management of time and materials can be much better way

Once the pour 1 is completed in one floor, it is shifted to the next floor, so that the time can be reduced

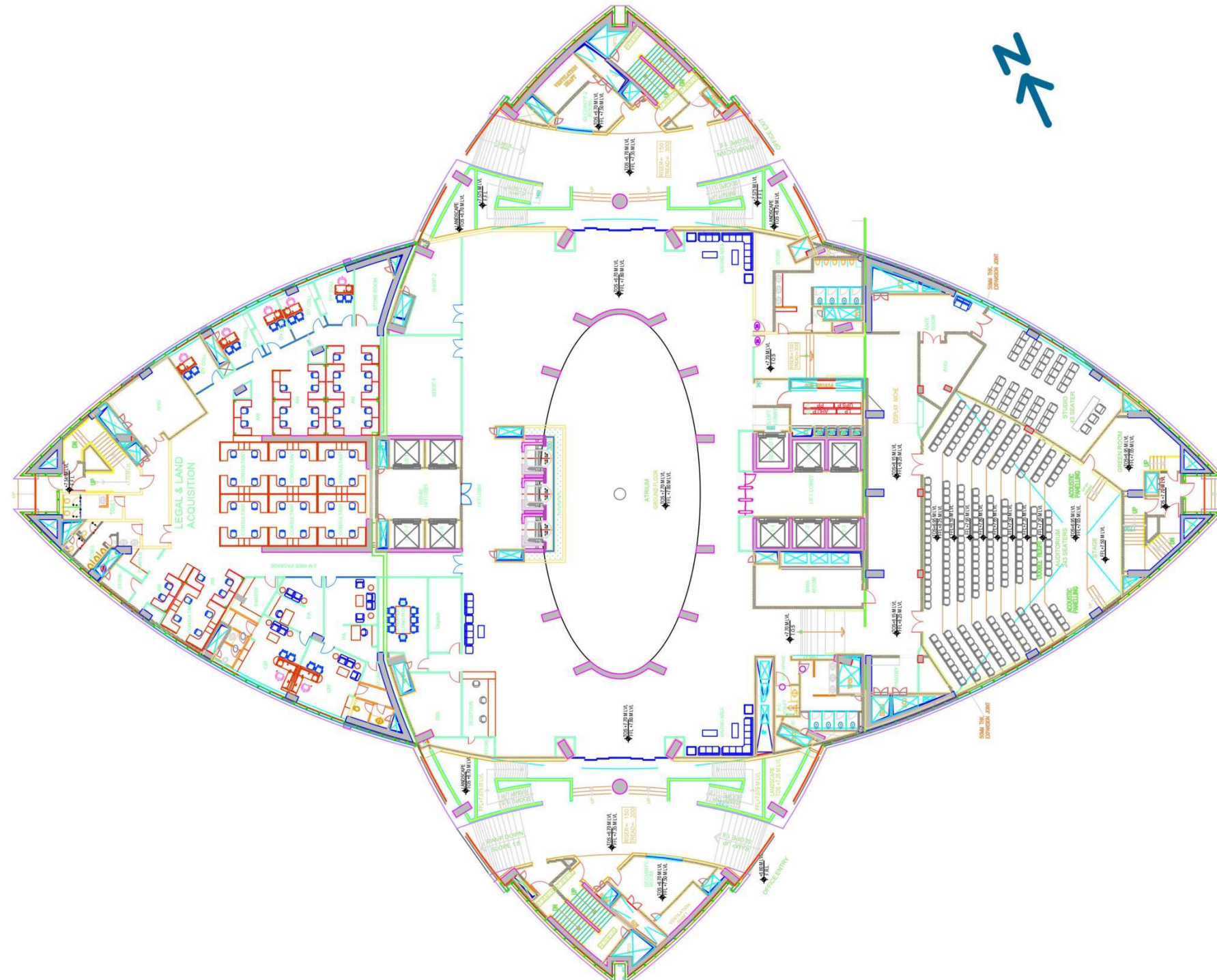
pour 1 is done first and pour 2,3 is done simultaneously and then the pour 4



COMMUNICATION sequence



Plans



GROUND FLOOR PLAN

The MHQ is a G+12 with one basement , It is piled structure Total 832 piles of 3 different sizes:450mm,600mm,1000mm

The basement has been divided as tower and non tower area for pile cap with raft concreting M25 concrete for pile

The basement has been divided into grids and worked for easier completion of work.

SEQUENCE:

AWARD OF WORK MOBILISATION CONSTRUCTION FINISHING HANDING OVER

EQUIPMENTS
MAN POWER
MATERIALS

RELEASE OF
DRAWINGS

SUB STRUCTURE

PILE
RETAINING WALL
BASEMENT

SUPER STRUCTURE

POURS

COLUMN
BEAM
SLAB

SUB STRUCTURE FOUNDATION PREPARATION WORK

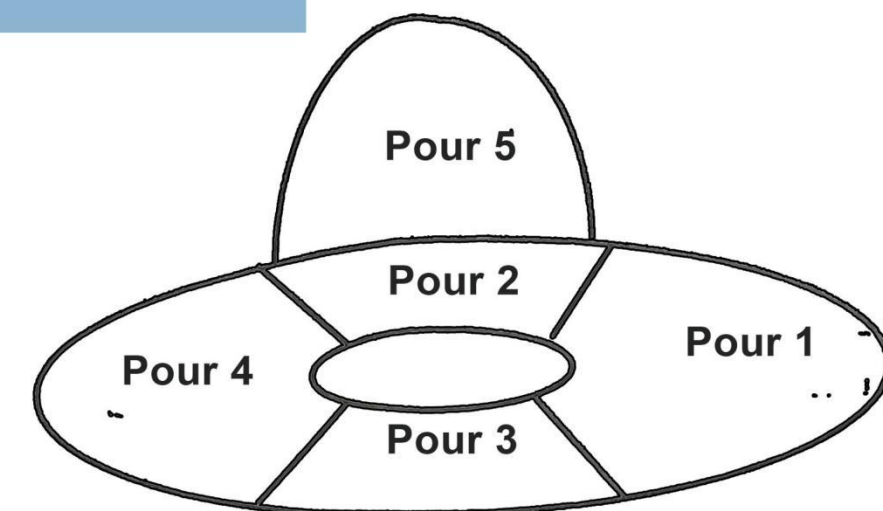
Marking out for excavation

Excavation of earth

Checking of levels

Levelling

Compacting



Construction sequence



PILE WORK

Marking of pile
Excavation
Anti termite solution
Reinforcement
Concreting
Block work for pile
Shuttering for raft

Filling and pcc for raft

Base plastering
Water proof coating

Protective plastering

RETAINING WALL

Reinforcement steel works
Shuttering works
Joint grouting

External water proofing

Plastering
Backfilling

BASEMENT FLOOR SLAB

Column

Level marking
Column starter
Vertical reinforcement and lateral ties
Shuttering oil
Shuttering fixing
Tie rod fixing with PVC pipes
Ring nut and wallers for support
Concreting
Vibrating

De-shuttering in 24 hrs
curing

Beam - PT

Level checking of column
Support fixing - scaffolding ,U jack, Runner , aluminium doka , RHS
Shuttering for beam bottom - plywood shuttering
Formwork oil

Beam bottom reinforcement
2nd layer of reinforcement

PT insertion

Additional rod , stirrups and cover block
Side shuttering
Nailing the formwork
Instering tie rod with PVC

Concreting
Level checking
De-shuttering after 7 days
Curing

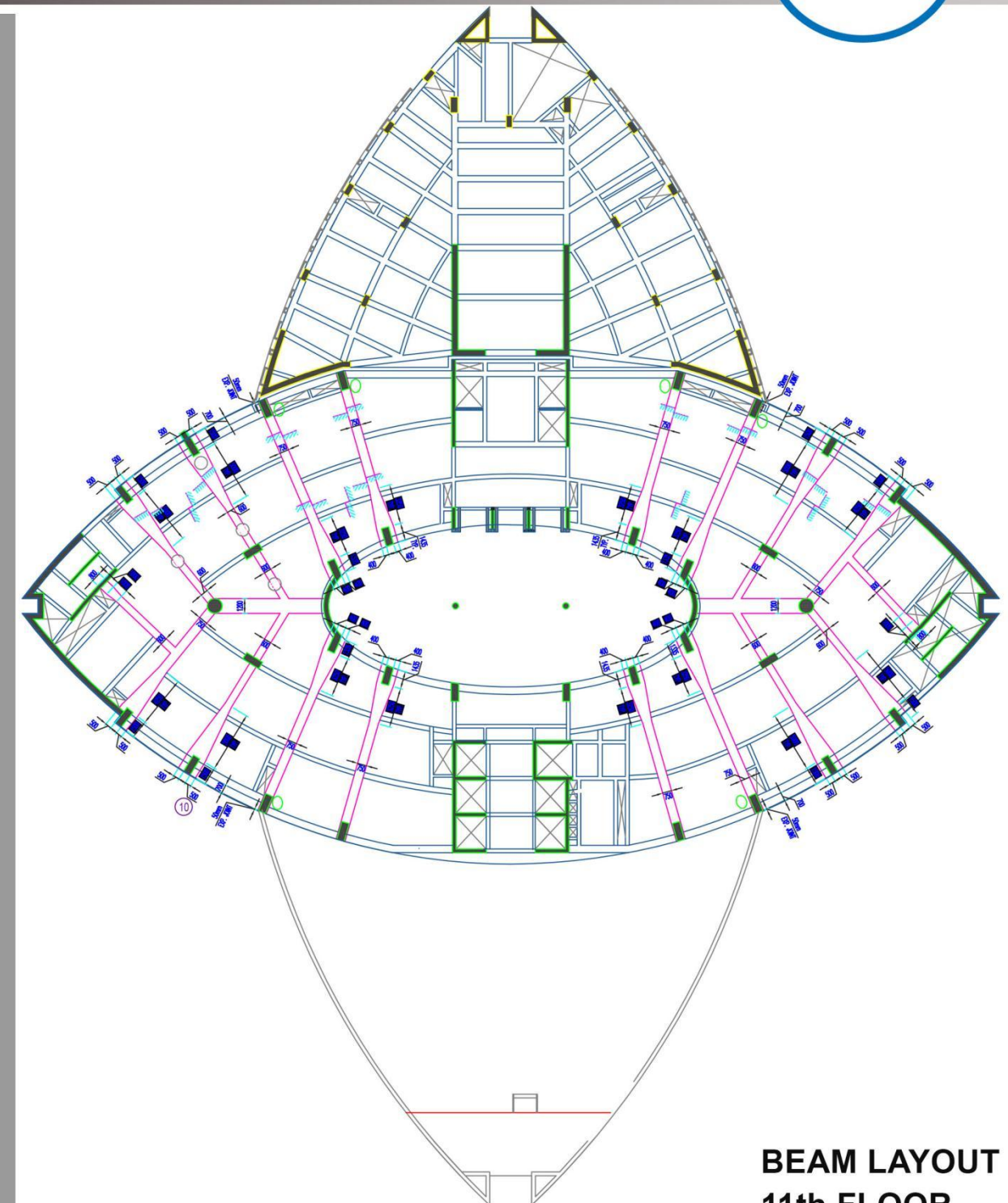
Construction sequence

Slab

Slab bottom shuttering oil
 Slab bottom shuttering
 Level checking
 Bottom matt reinforcement
 Top matt reinforcement
 Cover blocks
 Filling of the gaps with cellotapes
 Filling of the gaps with cellotapes
 Cleaning with blower / compressor
 Concreting
 De-shuttering
 Curing
 Scaffolding removal

Staircase

Staircase wall marking
 Starter
 Fixing of reinforcements
 Shuttering oil
 Fixing of shuttering
 Tie rod fixing
 Shuttering for staircase
 Concreting
 De-shuttering
 Footer and header



**BEAM LAYOUT
11th FLOOR**

Post Tensioning

Laying aluminium duct beam

Inserting PT Rod

Pipe for grouting

Fixing thermocol at the end
for PT grouting

Fixing thermocol at the
end for PT grouting

Stressing of tendons
and packing after 7
days of concreting

Grouting after 2 days
of stressing

Before concreting activities

Sieve analysis

Density check of aggregates

Density check of M-sand

Checking of calibration cer-
tificate of batching plant

Checking of manufacturing
date of cement

Checking of moisture

Checking of PH Value of water

Mix design approval by third
party

During concreting activities

Level checking

Vibrating

Post concreting activities/sequence

cube test

curing

Compressive strenght
test

Construction sequence

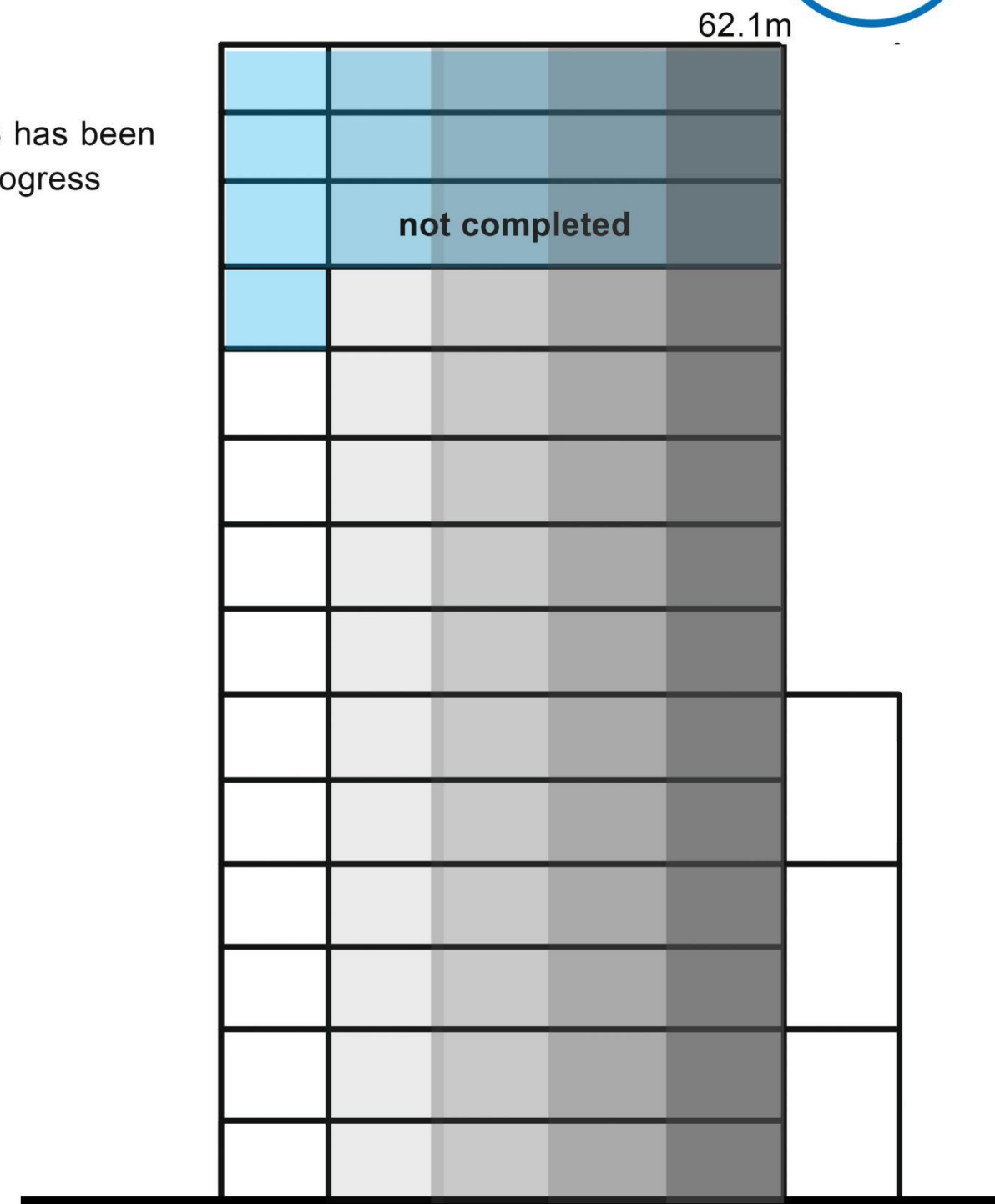
Status of the project in 10-12-2020

The status of the project is - till 10th floor slab pour 1 , pour 2 , pour 3 has been completed, pour 4 yet to complete , and office area column work is in progress

Each floor is 2.4m height
Ground floor , first floor and second floor height is
5.2 m

The activities to be completed between
10-12-2020 TO 20-1-2021:

S.no	Activity	Completion date
	11th FLOOR SLAB	
1	Roof Slab - Centre Tower (Pour-3)	09-12-2020
2	Roof Slab - Centre Tower (Pour-4)	24-12-2020
3	Roof Slab - Office Area	03-01-2021
	12th FLOOR SLAB	
4	Roof Slab - Centre Tower (Pour-1)	17-01-2021
5	Roof Slab - Centre Tower (Pour-2)	04-01-2021
6	Roof Slab - Centre Tower (Pour-3)	28-01-2021



Materials:

MTC-Manufacturing test certificate is important for material purchase

CEMENT:

Brand name: Ultratect Cement

Cement type: Ordinary portland cement

Grade 53 TS 12269

Setting time: Initial setting time 30 mins

Final setting time 600 mins

ISI Code must in the cement bag

1 kg :Rs.7

1 Bag :50Kg

Colour : Light Grey

Have to Check the Manufacturing Date(expiry date 3 months from the manufacturing date) if exceeded lumps formations occurs and the strenght of the cement reduced 10%

size :90 microns

1 kg of cement call fill 225sqm

STEEL:

Density : 7850 Kg/m3

Grade of steel: Fe 500D (Fe-Iron,D-Ductility)

Third part test for the following is done

-Physical test

-yeild test

-Tensile strenght

-Elongation test

-weight per kg

-Chemical test for

-carbon

-Sulphur

Phosphorus

COARS AND FINE AGGREGATE:

Coars Aggregate: 12mm
20mm

Fine Aggregate: 40mm

The Quality engineer visits the Quarry located in Ennore the physical and chemical properties of the materilas is checked by the third party

SIEVE ANALYSIS FOR COARS AGGREGATE		
Size of sieve	Passing %	Graded
12mm	93.10%	90-100%
10mm	59%	40-855
4.75mm	2.40%	0-10%
PAN	0	0
SIEVE ANALYSIS FOR FINE(M-SAND) AGGREGATE		
Size of sieve	Passing %	Graded
4.75mm	94.80%	90-100%
2.36mm	81.40%	60-95%
1.18mm	58.30%	30-70%
0.600mm	35.10%	15-34%
0.300mm	10.30%	5-20%
0.150mm	0.90%	0-20%
0.075mm	0.30%	-
PAN	0	

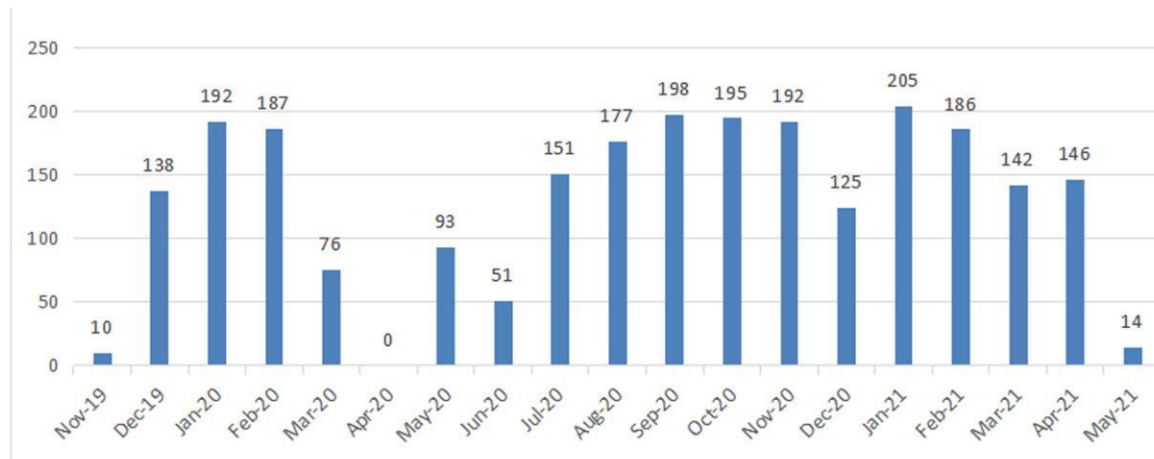
General:



la

WEEK PLAN						
S.No	Description of Items	Unit	Qty	Productivity as Per IS7272	No of Workers Req	No of Workers req per day
1	Shuttering of Column & Wall	Sqm		1.705	0	0
2	Shuttering of Slab	Sqm		1.946	0	0
3	Shuttering of Staircase	Sqm		1.735	0	0
4	Reinforcement of Column & Wall	MT		0.075	0	0
5	Reinforcement of Slab & Beam	MT		0.075	0	0
6	concrete For Column & Wall	Cum		2.2	0	0
7	Concrete For Slab	Cum		2.6	0	0

LABOUR HISTOGRAM



S.No	Description of Items	Unit	Qty	Productivity as Per	No of Workers Req	No of Workers req per day
1	Shuttering of Column & Wall	Sqm	74.83	1.705	44	7
2	Shuttering of Slab	Sqm	177.81	1.946	91	15
3	Shuttering of Staircase	Sqm		1.735	0	0
4	Reinforcement of Column & Wall	MT	3.654	0.075	49	8
5	Reinforcement of Slab & Beam	MT	7.08	0.075	94	16
6	concrete For Column & Wall	Cum	16.34	2.211	7	1
7	Concrete For Slab	Cum		2.6	0	0

8.12.2020-14.12.2020

S.No	Category of labour	Unit	Planned Man Days	Deployed Man Days	% of Achievem ent
1	Mason	Days	33	21	65%
2	Unskilled	Days	169	147	87%
3	Carpenter with helper	Days	700	697	100%
4	Barbender with helper	Days	448	422	94%
6	Scaffolder	Days	35	42	120%
7	Painter	Days		11	0%
8	Fabricator & Welder	Days	13	13	100%
9	Mechanic	Days	0	0	0%
10	Firefighting	Days		0	0%
11	Driver	Days		0	0%
12	Rigger	Days		0	0%
13	Operator & helper	Days		0	0%
14	Pipeline	Days	33	34	105%
15	Electrical	Days	21	36	171%
16	Sub Contractor		60	26	43%
17	Chipper				
18	Sewer Line				
TOTAL		Hrs	1511	1449	96%

During construction phase is the most critical phase of quality control. This is ensured by allotting responsibilities to concerned engineers with commensurate authority and supervisors with commensurate authority at execution and closely monitored by execution in-charge and QA/QC Engineer to ensure a total quality product at all times

THE MAJOR ACTIONS INVOLVED ARE:

Identifying the project defects and immediately taking corrective actions

Doing the quality assurance lab tests as per quality plan in QMS

Documentation in all areas of construction

Reporting to HO And Management

Internal quality audit

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Daily inspection by QC Engineer and Site manager who is an representative of CRN , visits the site and check for defects during the process . And the defects are documented and rectified

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The QC Lab is established in the site near the batching plant .The room size is about 10*20

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For cement, sand, metal, soil, concrete, Bricks – tests are done in site. for water and reinforced steel tests materials have been taken outside and Third party tests are done.

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Reporting to HO and management:

- a. Quality control report
- b. Raw materials defects report
- c. Fortnightly report
- d. Unproductive works report

Quality :



Role of quality manager:

Inspecting whether the works are done according to METHOD STATEMENT.

Proper documentation of records

Regular inspection of finishing work

Calibration date of the testing equipments

Periodical testing of all materials as per the contract

To ensure the materials received are satisfying the IS requirements

Educate the site engineers on how to avoid honey comb and to maintain verticality of columns

Should send reports to HO in daily and Monthly basis

Cube test as required (7 days/28 days) are conducted on regular basis in site laboratory

Should report the climatic conditions to the site manager prior concreting

QUALITY CHECKLIST FOR REINFORCEMENT:

- Beam reinforcement checked as per Drawing - numbers and size of main bars, stirrups
- Slab reinforcement checked as per Drawing - numbers and size of main bars, stirrups
- Checking of Straightening and alignment of the steel bars
- Checking of lap length and lap position as per structural drawings
- Checking the provisions of Dowels for support
- Checking the provisions of cover blocks
- Checking the provisions stirrups at correct spacing
- Checking the spacing between the slab reinforcement in top and bottom matt



Quality :

- Before concreting the slabs and reinforcement are cleaned with the help of a compressor



- Should ensure any deviation from communicated by the client
- Whether proper weldin works are done
- Check all the rods properly tied with binding wire
- Whether reinforcement are placed over a wooden plank
- Whether chair rods are provided in roof slab

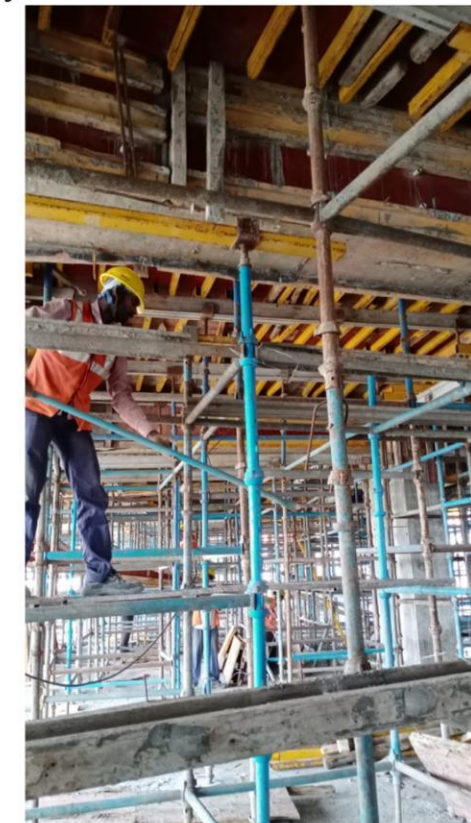
QUALITY CHECKLIST FOR DESHUTTERING :

After pouring the concrete, the cubes will be tested after 7 days and the average compressive strength required on 7 days (2/3rd of the required compressive strength) will be confirmed at lab.

Once the cube achieves the above said strength all the area are de shuttered except the beams spanning more than 4.5m and cantilevers.

In beams TCup lock verticals, ISMC are removed but the additional supports (adjustable props) and the beam bottom boards are left undisturbed.

After 14 days of pouring the concrete the adjustable props and the bottom boards in the remaining area are de shuttered completely.



Quality :

Tolerance on placing of Reinforcement:

Unless otherwise specified by engineer in charge, the reinforcement shall be placed within the following tolerances:

a) For effectiveness depth 200 mm or less -- (+) / (-) 10 mm

b) For effective depth more than 200 mm -- (+) / (-) 15 mm

QUALITY CHECKLIST FOR POST TENSIONING

Totally there are 21 PT Beams

CHECKING OF POST TENSIONED BEAMS ;

Inspection of the quality of material for coil and strands

Inspection whether the ducts are layed in position as per drawings

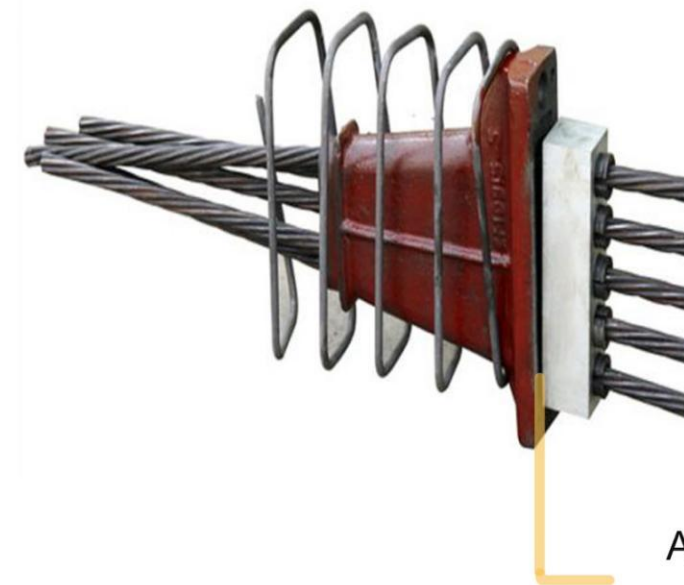
Checking whether all the ducts joints are taped

Checking whether all the Stressing anchorage components are provided

Inspecting whether the grouting pipe is installed and sealed with cellotape

Checking of any damage in the coil and and pipes

Ensuring the thickness of GI Duct(0.3mm) standard



Anchorage bearing plate

CONCRETING :

Pouring concrete shall be done when the reinforcement and Post-tensioning components are completely installed

Duct for tendons shall be observed during concreting. Any misalignment of duct shall be rectified.

After concreting is complete the concrete should be cured as appropriate until the specified strength has been attained prior to stressing operation

Quality :

STRESSING :

Cleaning of strand prior stressing

Stressing is done only when the concrete has achieved the required compressive strength

Checking of the stressing equipments

Color marking the stressed area

The elongation is observed and recorded once the stressing is done

The elongation as measured should be verified with theoretically calculated

After the elongation has been approved the strand should be cut by abrasive disc

GROUTING:

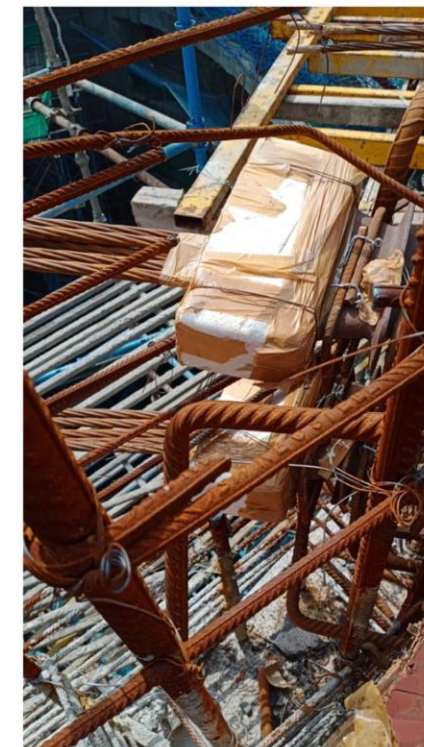
Grouting is done after 1 days of stressing of beams

Inspecting the ratio of cement slurry for grouting (the standard ratio is 1:2)

Inspecting the ratio of admixture (the ratio of admixture used here is 0.4%
For 50kg of cement 22.5 lt of water is used)

The flushing is done prior to grouting in order to prevent blockage while grouting

After grouting is completed the projected projection of grout vent should be cut flat by means of abrasive discs



Quality:



Work Item & Inspection Schedule			Required values	Frequency	Inspection Witness (W) & Hold Point (H)				Records	Remarks
Sl No	Work Item	Application of Standards & Documents			CCCL		GC			
					Inspection Point	Performed by	Inspection Point	Performed by		
1	Preparation Work									
a	Approval of survey and setting out	Approved construction drawings	Nil tolerance	Each Element	H	Surveyor	W	ER	Site Register	
2	Reinforcement									
a	Installation of reinforcement with necessary hooks, laps, etc.	Construction drawings	Approved drawings and reinforcement record	Each Element	H	Site engineer	W	ER	As per BBS	
	Check for cover distance & of spacing ties	Construction drawings	Approved drawings and reinforcement records	Each Element	H	Site engineer	W	ER	As per BBS	
3	Formwork									
a	Verticality Check	IS 4990	12mm	Each Element	W	Site engineer	W	ER		
b	Support Check	IS 806, 1161,1239, 2750		Each Element	W	Site engineer	W	ER		
4	Concrete									

a	Slump before pour	IS 456	80 to 130mm	Each supply	W	QA/QC	W	ER	Concrete Pour card	
b	Casting of Concrete Cube samples	IS 456	As reqd.	Each set	W	QA/QC	W	ER	Site Cube register	
c	Compression strength of cubes	IS 456	As per design mix	Each set	W	QA/QC	W	ER	Test report	
d	Concrete pour record	Concrete pour card & Method statement		Each Element	W	Site engineer	W	ER	Concrete Pour card	
e	Curing	CMRL -EAS 06 Vol.5 OCS Sec1.5.11.6	Physical/Visual	100%	W	Site engineer	W	ER	Curing Register	

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Safety :



All the safety standards are according to ISO8001

DAILY ACTIVITIES:

Tool box meeting :

Description about work at height
Description about scaffolding fixing
Description about electrical safety
Material handling and house keeping
Lifting equipments
Description Chemical handling safety

Work related training:

Work related training are given to the employees for all kinds of work

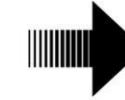
DAILY PERMIT:

Daily permit shall be provided to labours
Night permit to carry out work at night

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Night permit to carry out work at night

PERMIT ISSUER
CRN



PERMIT RECEIVER
URC

External audit

Monthly once by
URC TO CMRL

Internal Audit

Weekly check
by URC TO CRN

3 Months once external audit done by CMRL approved agencies

Once all these audits are done it is documented and submitted to CLINET



SAFETY
MEASURES

