

## **CONCEPTUAL PLAN**

### **1. Introduction:**

Bihar State Tourism Development Corporation has Proposed Development of Punaauradham, the birthplace of mother sita, situated in Sitamarhi District, Bihar in accordance with Shri Ram Janmabhoomi Tirtha Kshetra, Ayodhya. Total built- up area is **87051.61 Sqm.** & Plot Area is **271139.38.**

The Project built up area is greater than 20,000 sqm and less than 1, 50,000 sqm. Therefore, designated under Category “B” and falls under Item 8 (a) (Building & Construction Project) of the Environmental Impact Assessment (EIA) Notification of September 14, 2006 and its subsequent amendments. The Land documents is attached as **Annexure-III.**

### **1.1 SITE SURROUNDING & CONNECTIVITY**

The proposed project site is located at Sitamarhi, Bihar. Site surroundings and Connectivity details of the proposed project are given in **Table-1.**

- i. The surrounding features of the proposed site within 500 m is shown in **Figure 1**
- ii. The Pillar Coordinates map is mentioned in **Figure 2**

**Table-1: Site Surroundings and Connectivity Details**

| <b>S. No.</b> | <b>Connectivity &amp; Site Surroundings</b> |                                                                                                      |                                                                                             |
|---------------|---------------------------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|               | <b>Description</b>                          |                                                                                                      | <b>Distance and Direction</b>                                                               |
| 1.            | Nearest Railway Station                     | Sitamadhi Junction<br>Tapaswinarayan Nagar Halt                                                      | Approx. 3.72 Km towards ENE<br>Approx. 3.72 Km towards North                                |
| 2.            | Nearest Airport                             | Darbhanga Airport                                                                                    | Approx. 62.48 km towards SE                                                                 |
| 3.            | Nearest Village                             | Chakmahila<br>Riga<br>Mirchai Patti                                                                  | Approx. 1.54 Km towards East<br>Approx. 1.28 Km towards NE<br>Approx. 2.15 Km towards ENE   |
| 4.            | Nearest Highway/Roads                       | NH 227<br>Outer Bypass Road                                                                          | Adjacent to the Project site<br>Approx. 1 Km towards ENE                                    |
| 5.            | Nearest School & College                    | Government Middle School<br>Chakmahila<br>Nagarpalika Middle School<br>Rajkiye Madhyamik Urdu School | Approx. 2.35 Km towards East<br>Approx. 2.96 Km towards ENE<br>Approx. 3.76 Km towards East |

Development of Punaauradham, the BIRTHPLACE OF MOTHER SITA, situated in Sitamarhi District, Bihar in accordance with Shri Ram Janmabhoomi Tirtha Kshetra, Ayodhya

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|     |                        |                                                                                                               |                                                                                            |
|-----|------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| 6.  | Nearest Hospital       | Sadar Hospital Sitamarhi<br>Nandipat Memorial Hospital & Research Centre<br>Navjivan Multispeciality Hospital | Approx 2.82 Km towards ENE<br>Approx 3.15 Km towards ENE<br>Approx 3.99 Km towards East    |
| 7.  | Places of worship      | Shiv Temple<br>Janaki Sthan Mandir<br>Pundrik Shivshakti Peeth,<br>Punaura Dham                               | Approx. 0.75 Km towards East<br>Approx. 1.67 Km towards ENE<br>Approx. 0.79 Km towards SSW |
| 8.  | Water Bodies           | Baba Pokhra<br>Lakhandei River                                                                                | Approx. 0.15 Km towards West<br>Approx. 2.92 Km towards East                               |
| 9.  | Defense Installation   | NA                                                                                                            | NA                                                                                         |
| 10. | Town                   | Sitamarhi                                                                                                     | Approx. 3.32 Km towards East                                                               |
| 11. | Reserve Forest/<br>Zoo | NA                                                                                                            | NA                                                                                         |

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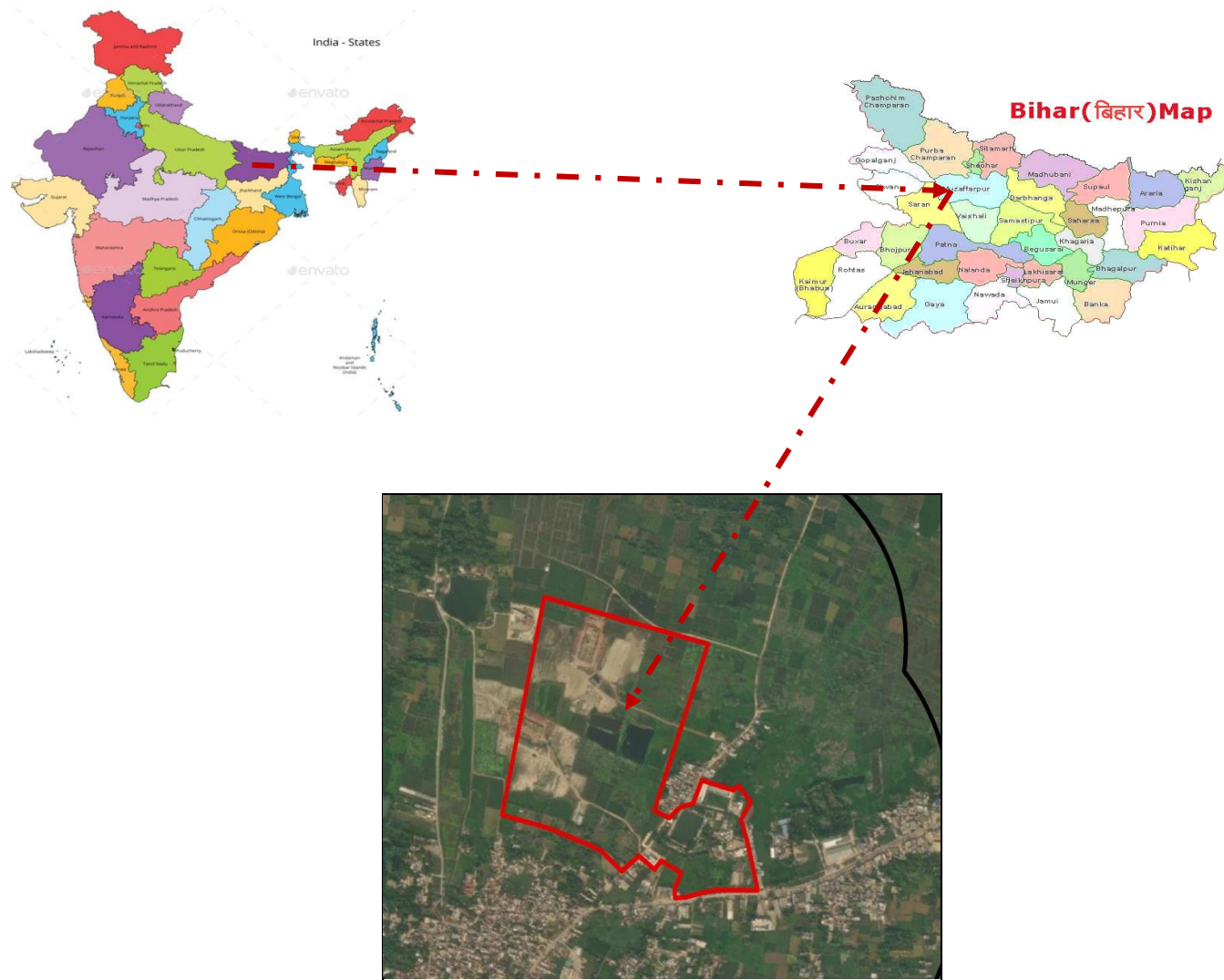
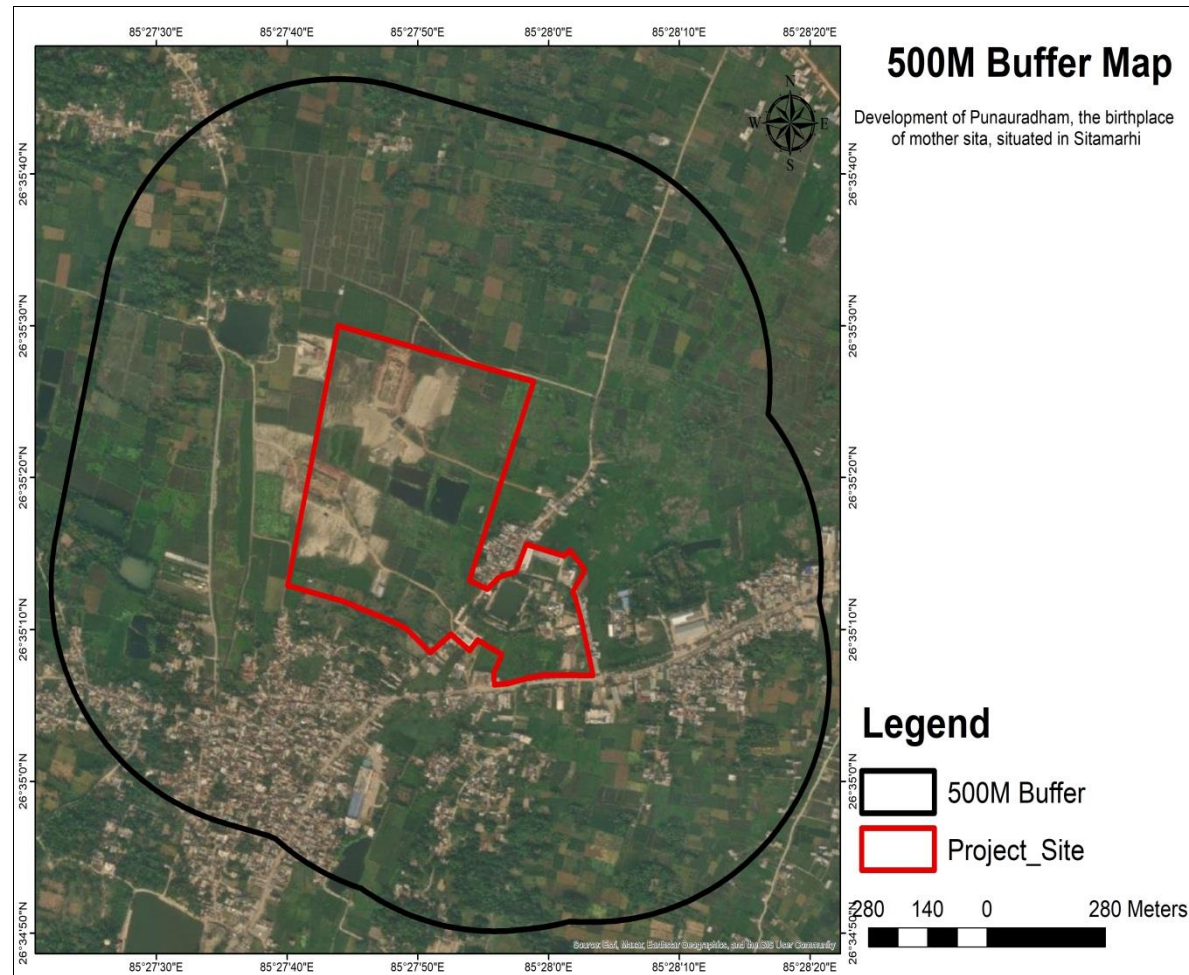


Figure 1: Site Location Map

Development of Punaauradham, the BIRTHPLACE OF MOTHER SITA, situated in Sitamarhi District, Bihar in accordance with Shri Ram Janmabhoomi Tirtha Kshetra, Ayodhya

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Source: Google earth

Figure 2: Project site coordinate map

Development of Punauradham, the BIRTHPLACE OF MOTHER SITA, situated in Sitamarhi District, Bihar in accordance with Shri Ram Janmabhoomi Tirtha Kshetra, Ayodhya

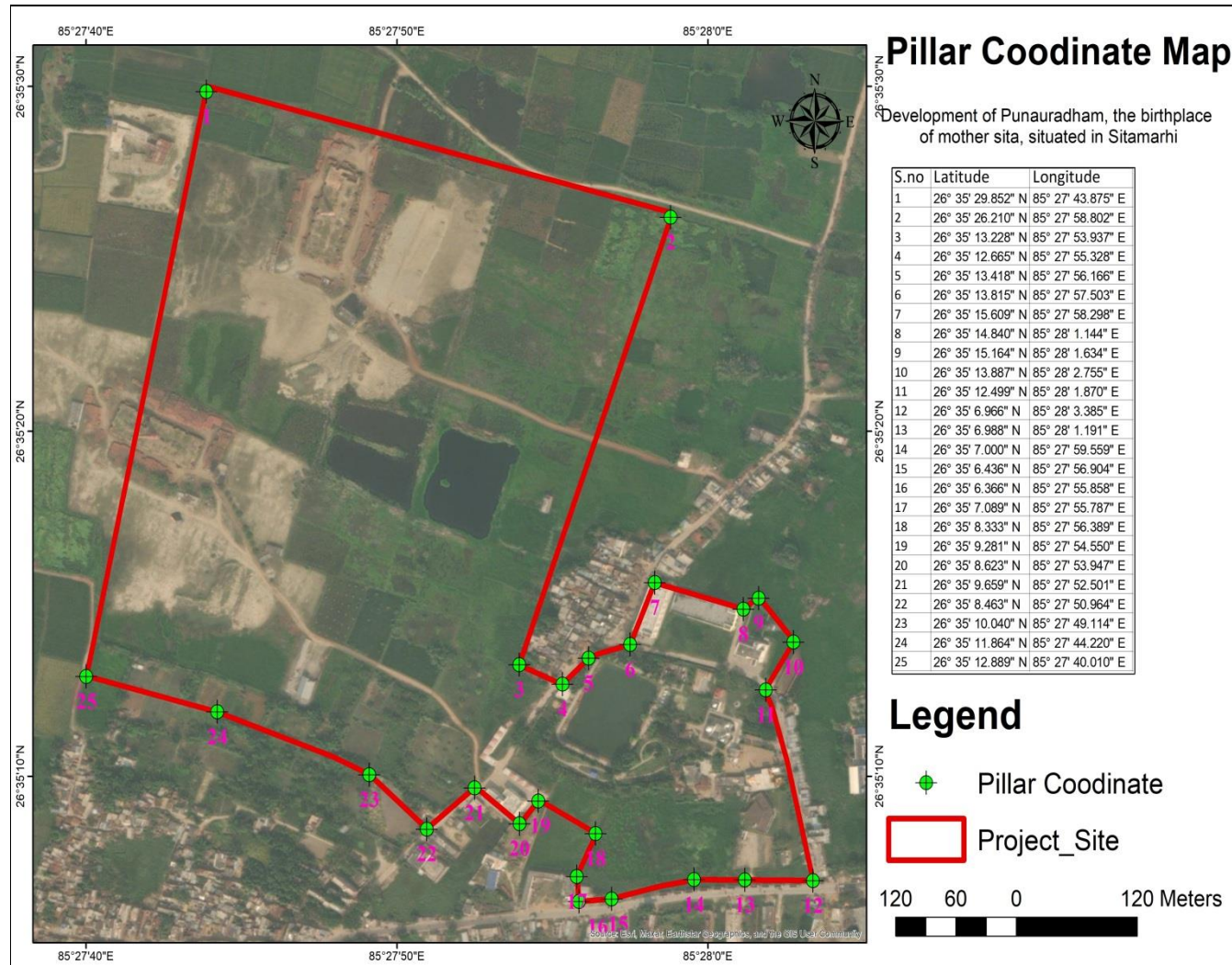


Figure 3: Pillar Coordinate Map

### 3. PROJECT LOCATION AND DESCRIPTION

Development of Punauradham, the birthplace of mother sita, situated in Sitamarhi District, Bihar in accordance with Shri Ram Janmabhoomi Tirtha Kshetra, Ayodhya. The coordinates of the project boundary is mentioned below in the **Table-2**.

**Table-2: Coordinates of the Project Boundary**

| S.no | Latitude          | Longitude         |
|------|-------------------|-------------------|
| 1    | 26° 35' 29.852" N | 85° 27' 43.875" E |
| 2    | 26° 35' 26.210" N | 85° 27' 58.802" E |
| 3    | 26° 35' 13.228" N | 85° 27' 53.937" E |
| 4    | 26° 35' 12.665" N | 85° 27' 55.328" E |
| 5    | 26° 35' 13.418" N | 85° 27' 56.166" E |
| 6    | 26° 35' 13.815" N | 85° 27' 57.503" E |
| 7    | 26° 35' 15.609" N | 85° 27' 58.298" E |
| 8    | 26° 35' 14.840" N | 85° 28' 1.144" E  |
| 9    | 26° 35' 15.164" N | 85° 28' 1.634" E  |
| 10   | 26° 35' 13.887" N | 85° 28' 2.755" E  |
| 11   | 26° 35' 12.499" N | 85° 28' 1.870" E  |
| 12   | 26° 35' 6.966" N  | 85° 28' 3.385" E  |
| 13   | 26° 35' 6.988" N  | 85° 28' 1.191" E  |
| 14   | 26° 35' 7.000" N  | 85° 27' 59.559" E |
| 15   | 26° 35' 6.436" N  | 85° 27' 56.904" E |
| 16   | 26° 35' 6.366" N  | 85° 27' 55.858" E |
| 17   | 26° 35' 7.089" N  | 85° 27' 55.787" E |
| 18   | 26° 35' 8.333" N  | 85° 27' 56.389" E |
| 19   | 26° 35' 9.281" N  | 85° 27' 54.550" E |
| 20   | 26° 35' 8.623" N  | 85° 27' 53.947" E |
| 21   | 26° 35' 9.659" N  | 85° 27' 52.501" E |
| 22   | 26° 35' 8.463" N  | 85° 27' 50.964" E |
| 23   | 26° 35' 10.040" N | 85° 27' 49.114" E |
| 24   | 26° 35' 11.864" N | 85° 27' 44.220" E |
| 25   | 26° 35' 12.889" N | 85° 27' 40.010" E |

The Salient Features of the Project is mentioned in **Table-2**.

**Table 3: Salient features of the Project**

| <b>Sr. No.</b> | <b>Particulars</b>                     |                             |                                                                                     |
|----------------|----------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|
| 1.             | Total Plot area                        |                             | 271139.38 Sqm                                                                       |
| 2.             | <b>Total Built-up Area</b>             |                             | <b>87051.61 Sqm</b>                                                                 |
| 3.             | Greenbelt area Provided                |                             | 75000 Sqm                                                                           |
| 4.             | Total Ground Coverage                  |                             | 48411.97 Sqm                                                                        |
| 5.             | Total Parking Provided                 |                             | 905 cars and 60 Buses                                                               |
| 6.             | Road Area                              |                             | 38000 Sqm                                                                           |
| 7.             | Open & Paved Area                      |                             | 109727.41 Sqm                                                                       |
| 8.             | Rain Water Harvesting Pits (with size) |                             | 26 (71.57 cu-mtr)                                                                   |
| 9.             | STP Capacity                           |                             | 1050 KLD                                                                            |
| 10.            | Maximum Height of the Building (m)     |                             | Max. 151 ft.                                                                        |
| 11.            | Power Requirement                      |                             | ~4000 KVA                                                                           |
| 12.            | Power Backup                           |                             | DG set<br>3500 KVA (4 x 750 KVA, 2 x 250 KVA)                                       |
| 13.            | Total Water Requirement                |                             | ~1095 KLD<br>Fresh water- 399 KLD<br>Treated water- 696 KLD<br>Source: Ground water |
| 14.            | Wastewater Generated                   |                             | ~870 KLD                                                                            |
| 15.            | Solid Waste Generated                  |                             | ~7065 Kg/day                                                                        |
| 16.            | Biodegradable Waste                    |                             | ~2826 Kg/day                                                                        |
| 17.            | Non-Biodegradable Waste                |                             | ~4239 Kg/day                                                                        |
| 22.            | Stories                                |                             | Max. upto G+3                                                                       |
| 23.            | Project Cost                           |                             | 942.38 Cr.                                                                          |
| 24.            | EMP Budget                             |                             | <b>During Construction</b><br>Capital Cost: 45 Lakhs<br>Recurring Cost: 14 Lakhs    |
|                |                                        |                             | <b>During Operation</b><br>Capital Cost: 485 Lakhs<br>Recurring Cost: 61 Lakhs      |
| 25.            | Connectivity                           | Sitamarhi Junction          | Approx. 3.72 Km towards ENE                                                         |
|                |                                        | Tapaswinarayan Nagar Halt   | Approx. 3.72 Km towards North                                                       |
|                |                                        | Darbhangha Airport          | Approx. 62.48 km towards SE                                                         |
|                |                                        | NH 227<br>Outer Bypass Road | Adjacent to the Project site<br>Approx. 1 Km towards ENE                            |

#### 4. DETAIL OF BUILDING BLOCK

The Project envisages construction of temple other religious spaces, pilgrim oriented facilities, administration and other infrastructures. Details of Building Blocks are given in **Table 4.**

**Table 4(a): Details of Building Blocks**

| S. No. | Spaces                        | Built up Area   |
|--------|-------------------------------|-----------------|
| 1      | Temple other religious spaces | 11426.04        |
| 2      | Pilgrim oriented facilities   | 59261.17        |
| 3      | Administration                | 12874.9         |
| 4      | Other infrastructures         | 3489.5          |
|        | <b>Total Built up Area</b>    | <b>87051.61</b> |

**Table 4(b) : TEMPLE & RELIGIOUS SPACES**

| S. NO.            | FUNCTION                |           | AREA (SQM)      | FLOOR |
|-------------------|-------------------------|-----------|-----------------|-------|
| 1                 | TEMPLE & PARKOTA        |           | 5733.04         | G+1   |
| 2                 | MATA JANKI KUND GHAT    | SOFTSCAPE | 1012.00         |       |
| 3                 | CHHATRI AROUND KUND     | 4 NO.     | 113.00          | G     |
| 4                 | YAGYA MANDAP            | 1 NO.     | 890.00          | G     |
| 5                 | ANUSHTHAN MANDAP        | 2 NO.     | 326.00          | G     |
| 6                 | BHOG KITCHEN            | 1 NO.     | 437.00          | G     |
| 9                 | VED PATHSHALA & LIBRARY |           | 951.00          | G     |
| 10                | SANT NIWAS              |           | 1331.00         | G     |
| 11                | SAFE HOUSE              |           | 1331.00         | G     |
| 12                | PUJARI RESIDENCE        |           | 314.00          | G     |
| <b>TOTAL AREA</b> |                         |           | <b>11426.04</b> | 0.00  |

**Table 4(C) : Pilgrim oriented facilities**

| S. NO. | FUNCTION                                                          | CAPACITY IN EACH      | BLOCK/UNIT | AREA (SQM)      | FLOOR |
|--------|-------------------------------------------------------------------|-----------------------|------------|-----------------|-------|
| 1      | PILGRIM FACILITATION CENTER                                       | 7605                  | 2          | <b>15447.68</b> | G+2   |
| 1A     | WAITING HALLS                                                     | 4000 CAPACITY         |            | 0.00            |       |
| 1B     | BAGGAGE/CLOAK ROOM                                                | 12 COUNTERS           |            | 0.00            |       |
| 1C     | SNACKES COUNTER                                                   | 06 COUNTERS           |            | 0.00            |       |
| 2      | MUSEUM                                                            |                       | 1          | <b>9342.38</b>  | G+2   |
| 3      | CAFETERIA &FOODCOURT                                              |                       | 1          | <b>1984.35</b>  | G+1   |
| 4      | AUDITORIUM                                                        | 750 SEAT              |            | <b>8227.68</b>  | G+2   |
| 5      | TEMPLE ENTRANCE FORECOURT & PILGRIM'S FACILITIES                  |                       |            | <b>5428.00</b>  | G     |
| 5A     | FRISKING AREA                                                     |                       |            | 410.00          |       |
| 5B     | SMALL STAFF AND SHOE DEPOSIT COUNTERS                             | 18                    |            | 1340.00         |       |
| 5C     | CCTV                                                              |                       |            | 90.00           |       |
| 5D     | ADMIN AREA + SECURITY                                             |                       |            | 235.00          |       |
| 5E     | MALE- FEMALE & DA TOILET, MOTHER & CHAILD CARE AND DRINKING WATER |                       |            | 379.00          |       |
| 5F     | TEMPLE SHOPS ( FOR OFFERING PRASAD & FLOWER)                      | 8                     |            | 478.00          |       |
| 5G     | PRASAD TAKE AWAY                                                  | 03 COUNTERS           |            | 177.00          |       |
| 5H     | INFORMATION DESKS                                                 | 4 COUNTER             |            | 59.00           |       |
| 6      | TENSILE CANOPY                                                    |                       |            | 4318.00         |       |
| 7      | COVERED CORRIDOR                                                  |                       |            | <b>3120.00</b>  | G     |
| 8      | BHANDARA HALL                                                     | 1000 CAPACITY         | 1          | <b>1973.00</b>  | G     |
| 9      | MELA GROUND STAGE                                                 |                       | 1          | <b>541.00</b>   | G+1   |
| 10     | PILGRIM ACCOMODATION DORMITORIES                                  | 900CAPACITY(BUNK BED) | 3          | <b>9060.06</b>  | G+3   |
| 11     | PILGRIM GUEST HOUSE                                               | 50 DELUX ROOM         | 1          | <b>3020.02</b>  | G+3   |
| 12     | AMENITY BLOCK IN BUS PARKING                                      |                       | 1          | <b>475.00</b>   | G     |
| 13     | TOILET BLAOCK-1                                                   |                       | 1          | <b>200.00</b>   | G     |
| 14     | TOILET BLAOCK-2                                                   |                       | 3          | <b>336.00</b>   | G     |

|                            |                                       |         |   |                 |   |
|----------------------------|---------------------------------------|---------|---|-----------------|---|
| 15                         | FEMALE AMENITIES NEAR MATA JANKI KUND |         |   | 106.00          | G |
| 16                         | DRIVER'S SHADE                        |         | 6 | 240.00          |   |
| 17                         | E-CART STAND WITH SITTING PAVILION    |         | 1 | 750.00          |   |
| 18                         | PARKING (60 BUS & 900 CAR)            | SURFACE |   | 0.00            |   |
| <b>TOTAL BUILT UP AREA</b> |                                       |         |   | <b>59261.17</b> |   |

**Table 4(D): ADMINISTRATION**

| ADMINISTRATION    |                                         |                     |            |                 |       |
|-------------------|-----------------------------------------|---------------------|------------|-----------------|-------|
| S. NO.            | FUNCTION                                | CAPACITY            | UNIT/BLOCK | AREA (SQM)      | FLOOR |
| 1                 | TRUST/ADMINISTRATIVE OFFICE             |                     | 1          | 2129.15         | G+1   |
| 2                 | FACILITY MANAGEMENT OFFICE & STAFF AREA |                     | 1          | 1500.00         | G+2   |
| 3                 | STAFF HDORMITORY                        | 160 BED + 18 STUDIO | 2          | 4197.24         | G+2   |
| 4                 | STAFF HOUSING                           | 24 2BHK+6 IBHK      | 2          | 4197.24         | G+2   |
| 6                 | STAFF CANTEEN                           |                     | 1          | 851.27          | G     |
| <b>TOTAL AREA</b> |                                         |                     |            | <b>12874.90</b> |       |

**Table 4(E): OTHER INFRASTRUCTURE**

| OTHER INFRASTRUCTURE |                          |     |            |       |
|----------------------|--------------------------|-----|------------|-------|
| S. NO.               | FUNCTION                 | UNT | AREA (SQM) | FLOOR |
| 1                    | MITHILA HAAT             |     | 1000.00    | G     |
| 2                    | POLICE BOTH              | 2   | 320.00     | G+1   |
| 3                    | WATCH TOWERS             | 8   | 160.00     |       |
| 4                    | FIRE STATION             | 1   | 360.00     | G     |
| 5                    | ESS-1                    | 1   | 300.00     | G     |
| 6                    | ESS-2                    | 1   | 344.00     | G     |
| 7                    | GUARD ROOM               | 5   | 67.50      |       |
| 8                    | PUMP & FILTERATION PLANT | 1   | 250.00     |       |
| 9                    | GATEWAY-1                | 1   | 130.00     |       |
| 10                   | GATEWAY-2                | 2   | 420.00     |       |
| 11                   | GATEWAY-3                | 1   | 138.00     |       |
| 12                   | STP                      | 1   |            |       |
| 13                   | WTP                      | 1   |            |       |
| 14                   | UGT                      | 1   |            |       |
| 14                   | SOLAR PLANT              | 1   |            |       |

|                   |  |                |  |
|-------------------|--|----------------|--|
| <b>TOTAL AREA</b> |  | <b>3489.50</b> |  |
|-------------------|--|----------------|--|

**Table 4(f): Area to be demolished**

| <b>S.NO.</b> | <b>BUILDING</b>           | <b>STORY</b>      | <b>DEMOLITION AREA (SQMT)</b> |
|--------------|---------------------------|-------------------|-------------------------------|
| 1            | MAIN TEMPLE               | G                 | 435                           |
| 2            | SUBSIDIARY TEMPLE         | G                 | 156                           |
| 3            | PUJARI AWAS               | G                 | 192                           |
| 4            | GAYATRI TEMPLE            | G+1               | 1014                          |
| 5            | TRUST OFFICE              | G+1               | 126.96                        |
| 6            | CANTEEN                   | G                 | 64.91                         |
| 7            | SANT NIWAS                | G                 | 450                           |
| 8            | OFFICE                    | G                 | 491                           |
| 9            | HEALTH AND FITNESS CENTER | G                 | 155                           |
| 10           | MUSEUM                    | G                 | 345                           |
| 11           | TOILET BLOCK              | G                 | 202                           |
| 12           | TOILET BLOCK-1            | G                 | 60                            |
| 13           | SANT NIWAS-1              | G+1               | 730                           |
| 14           | STAI KA RASOI             | G+1               | 760                           |
| 15           | PILGRIMS DORM             | G+1               | 1646.7                        |
| 16           | PRAVACHAN MANDAP          | G (DOUBLE HEIGHT) | 1082.58                       |
| 17           | OVER HEAD TANK            |                   | 53                            |
| 18           | PAVILION (KUND AREA)      | G                 | 92                            |
| 19           | UNDERPASS                 | G                 | 362                           |
| 20           | BUILDING                  | G                 | 92                            |
| 21           | BUILDING                  | G                 | 77                            |
| 22           | BRICK KILN-1              |                   | 3232                          |
| 23           | BRICK KILN-2              |                   | 2243                          |
| 24           | SHED                      | G                 | 284                           |
| 25           | SHED                      | G                 | 209                           |
|              | <b>TOTAL</b>              |                   | <b>14555.15</b>               |

## 5. POPULATION DETAIL

Total no. of population will be 42071 in the proposed temple, which includes Entrance Fore Court, Pilgrims Facilitation Centre, Bhog Kitchen, Pujari Niwas, Auditorium, Pilgrims Dormitory etc.

**Table-5: Calculation of Population**

| S. No. | Description                         | Total Population |
|--------|-------------------------------------|------------------|
| 1      | Pilgrim Footfall (Peak)             | 40000            |
| 2      | <b>Temple &amp; Percota</b>         |                  |
|        | Fixed population                    | 10               |
| 3      | <b>Entrance Fore Court</b>          |                  |
|        | Fixed population                    | 50               |
| 4      | <b>Pilgrims Facilitation Centre</b> |                  |
|        | Fixed population                    | 60               |
|        | <b>Total for 2 units</b>            | 120              |
| 5      | Bhog Kitchen                        | 10               |
| 6      | Pujari Niwas                        | 7                |
| 7      | Sant Niwas                          | 30               |
| 8      | VVIP Safe                           | 30               |
| 9      | Ved Pathshala & Library             | 72               |
| 11     | Admin & Trust Office                |                  |
|        | Fixed population                    | 70               |
| 12     | <b>Restaurant &amp; Food Court</b>  |                  |
|        | Fixed population                    | 40               |
| 13     | Auditorium                          | 1200             |
| 14     | Museum                              |                  |
|        | Fixed population                    | 40               |
| 15     | <b>Katha Sthal Stage</b>            |                  |
|        | Fixed population                    | 16               |
| 16     | Pilgrims Dormitory                  | 300              |
|        | Total for 3 units                   | 900              |
| 17     | Pilgrims Guest House                | 100              |
| 18     | Staff Dormitory                     | 200              |

|    |                               |              |
|----|-------------------------------|--------------|
| 19 | Staff Housing                 | 108          |
| 20 | Staffs & Pilgrims Canteen     |              |
|    | Fixed population              | 30           |
| 21 | Facility Management Block     |              |
|    | Fixed population              | 36           |
| 22 | Police Chowki                 | 36           |
|    | Total for 2 blocks            | 72           |
| 23 | Fire Station                  | 20           |
| 24 | Amenity Block in Parking Area | 8            |
| 25 | Mithila Haat                  | 52           |
| 26 | Miscellaneous                 | 50           |
|    | <b>Total</b>                  | <b>42071</b> |

## 6. PARKING DETAIL

There will not be any shortage of parking space in view of requirement of parking area. The total of 905 cars parking spaces and 60 bus parking spaces will be provided at the site.

## 7. LANDSCAPE DEVELOPMENT

Increasing vegetation in the form of greenbelt is one of the preferred methods to mitigate air pollution. Plants serve as a sink for pollutants, reduce the flow of dust and reduce noise pollution. Calculation of green area for proposed project is given in **Table-7**.

**Table-7: Calculation of Green area and no. of Trees Proposed**

|                                                                                                                    |                       |
|--------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Total Plot Area</b>                                                                                             | <b>271139.38 Sqm.</b> |
| Proposed greenbelt Area @ 28.70%                                                                                   | 75000 Sqm.            |
| No. of Trees Required @ 1 tree /80 sq. m of Plot Area (Trees including Periphery + Green Belt + Avenue Plantation) | 3,389                 |
| No. of trees to be cut                                                                                             | 194                   |
| Compensatory trees to be planted for tree cutting                                                                  | 1940                  |
| Total no. of trees to be planted at Site                                                                           | 5330                  |
| No. of Trees to be retain at Site                                                                                  | 123                   |

## 8. WATER REQUIREMENT, SUPPLY AND DISTRIBUTION

Water Requirement for the proposed project is discussed below.

### **8.1 Water requirement during Construction phase**

Approx. 21 KLD water will be required for domestic as well as for construction purpose. Water requirement of construction phase will be met from STP treated water / Private water tanker.

No use of ground water or surface water will be used during the construction activity

- Cement mixing- 05 KLD
- Curing - 02 KLD
- Sprinkling- 05 KLD
- Domestic purposes- 9 KLD

### **8.2 Water requirement during operation phase**

The fresh water requirement during the operational phase of the proposed project is 399 KLD will be met through Ground water. Ground water withdrawal will only after getting permission of CGWA. The total water requirement for the proposed project has been estimated 1095 KLD. This includes domestic water requirement, flushing, landscaping and DG cooling. The water requirement for Flushing and landscaping and other construction activities will be met through treated water from STP. The break-up of water requirement for the project is given in **Table-8**.

Total wastewater generated will be 870 KLD. After Treatment ~696 KLD water will be used for flushing, landscaping and filter backwashing. Water balance diagram for given in **Figure-4**.

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**Table 8: Details of water requirement**

| S.N | Description                         | Total Population | Water Required | Water Requirement |        |         |        | Total Water          | Flow To STP                |
|-----|-------------------------------------|------------------|----------------|-------------------|--------|---------|--------|----------------------|----------------------------|
|     |                                     |                  |                | Domesti           |        | Flushin |        | Requirement (Actual) | Domestic-90% Flushing-100% |
|     |                                     |                  | LPCD           | LPCD              | LPD    | LPCD    | LPD    | LPD                  | LPD                        |
| 1   | Pilgrim Footfall (Peak)             | 40000            | 15             | 5                 | 200000 | 10      | 400000 | 600000               | 580000                     |
| 2   | <b>Temple &amp; Percota</b>         |                  |                |                   |        |         |        |                      |                            |
|     | Fixed population                    | 10               | 45             | 25                | 250    | 20      | 200    | 450                  | 425                        |
| 3   | <b>Entrance Fore Court</b>          |                  |                |                   |        |         |        |                      |                            |
|     | Fixed population                    | 50               | 45             | 25                | 1250   | 20      | 1000   | 2250                 | 2125                       |
| 4   | <b>Pilgrims Facilitation Centre</b> |                  |                |                   |        |         |        |                      |                            |
|     | Fixed population                    | 60               | 45             | 25                | 1500   | 20      | 1200   | 2700                 | 2550                       |
|     | Total for 2 units                   |                  |                |                   | 3000   | 40      | 2400   | 5400                 | 5100                       |
| 5   | Bhog Kitchen                        | 10               | 35             | 25                | 250    | 10      | 100    | 250                  | 325                        |
| 7   | Pujari Niwas                        | 7                | 135            | 90                | 630    | 45      | 315    | 945                  | 882                        |
| 8   | Sant Niwas                          | 30               | 135            | 90                | 2700   | 45      | 1350   | 4050                 | 3780                       |
| 9   | VVIP Safe                           | 30               | 15             | 5                 | 150    | 10      | 300    | 450                  | 435                        |
| 10  | Ved Pathshala & Library             | 72               | 45             | 25                | 1800   | 20      | 1440   | 3240                 | 3060                       |

Development of Punaauradham, the BIRTHPLACE OF MOTHER SITA, situated in Sitamarhi District, Bihar in accordance with Shri Ram Janmabhoomi Tirtha Kshetra, Ayodhya

|    |                                    |      |     |    |              |    |             |              |              |
|----|------------------------------------|------|-----|----|--------------|----|-------------|--------------|--------------|
| 11 | Bhandara Sthal (floating )         | 500  | 35  | 25 | 12500        | 10 | 5000        | 17500        | 16250        |
| 12 | Admin & Trust Office               |      |     |    |              |    |             |              |              |
|    | Fixed population                   | 70   | 45  | 25 | 1750         | 20 | 1400        | 3150         | 2975         |
| 13 | <b>Restaurant &amp; Food Court</b> |      |     |    |              |    |             |              |              |
|    | Fixed population                   | 40   | 35  | 25 | 1000         | 10 | 400         | 1400         | 1300         |
|    | Floating Population                | 500  | 35  | 25 | 12500        | 10 | 5000        | 17500        | 16250        |
|    | <b>Total</b>                       |      |     |    | <b>13500</b> |    | <b>5400</b> | <b>18900</b> | <b>17550</b> |
| 14 | Auditorium                         | 1200 | 45  | 25 | 30000        | 20 | 24000       | 54000        | 51000        |
| 15 | Museum                             |      |     |    |              |    |             |              |              |
|    | Fixed population                   | 40   | 45  | 25 | 1000         | 20 | 800         | 1800         | 1700         |
| 16 | <b>Katha Sthal Stage</b>           |      |     |    |              |    |             |              |              |
|    | Fixed population                   | 16   | 45  | 25 | 400          | 20 | 320         | 720          | 680          |
| 17 | Pilgrims Dormitory                 | 300  | 135 | 90 | 27000        | 45 | 13500       | 40500        | 37800        |
|    | Total for 3 units                  | 900  |     |    | 81000        |    | 40500       | 121800       | 113400       |
| 18 | Pilgrims Guest House               | 100  | 135 | 90 | 9000         | 45 | 4500        | 13500        | 12600        |
| 19 | Staff Dormitory                    | 200  | 135 | 90 | 18000        | 45 | 9000        | 27000        | 25200        |
| 20 | Staff Housing                      | 108  | 135 | 90 | 9720         | 45 | 4860        | 14850        | 13608        |
| 21 | Staffs & Pilgrims Canteen          |      |     |    |              |    |             |              |              |
|    | Fixed population                   | 30   | 35  | 25 | 750          | 10 | 300         | 1050         | 975          |
|    | Floating                           | 220  | 35  | 25 | 5500         | 10 | 2200        | 7700         | 7150         |

Development of Punaauradham, the BIRTHPLACE OF MOTHER SITA, situated in Sitamarhi District, Bihar in accordance with Shri Ram Janmabhoomi Tirtha Kshetra, Ayodhya

|    |                                               |    |    |    |               |    |               |               |               |
|----|-----------------------------------------------|----|----|----|---------------|----|---------------|---------------|---------------|
|    | population                                    |    |    |    |               |    |               |               |               |
|    | Total                                         |    |    |    | 6250          |    | 2500          | 8750          | 8125          |
| 22 | Facility Management Block                     |    |    |    |               |    |               |               |               |
|    | Fixed population                              | 36 | 45 | 25 | 900           | 20 | 720           | 1620          | 1530          |
| 23 | Police Chowki                                 | 36 | 45 | 25 | 900           | 20 | 720           | 1620          | 1530          |
|    | Total for 2 blocks                            |    |    |    | 1800          |    | 1440          | 3240          | 3060          |
| 24 | Fire Station                                  | 20 | 45 | 25 | 500           | 20 | 400           | 900           | 850           |
| 25 | Amenity Block in Parking Area                 | 8  | 45 | 25 | 200           | 20 | 160           | 360           | 340           |
| 26 | Mithila Haat                                  | 52 | 45 | 25 | 1300          | 20 | 1040          | 2340          | 2210          |
| 27 | Miscellaneous                                 | 50 | 45 | 25 | 1250          | 20 | 1000          | 2250          | 2125          |
|    | <b>SUB TOTAL</b>                              |    |    |    | <b>399100</b> |    | <b>511345</b> | <b>909715</b> | <b>869335</b> |
| 28 | Filter Backwash                               |    |    |    |               |    |               | 10000         | 0             |
|    | Horticulture area 75000 sqm @ 2.34 sqm /Liter |    |    |    |               |    |               | 175500        |               |
|    | TOTAL                                         |    |    |    | 399100        |    |               | 1095215       | 869335        |
|    | <b>Say (KLD)</b>                              |    |    |    | <b>399</b>    |    | <b>511</b>    | <b>1095</b>   | <b>870</b>    |

### 8.3 Wastewater Generation

The total estimated quantity of wastewater to be generated from proposed project is ~870 KLD.

Calculation of wastewater generation is shown below in **Table-9**.

**Table-9: Calculation of Wastewater Generation**

| Details                                                                                   | Water (KLD) |
|-------------------------------------------------------------------------------------------|-------------|
| Water requirement for domestic purpose                                                    | 399         |
| <b>Wastewater to be generated from domestic use (@ 80% of domestic water requirement)</b> | <b>359</b>  |
| Water requirement for Flushing Purpose                                                    | 511         |
| <b>Wastewater to be generated from Flushing @ 100% of flushing requirement)</b>           | <b>511</b>  |
| <b>Total Wastewater generated</b>                                                         | <b>870</b>  |
| <b>STP capacity</b>                                                                       | <b>1050</b> |

Water balance diagram for given in **Figure-4**.

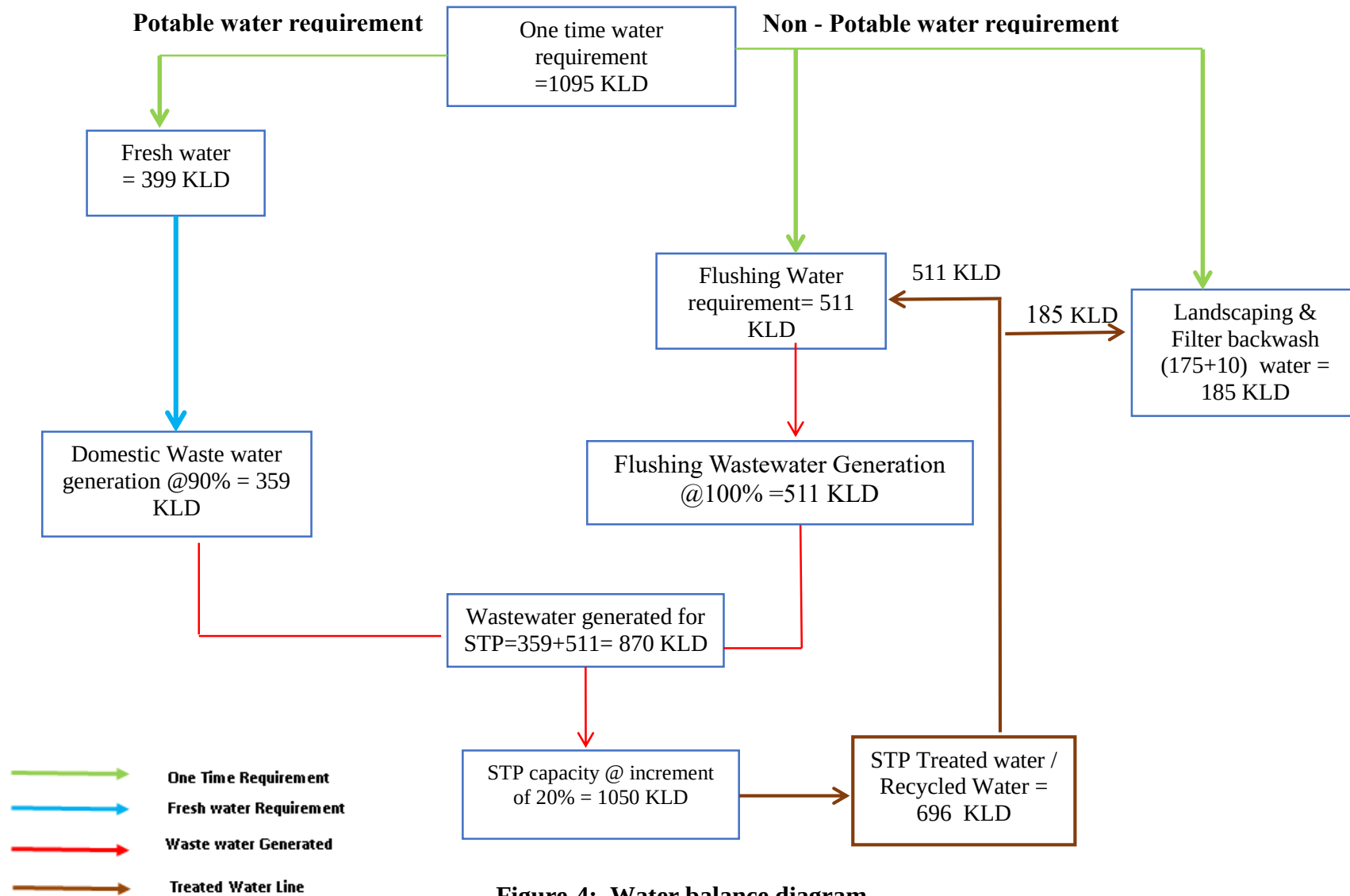


Figure-4: Water balance diagram

### **Reuse of Treated Water:**

Wastewater generated is 870 KLD, which will be treated in the onsite STP of capacity 20% more than the wastewater generated i.e. 1050 KLD. The treated water available is 696 KLD (@ of 80% of Total wastewater) and it will be recycled and re-used for flushing and landscaping purpose.

During the non-monsoon season, treated water will be used in Flushing & landscaping management and during the monsoon season, as there will be no requirement of water for landscaping, and the excess treated water depending up on requirement either will be used in nearby construction site or discharged into the sewer line.

### **Wastewater Treatment Scheme**

The waste water generated will be treated in the Sewage Treatment Plant, and the capacity of Sewage Treatment Plant (STP) will be higher of waste water generated i.e., 1050 KLD. The proposed STP is based on **Membrane Bio reactor (MBR)**. MBR is a process that combines a membrane ultra / micro filtration process and activated sludge process. The MBR process is used in place of the secondary sedimentation tank and sand filter used for tertiary treatment in the conventional activated sludge process.

### **Pre-treatment:**

To reduce the chances of membrane damage, wastewater should undergo a high level of debris removal using screens prior to the MBR. Primary treatment is often provided in larger installations. In addition, all MBR systems require 1- to 3-mm-cutoff fine screens immediately before the membranes, depending on the MBR manufacturer. These screens require frequent cleaning.

### **Membrane Configuration:**

MBR manufacturers employ membranes in two basic configurations: hollow fiber bundles and plate membranes. A number of **bundles** are connected by manifolds into units that can be readily changed for maintenance or replacement.

The other configuration, employ **membranes** in a flatplate configuration, again with manifolds to allow a number of membranes to be connected in readily changed units.

### System Operation:

All MBR systems require some degree of pumping to force the water flowing through the membrane. While other membrane systems use a pressurized system to push the water through the membranes, the major systems used in MBRs draw a vacuum through the membranes so that the water outside is at ambient pressure. The advantage of the vacuum is that it is gentler to the membranes; the advantage of the pressure is that throughput can be controlled. All systems also include techniques for continually cleaning the system to maintain membrane life and keep the system operational for as long as possible. All the principal membrane systems used in MBRs use an air scour technique to reduce buildup of material on the membranes. This is done by blowing air around the membranes out of the manifolds.

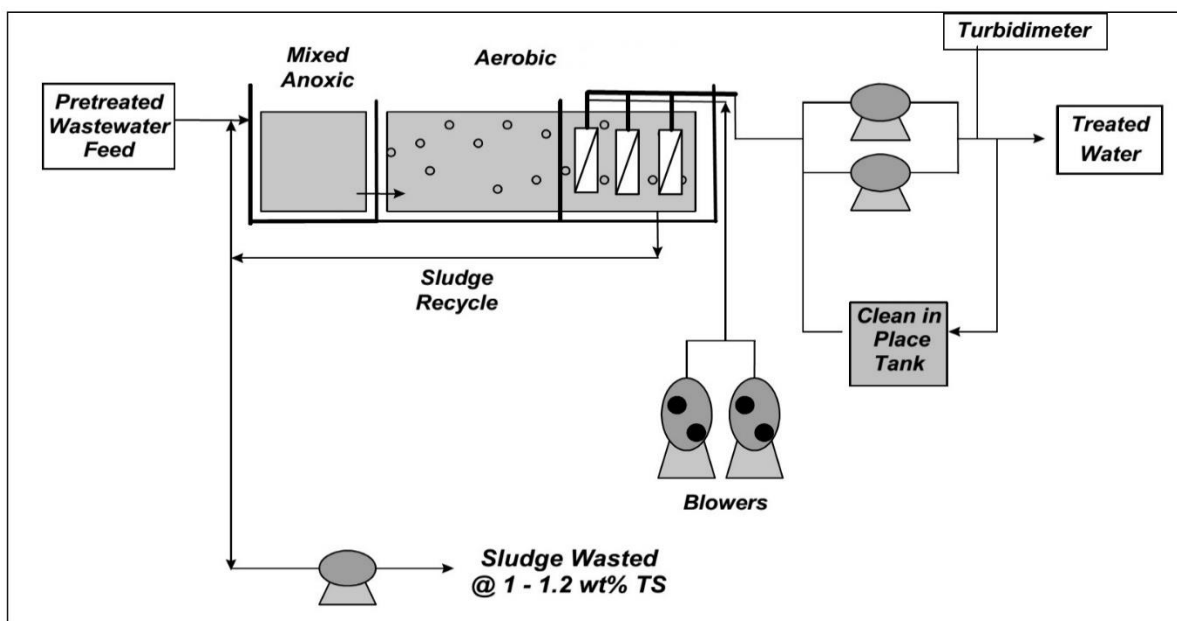


Figure-5: Schematic Diagram of MBR STP

## 9. SOLID WASTE GENERATION AND MANAGEMENT

The well adopted a systematic approach for solid waste collection and disposal from project activities. Solid waste generated from the project is collected properly and managed as per Solid waste Management Rules, 2016.

The domestic solid waste generated from the occupants of the College, Residence, Hostel, Visitors, Patients, and Staff; pertains to the two categories, Bio-degradable and non-biodegradable. These solid wastes are collected separately by putting different types of separate bins at the source of generation. It is estimated that maximum solid waste generation would be about ~7065 kg/day. The solid waste generation considered is given in **Table-10**.

**Table-10: Solid waste Generation details**

| S.N | Description                         | Total Population | Unit rate Waste Generation | Solid Waste (Kg/day) | Bio-degradable | Non-biodegradable |
|-----|-------------------------------------|------------------|----------------------------|----------------------|----------------|-------------------|
| 1   | Pilgrim Footfall (Peak)             | 40000            | 0.15                       | 6000                 | 2400           | 3600              |
| 2   | <b>Temple &amp; Percota</b>         |                  |                            |                      |                |                   |
|     | Fixed population                    | 10               | 0.15                       | 1.5                  | 0.6            | 0.9               |
| 3   | <b>Entrance Fore Court</b>          |                  |                            |                      |                |                   |
|     | Fixed population                    | 50               | 0.15                       | 7.5                  | 3              | 4.5               |
| 4   | <b>Pilgrims Facilitation Centre</b> |                  |                            | 0                    | 0              | 0                 |
|     | Fixed population                    | 60               | 0.15                       | 9                    | 3.6            | 5.4               |
|     | <b>Total for 2 units</b>            | 120              | 0.15                       | 18                   | 7.2            | 10.8              |
| 5   | Bhog Kitchen                        | 10               | 0.1                        | 1                    | 0.4            | 0.6               |
| 6   | Pujari Niwas                        | 7                | 0.45                       | 3.15                 | 1.26           | 1.89              |
| 7   | Sant Niwas                          | 30               | 0.45                       | 13.5                 | 5.4            | 8.1               |
| 8   | VVIP Safe                           | 30               | 0.1                        | 3                    | 1.2            | 1.8               |

Development of Punaauradham, the BIRTHPLACE OF MOTHER SITA, situated in Sitamarhi District, Bihar in accordance with Shri Ram Janmabhoomi Tirtha Kshetra, Ayodhya

|    |                                    |      |      |      |       |       |
|----|------------------------------------|------|------|------|-------|-------|
| 9  | Ved Pathshala & Library            | 72   | 0.15 | 10.8 | 4.32  | 6.48  |
| 10 | Bhandara Sthal (floating )         | 500  | 0.15 | 75   | 30    | 45    |
| 11 | Admin & Trust Office               |      |      | 0    | 0     | 0     |
|    | Fixed population                   | 70   | 0.15 | 10.5 | 4.2   | 6.3   |
| 12 | <b>Restaurant &amp; Food Court</b> |      | 0.45 | 0    | 0     | 0     |
|    | Fixed population                   | 40   | 0.1  | 4    | 1.6   | 2.4   |
|    | Floating Population                | 500  | 0.15 | 75   | 30    | 45    |
|    | <b>Total</b>                       |      | 0.15 | 79   | 31.6  | 47.4  |
| 13 | Auditorium                         | 1200 | 0.15 | 180  | 72    | 108   |
| 14 | Museum                             |      | 0    | 0    | 0     | 0     |
|    | Fixed population                   | 40   | 0.15 | 6    | 2.4   | 3.6   |
| 15 | <b>Katha Sthal Stage</b>           |      | 0.45 | 0    | 0     | 0     |
|    | Fixed population                   | 16   | 0.45 | 7.2  | 2.88  | 4.32  |
| 16 | Pilgrims Dormitory                 | 300  | 0.45 | 135  | 54    | 81    |
|    | Total for 3 units                  | 900  | 0.45 | 405  | 162   | 243   |
| 17 | Pilgrims Guest House               | 100  | 0.45 | 45   | 18    | 27    |
| 18 | Staff Dormitory                    | 200  | 0.45 | 90   | 36    | 54    |
| 19 | Staff Housing                      | 108  | 0.45 | 48.6 | 19.44 | 29.16 |
| 20 | Staffs & Pilgrims Canteen          |      | 0    | 0    | 0     | 0     |
|    | Fixed population                   | 30   | 0.15 | 4.5  | 1.8   | 2.7   |
|    | Floating population                | 220  | 0.1  | 22   | 8.8   | 13.2  |
|    | Total                              | 250  |      | 26.5 | 10.6  | 15.9  |
| 21 | Facility Management Block          |      | 0    | 0    | 0     | 0     |
|    | Fixed population                   | 36   | 0.15 | 5.4  | 2.16  | 3.24  |
| 22 | Police Chowki                      | 36   | 0.15 | 5.4  | 2.16  | 3.24  |

|    |                               |    |      |      |      |      |
|----|-------------------------------|----|------|------|------|------|
|    | Total for 2 blocks            | 72 | 0.15 | 10.8 | 4.32 | 6.48 |
| 23 | Fire Station                  | 20 | 0.1  | 2    | 0.8  | 1.2  |
| 24 | Amenity Block in Parking Area | 8  | 0.1  | 0.8  | 0.32 | 0.48 |
| 25 | Mithila Haat                  | 52 | 0.15 | 7.8  | 3.12 | 4.68 |
| 26 | Miscellaneous                 | 50 | 0.15 | 7.5  | 3    | 4.5  |
|    | <b>Total</b>                  |    |      | 7065 | 2826 | 4239 |

***\*Source: Manual on Municipal Solid Waste Management, published by Central Public Health and Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India.***

The E-waste generated is managed as per the E-waste management and handling rules 2016.

## **10. RAINWATER HARVESTING/STORM WATER MANAGEMENT**

Rainwater harvesting is the activity of direct collection of rainwater. Collected Rainwater is stored for direct use or for recharging the groundwater. Rain water Harvesting is the technique through which rain water is captured from the roof and paved surfaces and stored in sub-surface ground water reservoir by adopting artificial recharge techniques.

Advantages:

- ✓ To meet the ever-increasing demand for water.
- ✓ To avoid flooding of roads.
- ✓ To augment the ground water storage and control the decline of water table levels.
- ✓ To reduce ground water pollution.
- ✓ To improve the quality of ground water.
- ✓ To reduce the soil erosion.
- ✓ To supplement domestic water requirement during summer, drought etc.
- ✓ Improves the quality of ground water through dilution when recharged to ground water.
- ✓ In saline areas, rain water provides good quality water and when recharged to ground water, it reduces salinity and also helps in maintaining balance between the fresh-saline water inter-faces.

Rainwater Harvesting Calculation for the project is given in **Table-11**.

## **RAIN WATER HARVESTING**

(i) **Rainwater Collection Potential for Reuse**

Rainwater harvesting is the activity of direct collection of rainwater. Collected Rainwater will be stored for direct use or for recharging the groundwater. Rain water Harvesting is the technique through which rain water is captured from the roof and paved surfaces and stored in sub-surface ground water reservoir by adopting artificial recharge techniques.

**Table 11: Rain water Harvesting Details**

| Estimation of Quantum of runoff available through Rain water harvesting (within premises) |                                   |             |             |             |                                    |
|-------------------------------------------------------------------------------------------|-----------------------------------|-------------|-------------|-------------|------------------------------------|
| Input Data                                                                                |                                   |             |             |             | Reference                          |
| Catchment Area                                                                            |                                   | Value       |             |             |                                    |
| 1                                                                                         | Rooftop Area of Building/shed     | 46000       | sq-mtr      |             |                                    |
| 2                                                                                         | Green Belt Area                   | 75000       | sq-mtr      |             |                                    |
| 3                                                                                         | Open & Paved Area                 | 1,50,139.38 | sq-mtr      |             |                                    |
|                                                                                           | Total                             | 271139.38   |             |             |                                    |
|                                                                                           |                                   |             |             |             |                                    |
| Run off Coefficient, c                                                                    |                                   |             |             |             |                                    |
|                                                                                           | Rooftop Area of Building/shed     | 0.85        |             |             | RWH in India, MoEF&CC, e-book 2016 |
|                                                                                           | Green Belt Area                   | 0.15        |             |             |                                    |
|                                                                                           | Paved Area                        | 0.75        |             |             |                                    |
|                                                                                           | Open Area                         | 0.15        |             |             |                                    |
|                                                                                           |                                   |             |             |             | CGWB Sitamardhi, 2023              |
| Rainfall                                                                                  |                                   |             |             |             |                                    |
|                                                                                           | Average Annual Rainfall           | 744.1       | mm/year     |             |                                    |
|                                                                                           | Hourly Peak Rainfall Intensity, I | 45          | mm/hour     |             |                                    |
|                                                                                           | Peak Time taken                   | 15          | minutes     |             |                                    |
| Total Volume of Water to be Captured on Annual Basis                                      |                                   |             |             | Q = A* c* I |                                    |
|                                                                                           | Rooftop Area of Building/shed     | 29094.31    | cu-m/year   |             |                                    |
|                                                                                           | Green Belt Area                   | 8371.13     | cu-m/year   |             |                                    |
|                                                                                           | Paved Area                        | 83789.03    | cu-m/year   |             |                                    |
|                                                                                           |                                   |             |             |             |                                    |
| Runoff Calculation for the Peak Rainfall, Q                                               |                                   |             |             |             |                                    |
|                                                                                           | Rooftop Area of Building/shed     | 439.88      | cu-mtr/hour |             | RWH in India, MoEF&CC, e-          |

|                                                            |                    |                |                    |           |
|------------------------------------------------------------|--------------------|----------------|--------------------|-----------|
|                                                            | Green Belt Area    | 126.56         | cu-mtr/hour        | book 2016 |
|                                                            | Paved Area         | 1266.80        | cu-mtr/hour        |           |
|                                                            | <b>Total</b>       | <b>1833.24</b> | <b>cu-mtr/hour</b> |           |
| <b>Annual Recharge Potential</b>                           |                    |                |                    | IMD       |
|                                                            | Recharge Potential | 121254.47      | cu-m/year          |           |
|                                                            | Rainy Season       | June-Sep       |                    |           |
| <b>Design of Recharge Structure for Peak Flow</b>          |                    |                |                    |           |
| <b>Calculation for One Pit</b>                             |                    |                |                    |           |
|                                                            | Diameter of Pit    | 4.5            | mtr                |           |
|                                                            | Depth of the Pit   | 4.5            | mtr                |           |
|                                                            | Volume of the Pit  | 71.57          | cu-mtr             |           |
| <b>Number of Pits Required to store the peak discharge</b> |                    | 25.6           |                    |           |
| Rain water harvesting Pits provided                        |                    | 26             |                    |           |

**Number of RWH Pits Proposed = ~26**

## 11. POWER REQUIREMENT

Total Power requirement is 4000 KVA

### Power backup

Total No. of DG set is 6,

DG set with total power generation capacity of 3500 KVA (4 x 750 KVA, 2 x 250 KVA).

## 12. FIRE FIGHTING SYSTEM

### INTRODUCTION

Engineering services systems for Development of Punaauradham, the birthplace of mother sita, situated in Sitamarhi District, Bihar has been conceptualized based on conceptual architectural drawings and details mentioned in Architectural report, standards, to produce an integrated services system design.

### FIRE FIGHTING SYSTEM

### SALIENT FEATURES OF ENGINEERING SYSTEMS

### OBJECTIVE

The complex is categorized under 'Ordinary Hazard' as per National Code of India 2016. The main objective of firefighting system shall be to protect loss to Life and Property duly complying or exceeding statutory provisions. Essential Life Safety aspects relating to fire compartmentation and emergency escapes/ egress route planning shall be dealt by Architect. However, scope of this report shall be to highlight the proposed firefighting measures including installation of sprinkler for the entire facility, external/ internal hydrants, handheld fire extinguishers, inert gas fire suppression system for electrical rooms.

The entire system shall be monitored from the Fire pump room / Fire Control Room

### **BASIS OF DESIGN**

- National Building Code of India - 2016
- Relevant Bureau of Indian Standards (BIS) Codes
- Motors, cabling, wiring and accessories as per BIS codes/IE Rules/IS codes
- Recommended practices of Equipment manufacture.
- Recommendations of CFO, BIHAR