



DESIGN FOR THE CONSTRUCTION
OF
SINGLE STOREY PRE-FABRICATED COMBINED WASH BLOCK AT CHAR AREA

CASE-03

UNDER
4TH PRIMARY EDUCATION DEVELOPMENT PROGRAM (PEDP-4)

Note:

Foundation

: Single Storey

Structure

: Single Storied Pre-Fabricated WB

Foundation Type : Isolated Footing

STRUCTURAL DESIGN CRITERIA & MINIMUM REQUIREMENTS

1. GENERAL

- a) DESIGN METHOD USED IS USD ACCORDING TO BANGLADESH NATIONAL BUILDING CODE (BNBC) 2012, UBC 1997 AND ACI 1994.
- b) ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH RELEVANT ARCHITECTURAL DRAWINGS IF ANY.
- c) FOLLOW BNBC-2012 FOR SPECIFICATIONS / STRUCTURAL REQUIREMENTS NOT MENTIONED IN THE DRAWINGS OR IN THIS NOTE SHEET.
- d) ANY DETAILS NOT SHOWN IN THE DRAWING SHOULD BE DONE ACCORDING TO ACI DETAILING MANUAL - 1994
- e) BASIC WIND SPEED = 210 km/hr
- f) SEISMIC ZONE - 2
- g) OTHER LOADS AS PER BNBC 2012

2. FOUNDATION

- a) THE WASH BLOCK HAS BEEN DESIGNED FOR SINGLE-STORIED STRUCTURE TO BE CONSTRUCTED AT THE PRIMARY SCHOOLS LOCATED IN THE CHAR AREA OF BANGLADESH.
- b) IN CASE OF BLACK/SWAMPY SOIL FOUND DURING EXCAVATION, THESE BLACK/SWAMPY SOIL REQUIRES TO BE REMOVED.
- FOUNDATION TYPE IS - ISOLATED FOOTING AS DEEMED SUITABLE DESIGN SHOULD BE MODIFIED BASED ON ANY CHANGE IN SOIL BEARING CAPACITY.

3. CONCRETE

- a) TYPE : CONCRETE COMPRESSIVE STRENGTH CONSIDERED AS FOLLOWS :
 - 1) CONCRETE FOR FOOTING, GRADE BEAM, COLUMN = 19 MPa
 - 2) CONCRETE FOR FLOOR BEAM, SLAB & OTHER ELEMENT = 19 MPa
 - 3) MIX PROPORTION : CEMENT: SAND: BRICK CHIPS (1:2:4)
- b) MINIMUM CYLINDER STRENGTH : BASED ON CYLINDER TEST OF DIAMETER $D = 150\text{mm}$ & HEIGHT = 300mm
- c) 28TH DAYS STRENGTH FOR FOUNDATION, GRADE BEAM, COLUMN = 19 MPa FOR FLOOR BEAM, SLAB & OTHER R.C.C MEMBERS = 19 MPa
- c) CURING OF R.C.C WORK :
 - i) CURING TIME MINIMUM 28 DAYS
 - ii) METHOD OF CURING :
 - * HORIZONTAL SURFACE - BY PONDING OF WATER
 - * OTHER SURFACES - BY WRAPPING MOIST JUTE FABRIC AND SPRINKLING WATER BY HOSE PIPE FREQUENTLY.

4. CEMENT

POTRAND CEMENT CONFORMING TO BDS EN-197-1- CEM1, 52.5N (52.5MPa) / ASTM-C 150 TYPE - I

5. CONCRETE AGGREGATE

- a) FINE AGGREGATES : 50% MIXTURE OF FINE SAND OF F.M 1.20 AND COARSE SAND OF F.M 2.20 (Min.)
- b) COARSE AGGREGATES : 20 MM DOWNGRADED PICKED JHAMA BRICK CHIPS

6. WATER

POTABLE WATER TO BE USED IN CONCRETE MIX

7. STEEL REINFORCEMENT

- a) COLUMN & BEAM REINFORCEMENTS ARE OF 400 MPa DEFORMED BAR MADE FROM STANDARD BILLET STEEL.
- b) SLAB & STAIR REINFORCEMENTS ARE OF 400 MPa DEFORMED BAR
- c) MINIMUM YIELD STRENGTH OF STEEL $f_y = 400$ MPa BUT NOT GREATER THAN 450 MPa SHALL CONFORM TO ONE OF THE FOLLOWING SPECIFICATIONS: i) BDS 1313:1991, ii) ASTM A615M
- d) THE FOLLOWING TESTS FOR REINFORCING BARS FROM RANDOM SAMPLES SHALL BE CONDUCTED AT BUET/OTHERS AS PER BDS 1313:1991 AND TEST RESULT SHOULD BE SUBMITTED TO THE OFFICE OF THE EXECUTIVE ENGINEER & PROJECT OFFICE FOR CHECKING AND RECORD:
 - i) TENSILE STRENGTH TEST
 - ii) PERCENTAGE ELONGATION TEST
 - iii) BEND/REBEND TEST
- e) REBAR TEST RESULT SHOULD CONTAIN THE FOLLOWING INFORMATION UNLESS NOTED OTHERWISE
 - i) YIELD STRENGTH (f_y), TENSILE STRENGTH (f_t) & RATIO OF f_t AND f_y
 - ii) MINIMUM ELONGATION AFTER FRACTURE
 - iii) MINIMUM TOTAL ELONGATION AT MAXIMUM FORCE

8. LAP LENGTH

UNLESS OTHERWISE MENTIONED IN THE DRAWINGS, LAP LENGTH OF BARS SHALL BE :

BAR DIA (mm)	TENSION (INCH)	COMPRESSION (INCH)
100	375 (15")	300 (12")
120	400 (18")	375 (15")
160	600 (24")	450 (18")
200	750 (30")	600 (24")
220	825 (33")	675 (27")
250	900 (36")	750 (30")

9. HOOKS OF REBAR

- a) FOR ALL REBAR : PROVIDE 90° STANDARD HOOKS (L-BENT) IF NOT SHOWN IN THE DRAWINGS.

10. SPACER BARS

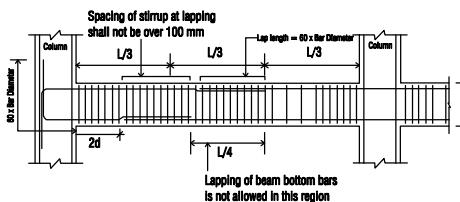
TO SUPPORT SECOND LAYER BARS IN BEAMS USE 16Ø SPACER BARS @ 3'-0" C/C WHERE REQUIRED.

11. CHAIRS

USE CHAIRS OF NECESSARY DIMENSION MADE OF 10Ø / 12Ø BAR TO SUPPORT TOP BARS OF SLAB OR FOOTING @ 3'-0" C/C.

12. LAP LOCATION

- a) FOR BEAM BOTTOM BAR, LAP SHOULD NOT BE PROVIDED AT MIDDLE THIRD ZONE OF THE SPAN
- b) FOR BEAM TOP BAR, LAP SHOULD BE PROVIDED AT MIDDLE THIRD ZONE OF THE SPAN
- c) NOT MORE THAN 50% OF THE BARS SHALL BE SPLICED AT ONE PLACE
- d) LAP SPLICES ARE TO BE CONFINED BY HOOPS WITH MAXIMUM SPACING OR PITCH OF $1/4$ OR $4"$ WHERE d IS THE EFFECTIVE DEPTH OF BEAM



13. DEVELOPMENT LENGTH

ALL BEAM AND SLAB REBARS SHOULD BE EXTENDED INTO THE SUPPORT UPTO DEVELOPMENT LENGTH.

14. ADMIXTURE

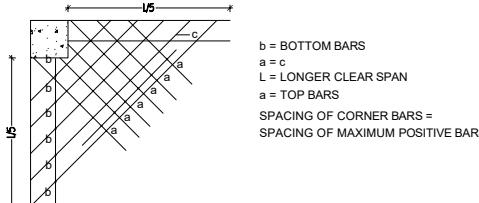
AS PER DIRECTION & APPROVAL OF THE ENGINEER IN CHARGE

15. WATER STOPPER

9" WIDE PVC WATER STOPPER TO BE USED AT ALL CONSTRUCTION JOINTS BELOW GROUND IN WATER TANK WALL IF NEEDED

16. CORNER REINFORCEMENT ('CR')

CORNER REINFORCEMENT FOR BEAM SUPPORTED 2-WAY SLABS ARE AS FOLLOWS:



17. CONCRETE CLEAR COVER FOR REINFORCING BARS

Member	Location/Condition	Clear Cover	Sketch
Foundation	Side	2.0"	
	Bottom	2.0"	
Column	Above F.G.L.	* 2.0"	
	Below F.G.L.	* 2.0"	
Grade Beam	top	** 1.5"	
	bottom, side	** 2.0"	
Floor Beam	top, side	** 1.5"	
	bottom	** 1.5"	
Slab and Stair	Top and bottom	1.0"	
Wall	Exterior	2.0"	
	Interior	1.5"	
Water tank	Water face	2.0"	
	Other face	2.0"	

18. MAXIMUM BARS IN BEAMS IN SINGLE LAYER

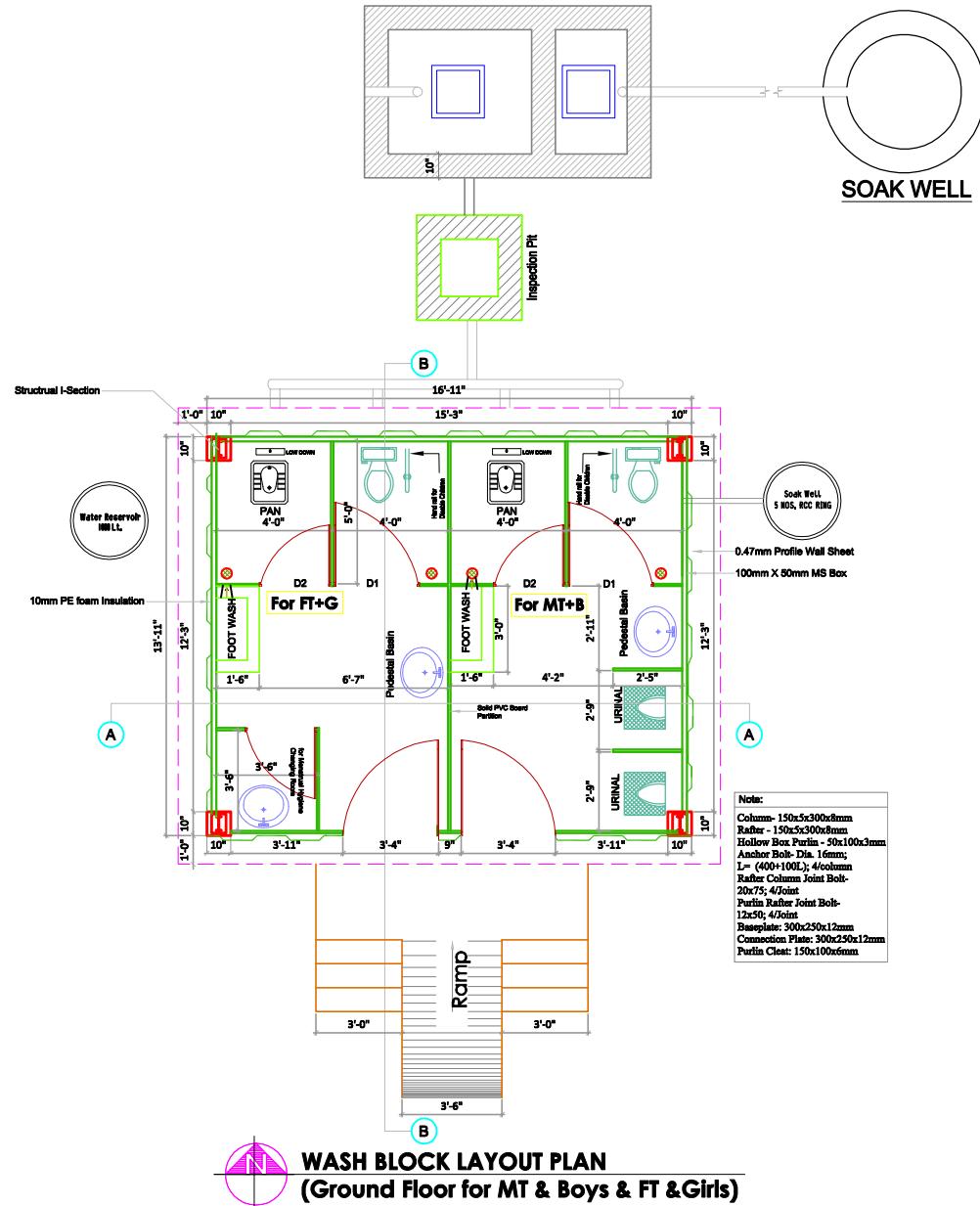
MAXIMUM NUMBER OF BARS AS A SINGLE LAYER IN BEAM STEM SHALL BE AS PER ACI DETAILING MANUAL 1994.

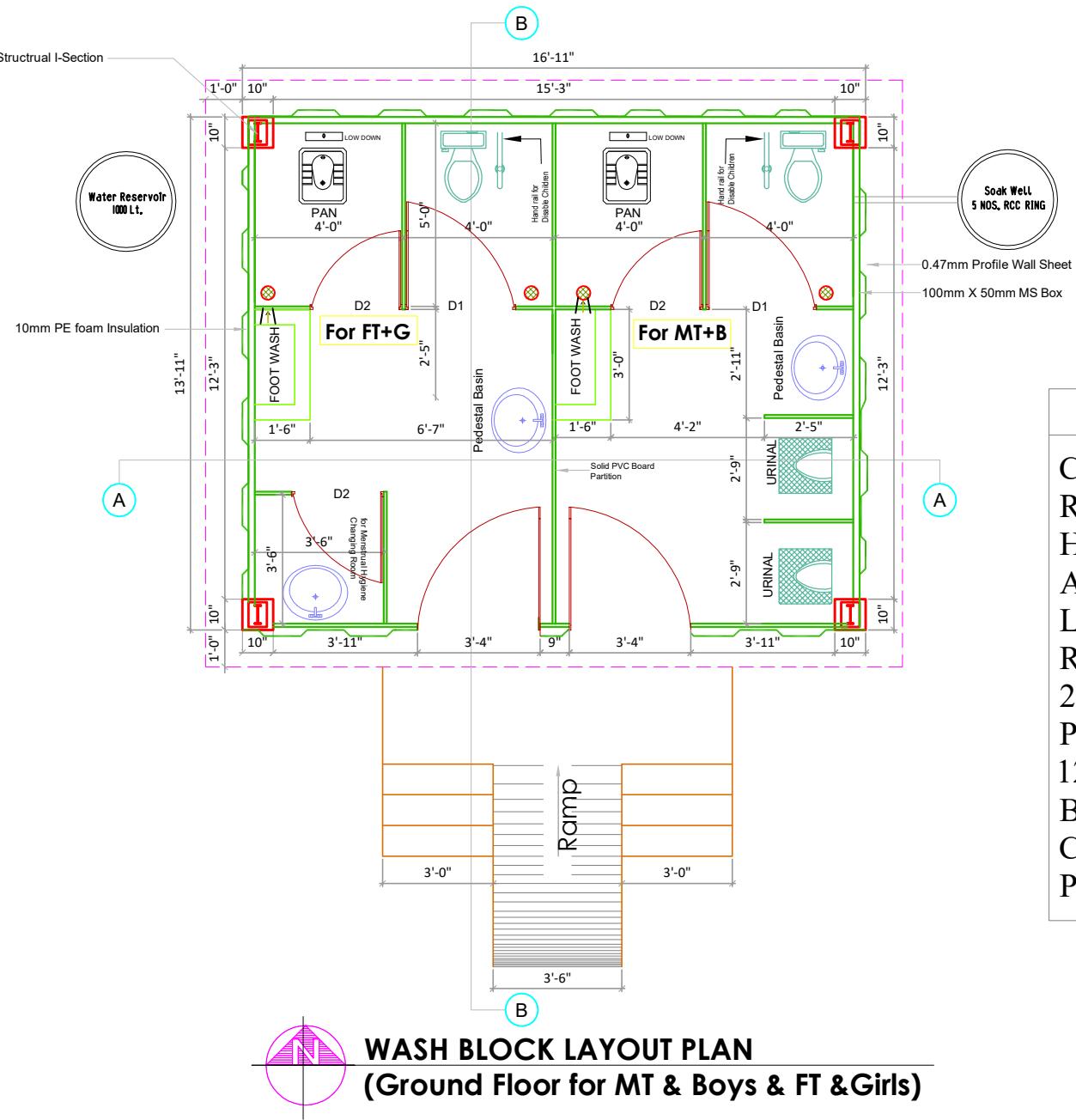
19. MINIMUM BAR SPACING OF COLUMN

LONGITUDINAL BARS:

CLEAR DISTANCE BETWEEN LONGITUDINAL BARS SHALL NOT BE LESS THAN 1.5 TIMES BAR DIAMETER, 1.5 TIMES OF THE MAXIMUM SIZE OF COARSE AGGREGATE NOR 1.5".







WASH BLOCK LAYOUT PLAN (Ground Floor for MT & Boys & FT & Girls)



4TH PRIMARY EDUCATION DEVELOPMENT PROGRAM **PEDP-4**

GROUND FLOOR LAYOUT PLAN WITH SEPTIC TANK

Focal Point, PEDP-4

Dr. Engr. Sushanta Roy
Executive Engineer, DPHE
FIEB-F/13505, MASCE

Focal Point, PEU

Mir Abdus Shahid
Addl. Chief Engineer, DPHE

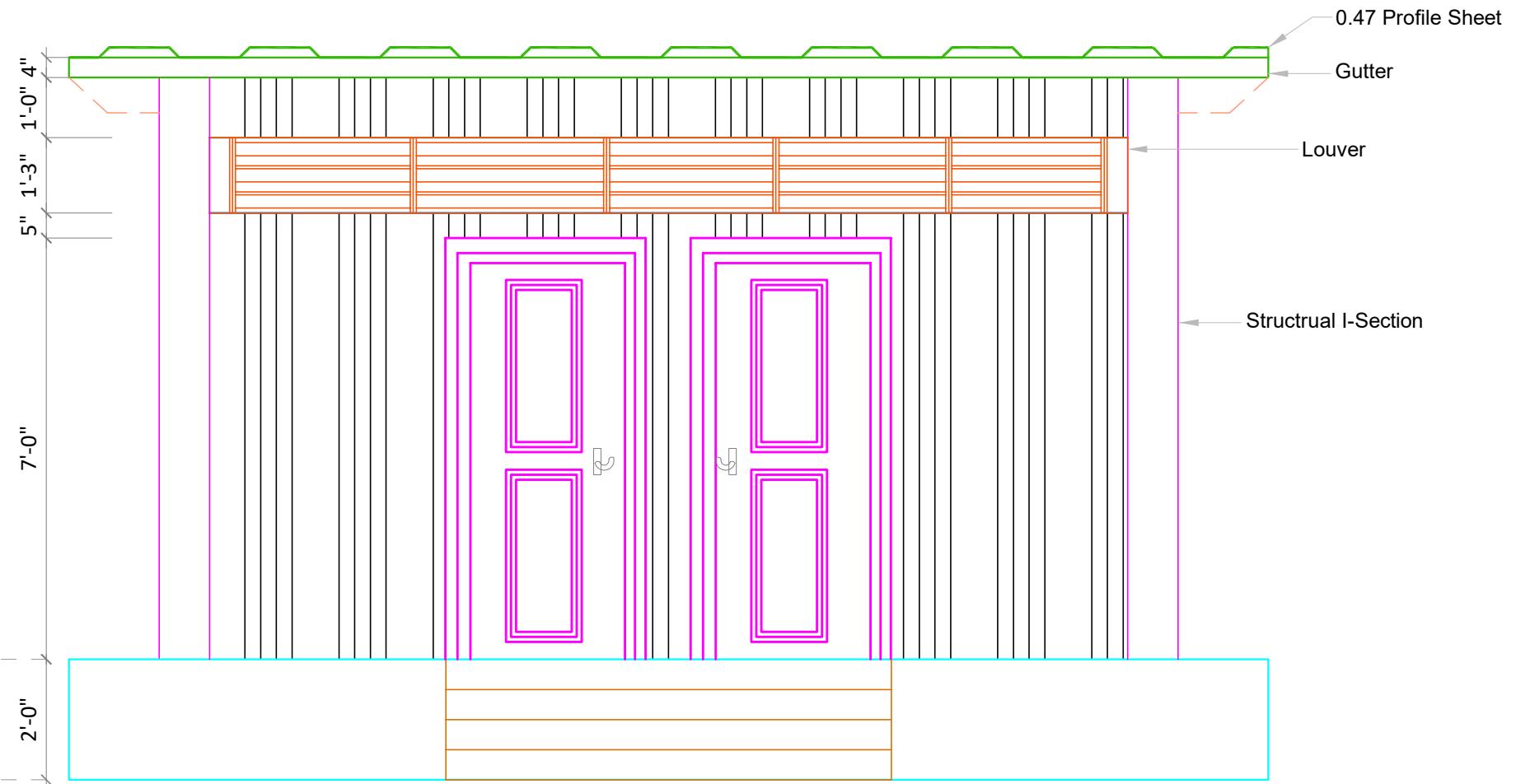
Approved By

Md. Sarwar Hossain
Chief Engineer, DPHE
Govt. of Bangladesh

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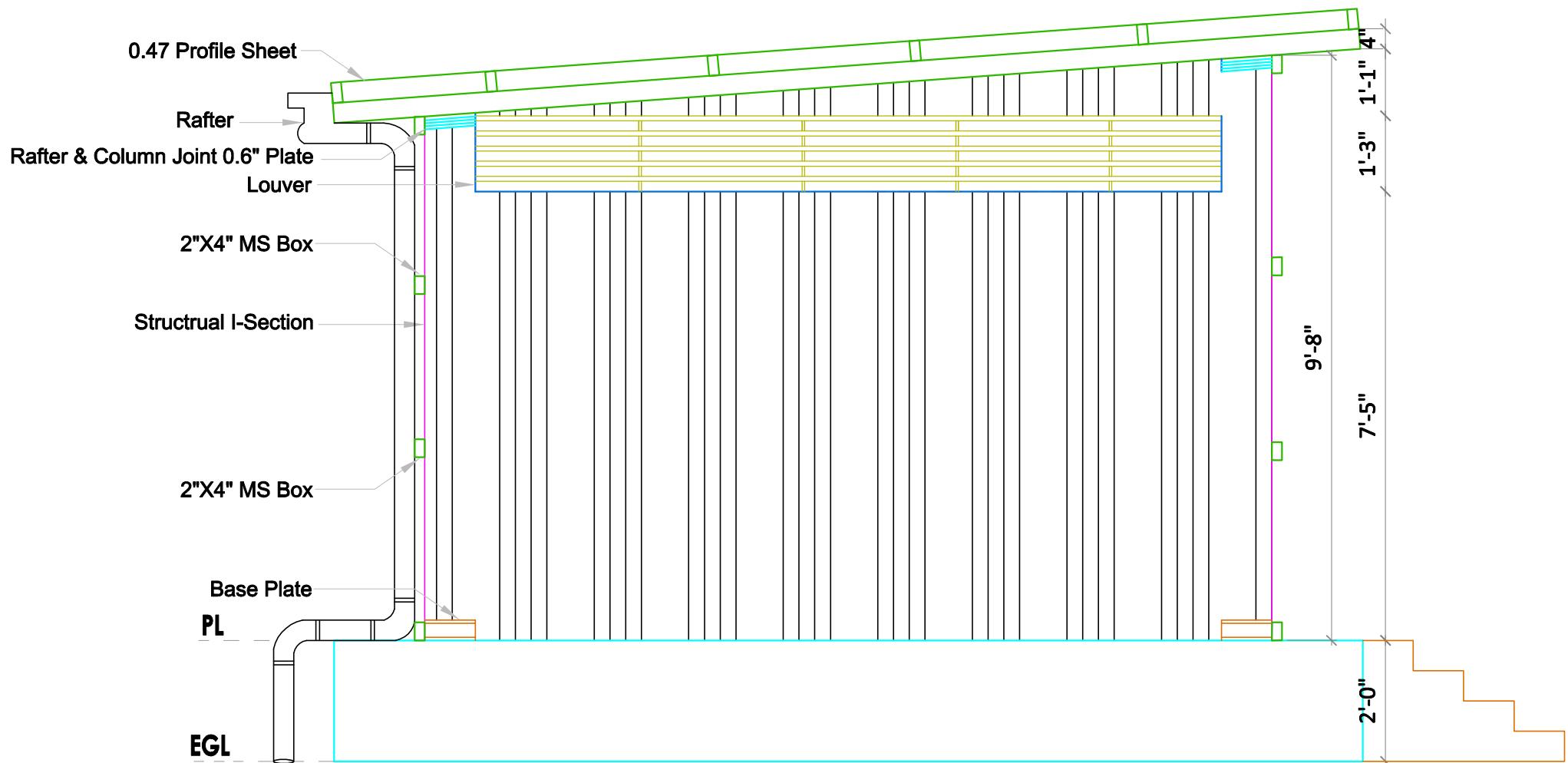
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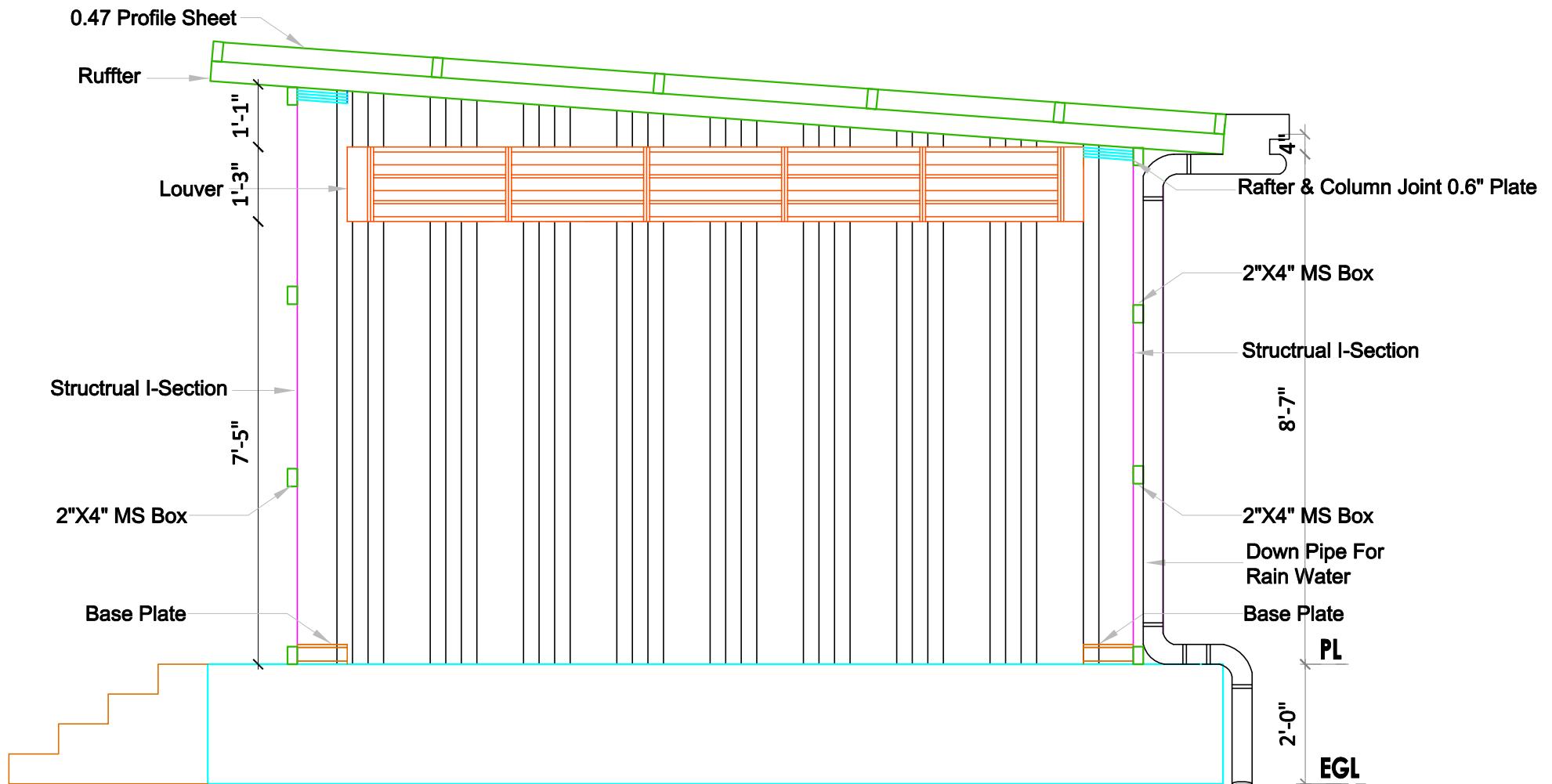
Note:	
LOUVER	15'-3" x 1'-3"
DOOR	3'-4" x 7'-0"





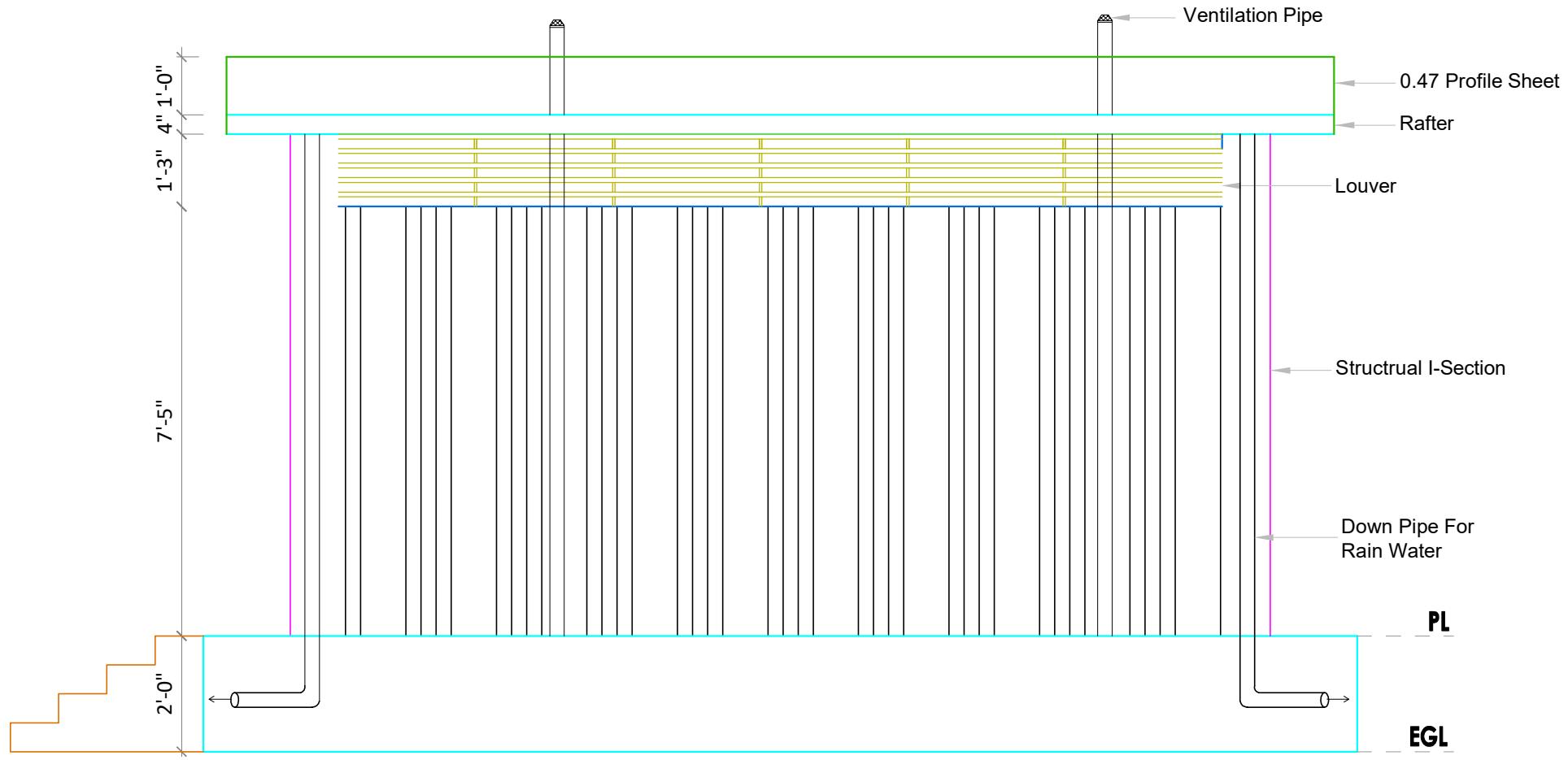
RIGHT ELEVATION





LEFT SIDE ELEVATION





BACK ELEVATION



4TH PRIMARY EDUCATION
DEVELOPMENT PROGRAM
PEDP-4

BACK SIDE ELEVATION

Focal Point, PEDP-4

Dr. Engr. Sushanta Roy
Executive Engineer, DPHE
FIEB-F/13505, MASCE

Focal Point, PEU

Mir Abdus Shahid
Addl. Chief Engineer, DPHE

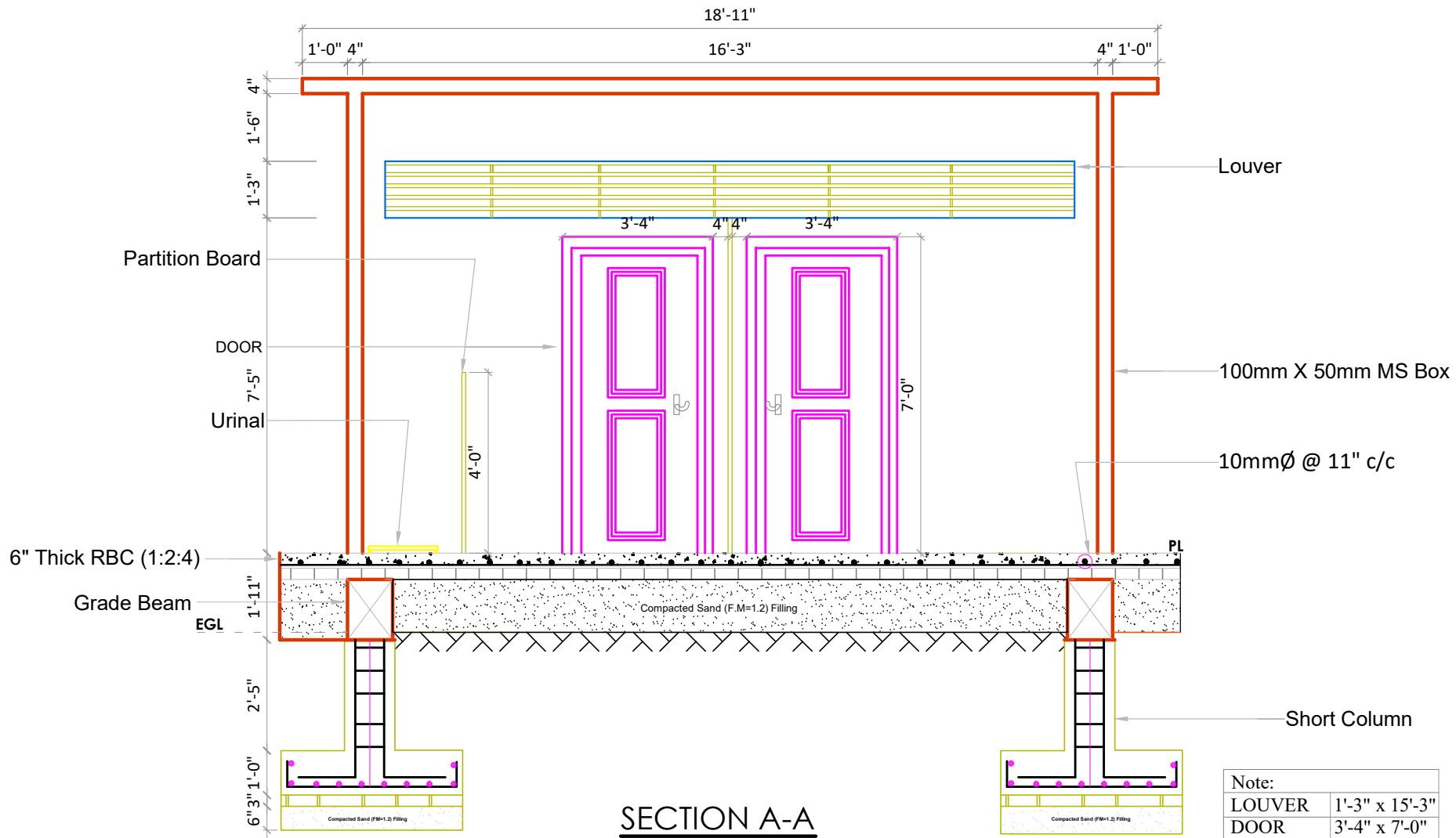
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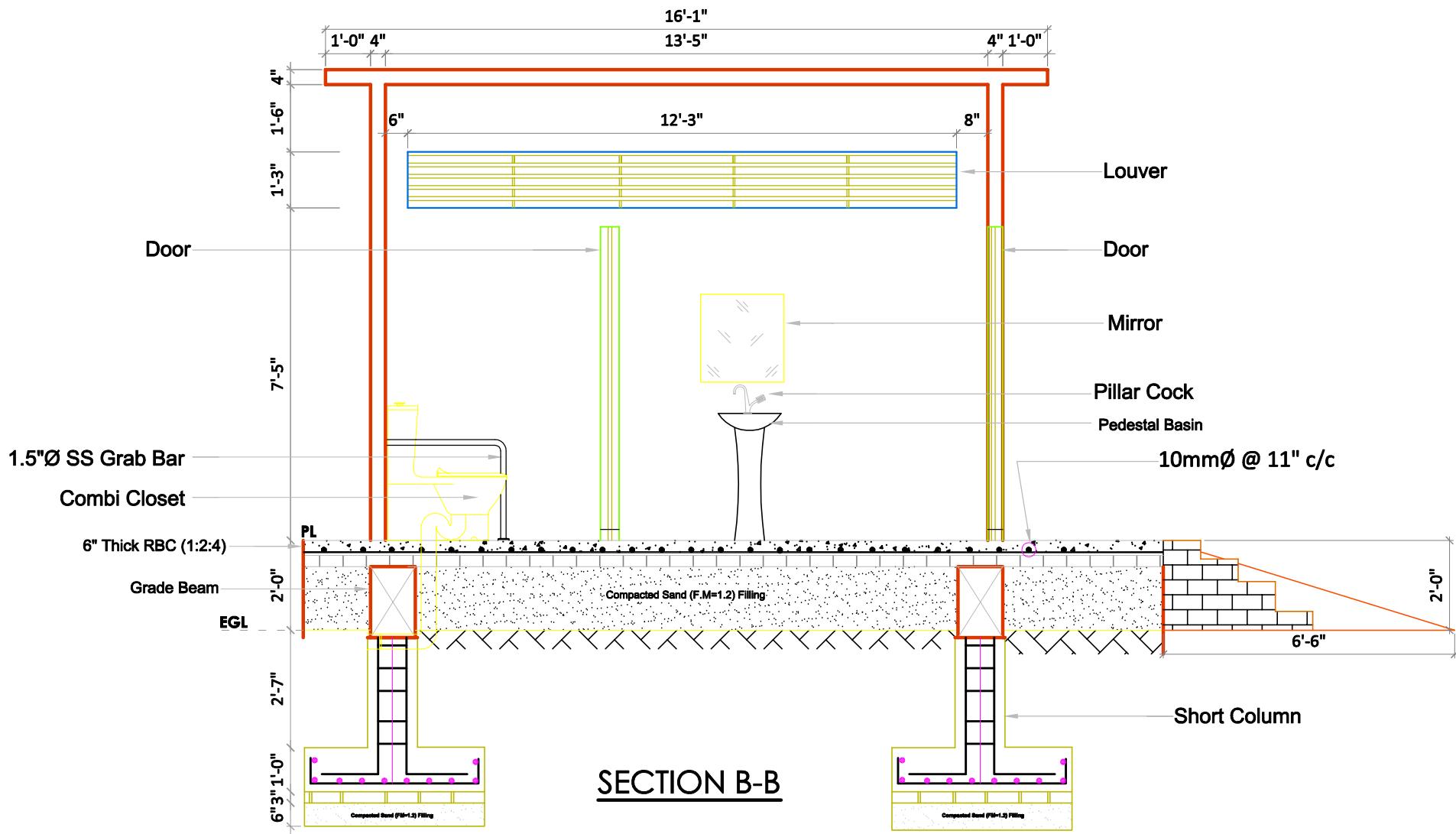
Md. Sarwar Hossain
Chief Engineer, DPHE
Govt. of Bangladesh

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1

2

B

C-01
10"X10"

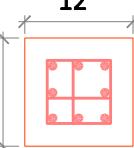
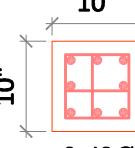
16'-1"

13'-2"

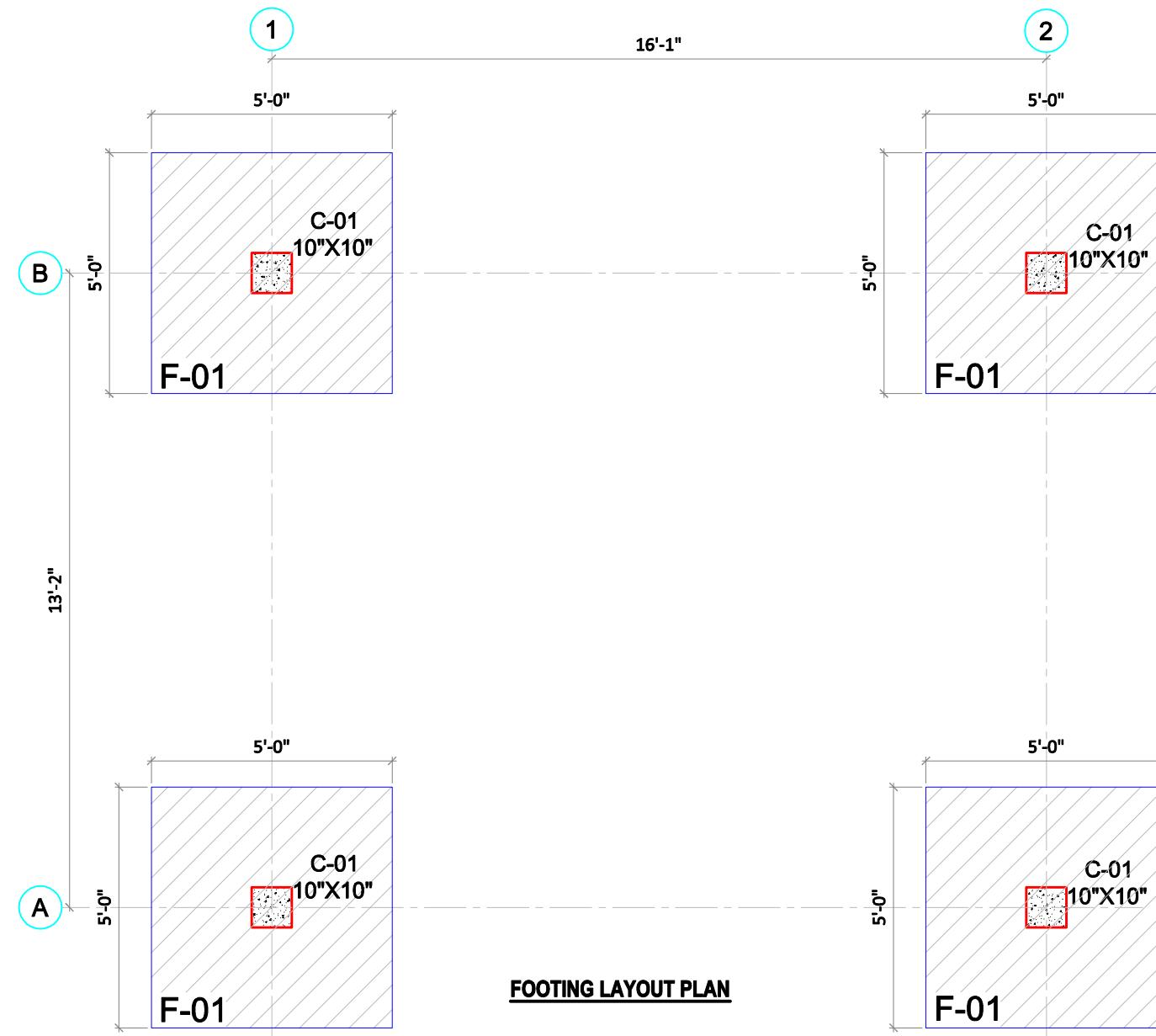
C-01
10"X10"

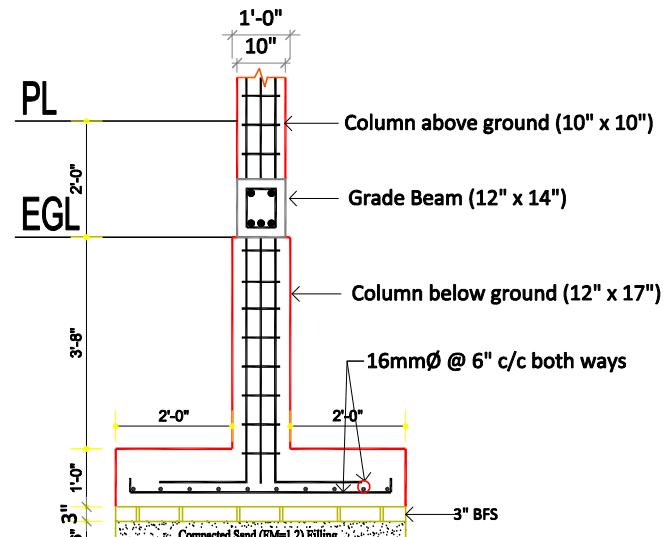
A

C-01
10"X10"COLUMN REBAR SCHEDULE $f'_c = 2500 \text{ psi}$, $f_y = 40,000 \text{ psi}$

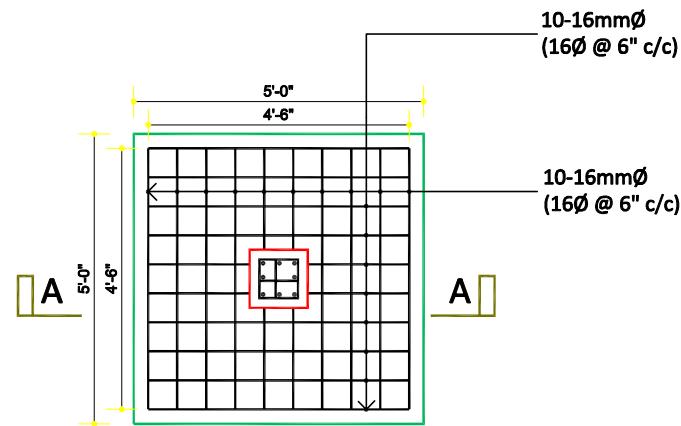
Col. ID	Below GB	Ground - 1st
C-01	<p>12"</p>  <p>8 - 16 Ø</p> <p>Tie : 10 Ø @ 5"-7"-5" C/C</p>	<p>10"</p>  <p>8 - 16 Ø</p> <p>Tie : 10 Ø @ 5"-7"-5" C/C</p>

COLUMN LAYOUT PLAN





Section A-A



Reinforcement arrangement of footing F-01

NOTES

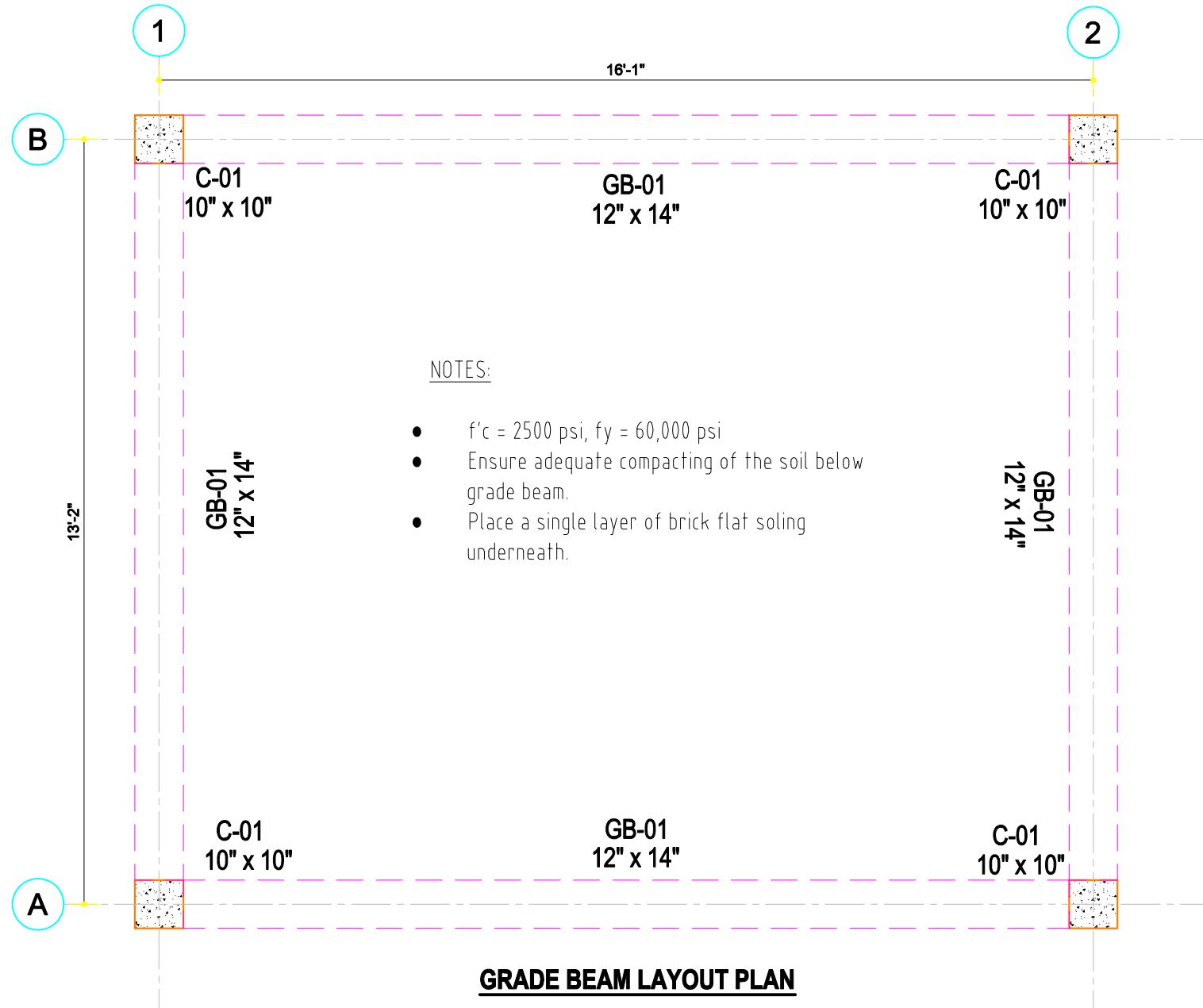
1. In case of Black/Swampy soil found during excavation, these black/swampy soil requires to be removed.
2. Design compressive strength of concrete to be utilized in footing is 19 MPa .
3. In order to ensure that the desired compressive strength is achieved mix ratio of 1:2:4 should be used unless noted otherwise.
4. Concrete should be produced by using best quality cement conforming to BDS EN-197-1- CEM1, 52.5N (52.5MPa) / ASTM-C 150 Type – I along with the blend of local (50%) [F.M. 1.2] and sylhet sand (50%) [F.M 2.2] and 20mm downgraded picked jhama brick chips.
5. Water to cement ratio for producing the desired concrete should be 0.45.
7. Rebar of designed diameter should be of minimum grade of 400 to be confirmed by testing.
8. Clear cover for footing should be 2"(50mm) in all sides
9. Steel shutter is mandatory to be used.
10. Sample concrete cylinders should be prepared during casting which should be tested after a curing age of 28 days for compressive strength.

a [] b [] a

Rebar Schedule

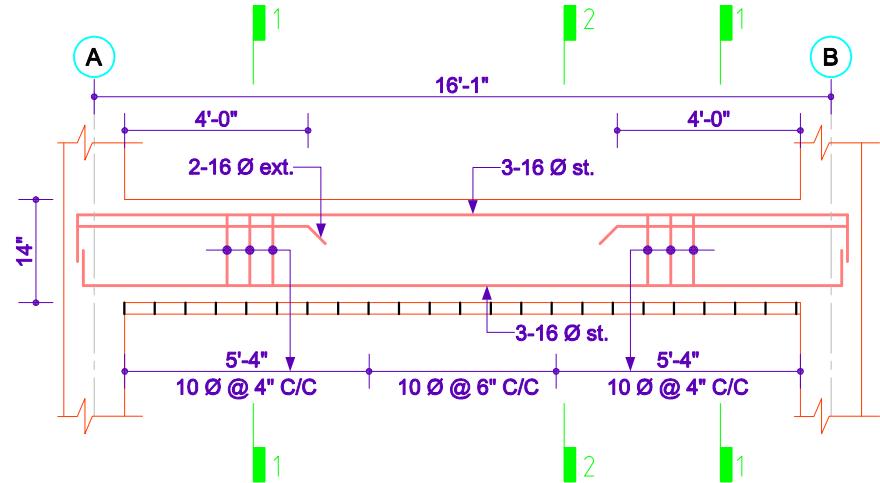
Legend	Direction	a (mm)	b (mm)
F-01	Short	6"	4'-6"
F-01	Long	5"	4'-6"



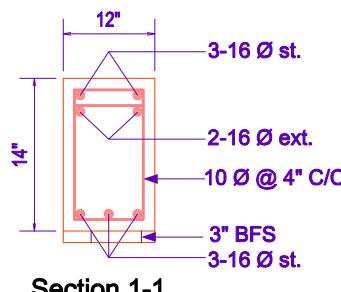


GRADE BEAM LAYOUT PLAN

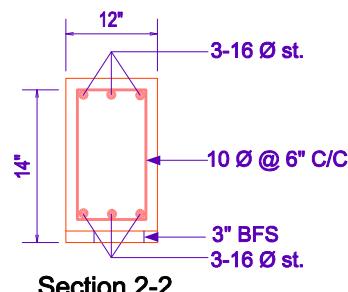




Long Section of GB-01(12" X 14")



Section 1-1

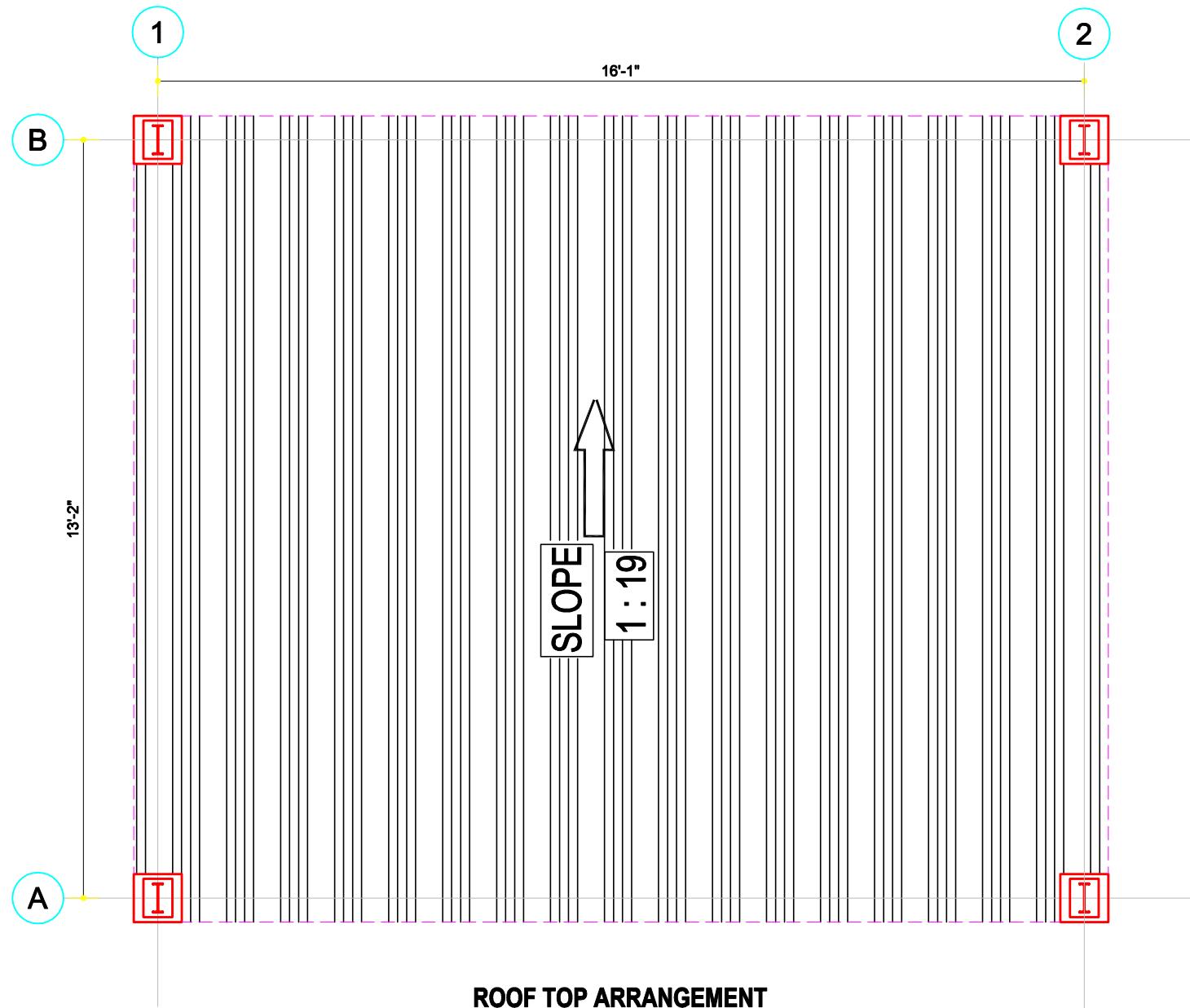


Section 2-2

NOTES

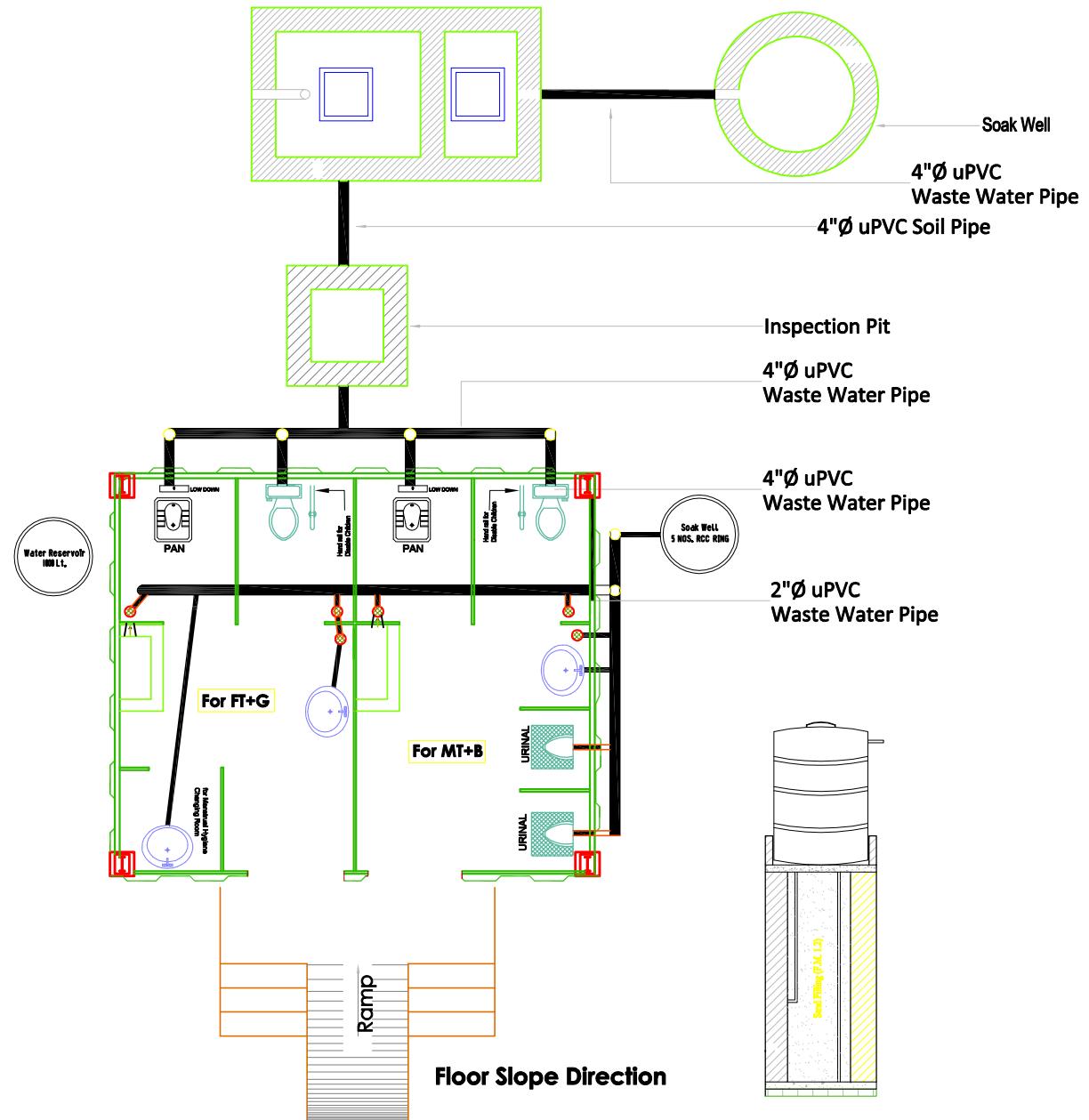
1. Design compressive strength of concrete to be utilized in grade beam is 19 MPa.
2. In order to ensure that the desired compressive strength is achieved mix ratio of 1:2:4 should be used unless noted otherwise.
3. Concrete should be produced by using best quality cement conforming to BDS EN-197-1- CEM1, 52.5N (52.5MPa) / ASTM-C 150 Type - I along with the blend of local (50%) [F.M. 1.2] and sylhet sand (50%) [F.M 2.2] and 20mm downgraded picked jhama brick chips.
4. Water to cement ratio for producing the desired concrete should be 0.45.
5. Rebar of designed diameter should be of minimum grade of 400 to be confirmed by testing.
6. Lapping of rebar in grade beam should be in the zone as designated in sheet -1 and minimum lap length should be $60D$, where, D is the diameter of rebar.
7. Clear cover for grade beam should be 2"(50mm) at bottom and 1.5" (37.5mm) at top.
8. Steel shutter is mandatory to be used.
9. Sample concrete cylinders should be prepared during casting which should be tested after a curing age of 28 days for compressive strength.

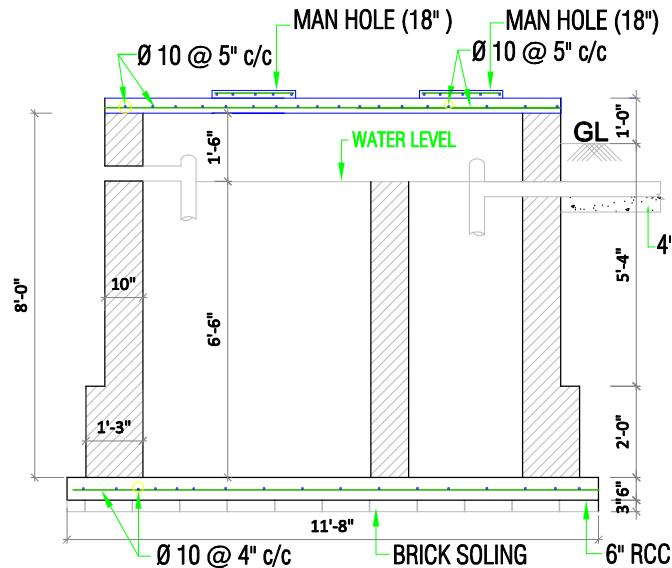




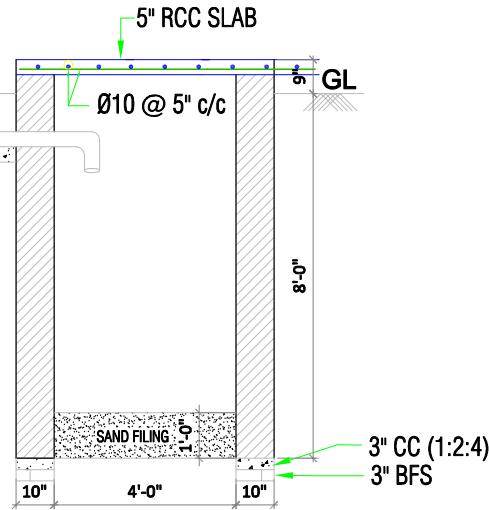
ROOF TOP ARRANGEMENT



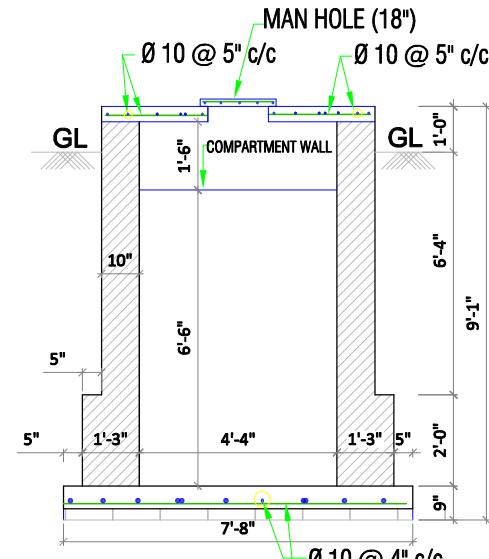




SECTION :A-A



SECTION :B-B



PLAN OF SEPTIC TANK (Option-03)



4TH PRIMARY EDUCATION DEVELOPMENT PROGRAM **PEDP-4**

SEPTIC TANK DETAILS

Focal Point, PEDP-4

Dr. Engr. Sushanta Roy
Executive Engineer, DPHE
FIEB-F/13505, MASCE

Focal Point, PEU

Mir Abdus Shahid
Addl. Chief Engineer, DPHE

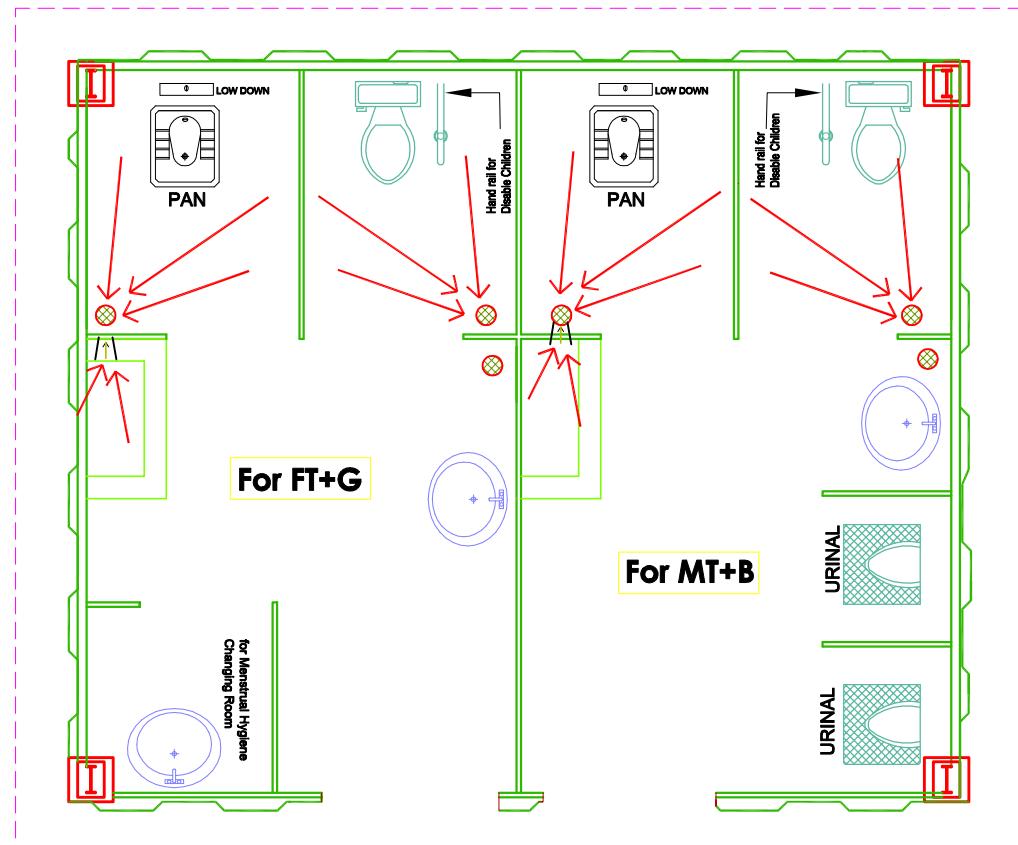
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Md. Sarwar Hossain
Chief Engineer, DPHE
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Ramp

Floor Slope Direction

