



Project Brief

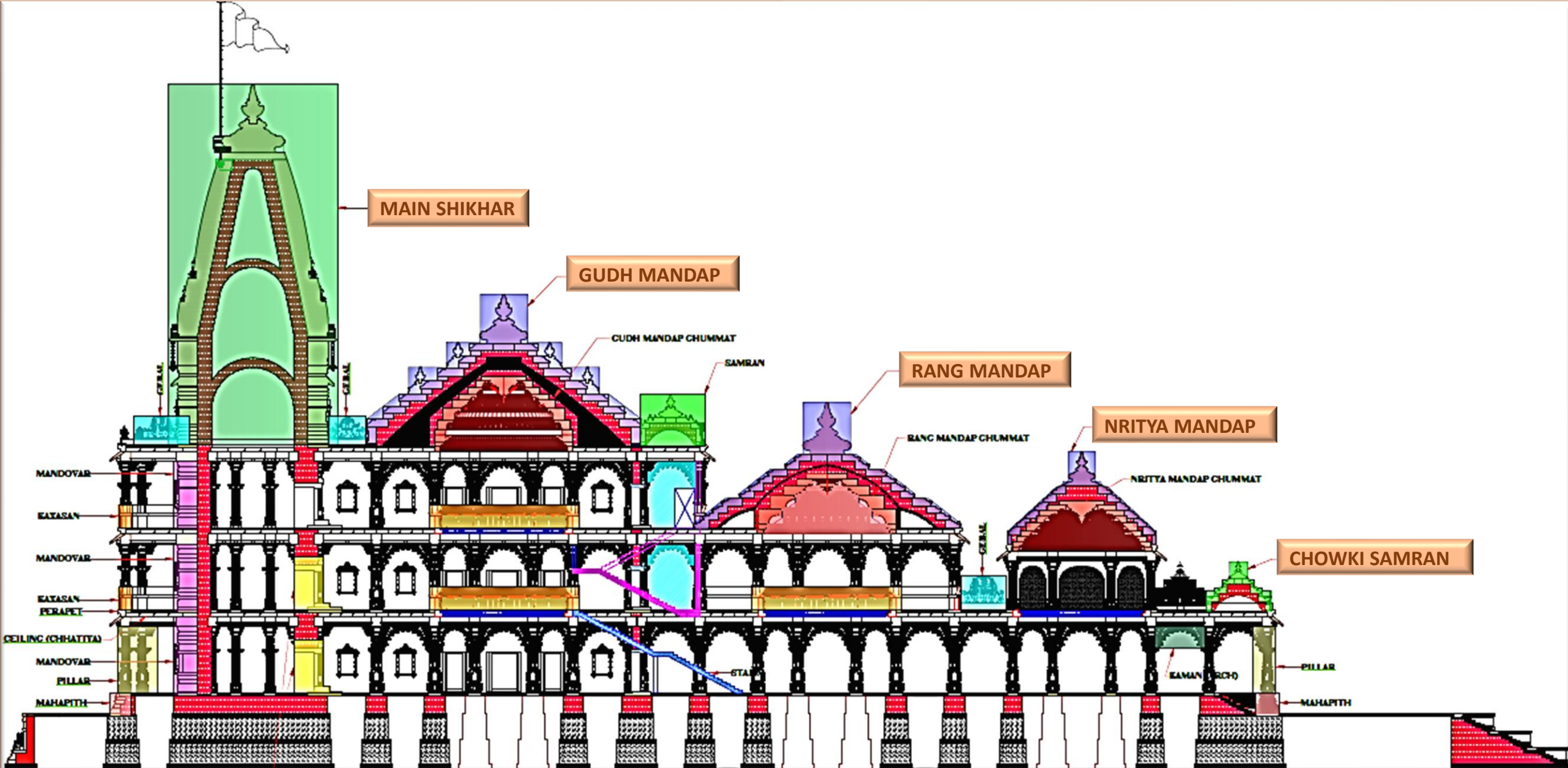
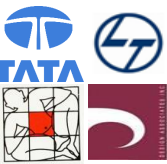


	Description
Project	Development of Shri Ram Janmabhoomi Mandir at Ayodhya
Client	Shree Ram Janmabhoomi Teerth Kshetra Trust (SRJBTKT)
PMC	TATA Consulting Engineers Limited (TCE)
Architect	C.B. Sompura Mandir Architecture
Master Planning	Design Associates Inc. (Master Planning & Arch. Design services)
Contractor	Larsen & Toubro Limited (L&T) (Design & Build)
Project Duration	36+3 Months, Aug' 23 (Expected Completion by Dec 2024)
Project Budget	Part A – Budgeted Rs.1200 Crs. (Excluding Taxes, Consult. and Arch. Fee)
Total Land	67.7 Acres
Proposed Temple Area	Part A: @ 18.24 Acres
Temple Size	108m x 75m x 49m height



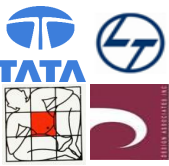


Longitudinal Section



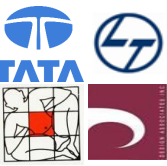


Entrance of Pilgrims Facility Centre (PFC) Building 3D View with Security Checks & Baggage Scanning



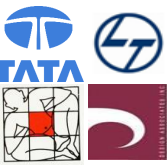


Site Plan- View from East





Mandir- Views from Different Angles





Salient Features

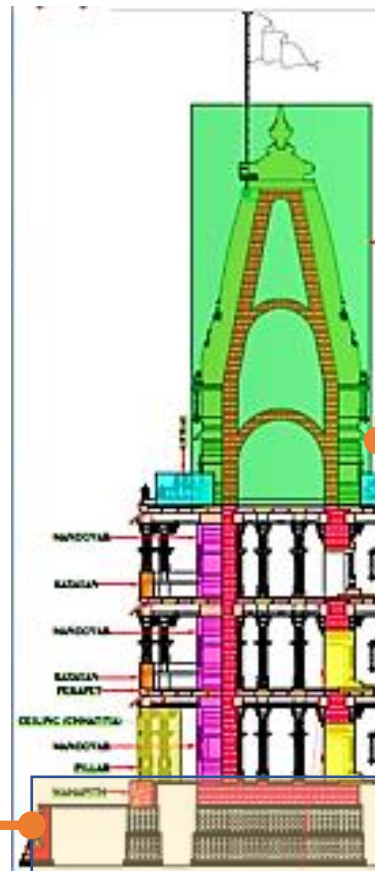


PLINTH

- Granite of Big size
- 1490 x 740 x 900, 1490 x 1115 x 900, 2240 x 740 x 900, 2240 x 1115 x 900, 1490 x 590 x 900, 2990 x 740 x 900, 1490 x 890 x 900
- Top of Plinth will be +114.046 M
- Total 17005 nos. of blocks
- Cut to size granite total 1300 Nos. of blocks. (Additional)

EXCAVATION & BACKFILL

- Excavation: Open excavation @ approx. 12/ 14 M depth i.e., +94.19/ +92.19 M level. (1,82,000 Cum)
- Engg Backfill: up to +106.19 M level. (1,32,000 Cum).
- Backfilling – Selected/ Available Soil



RAFT

EXCAVATION & ENGINEERED BACKFILL

SUPER STRUCTURE

- Mandir- 380 ft X 250 ft, Shikhara - 161 ft.
- Bansi Paharpur – Pink Sandstone 4,73,476 Cft
- Total Nos. of pillars – 392 nos. (GF-166 Nos, FF-144 Nos. SF-82 Nos).
- Floor to Floor Height - 19'11"
- Carving in stone – Before & after installation.
- Elements within Garbhagriha- Pillars & Cladding with Makrana Marble (14,662 Cft).
- Flooring- Makrana Marble with inlay work (95,358 Sqft)
- Wooden Doors- 42 nos.
- Red Bricks- 11,00,000 nos.
- Copper Pins and Strips – 28 MT

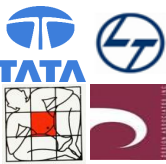
RAFT

6,290 sqft PCC raft 1.5m thick; Qty 9,453 Cum; Top of Raft level is +107.69 M





Project Brief

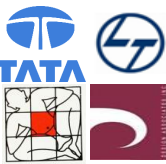


- The proposed temple area is situated on the banks of River Sarayu (Approximately 1km from the riverbank).
- The temple is designed by a specialist Architect Consultant, as a Traditional structure, in a Nagara style of Temple architecture.
- The Parkota around the boundary of the temple will have temples of 06 Nos. Gods and Goddesses.
- The Temple structure shall be integrated with the Shri Ram Janmbhoomi Complex Master plan.
- The temple will be constructed using traditional stone made up of sandstone, Granite, Mirzapur stone and Makrana Marble for flooring and cladding.
- The structural elements are joined together by tongue and groove joints with copper pins and strip. Its dimensions are approx. 380x250 feet. The main Shikhara over Garbhagriha is 161 feet high.
- Finalization of Structural Stability analysis & Integrated Structural analysis by M/s L&T, TCE, Architect and CBRI Roorkee





Brief Description - Foundation

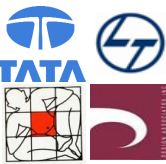


- **Requirement:** No use of iron in foundation,
- Design life of Mandir - 1000 years
- Differential settlement between two columns is Negligible.
- No exposed concrete above ground level.
- **Foundation-** Geotechnical findings showed presence of cultural materials upto depth of 8-11m.
- Properties of existing **cultural material in sub soil** couldn't be predicted with certainty
- Seismic forces were expected to be amplified in top 8-11m layer.
- After **analysing Case studies, primary and secondary research**, onsite survey and review of the **Architectural drawings, pile foundation was not advisable.**
- Retaining wall was designed to retain the earth of courtyard of Mandir.

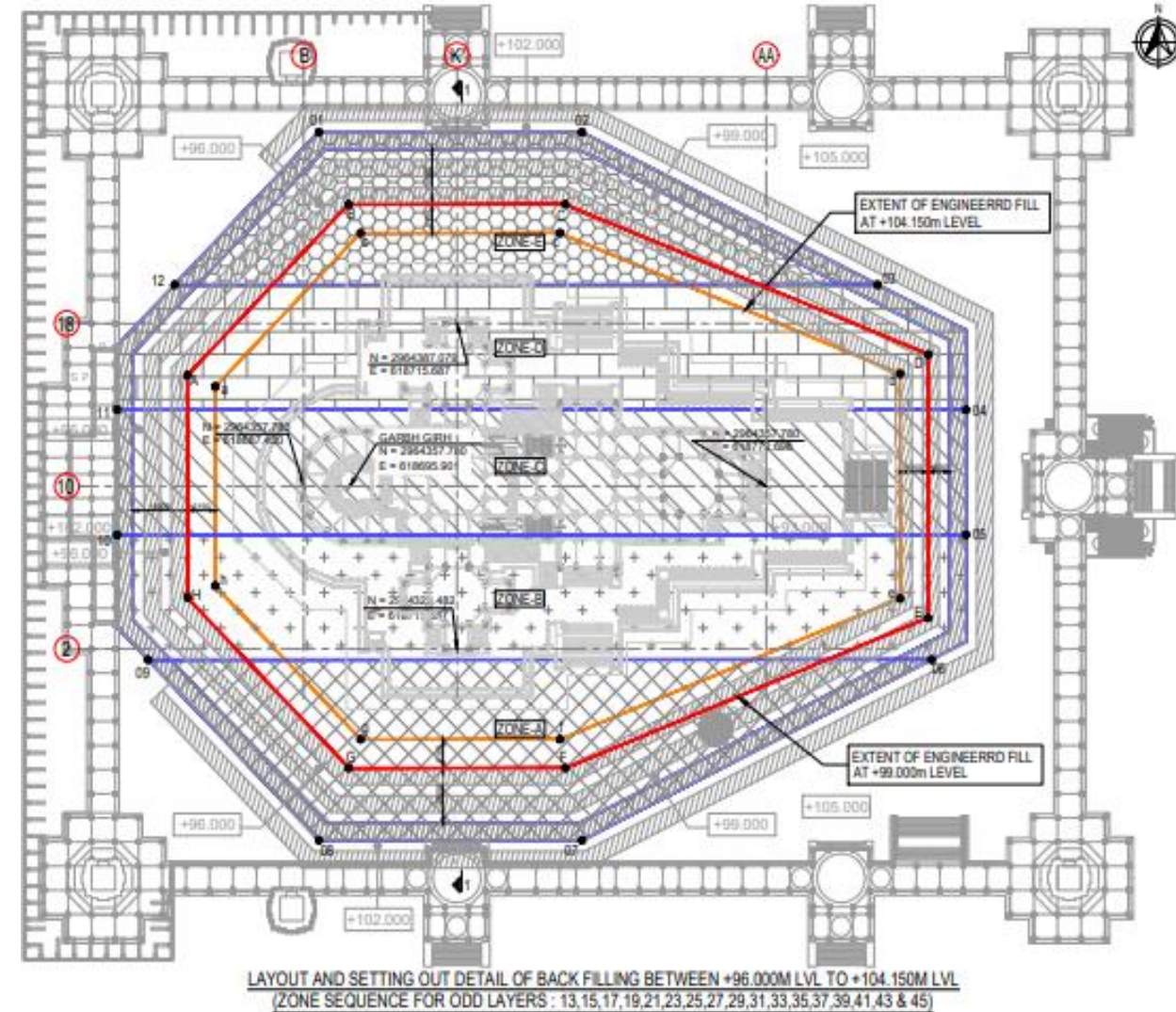




Brief Description - Foundation

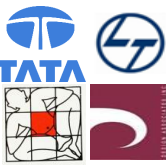


- Site is close to river Saryu and has large deposit of silty sediments consolidated over thousand of years.
- Due to proximity to Himalayan tectonic region, the structure was supposed to be designed for site spectra or Zone IV.
- Due to seismicity of area it was imperative to design engineered foundation system that can achieve almost rock like characteristics.
- NGRI was deputed to do the soil investigation survey.
- An expert committee was constituted, comprises of eminent Professors and Directors of IIT Madras, Guwahati, Delhi, Mumbai, CBRI Roorkee, SVNIT Surat & Tata Consulting Engineers Ltd for their recommendation on foundation.
- It was proposed by the expert committee to completely excavate the existing fill (8-11m depth) and replace it with high quality engineered fill.
- The temple structure was proposed to rest on plain cement concrete raft foundation designed to meet requirement of 1000 year life.





Brief Description – Engineering Fill

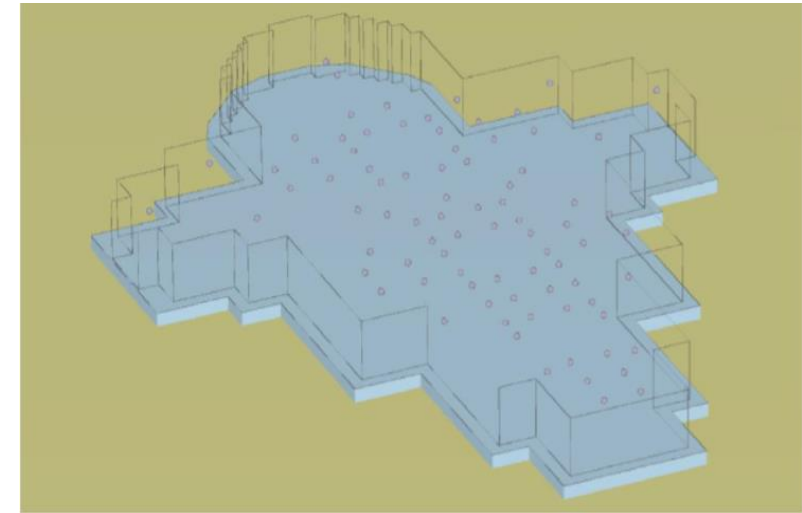
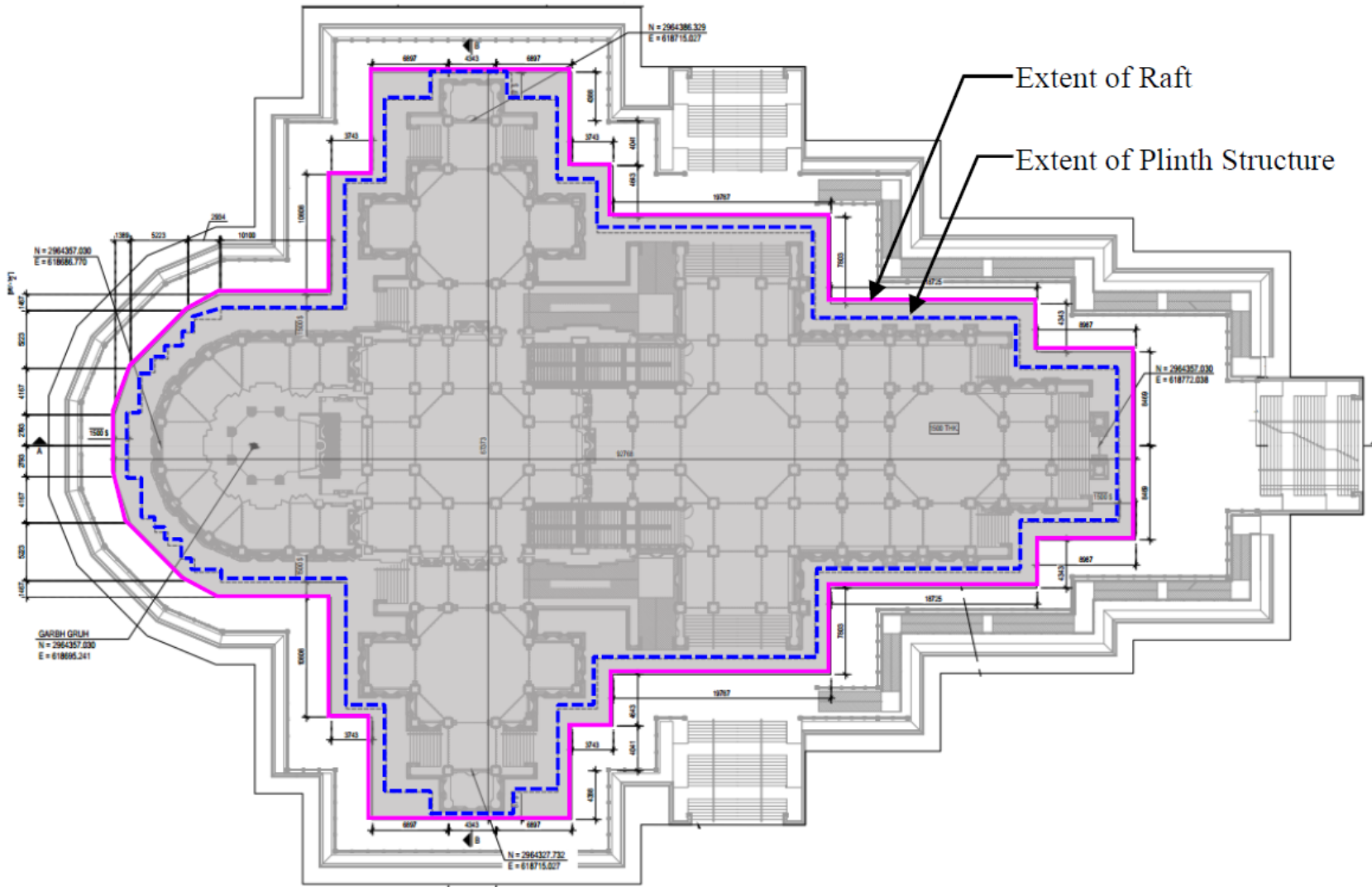
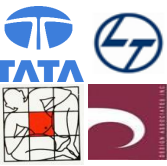


- The overall settlement is controlled by designing the properties of **engineered fill**.
- The differential settlement below **raft** is controlled by proposing appropriate raft section and construction sequence.
- It was proposed to fill the excavated area with **Engineered fill materials** for temple project.
- Roller compacted concrete was suggested with compressive strength of 3 Mpa.
- The total cementitious material was restricted to 140-160 kg/m³ with high volume of flyash.
- **Settlement analysis** considering properties of RCC derived from extensive lab test and mockup test done on site carried in PLAXIS. The settlements found within prescribed limits.
- **It was referred to expert committee** of different **National Engineering institutes** like various IITs, NIT & CBRI. The suggestion of **open foundation** was studied and approved by the experts.
- Traditionally, **Roller compacted concrete** have been used in construction of dams, pavements. The use of Roller compacted concrete (RCC) for a height of 12 m as an engineered fill for a temple structure is a unique first-time solution implemented in India and abroad.





Temple Foundation - Plan

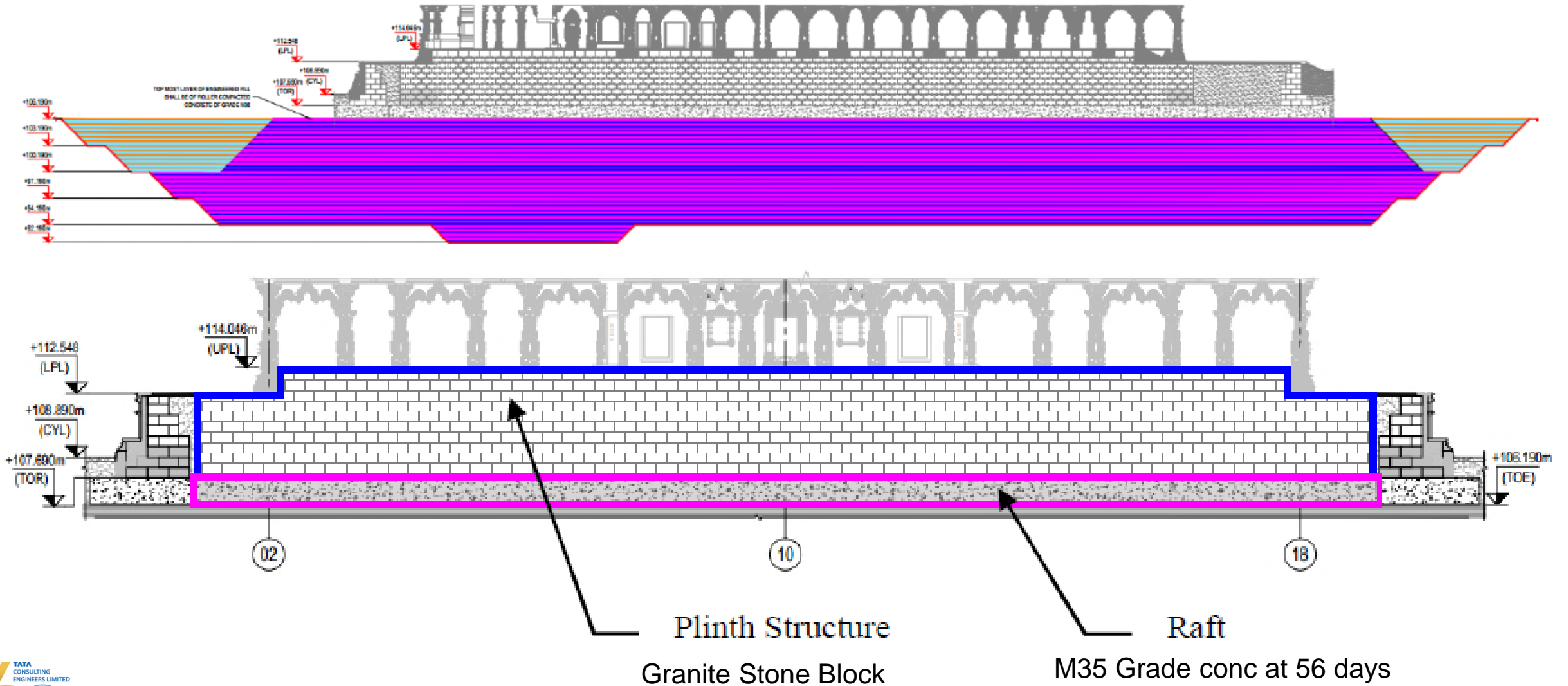
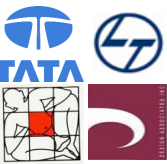


Raft Element



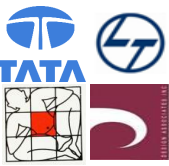


Temple Foundation – Vertical Section





Soil Investigation

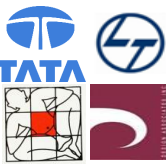


- Soil investigation carried out by **ASI** (Archaeological survey of India), the construction Agency & **NGRI** (National Geophysical Research Institute).
- 24 boreholes of varying depths executed with maximum depth up to 120m.





Excavation for Temple

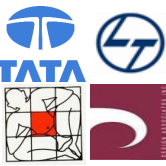


- Excavation: open excavation @ approx. 12/14 m depth i.e., for founding/ Garbh Griha area respectively.
- The excavation works completed in 3 months for a volume of approx. 1,85,000 Cum





Engineered Fill

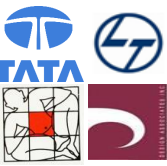


- Roller Compacted Concrete (RCC) completed in 48/56 layers. Each layer laid 300mm thick & compacted to 250mm by Vibro Roller compactor.
- 3 Nos. Batching plant were mobilized with total capacity more than 200 Cum/Hr. The activity was completed in 5.5 months with Peak concrete of 2200 Cum /day.
- To Protect the excavated slope against rainfall and ingress of soil in finished concrete, the entire sloped area was covered with Tarpaulin sheet and sand bags covering an area of 2.25 Lacs Sqft . No lost of time in rainy season, and work completed ahead of schedule timelines.
- The quantity of Engineering fill was 1,32,219 Cum.





Raft- Internal & External (Self Compacted M-35 Grade Concrete by Boom Placer)

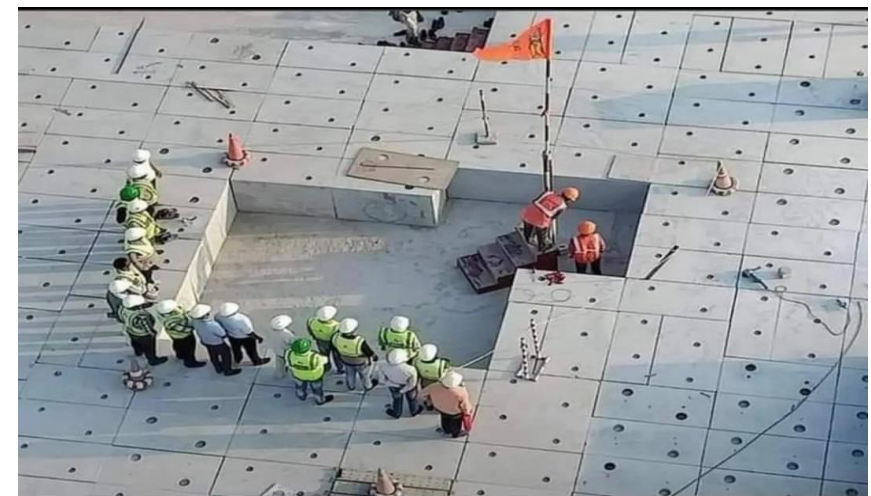
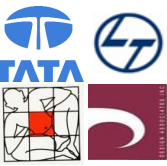


Sr. No	Description	Total Scope
1	Internal Raft	5266 Cum
2	External Raft	4165 Cum



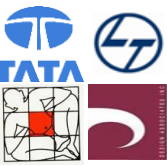


Plinth Work 21 Ft High, Raised through Granite Blocks (5' X 2.5' X 3' about 17000 nos. Blocks)





Superstructure- Bansi Paharpur (Hill Area in Bharatpur District of Rajasthan) Pink Colour Sandstones

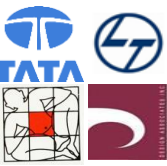


Sr. No	Description	Total Scope in Nos	Total Scope in Cft
1	Ground Floor	10654 Nos.	1.74 Lacs Cft
2	First Floor	8344 Nos.	1.54 Lacs Cft
3	Second Floor	5282 Nos.	0.92 Lacs Cft
4	Shikhar & Roof	1548 Nos.	0.34 Lacs Cft
5	Lower Plinth	393 Nos.	0.18 Lacs Cft
TOTAL		26221 Nos.	4.74 Lacs Cft





Mahapith, Kakshasan & Mandovar



Mahapith & Kakshasan

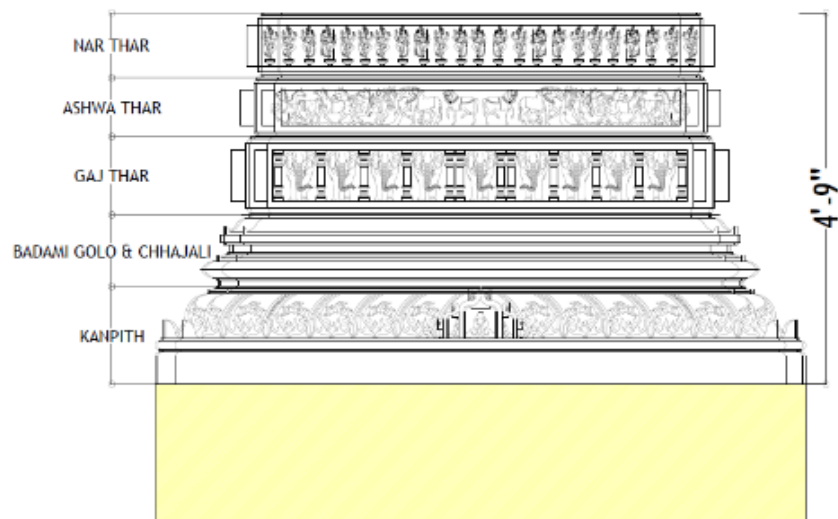
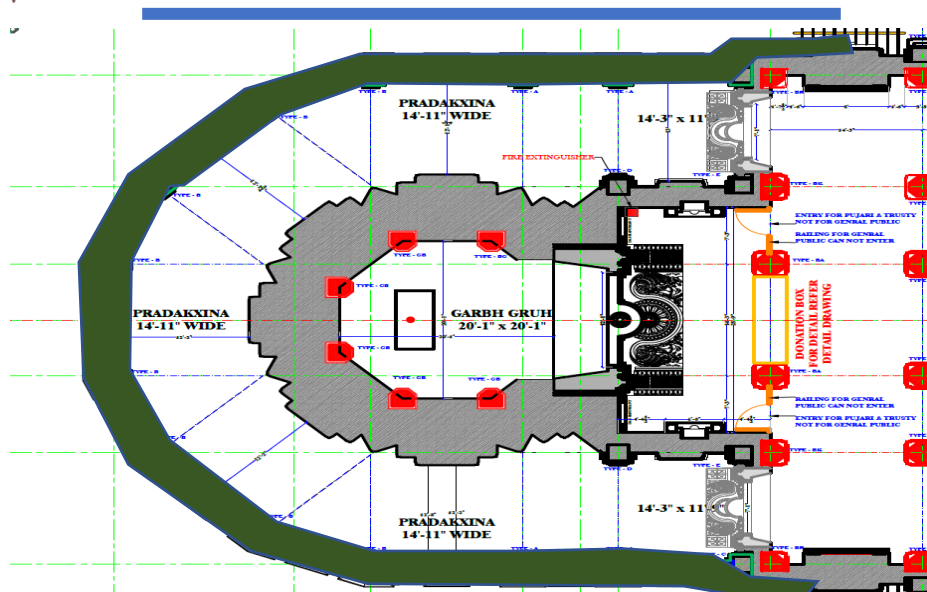


Mock up- Pillar & Mandovar





Superstructure- Mahapith

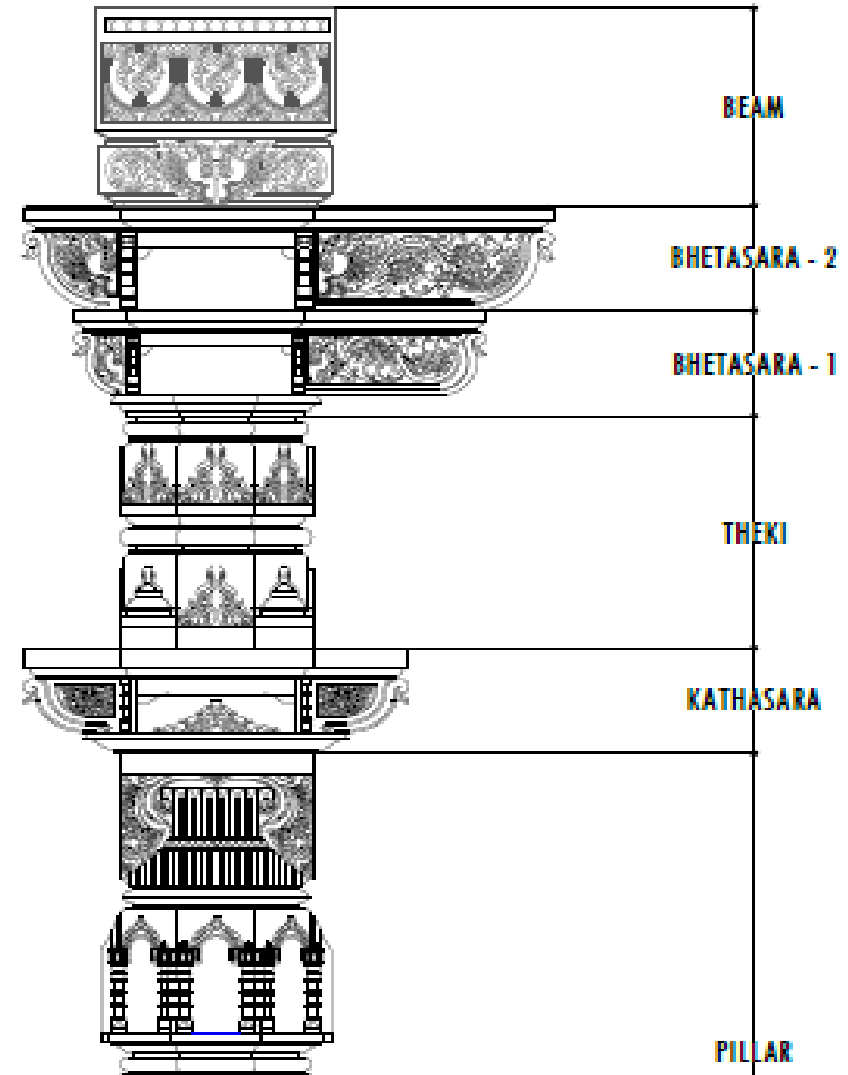
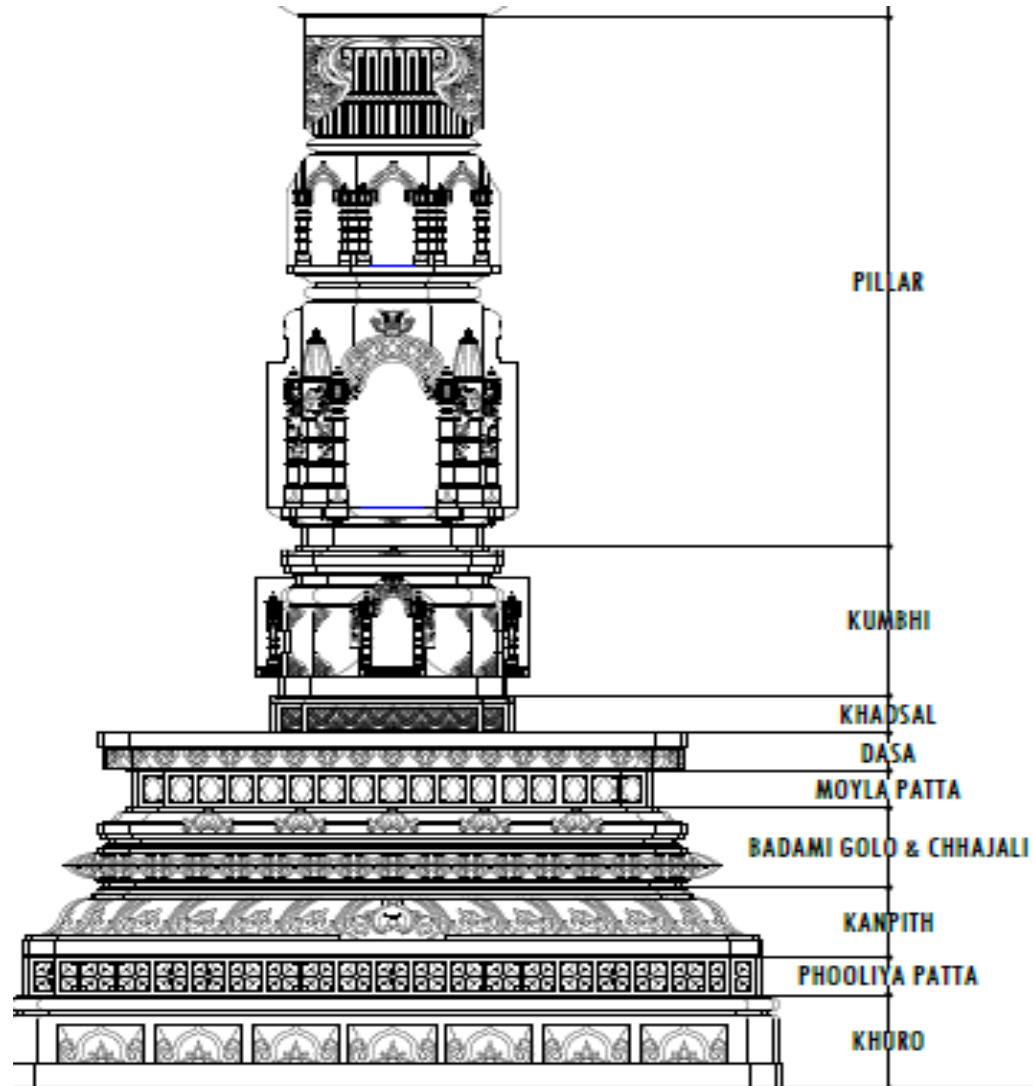
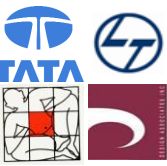


MAHAPITH



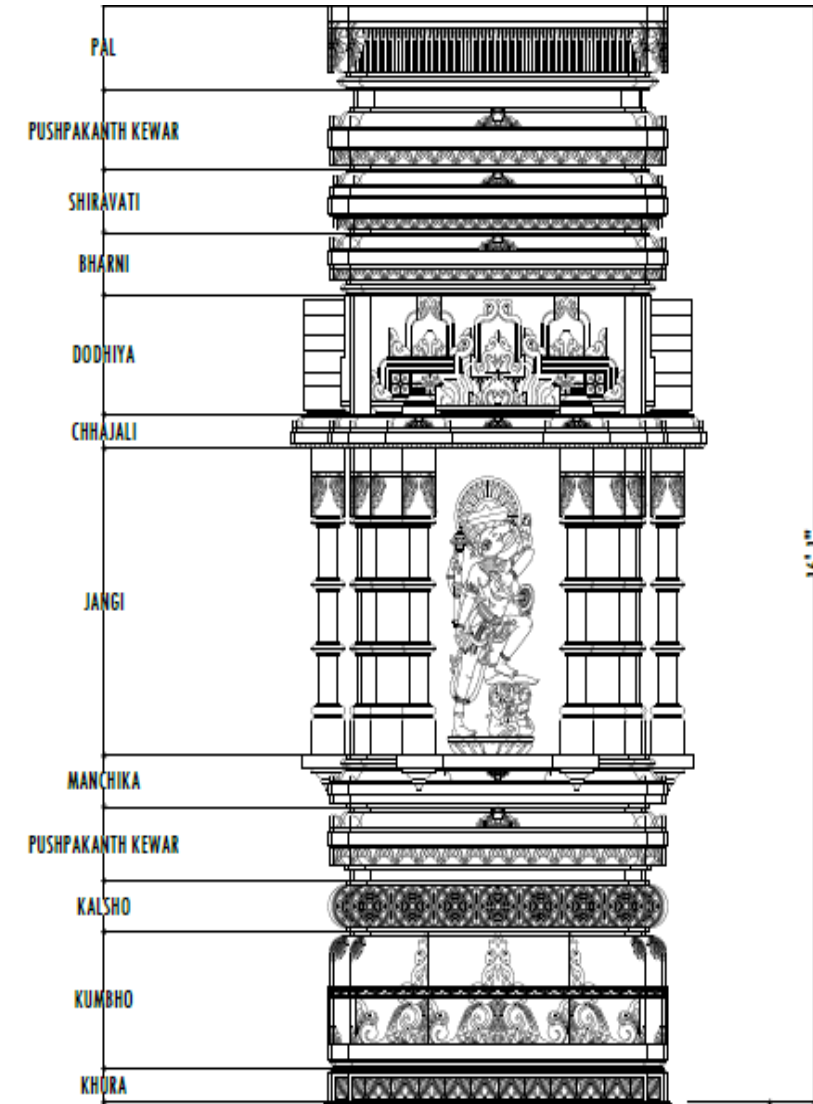
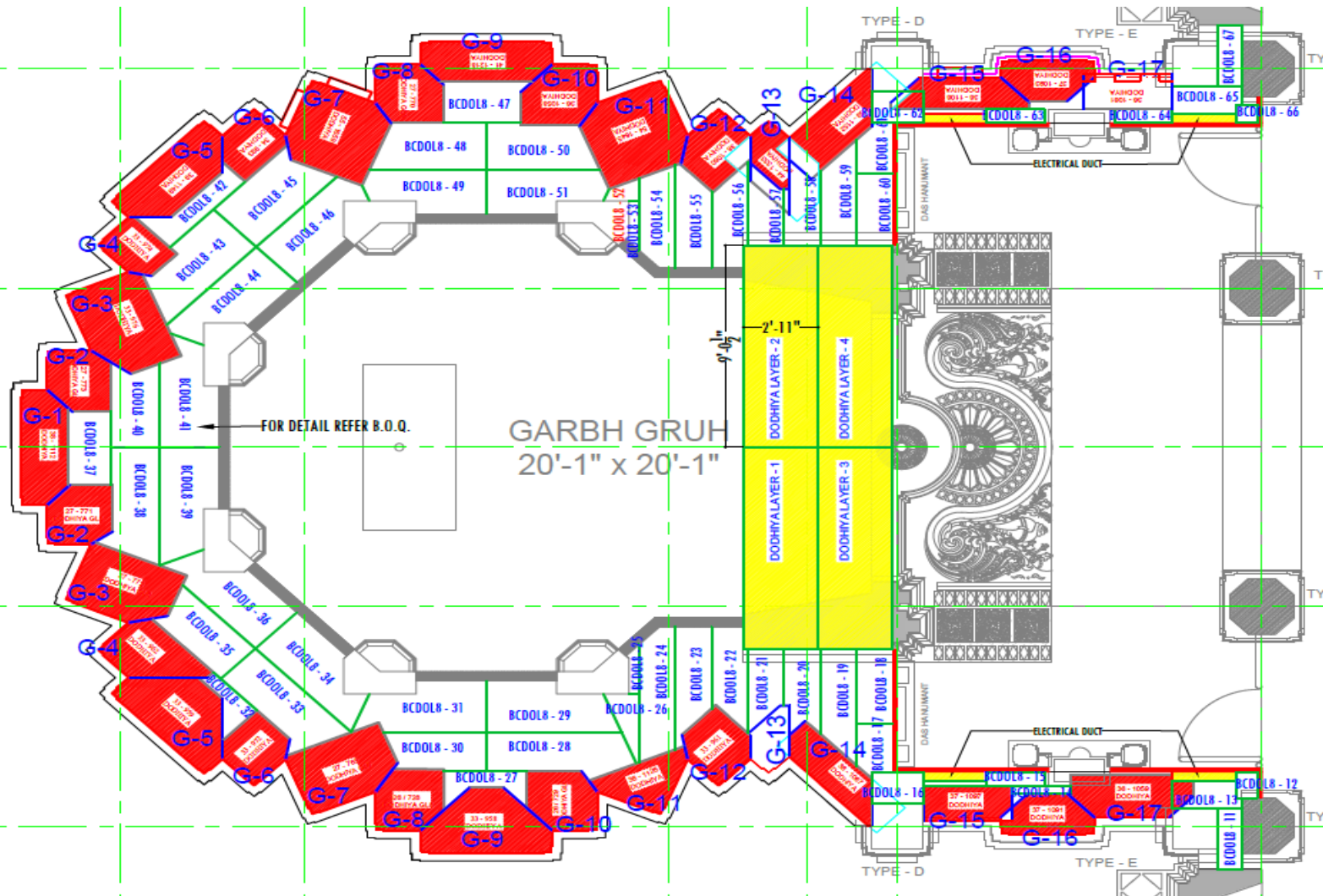
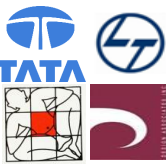


Superstructure- Section of Pillar



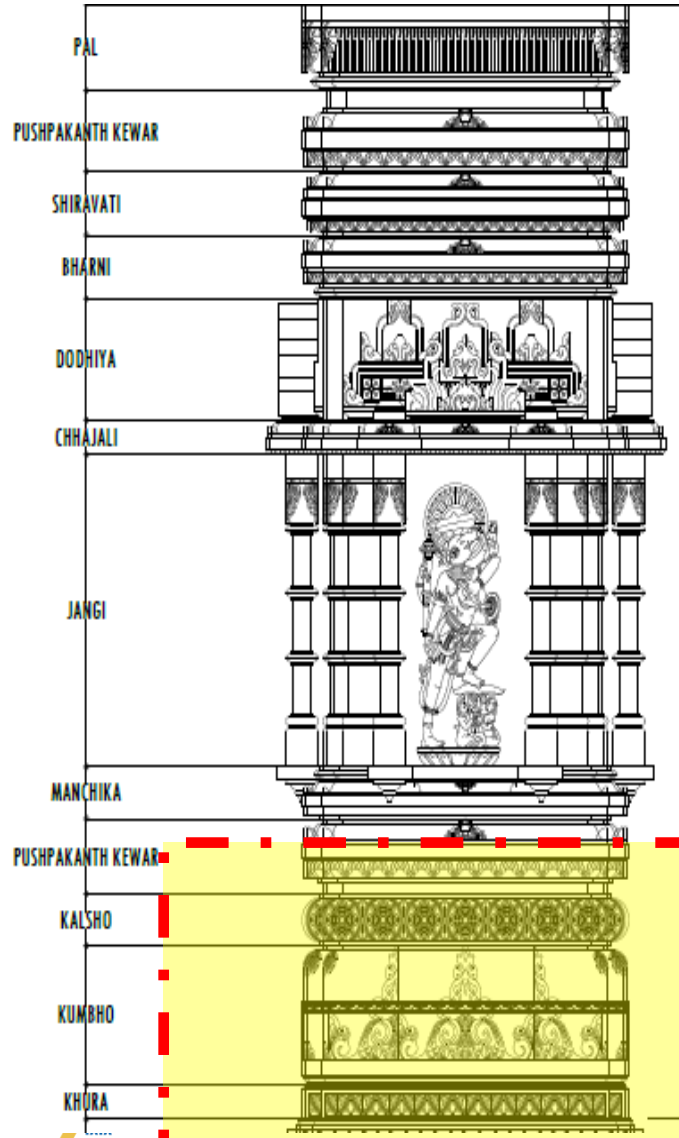
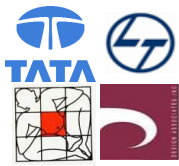


Superstructure Mandovar (A Wall Covering Garbhagriha & Gudhamandap)





Superstructure Mandovar (A Wall Covering Garbhagriha & Gudhamandap)



Layers	Total Scope (Nos)
13 th Layer +BS	122
12 th Layer + BS	49
11 th Layer + BS	139
10 th Layer + BS	125
9 th Layer + BS	141
8 th Layer + BS	162
7 th Layer + BS	142
6 th Layer + BS	251
5 th Layer + BS	129
4 th Layer + BS	142
3 rd Layer + BS	132
2 nd Layer + BS	142
1 st Layer + BS	130
PCC Level Stone stones	49
Total	1855



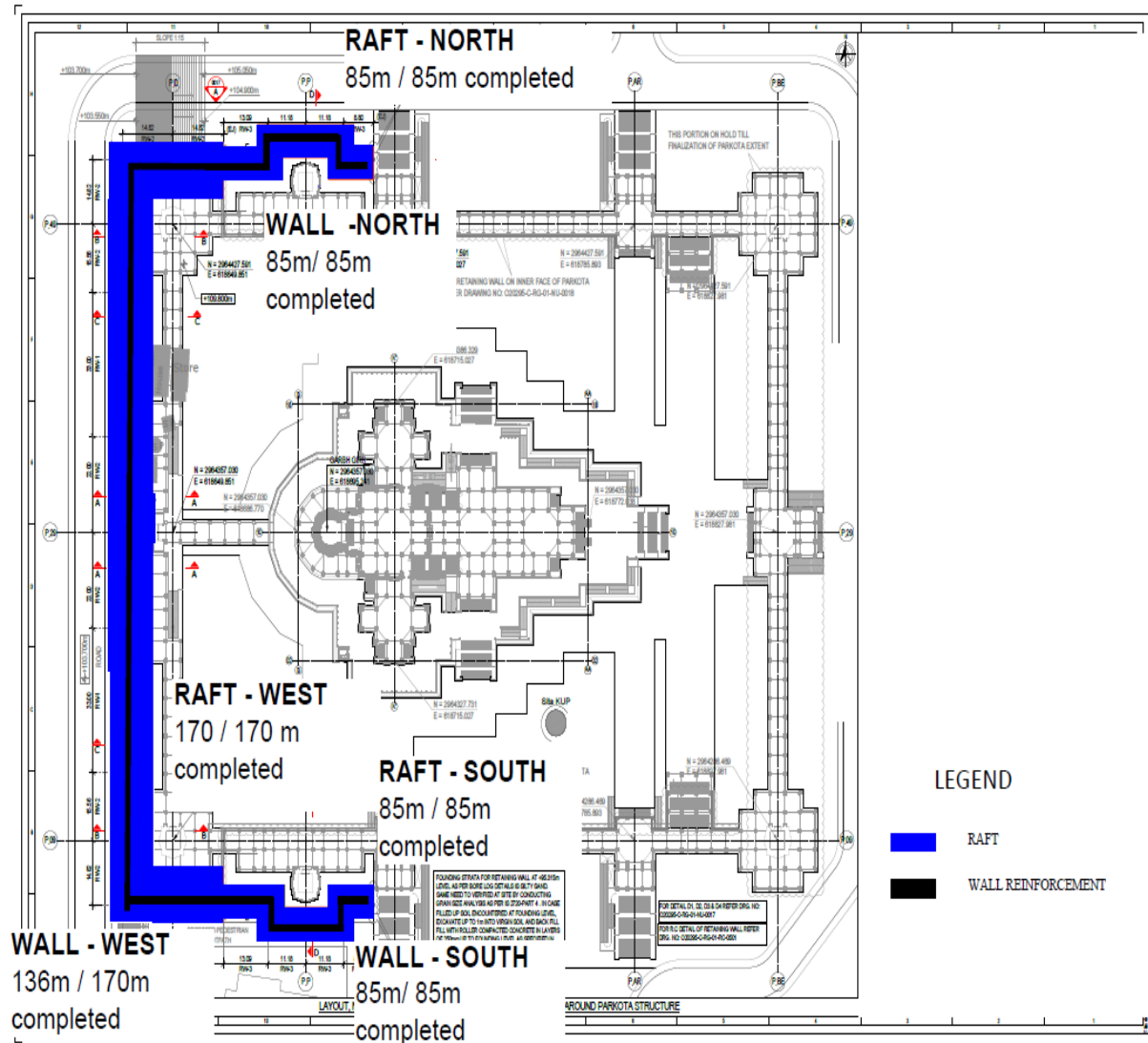
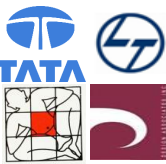
Location of Flag is the Ashan of Shri Ram Lala in Garbhagriha



Outer Periphery of Mandovar



Retaining Wall (In West Side of Temple to Retain the Soil between Parkota & Temple)



Sr. No	Description	Total Scope
1	Length of Wall	338 RM
2	Height of Wall	12 m

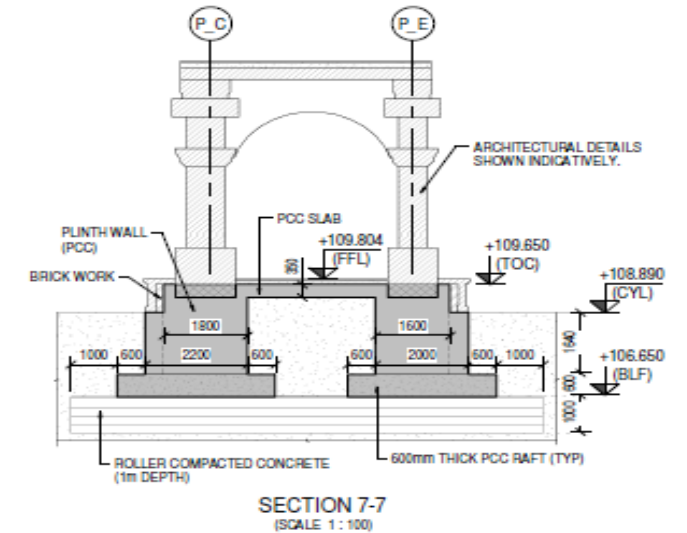
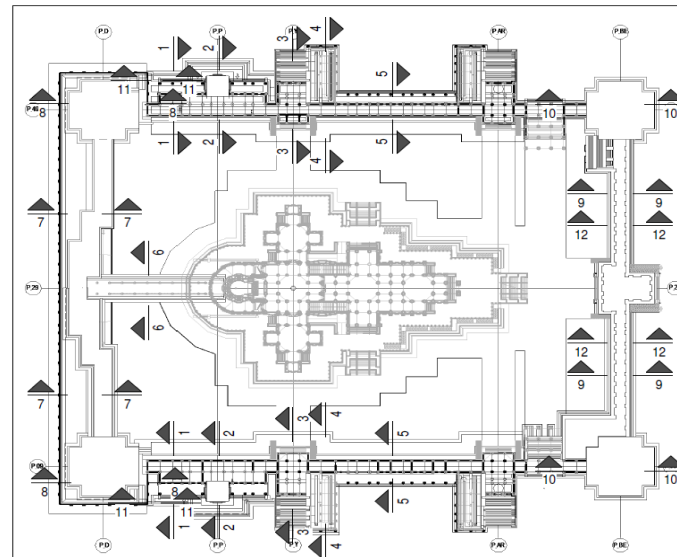
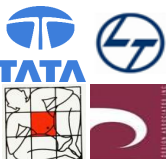


PARKOTA





Parkota (All Around Temple)



- Total Length of Parkota is 760 RM.
- Total Estimated quantity of Bansi Paharpur Red Sandstone is 930000 Cft.
- Width of Pathway for devotees is 14 feet
- There are 6 Mandir in periphery of Parkota with God and Goddess: Maa Bhagwati, Lord Shiv, Lord Surya, Maa Annapurna, Lord Ganesh & Lord Hanuman.



THANK YOU