



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
REGION XI
DAVAO DEL NORTE
DISTRICT ENGINEERING OFFICE
TAGUM CITY

C.Y. 2025 PROJECT
DETAILED ENGINEERING DESIGN PLAN FOR
**CONSTRUCTION OF WATER SUPPLY SYSTEM, PUROK
4A, BRGY. CANOCOTAN
TAGUM CITY DAVAO DEL NORTE**
PROJECT
DAVAO DEL NORTE
LOCATION

DESIGNED


CHIRWEN P. NAZARENO
CAPS PLANNING & DESIGN SECTION

DATE

REVIEWED

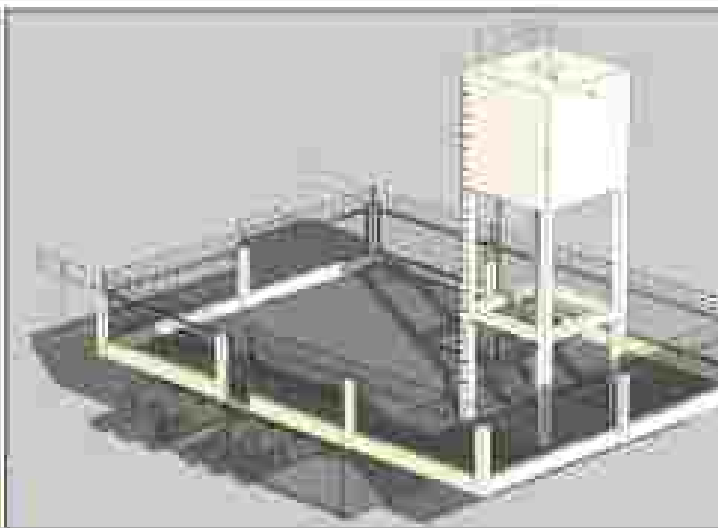

LEO ALEX A. MABANGLO
OFFICIAL CHARGE
OFFICE OF THE ASSISTANT DISTRICT ENGINEER

DATE

APPROVED


EDITHA G. MONTILDE
DISTRICT ENGINEER

DATE



VICINITY MAP

	CEMENTED INTER-TYPE PLASTER
F-1	SLAB-ON-GRADE THICK 4" CONC. CONCRETE SLAB ON RIGID INSULATING SOIL
F-2	WALLS IN-OUT FLIN
F-3	WALLS INTERCONNECTION DETAIL
F-4	SLAB-ON-GRADE THICK 4" CONC. CONCRETE RIGID INSULATING SOIL
F-5	CEILING DETAIL OF FLOOR DETAIL OF F
F-6	WALLS FINISH DETAIL
F-7	CEILING DETAIL OF FLOOR DETAIL OF FLOOR DETAIL OF RIGID INSULATING SOIL CEILING DETAIL OF FLOOR DETAIL OF FLOOR DETAIL OF

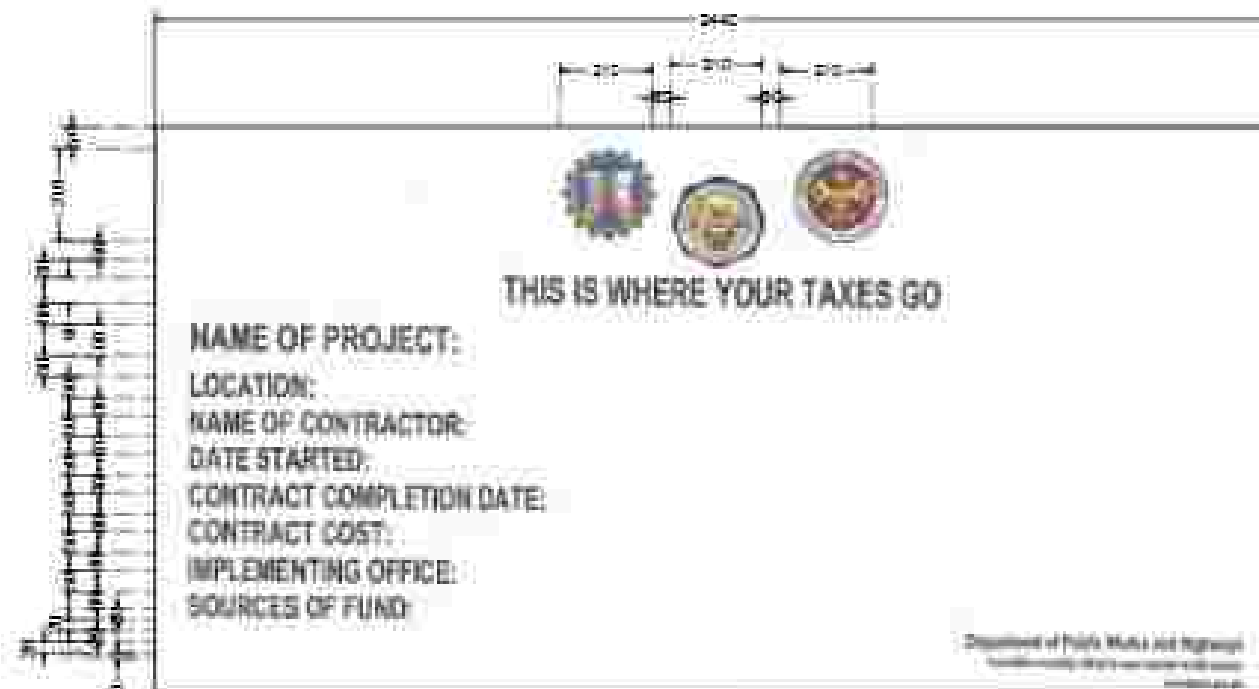
	
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SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	QTY.	UNIT
(Project ID)			
(Project Component ID - Description)			
PART B OTHER GENERAL REQUIREMENTS			
B.1(1)	Permits and Clearances	As Submitted As Evaluated	1.00 1
B.2(1)	Project Manual/ Signboard	As Submitted As Evaluated	1.00 1
B.7 (1)	Occupational Safety and Health Program	As Submitted As Evaluated	1.00 1
B.8(1)	Mobilization/Demobilization	As Submitted As Evaluated	1.00 1
PART C EARTHWORKS			
C01(1)	Removal of Structures & Obstruction	As Submitted As Evaluated	1.00 1
C03(1)B	Structure Excavation (Concrete Soil)	As Submitted As Evaluated	100.00 1
C04(2)	Gravel Fill	As Submitted As Evaluated	171.00 1
C07(1)	Site Development (Fence)	As Submitted As Evaluated	1.00 1
PART D PLAIN AND REINFORCED CONCRETE WORKS			
D01(2)c	Structural Concrete (Footings, Slab w/ F.H. WP, 28 days, 1000PSI)	As Submitted As Evaluated	17.78 1
D01(1)d	Structural Concrete (Columns, Roof Beams, 4000 PSI)	As Submitted As Evaluated	84.89 1
D02(1a)	Reinforcing Steel (Deformed), Grade 60	As Submitted As Evaluated	1,460.00 1

D02(1)a2	Reinforcing Steel (Deformed), Grade 60	As Submitted As Evaluated	14,880.75 1
D03(7)	Formwork and Falsework	As Submitted As Evaluated	101.20 1
PART E FINISHING AND OTHER CIVIL WORKS			
E.1 Masonry Works			
E01(2)a2	150mm CHB (non-load bearing (including #4 reinforcing steel))	As Submitted As Evaluated	10.00 1
E.2 Finishing Works			
E02(1)	Cement Render Finish	As Submitted As Evaluated	1,710.00 1
E.3 Painting Works			
E03(1)a	Painting Works (Plaster/Congress)	As Submitted As Evaluated	191.80 1
E03(1)x	Painting Works (Steel)	As Submitted As Evaluated	10.00 1
E.4 Plumbing/ Sanitary Works			
E04(2)	Plumbing Works (Installation of Slow-off Valve)	As Submitted As Evaluated	1.00 1
E04(7)c	Water Tank (Polyethylene)	As Submitted As Evaluated	10.00 1
E04(8)	Valves and Pipes Fittings	As Submitted As Evaluated	1.00 1
E04(9)	Fire Hydrant	As Submitted As Evaluated	1.00 1
PART F WATER SUPPLY			
F00(1)	Pipeline Trench Excavation	As Submitted As Evaluated	101.00 1
F01(2)	Cast Iron Water Pipe	As Submitted As Evaluated	1.00 1
F02(1)	PVC Polyvinyl Chloride Pipe	As Submitted As Evaluated	1.00 1
F02(4)	Polyethylene (PE) Plastic Pipe	As Submitted As Evaluated	1.00 1

 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS OFFICE OF THE PROVINCIAL ENGINEER DIVISION OFFICE - MARIKINA CITY	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT	REPRESENTATIVE OF THE CLIENT REPRESENTATIVE OF THE CONSULTANT
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THIS IS WHERE YOUR TAXES GO

NAME OF PROJECT:
 LOCATION:
 NAME OF CONTRACTOR:
 DATE STARTED:
 CONTRACT COMPLETION DATE:
 CONTRACT COST:
 IMPLEMENTING OFFICE:
 SOURCES OF FUND:

Department of Public Works and Highways
 National Office, 6th Floor, Department Building
 1000, Manila, Philippines

DPWH STANDARD PROJECT BILLBOARD

NOTE:

1. THE NEW BILLBOARD DESIGN LAYOUT, DIMENSION AND LETTER SIZES ON WHITE BACKGROUND, AS SHOWN ON THE ATTACHED DRAWING SHALL BE DEPICTED ON A STANDARD BILLBOARD MEASURING 1220mm x 4400mm (4ft. x 8ft.) USING 12.50mm (1/2 INCH) THICK MARINE PLYWOOD OR TARPULLIN OF THE SAME SIZE POSTED ON 5mm (3/16 INCHES) MARINE PLYWOOD.
 2. ALL EXISTING BILLBOARDS OF ON-GOING PROJECTS SHALL BE REPLACED WITH NEW ONE ADOPTING THE ABOVE GUIDELINES.
 3. FOR EACH BUILDING PROJECT, THE BILLBOARD SHALL BE INSTALLED IN FRONT OF THE PROJECT.
 4. FOR EACH ROAD, BRIDGE, FLOOD CONTROL PROJECT, TWO BILLBOARD SHALL BE INSTALLED, ONE AT THE BEGINNING AND ONE AT THE END OF PROJECT.
 5. NAME(S) AND/ OR PICTURE(S) OF ANY PERSONAGE SHOULD NOT APPEAR IN THE BILLBOARD.
 6. NO OTHER BILLBOARDS SHALL BE ALLOWED TO BE INSTALLED 100 METERS BEFORE AND 100 METERS AFTER ALL DPWH PROJECT AND IN-BETWEEN THE PROJECT LIMITS OR WITHIN THE ROAD RIGHT-OF-WAY.
 7. DPWH CONTRACTORS SHALL NOT BE ALLOWED TO PLACE NAMES OF POLITICIANS OR CARRY POLITICAL BILLBOARD ON THEIR EQUIPMENT.
- DO #21, S.2017



REPUBLIC OF THE PHILIPPINES
 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
 REGION III
 BANGAL DEL MONTE
 DISTRICT ENGINEERING OFFICE
 TUGUEGARAO

Project: _____ Cost: _____
 Location: _____ Fund Source/s: _____
 Implementing Agency/ies: _____
 Development Partner/s: _____
 Contractor/Supplier: _____
 Brief Description of Project: _____

Project Details:

PROJECT DATE			PROJECT STATUS				REMARKS
Contract	Started	Target Date of Completion	Percentage of Completion	As of Date	Cost Incurred to Date	Work Completed	

For particulars or complaint about this project, please contact the Regional Office or Cluster which has such jurisdiction to this project.

COA Regional Office No./Cluster: _____
 Address: _____
 Contact No.: _____ or Text COA Cluster's Desk at 0915-2381967

WHITE BACKGROUND

 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS REGION III DISTRICT ENGINEERING OFFICE TUGUEGARAO	CONSTRUCTION OF WATER SUPPLY SYSTEM, FUNDING BY: _____, LOCALITY: _____, DISTRICT: _____	DPWH STANDARD PROJECT BILLBOARD COORDINATOR: _____	_____ _____	_____ _____	_____ _____	_____ _____	_____ _____	1 2	3 43/23
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GENERAL NOTES

1.0 STANDARDS AND REFERENCES

THE FOLLOWING SHALL APPLY TO THE DESIGN, CONSTRUCTION AND CONSTRUCTION OF THE PROJECT:

1.1 NATIONAL STRUCTURAL CODE OF THE REPUBLIC OF THE PHILIPPINES, 1992 EDITION.

2.0 DESIGN CRITERIA

2.1 LOADINGS

2.1.1 DEAD LOAD

2.1.2 LIVE LOAD

2.1.3 WIND LOAD

2.1.4 EARTHQUAKE LOAD

2.1.5 TEMPERATURE LOAD

2.1.6 COLLISION LOAD

2.1.7 ICE LOAD

2.1.8 OTHER LOADS

2.1.9 COMBINED LOADS

2.1.10 FACTOR OF SAFETY

2.1.11 DESIGN CRITERIA

2.1.12 MATERIAL PROPERTIES

2.1.13 CONSTRUCTION

2.1.14 MAINTENANCE

2.1.15 OPERATION

2.1.16 DEMOLITION

2.1.17 REPAIRS

2.1.18 INSPECTION

2.1.19 TESTING

2.1.20 RECORDS

2.1.21 TRAINING

2.1.22 SAFETY

2.1.23 ENVIRONMENT

2.1.24 SOCIETY

2.1.25 ECONOMY

2.1.26 AESTHETICS

2.1.27 HEALTH

2.1.28 CULTURE

2.1.29 HISTORY

2.1.30 ARTS

2.1.31 SCIENCE

2.1.32 TECHNOLOGY

2.1.33 INNOVATION

2.1.34 LEARNING

2.1.35 RESEARCH

2.1.36 DEVELOPMENT

2.1.37 PROGRESS

2.1.38 IMPROVEMENT

2.1.39 ADVANCEMENT

2.1.40 INNOVATION

2.1.41 RESEARCH

2.1.42 DEVELOPMENT

2.1.43 PROGRESS

2.1.44 IMPROVEMENT

2.1.45 ADVANCEMENT

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2.1.48 DEVELOPMENT

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2.1.216 DEVELOPMENT

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2.1.227 RESEARCH

2.1.228 DEVELOPMENT

2.1.229 PROGRESS

2.1.230 IMPROVEMENT

2.1.231 ADVANCEMENT

2.1.232 INNOVATION

2.1.233 RESEARCH

2.1.234 DEVELOPMENT

GENERAL CONSTRUCTION NOTES "B"

TABLE 1
MINIMUM WALL THICKNESS
TABLE OF MINIMUM WALL THICKNESS (mm) FOR REINFORCED CONCRETE WALLS

WALL TYPE	MINIMUM WALL THICKNESS (mm)
1. EXTERIOR WALLS	150
2. INTERIOR WALLS	100
3. PARTITION WALLS	100
4. CURB WALLS	100
5. RETAINING WALLS	150

TABLE 2
MINIMUM WALL THICKNESS
TABLE OF MINIMUM WALL THICKNESS (mm) FOR UNREINFORCED CONCRETE WALLS

WALL TYPE	MINIMUM WALL THICKNESS (mm)
1. EXTERIOR WALLS	150
2. INTERIOR WALLS	100
3. PARTITION WALLS	100
4. CURB WALLS	100
5. RETAINING WALLS	150

REINFORCING CONCRETE WALLS
TABLE OF REINFORCING CONCRETE WALLS

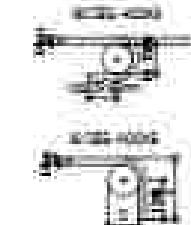
WALL TYPE	MINIMUM WALL THICKNESS (mm)	MINIMUM WALL THICKNESS (mm)	MINIMUM WALL THICKNESS (mm)	MINIMUM WALL THICKNESS (mm)	MINIMUM WALL THICKNESS (mm)
1. EXTERIOR WALLS	150	100	100	100	100
2. INTERIOR WALLS	100	100	100	100	100
3. PARTITION WALLS	100	100	100	100	100
4. CURB WALLS	100	100	100	100	100
5. RETAINING WALLS	150	100	100	100	100

NOTES ON STIRUPS

1. ALL REINFORCEMENT SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
2. ALL STIRUPS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
3. ALL STIRUPS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.



TYPICAL CONNECTION DETAIL OF R.C. WALL AT CORNERS



NOTES ON BELLS

1. ALL BELLS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
2. ALL BELLS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
3. ALL BELLS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.

NOTES ON STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE USED FOR REINFORCEMENT AND CONNECTIONS OF THE STRUCTURE SHALL COMPLY WITH ALL THE REQUIREMENTS OF THE SPECIFICATION FOR THE DESIGN, FABRICATION AND Erection OF STRUCTURAL STEEL FOR BUILDING, FIRST EDITION.
2. ALL STRUCTURAL STEEL SHALL COMPLY TO THE REQUIREMENTS OF THE SPECIFICATION FOR THE DESIGN, FABRICATION AND Erection OF STRUCTURAL STEEL FOR BUILDING, FIRST EDITION.
3. ALL BELLS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
4. ALL BELLS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
5. ALL BELLS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.

TABLE 3
MINIMUM WALL THICKNESS
TABLE OF MINIMUM WALL THICKNESS (mm) FOR REINFORCED CONCRETE WALLS

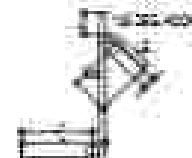
WALL TYPE	MINIMUM WALL THICKNESS (mm)
1. EXTERIOR WALLS	150
2. INTERIOR WALLS	100
3. PARTITION WALLS	100
4. CURB WALLS	100
5. RETAINING WALLS	150

NOTES ON EMBEDDED PIPES

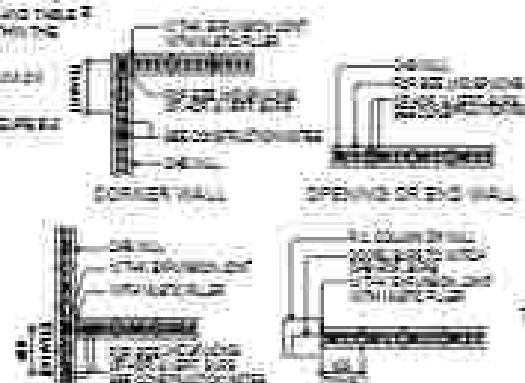
1. ALL EMBEDDED PIPES SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
2. ALL EMBEDDED PIPES SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
3. ALL EMBEDDED PIPES SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.

NOTES ON CONSTRUCTION JOINTS IN CONCRETE

1. CONSTRUCTION JOINTS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
2. CONSTRUCTION JOINTS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
3. CONSTRUCTION JOINTS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.



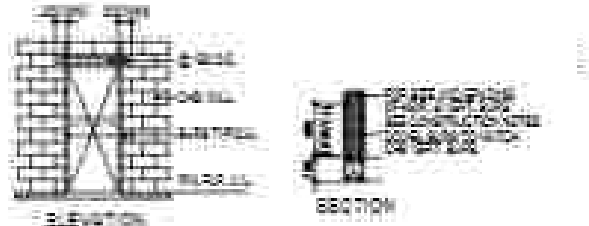
1. IF THE REINFORCING BARS ARE IN A WALL, THE CLEAR DISTANCE FROM THE BAR TO THE EXTERIOR FACE OF THE WALL SHALL BE NOT LESS THAN 25mm. OTHERWISE IT SHALL BE NOT LESS THAN 25mm. OTHERWISE IT SHALL BE NOT LESS THAN 25mm.
2. IF THERE ARE TWO OR MORE LAYERS OF REINFORCING BARS, THE CLEAR DISTANCE BETWEEN THE LAYERS OF BARS SHALL BE NOT LESS THAN 25mm. OTHERWISE IT SHALL BE NOT LESS THAN 25mm. OTHERWISE IT SHALL BE NOT LESS THAN 25mm.
3. IF THERE ARE TWO OR MORE LAYERS OF REINFORCING BARS, THE CLEAR DISTANCE BETWEEN THE LAYERS OF BARS SHALL BE NOT LESS THAN 25mm. OTHERWISE IT SHALL BE NOT LESS THAN 25mm. OTHERWISE IT SHALL BE NOT LESS THAN 25mm.



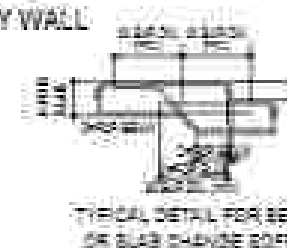
TYPICAL CONNECTION DETAIL OF MASONRY WALL



TYPICAL CONNECTION DETAIL OF MASONRY WALL



TYPICAL CONNECTION DETAIL OF MASONRY WALL



TYPICAL CONNECTION DETAIL OF MASONRY WALL



TYPICAL CONNECTION DETAIL OF MASONRY WALL

TABLE 4
MINIMUM WALL THICKNESS
TABLE OF MINIMUM WALL THICKNESS (mm) FOR REINFORCED CONCRETE WALLS

WALL TYPE	MINIMUM WALL THICKNESS (mm)
1. EXTERIOR WALLS	150
2. INTERIOR WALLS	100
3. PARTITION WALLS	100
4. CURB WALLS	100
5. RETAINING WALLS	150

1. WHEN A BEAM IS CASTED, THE REINFORCING BARS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
2. WHEN A BEAM IS CASTED, THE REINFORCING BARS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
3. WHEN A BEAM IS CASTED, THE REINFORCING BARS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.

NOTES ON CONCRETE HOLLOW BLOCKS WALLS

1. UNLESS OTHERWISE SPECIFIED, ALL CONCRETE HOLLOW BLOCKS AND CURB BLOCKS SHALL BE REINFORCED AS SHOWN IN THE SCHEDULE OF CONCRETE HOLLOW BLOCKS AND CURB BLOCK REINFORCEMENT.
2. UNLESS OTHERWISE SPECIFIED, ALL CONCRETE HOLLOW BLOCKS AND CURB BLOCKS SHALL BE REINFORCED AS SHOWN IN THE SCHEDULE OF CONCRETE HOLLOW BLOCKS AND CURB BLOCK REINFORCEMENT.
3. UNLESS OTHERWISE SPECIFIED, ALL CONCRETE HOLLOW BLOCKS AND CURB BLOCKS SHALL BE REINFORCED AS SHOWN IN THE SCHEDULE OF CONCRETE HOLLOW BLOCKS AND CURB BLOCK REINFORCEMENT.

NOTES ON CONCRETE HOLLOW BLOCKS WALL REINFORCEMENTS

WALL THICKNESS	REINFORCEMENT	WALL THICKNESS	REINFORCEMENT
150mm	1. 2-10mm bars	150mm	1. 2-10mm bars
100mm	1. 10mm bars	100mm	1. 10mm bars
100mm	1. 10mm bars	100mm	1. 10mm bars
100mm	1. 10mm bars	100mm	1. 10mm bars



TYP. SECTION OF MASONRY PARTITION REINFORCEMENTS

NOTES ON CONCRETE WALLS

1. ALL WALLS SHALL BE REINFORCED ACCORDING TO THE FOLLOWING SCHEDULE OF WALL REINFORCEMENT UNLESS OTHERWISE SPECIFIED IN THE SCHEDULE.
2. ALL WALLS SHALL BE REINFORCED ACCORDING TO THE FOLLOWING SCHEDULE OF WALL REINFORCEMENT UNLESS OTHERWISE SPECIFIED IN THE SCHEDULE.
3. ALL WALLS SHALL BE REINFORCED ACCORDING TO THE FOLLOWING SCHEDULE OF WALL REINFORCEMENT UNLESS OTHERWISE SPECIFIED IN THE SCHEDULE.

REINFORCEMENT

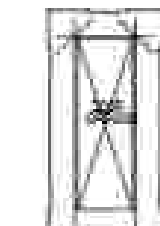
WALL THICKNESS	REINFORCEMENT
150mm	1. 2-10mm bars
100mm	1. 10mm bars
100mm	1. 10mm bars
100mm	1. 10mm bars

1. REINFORCING BARS SHALL HAVE 25mm CLEAR COVER FROM FACE OF WALL EXCEPT FOR WALLS ALIGNED WITH THE GROUND WHERE 15mm CLEAR COVER SHALL BE PROVIDED AND FOR EXPOSED PARTS OF WALLS WHERE THE COVER SHALL BE 25mm CLEAR.
2. ALL REINFORCING BARS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
3. ALL REINFORCING BARS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.
4. ALL REINFORCING BARS SHALL BE SET FOLD UNLESS OTHERWISE PERMITTED BY THE STRUCTURAL ENGINEER.

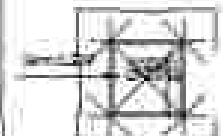
TYP. DET. OF LINTEL BEAM AT CHB WALL OPENING

NOTE

1. PROVIDE THESE ADDITIONAL BARS FOR ALL OPENINGS IN WALLS UNLESS OTHERWISE SPECIFIED IN THE SCHEDULE.
2. PROVIDE THESE ADDITIONAL BARS FOR ALL OPENINGS IN WALLS UNLESS OTHERWISE SPECIFIED IN THE SCHEDULE.
3. PROVIDE THESE ADDITIONAL BARS FOR ALL OPENINGS IN WALLS UNLESS OTHERWISE SPECIFIED IN THE SCHEDULE.

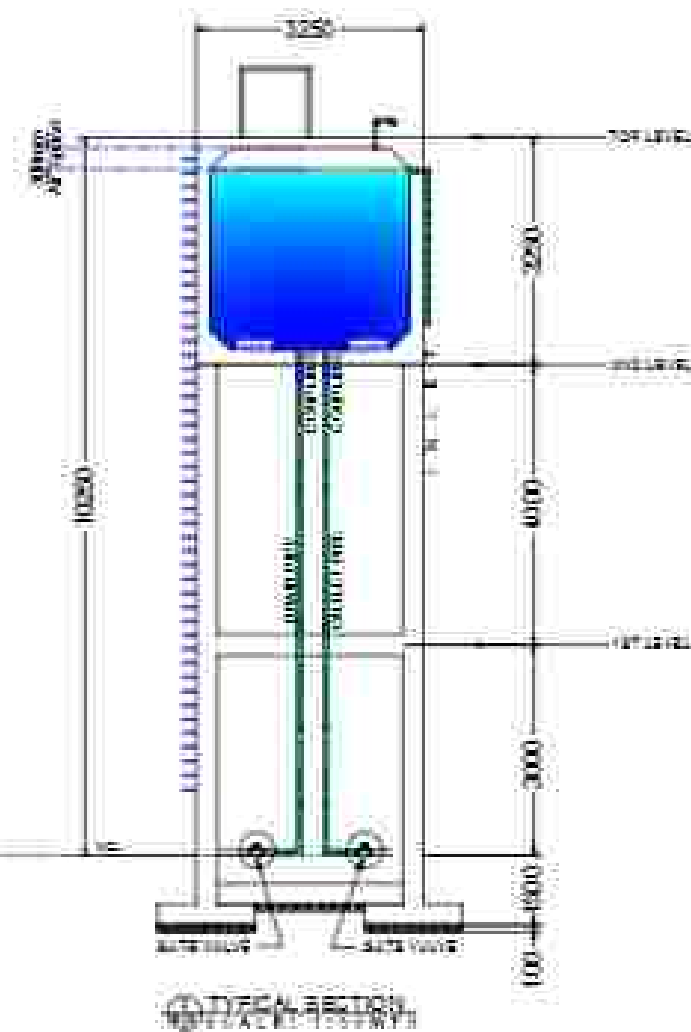
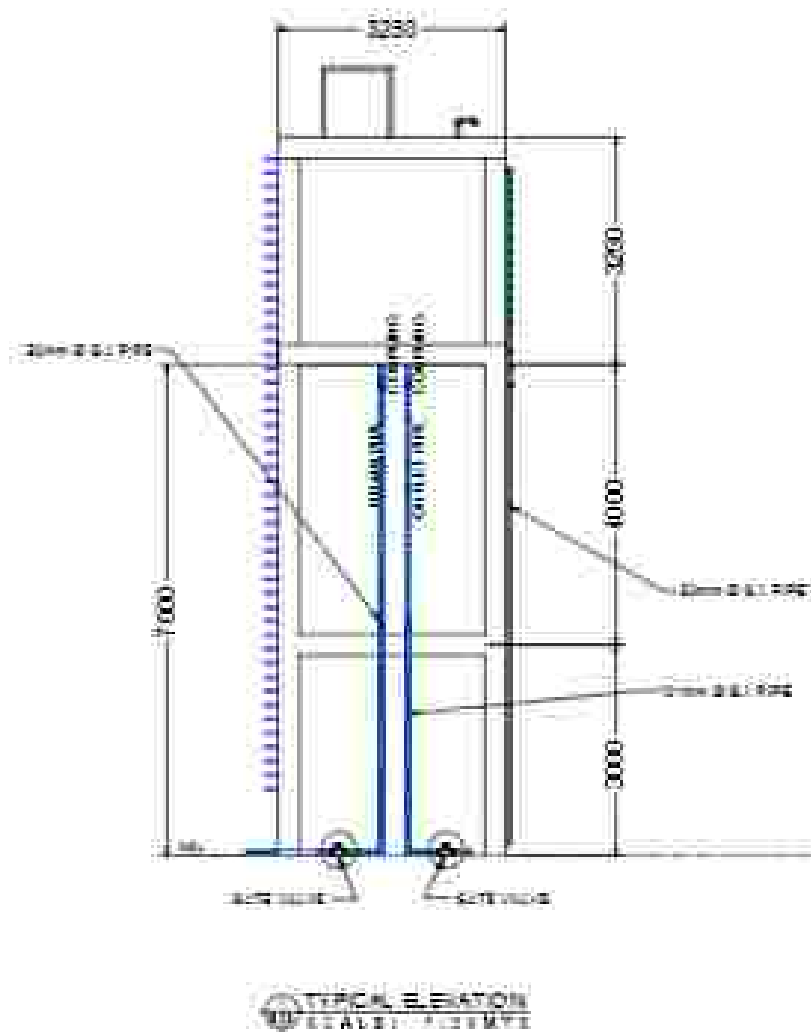


TYP. EXTERIOR WALL WITH DOOR OPENING



TYP. EXTERIOR WALL WITH DOOR OPENING

ELEVATED WATER TANK



VOLUME COMPUTATION PURER 4A, BRGY. CASOCOTAN TAGEAN CITY, DAVAO DEL NORTE

DESIGN OF WATER SYSTEM BASED ON DRY-WEATHER

- A. PROJECTION OF POPULATION
HOUSEHOLDS IN BRGY. CASOCOTAN TAGEAN CITY, DAVAO DEL NORTE
• 500 HOUSEHOLDS @ 4.5 PERSONS
• 500 HOUSEHOLDS @ 3 PERSONS (HOUSEHOLD)
• 2500 PERSONS

- B. WATER CONSUMPTION (RATES - LPCD) (LITER CAPITA PER DAY)
PEAK FACTOR = 3.0
AVE. DAY DEMAND = 1.5 (AVERAGE DAY DEMAND)
AVE. DAY DEMAND = 1.500 (100 LPCD)
• 250,000 LPCD
AVE. DAY DEMAND = 1.5 (250,000) LPCD
• 375,000 LPCD
PEAK HOUR : FROM 10:00 AM TO 8:00 PM
MAX. PEAK HOUR DEMAND = PEAK FACTOR / AVERAGE DAY DEMAND / 24 HOURS
• 3.0 (375,000) / 24
• 47,250 LTRP - CAPITA - HOUR

- VOLUME COMPUTATION
 $V = 24 \times 47,250 \text{ LTRP - CAPITA - HOUR} \times 1 \text{ CU. M. / 1000 LTRP}$
• 1,134,000 LTRP - CAPITA - HOUR

$$V = \frac{4}{3} \pi r^3$$

$$r = \sqrt[3]{\frac{3V}{4\pi}}$$

$$r = 2.7 \text{ M.}$$

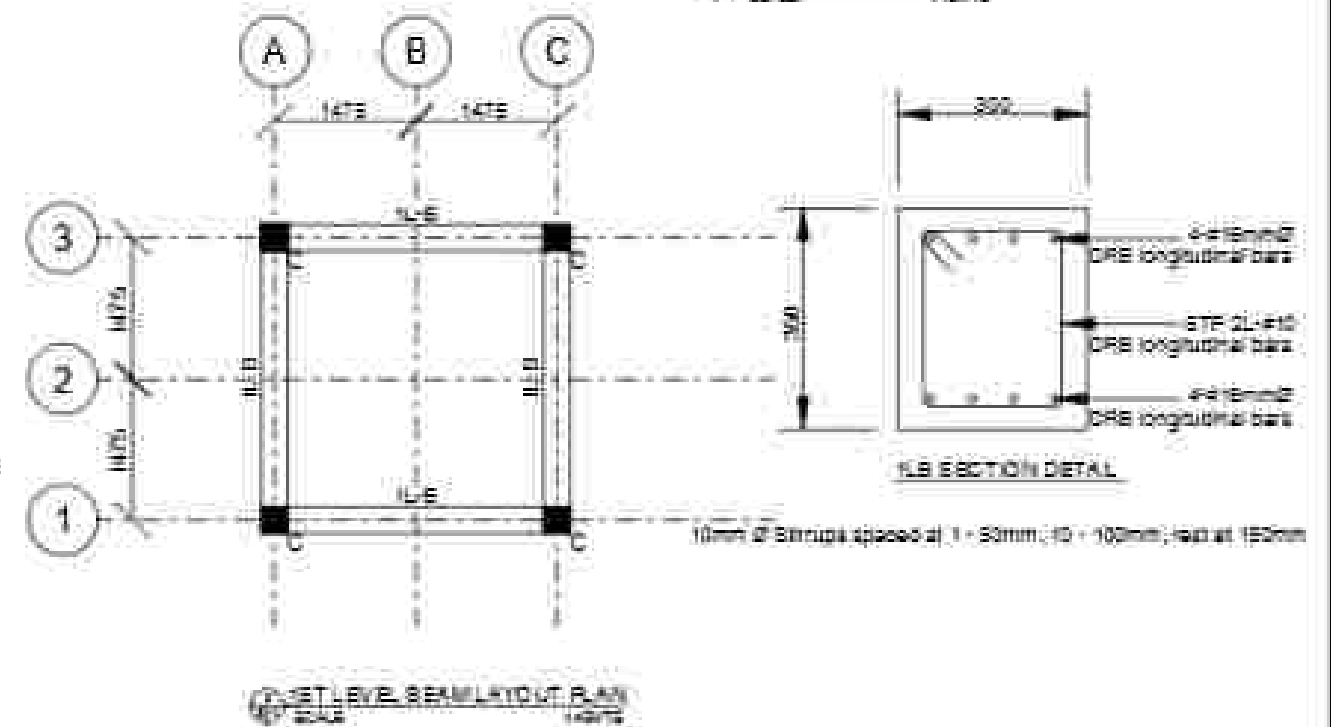
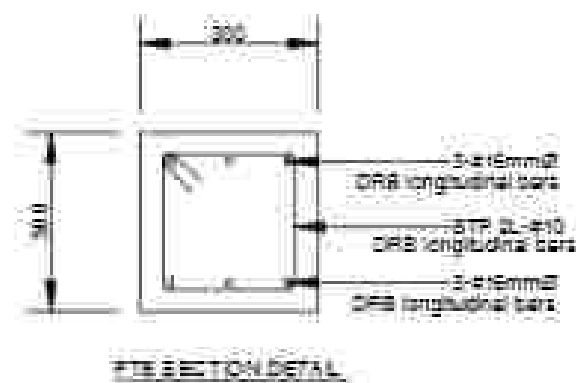
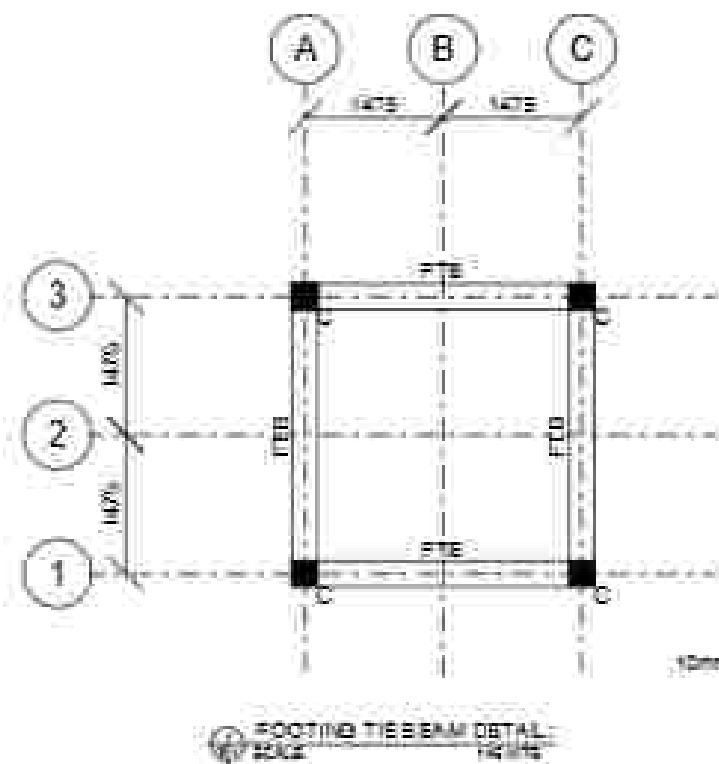
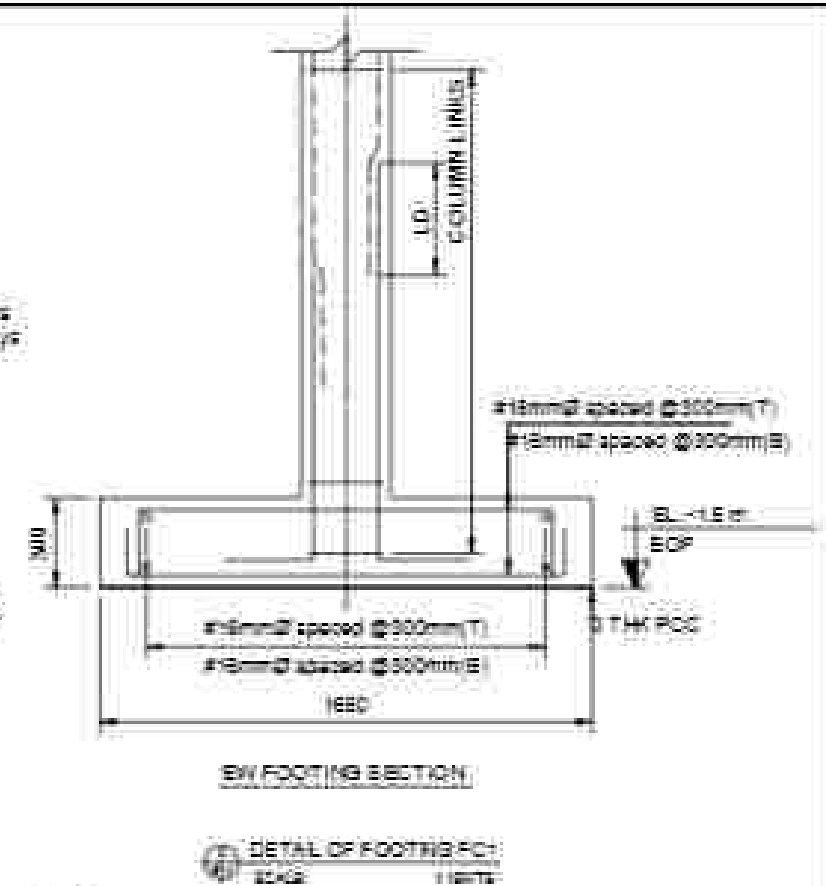
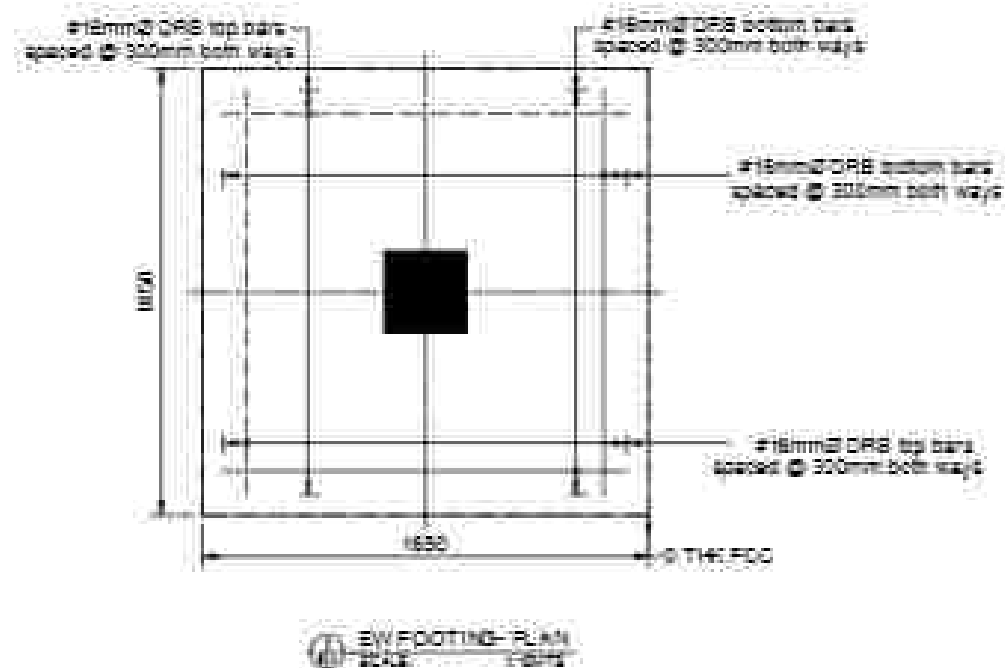
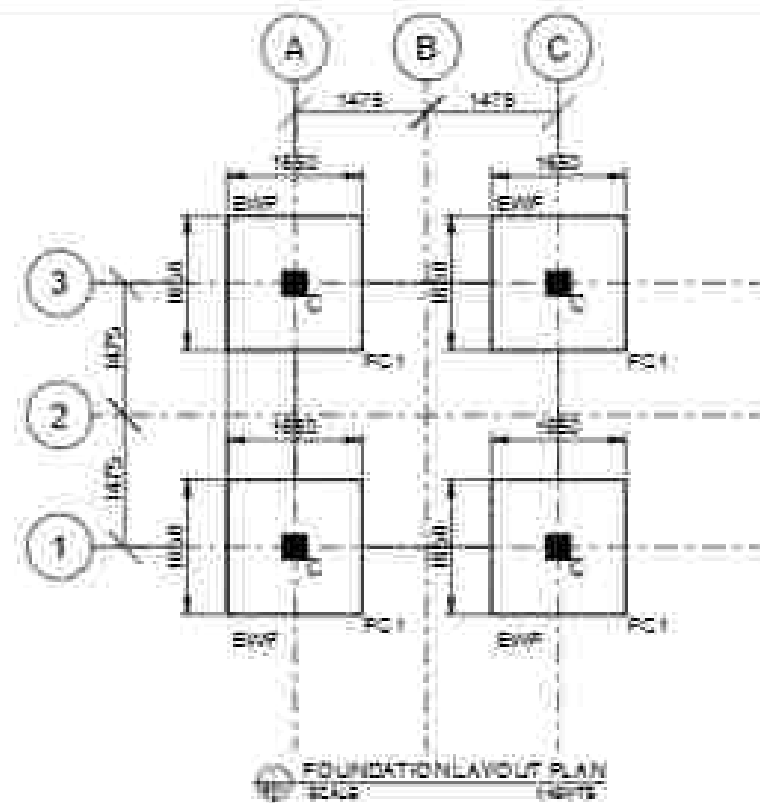


$$\text{FOOT PRESSURE @ 4' } = 0.21 \text{ KG/CM}^2 (2.1 \text{ MT})$$

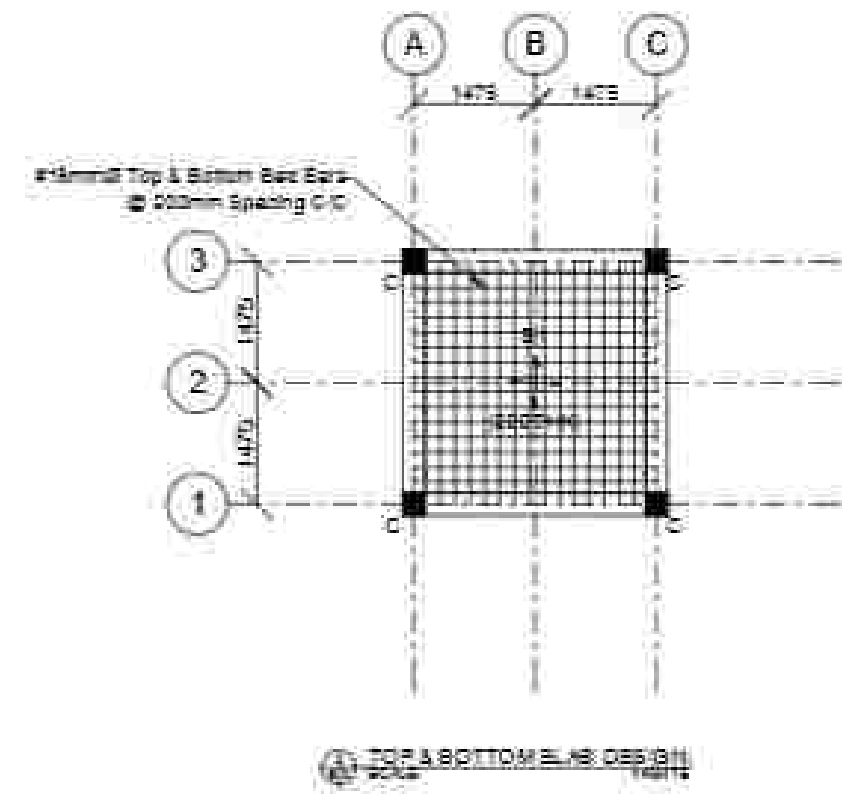
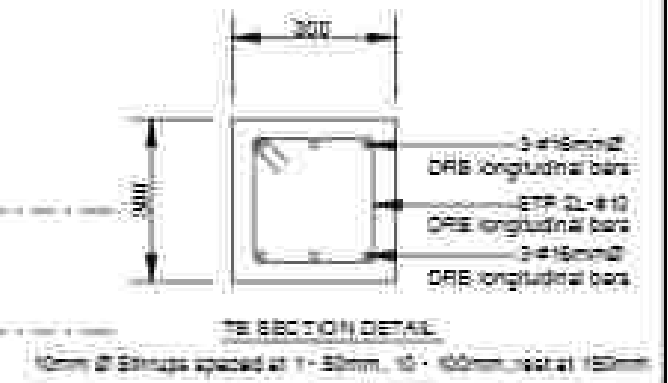
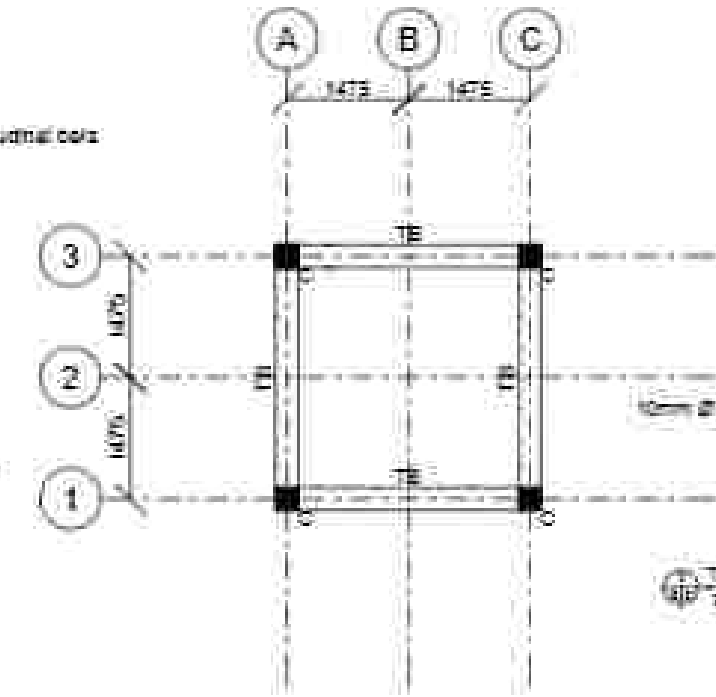
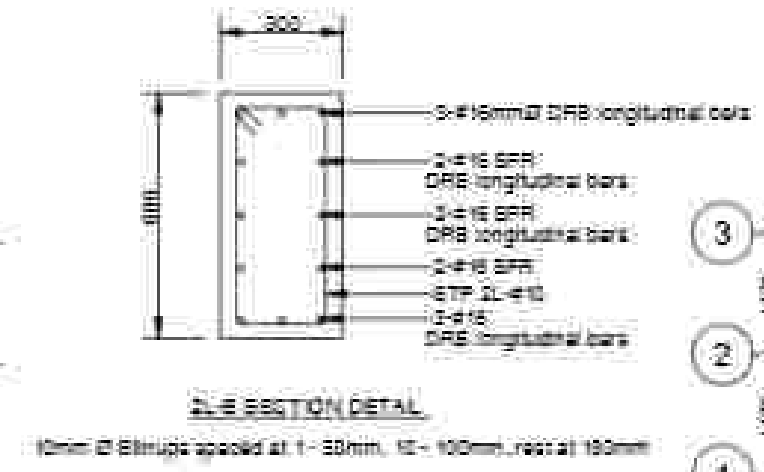
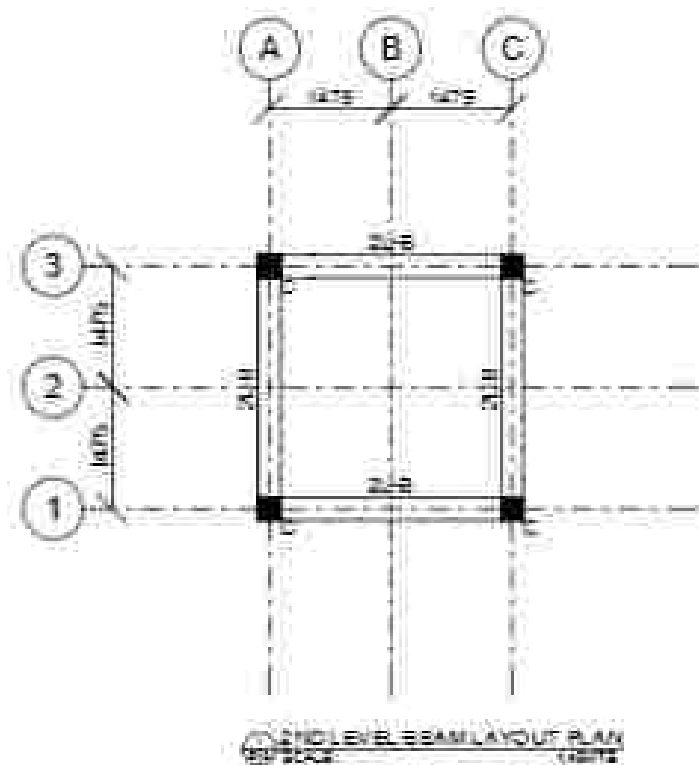
$$= 20.9 \text{ KN/M}^2$$

NOTE:
DESIGN BASED ON DESIGN FOR GROUND WATER TABLE

 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS DAVAO DEL NORTE DISTRICT ENGINEERING OFFICE	PROJECT TITLE: CONSTRUCTION OF WATER SUPPLY SYSTEM, PURER 4A, BRGY. CASOCOTAN, TAGEAN CITY, DAVAO DEL NORTE	DATE OF DESIGN: SCHEDULE OF DESIGN AND CONSTRUCTION VOLUME COMPUTATION	DESIGNED BY:  CHECKED BY:  APPROVED BY: 	DATE OF REVIEW: 	DATE OF REVIEW: 	DATE OF REVIEW: 	DATE OF REVIEW: 	REVISION: 2 3	REVISION: 7 53/23
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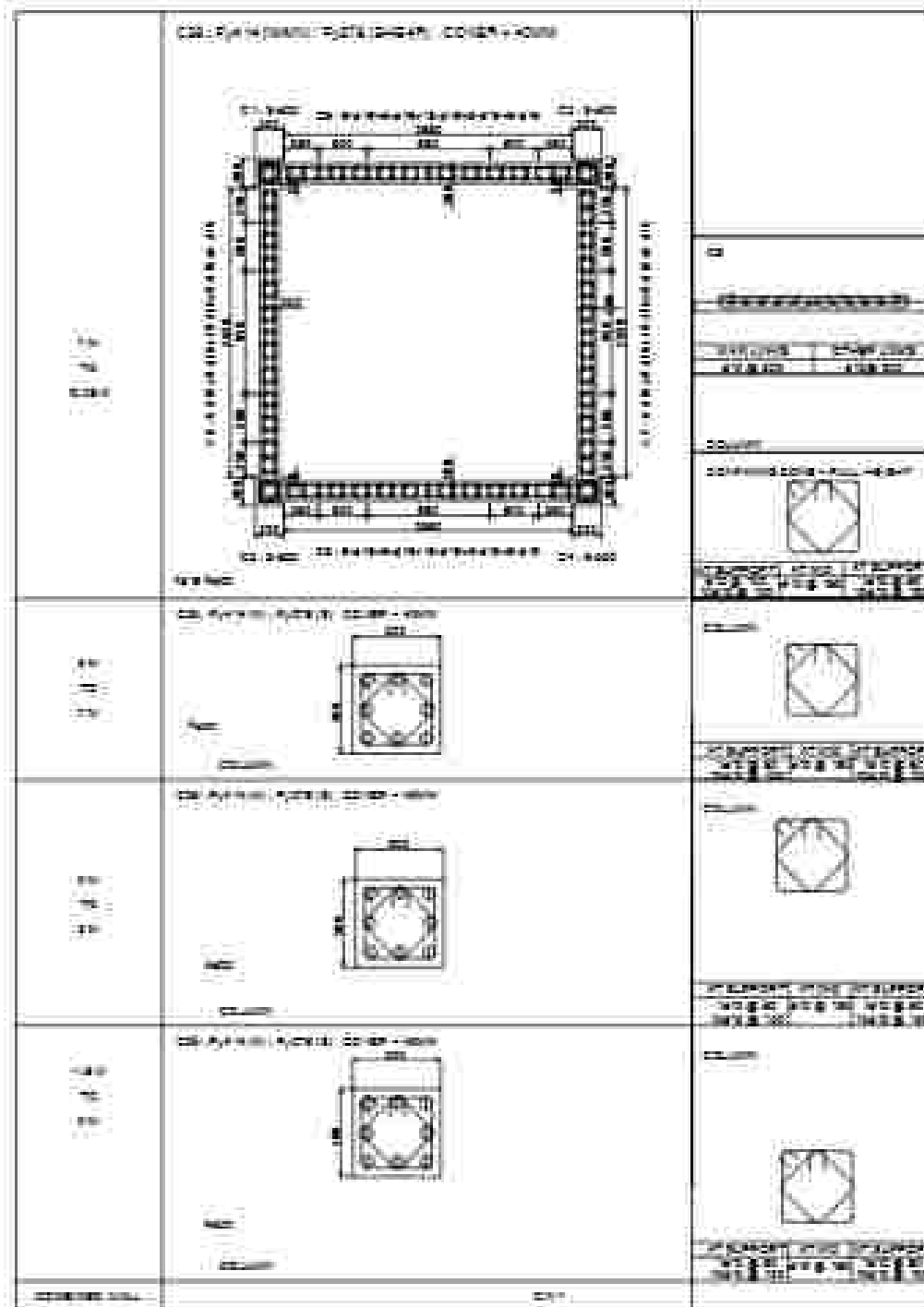


	DESIGNATION OF WATER SUPPLY SYSTEM, PUMP AND TANK, AND OTHER RELATED STRUCTURES	FOOTING DESIGN, DETAIL OF FOOTING TO BE USED FOR DESIGN OF LEVEL DESIGN						2/3	3/23
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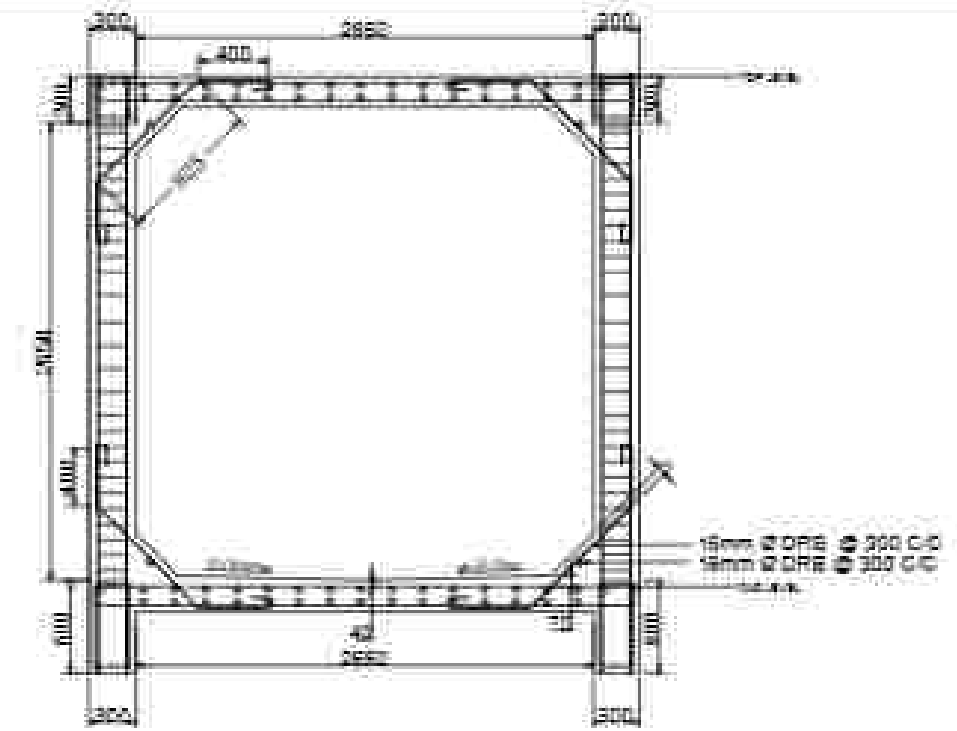


DEPARTAMENTO DE OBRAS PÚBLICAS Y INGENIERÍA CITY OF SAN JOSE, COSTA RICA DISTRICT ENGINEERING OFFICE	PROYECTO: RECONSTRUCCIÓN DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA	PROYECTO: DISEÑO DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA	PROYECTO: DISEÑO DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA	PROYECTO: DISEÑO DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA	PROYECTO: DISEÑO DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA	PROYECTO: DISEÑO DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA	PROYECTO: DISEÑO DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA	PROYECTO: DISEÑO DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA	PROYECTO: DISEÑO DE LA LÍNEA DE ALIMENTACIÓN DE AGUA POTABLE EN LA ZONA DE LA CIUDAD DE SAN JOSE, COSTA RICA
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COLUMN DETAIL



COMBINED WALL SECTION

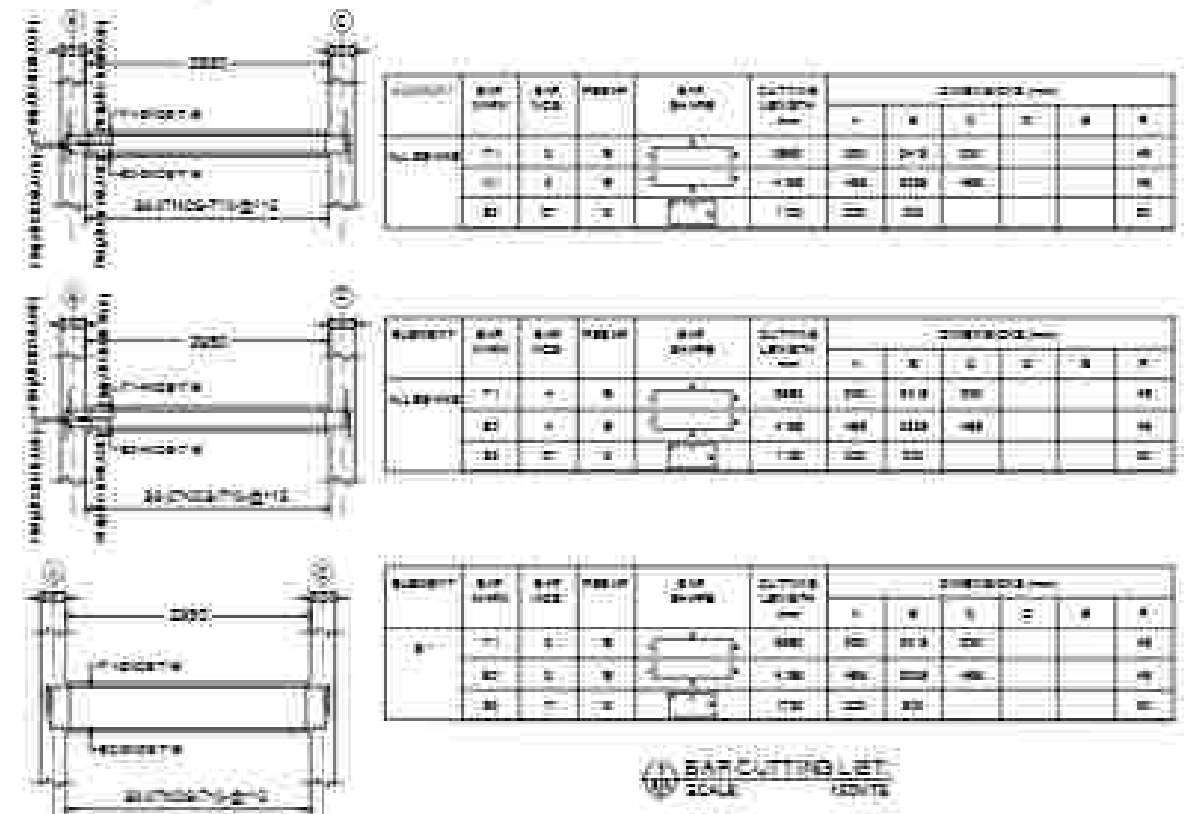


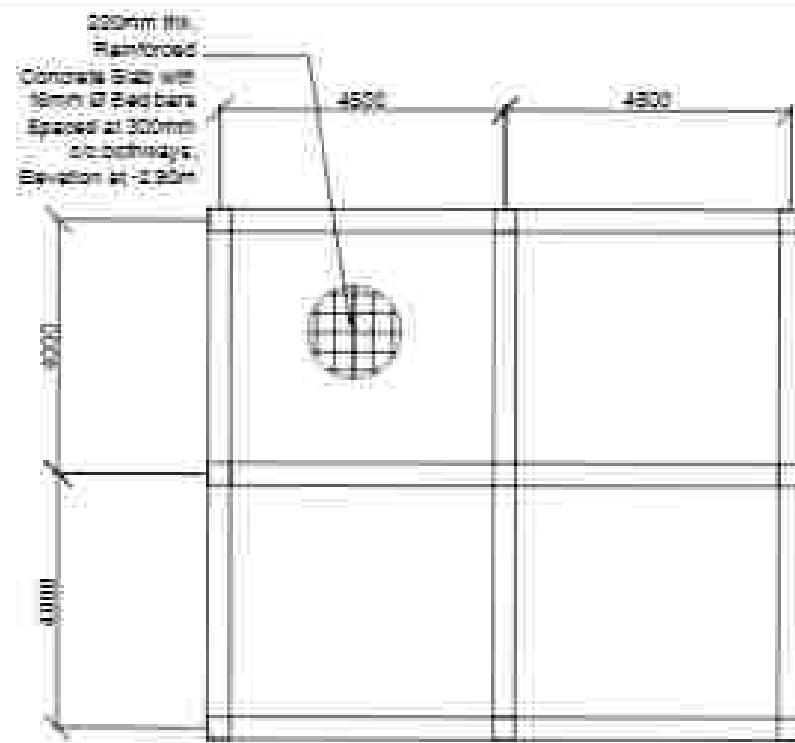
TYPICAL CROSS-SECTION (SIDE ELEVATION)

FTB LEVEL

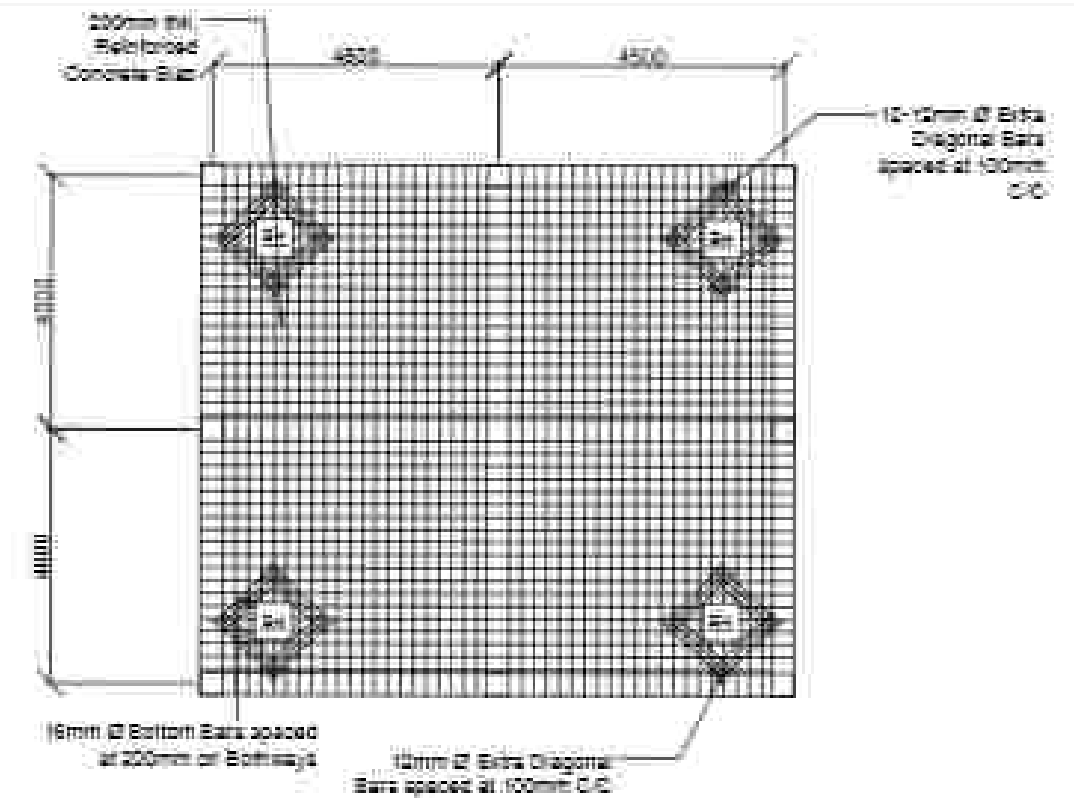
1ST LEVEL

2ND LEVEL

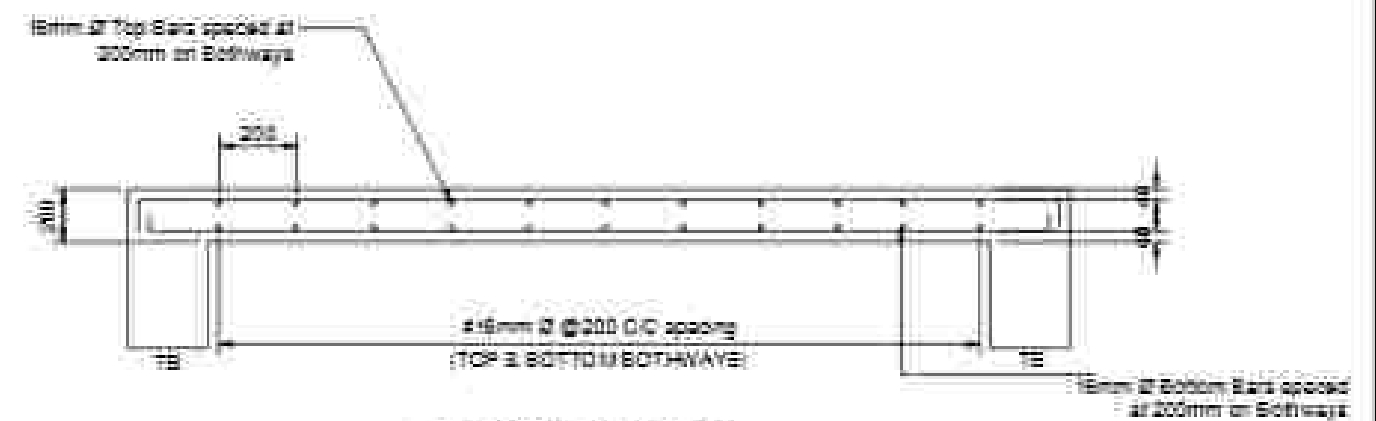
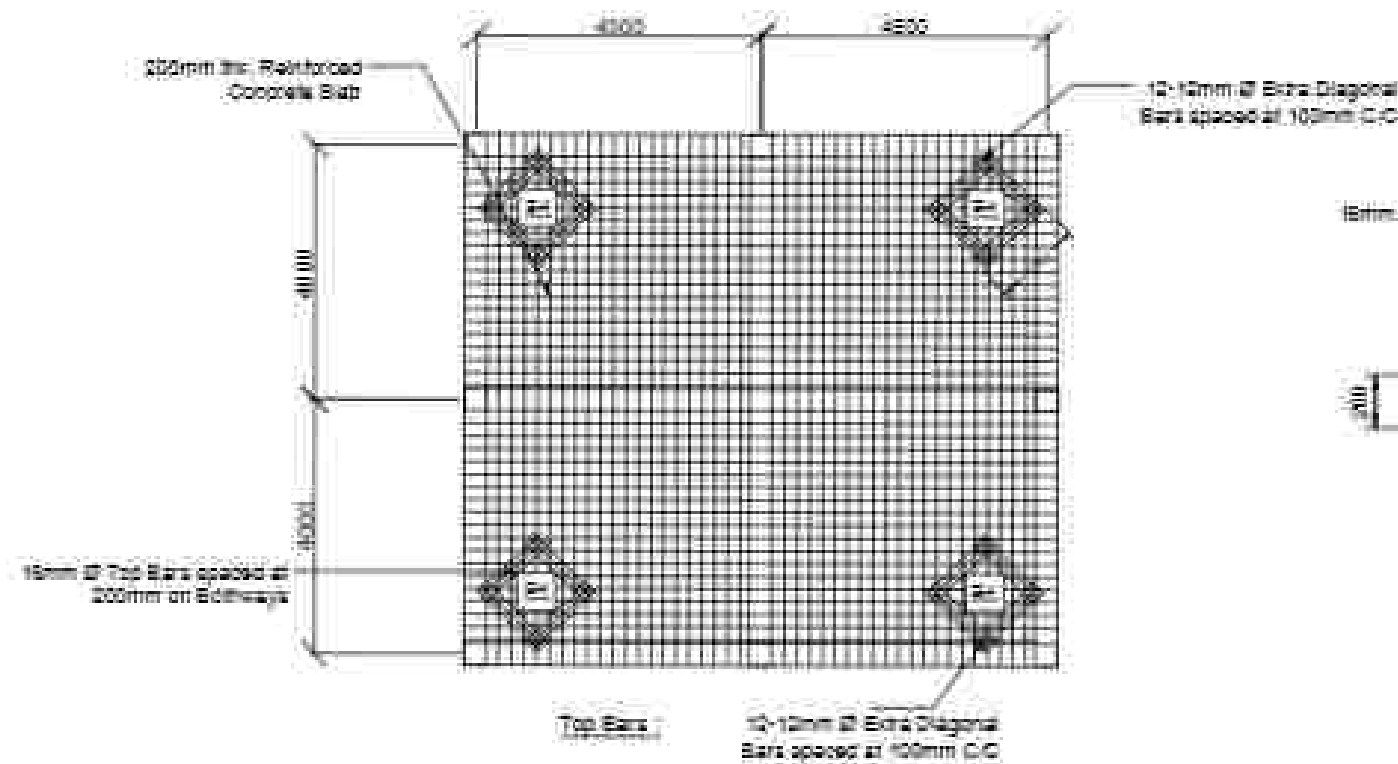




BOTTOM SLAB DESIGN
SCALE: 1/4000

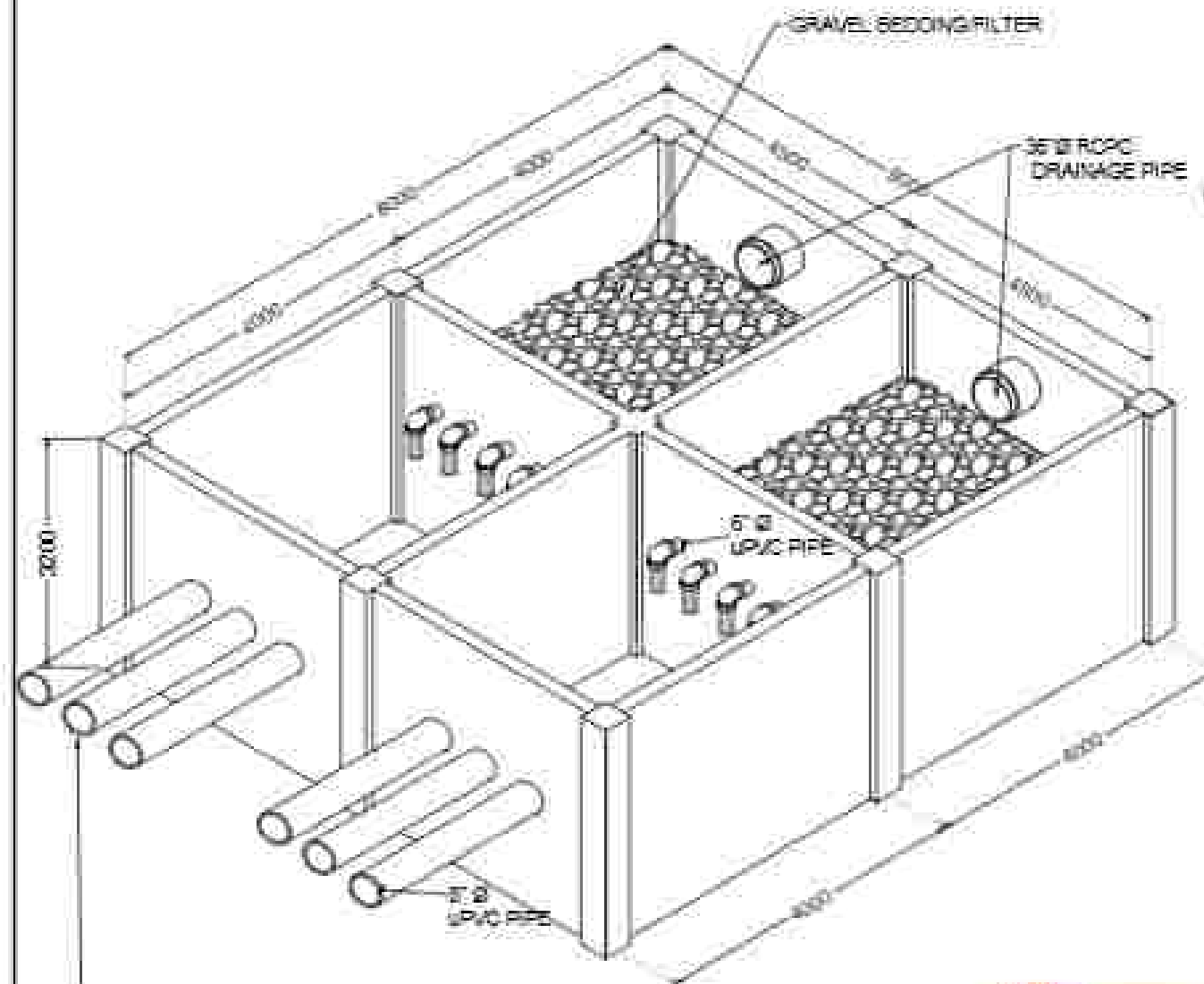


BOTTOM DISTRIBUTION BARS
SCALE: 1/4000

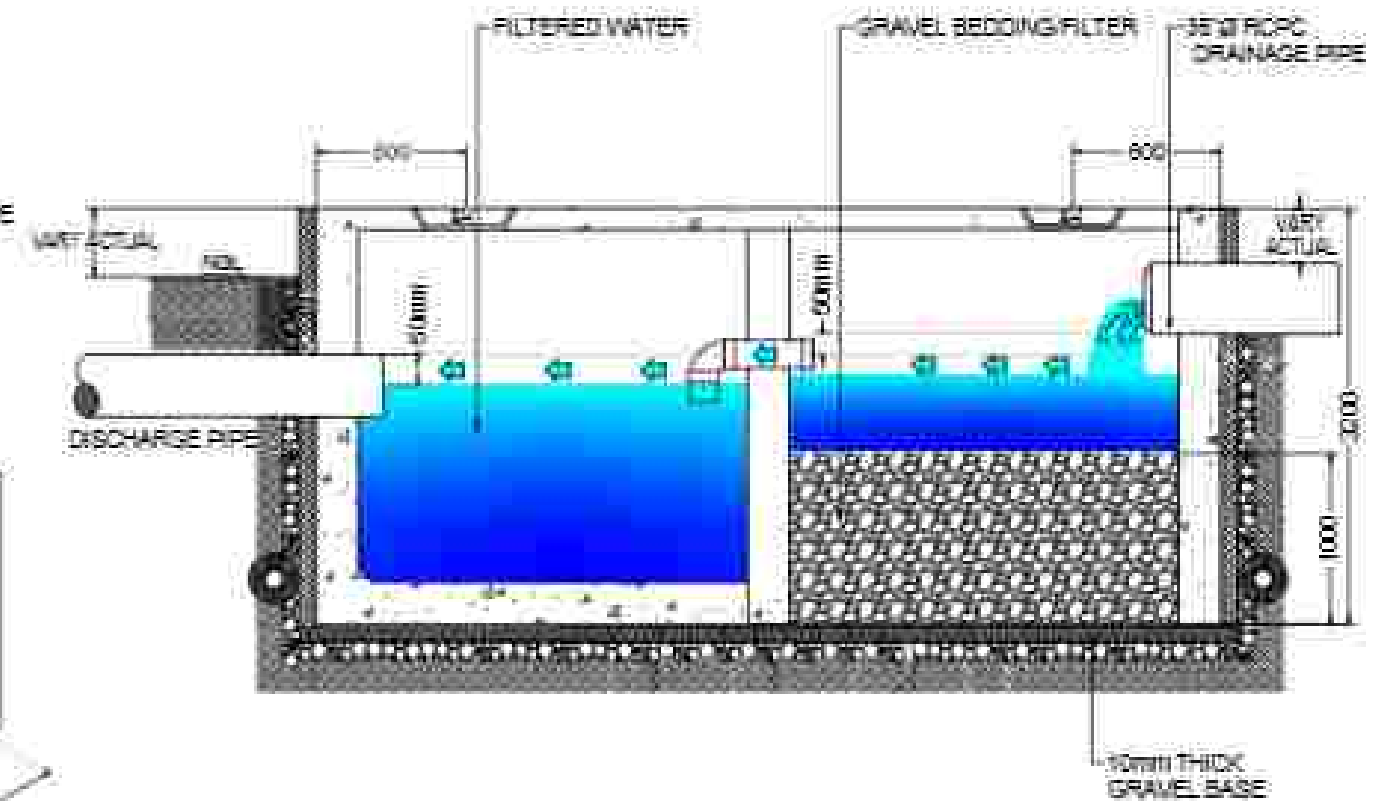


TYPICAL SLAB SECTION
SCALE: 1/1000

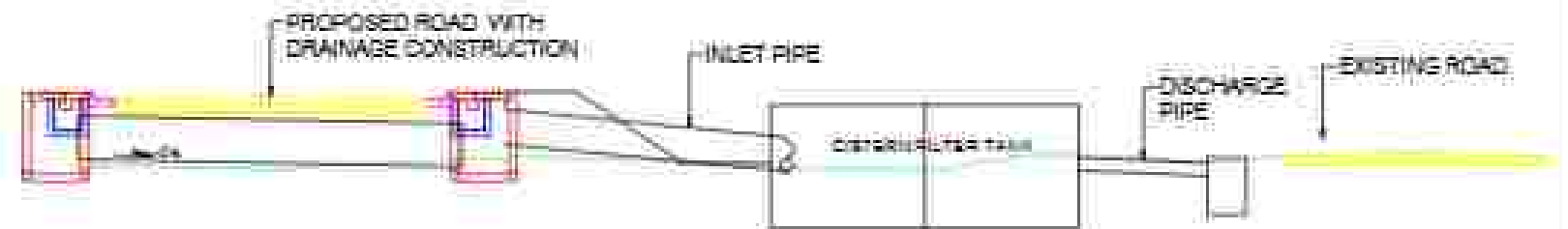
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING CITY OF MANILA DISTRICT ENGINEERING OFFICE DIVISION OFFICE	CONSTRUCTION OF WATER SUPPLY SYSTEM, PHASE II BAYAN, CALABARZON, LAGUNA CITY, CALABARZON, LAGUNA	BOTTOM SLAB DESIGN BOTTOM AND TOP DISTRIBUTION BARS TYPICAL SLAB SECTION	DESIGNED BY: CHECKED BY: APPROVED BY:	DATE:	DATE:	DATE:	DATE:	2 3	12 58-23
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ISOMETRIC DRAWING
CISTERN TANK DETAIL
DATE



WASTE WATER FILTRATION DETAIL
DATE



TYPICAL CROSS SECTION FROM ROADWAY TO CISTERN
DATE

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS DIVISION OFFICE - MARIKINA CITY DISTRICT ENGINEERING OFFICE	CONSTRUCTION OF WATER SUPPLY SYSTEM, PHASE II WATER FILTRATION DETAIL	CISTERN TANK DETAIL (ISOMETRIC) WASTE WATER FILTRATION DETAIL TYPICAL CROSS SECTION FROM ROADWAY TO CISTERN	DISTRICT ENGINEER	DISTRICT ENGINEER	DISTRICT ENGINEER	DISTRICT ENGINEER	DISTRICT ENGINEER	2 3	12 58/23
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MINIMUM CONCRETE COVER FOR REINFORCEMENT

MINIMUM COVER

LOCATION

UNFORMED SURFACES ADJACENT TO EXCAVATION

75

FORMED OR TOP SURFACES EXPOSED TO WEATHER OR SATURATED AIR, SUBMERGED OR IN CONTACT WITH GROUND

D 150 LARGER BARS

40

D 150 < LARGER BARS

40

OTHER LOCATION

BAR IN BEAM OR SLAB, INCLUDING STIRRUPS

40

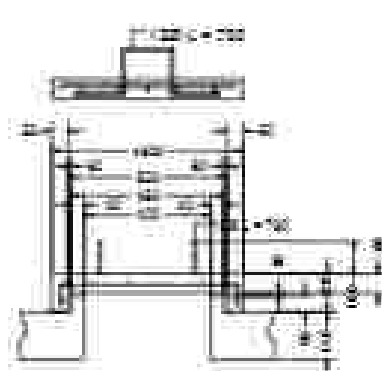
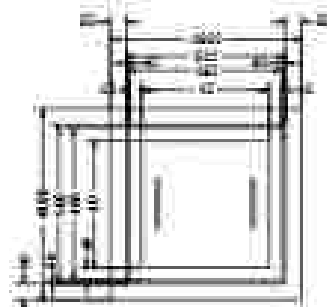
AND COLUMN SPIRAL OR TIE

40

LARGER THAN D 30 BARS

75

D 30 AND SMALLER BARS



DET. OF SERVICE HOLE
SCALE: 1/8" = 1'-0"

SCHEDULE OF REBAR SPLICES AND LENGTH OF EMBEDMENT

BAR SIZE	LENGTH OF LAPPED SPLICES FOR REINFORCING (mm)		LENGTH OF EMBEDMENT FOR END HIGH-GRADE OR REINFORCED W/ STANDARD HOOKS (mm)	
	TOP BARS	OTHERS	TOP BARS	OTHERS
D 10	200	300	200	300
D 12	275	330	275	330
D 14	325	380	325	380
D 16	425	480	425	480
D 18	500	550	500	550
D 20	550	600	550	600
D 22	600	650	600	650
D 24	675	725	675	725
D 28	775	825	775	825
D 32	875	925	875	925
D 36	1000	1050	1000	1050

* TOP BARS ARE HORIZONTAL BARS SO PLACED THAT 400 OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TO PROVIDED WITH AS REQUIRED FOR TOP BARS. EXCEPT AS OTHERWISE INDICATED ON THE PLANS, EMBEDMENT LENGTHS FOR END HIGH-GRADE AND LAPPED SPLICES SHALL NOT BE LESS THAN MINIMUM TOLERANCES SHOWN ABOVE.

LAPPED SPLICES SHALL NOT BE MADE AT POINT OF MAXIMUM STRESS DETERMINED BY THE ENGINEER, AND SHALL NOT BE SPACED CLOSER THAN 18" ON CENTERS. IF SPLICES ARE STAGGERED SO THAT NO MORE THAN 3 ARE SPICED ON A LAP SPLICE LENGTH, THE SPLICE LENGTH CAN BE REDUCED TO 75% OF THE LENGTH TABULATED ABOVE.

GENERAL NOTES

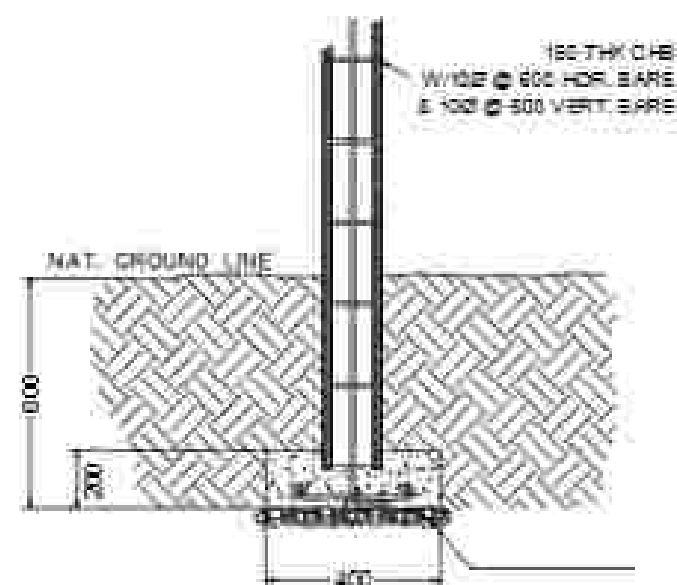
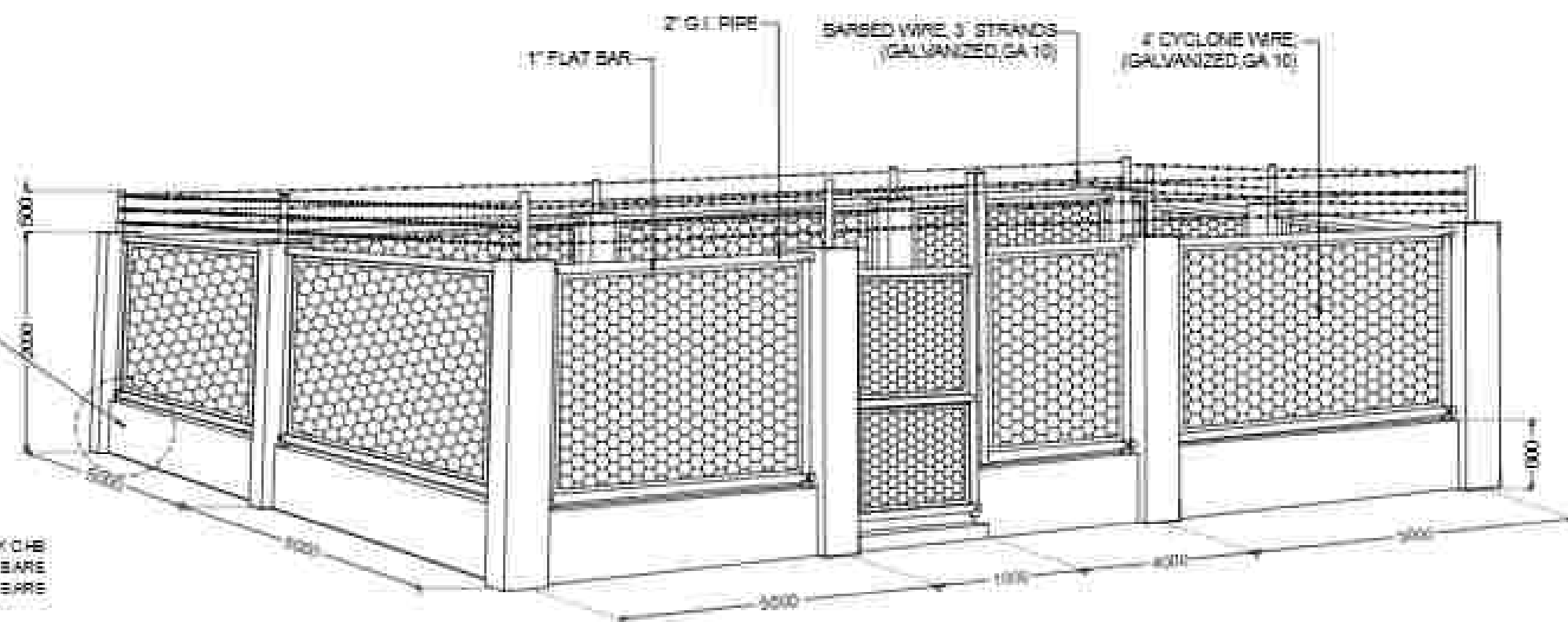
1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE SPECIFIED.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH, 3400 PSI EXCEPT LAYERS OF CONCRETE WHICH SHALL BE 12,500 PSI AT 28 DAYS BASED ON STANDARD CYLINDER.
3. REINFORCEMENT BARS SHALL BE DEFORMED BILLET STEEL BARS, OVERSIZED GRADE WITH MINIMUM YIELD STRENGTH, f_y , OF 275 MPa AND ALLOWABLE TENSILE STRENGTH OF 138 MPa CONFORMING TO ASTM A615.
4. ALLOWABLE SOIL BEARING PRESSURE 120 KPa.
5. REINFORCEMENT:

- TE - TOP BARS
- BB - BOTTOM BARS
- BT - BOTHWAYS
- B - INSIDE DIVISIONS OF TANK
- W - THICKNESS OF WALLS
- T - THICKNESS OF TOP SLAB
- B - THICKNESS OF BOTTOM SLAB
- OUT - OUTSIDE DIVISIONS OF TANK
- MIN - MINIMUM
- FWL - HIGH WATER LEVEL
- THK - THICK
- EP - EACH FACE
- WELD - WELD

REFERENCE DRAWINGS

- CHG. NO. 5-12
- CHG. NO. 2-18

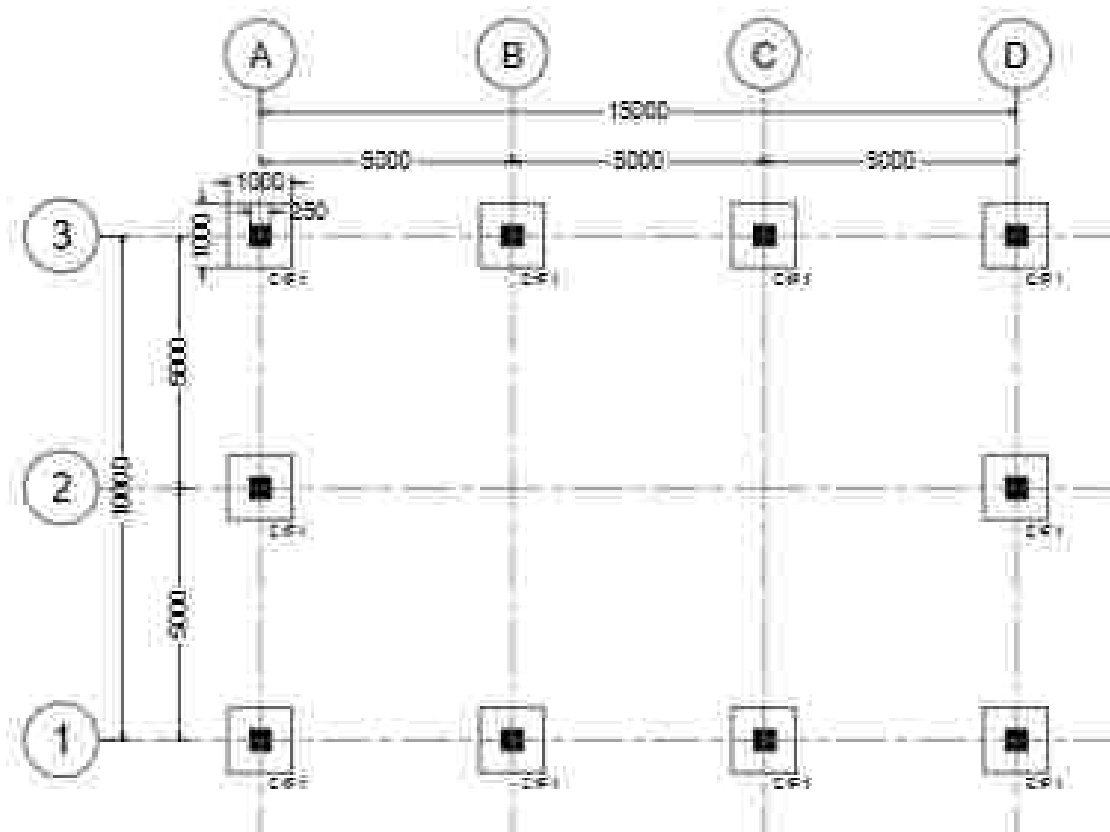
OFFICE OF THE DISTRICT ENGINEER DIVISION OF WATER SUPPLY AND WASTE DISTRICT ENGINEERING OFFICE SAN FRANCISCO, CALIFORNIA	DESIGNATION OF WATER SUPPLY AND WASTE DIVISION OF WATER SUPPLY AND WASTE DISTRICT ENGINEERING OFFICE SAN FRANCISCO, CALIFORNIA	SERVICE HOLE DETAIL SCHEDULE OF REBAR SPLICES AND LENGTH OF EMBEDMENT FOR WATER SERVICE DESIGN	DESIGNED BY CHECKED BY APPROVED BY DATE	DESIGNED BY CHECKED BY APPROVED BY DATE	DESIGNED BY CHECKED BY APPROVED BY DATE	DESIGNED BY CHECKED BY APPROVED BY DATE	DESIGNED BY CHECKED BY APPROVED BY DATE	2 3	14 51423
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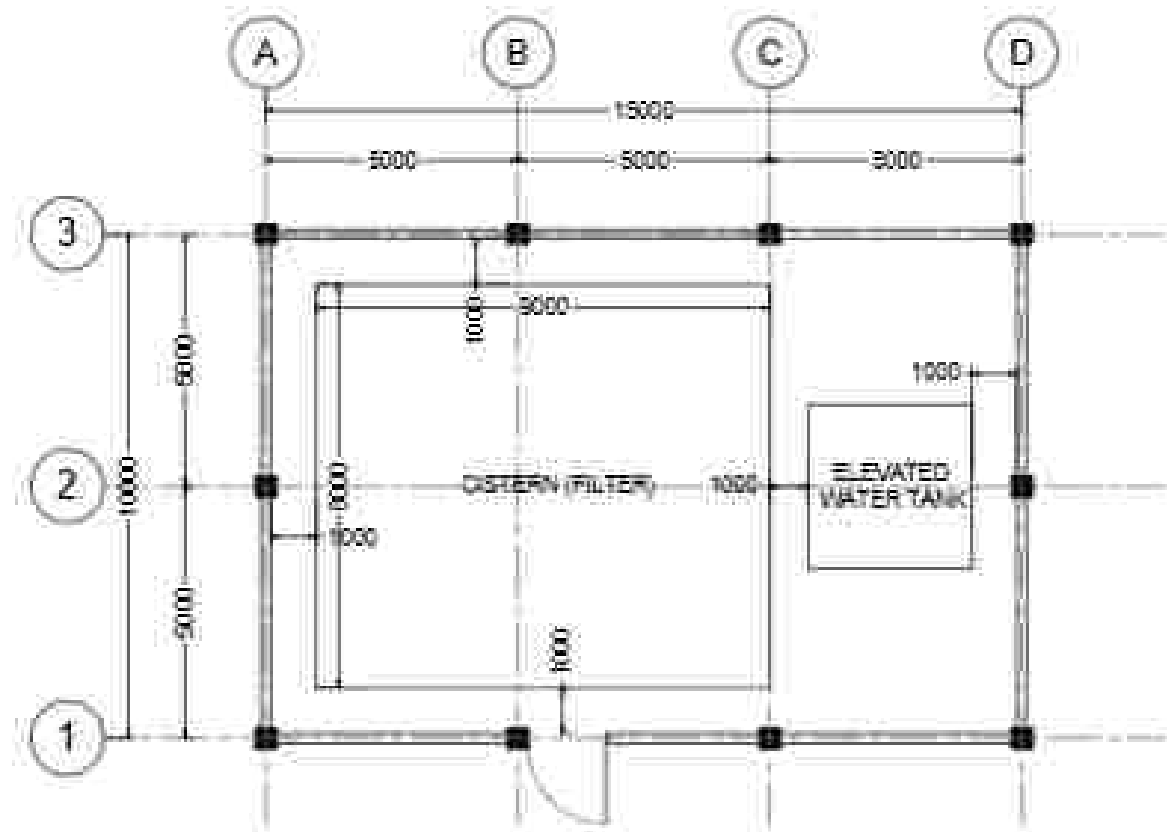
DETAIL OF WALL FOOTING

PERIMETER FENCE DESIGN
DATE

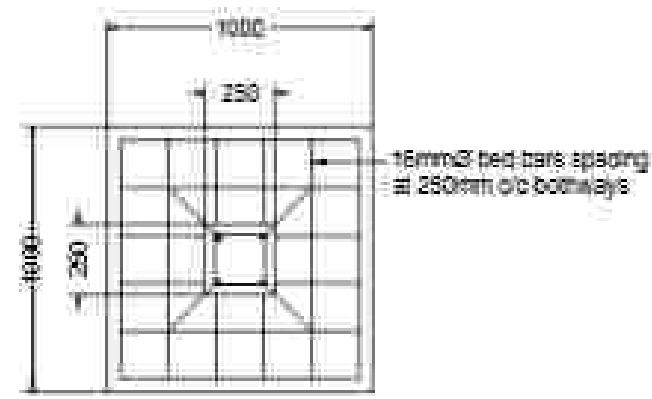
 OFFICE OF THE DISTRICT ENGINEER DISTRICT ENGINEERING OFFICE	CONSTRUCTION OF WATER SUPPLY SYSTEM, PULASKI AND BAYAN, CALABANG, TIGAY CITY, SOUTHERN TAGBAYAN	REINFORCED CONCRETE DETAIL OF WALL FOOTING	 REINFORCED CONCRETE DETAIL OF WALL FOOTING					2 3	15 \$11.23
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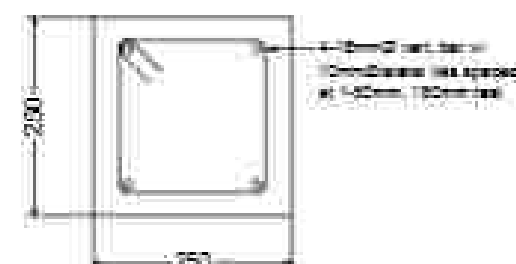
FOOTING LAYOUT PLAN
SCALE: 1/10th



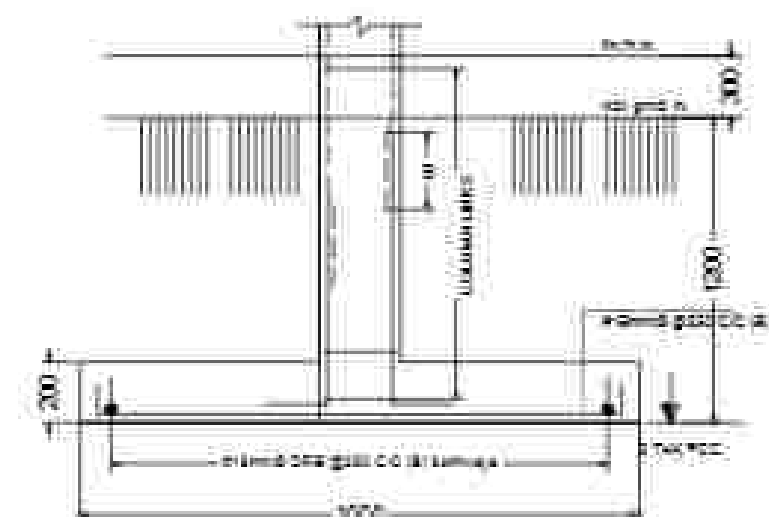
FLOOR PLAN
SCALE: 1/10th



CIP-1 DETAIL
SCALE: 1/10th

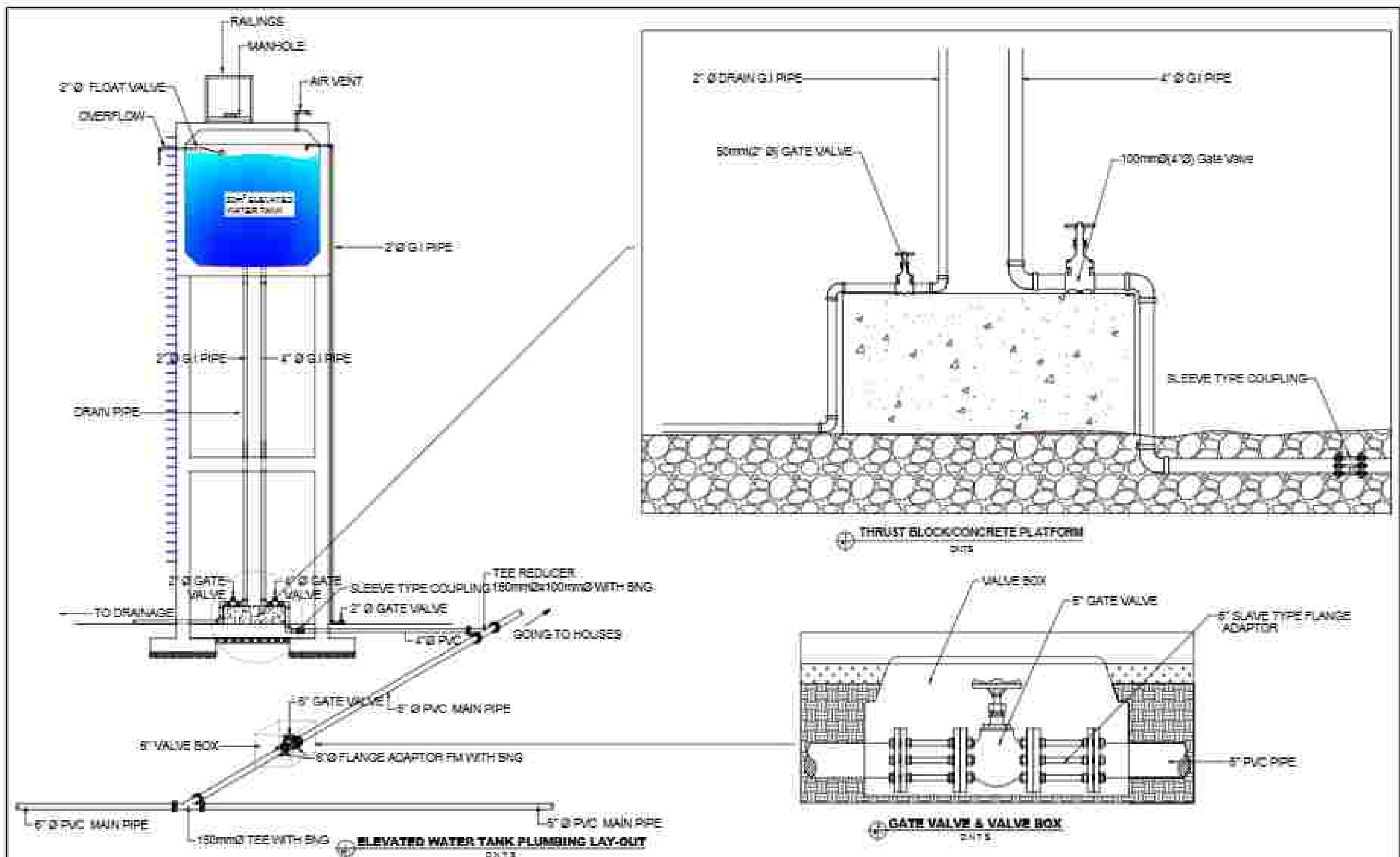


C1 DETAIL
SCALE: 1/10th

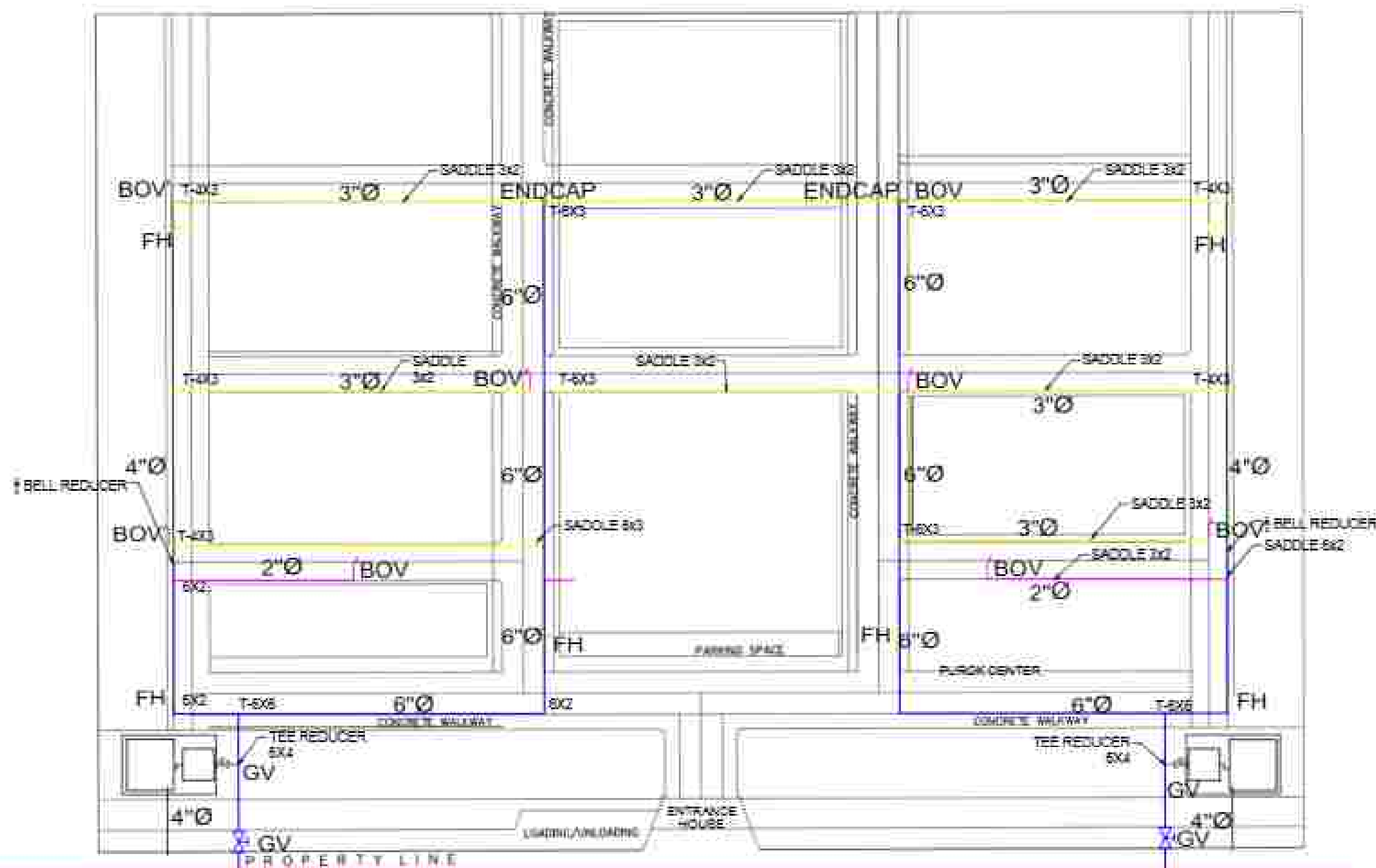


DETAIL OF FOOTING CIP-1
SCALE: 1/10th

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING CITY OF JOHANNESBURG DISTRICT ENGINEERING OFFICE	PROJECT DESCRIPTION: CONSTRUCTION OF WATER SUPPLY SYSTEM, PURKIS WATER TREATMENT PLANT, JOHANNESBURG	PROJECT NAME: FOOTING DESIGN FLOOR PLAN CIP-1 DETAIL C1 DETAIL DETAIL OF FOOTING CIP-1	DESIGNED BY: CHECKED BY: APPROVED BY: 	DATE: 15/05/2023	SCALE: 1/10th	REVISIONS: 1. Initial design 2. Final design	REVISIONS: 1. Initial design 2. Final design	REVISIONS: 1. Initial design 2. Final design	REVISIONS: 1. Initial design 2. Final design
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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING CITY OF MANILA DISTRICT ENGINEERING OFFICE DIVISION OFFICE	DESIGNATION OF WATER SUPPLY SYSTEM PLUMBING LAY-OUT FOR ELEVATED WATER TANK PLUMBING LAY-OUT	DESIGNER ENGINEER CHECKER APPROVER	DESIGNER ENGINEER CHECKER APPROVER	DESIGNER ENGINEER CHECKER APPROVER	DESIGNER ENGINEER CHECKER APPROVER	DESIGNER ENGINEER CHECKER APPROVER	DESIGNER ENGINEER CHECKER APPROVER	2 3	17 P1/23
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LEGEND

	4"Ø J.V.C PIPE
	6"Ø J.V.C PIPE
	3"Ø J.V.C PIPE
	8"Ø W.P.P. (S.D.T)
	EXISTING PIPELINE

TEE
6X6



PIPELINES LAY-OUT PLAN
S.D.T

TEE
6X6

S MAIN PIPE (TRANSMISSION)
TAGUMI WATER DISTRICT



DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
DIVISION OFFICE - MARIKINA CITY
DISTRICT ENGINEERING OFFICE
MARIKINA CITY

PROJECT TITLE
CONSTRUCTION OF WATER SUPPLY SYSTEM, PLUCK CENTER
MARIKINA CITY, TAGUMI CITY, DIVISION OFFICE - MARIKINA CITY

PROJECT NO.
S.D.T

DESIGNED BY
MARIKINA ENGINEERING

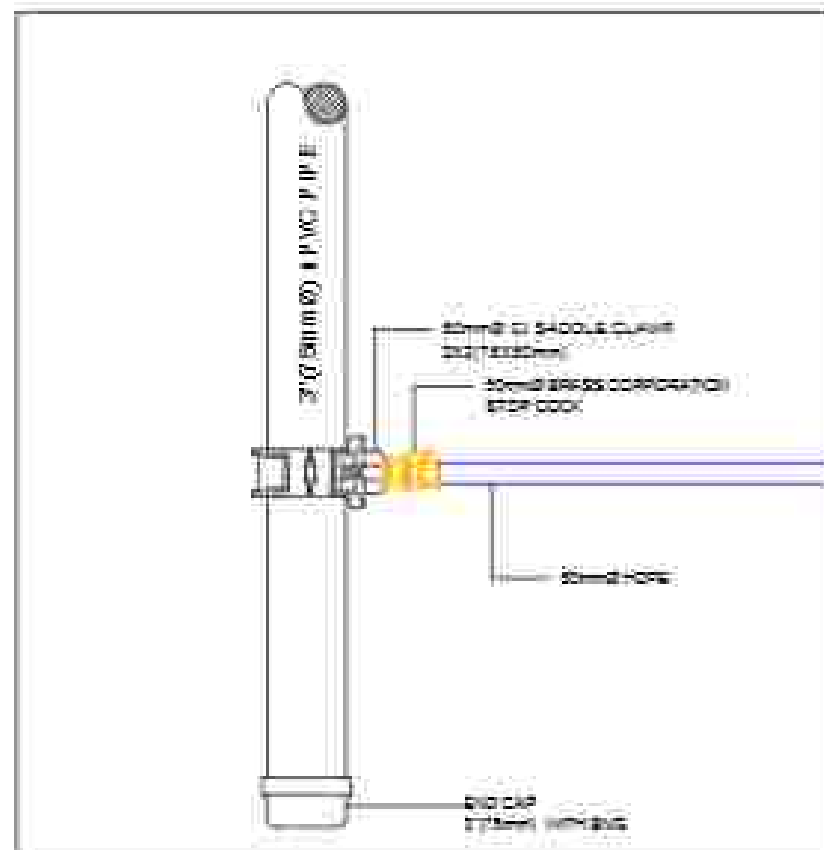
CHECKED BY
MARIKINA ENGINEERING

APPROVED BY
MARIKINA ENGINEERING

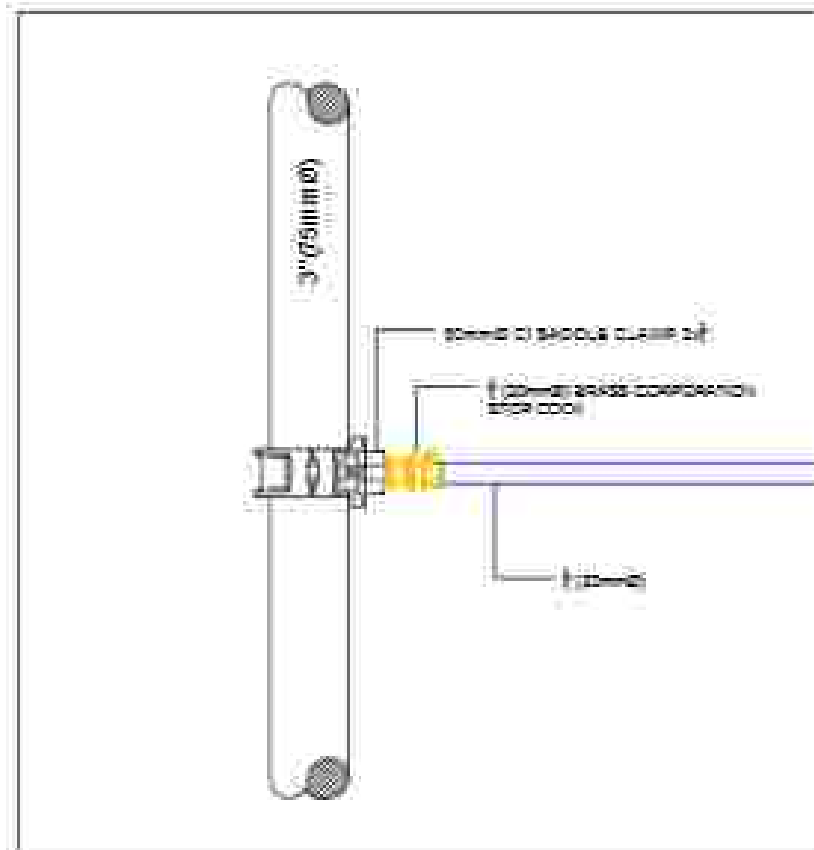
DATE
MAR 2023

REVISIONS
MAR 2023

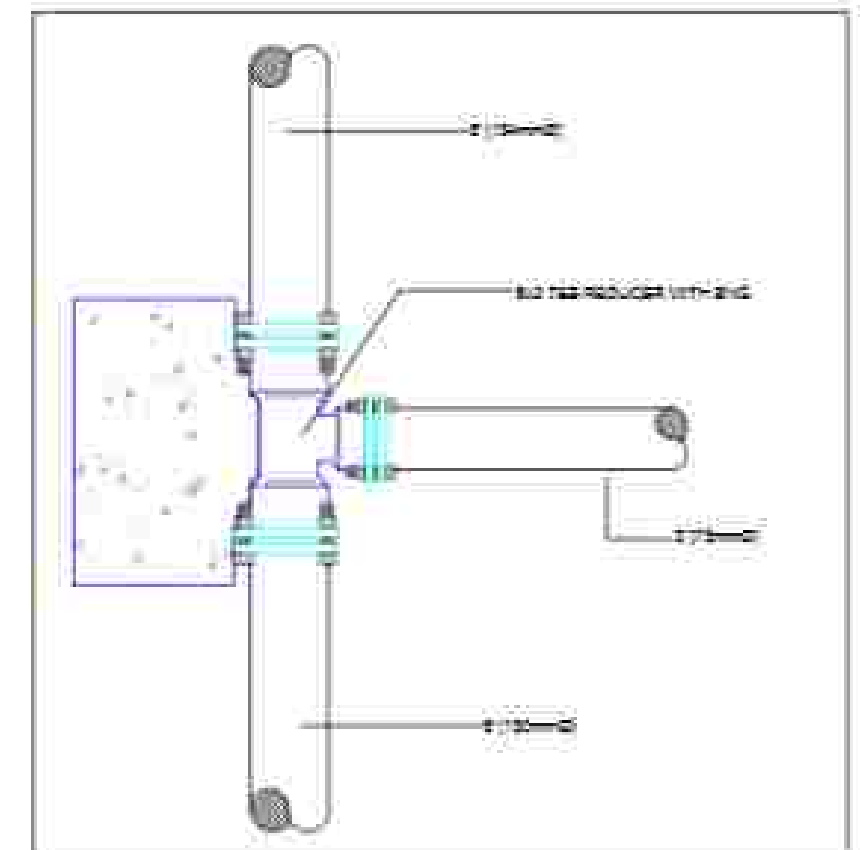
NO. OF SHEETS
18
P2/23



INTERCONNECTION DETAIL



INTERCONNECTION DETAIL

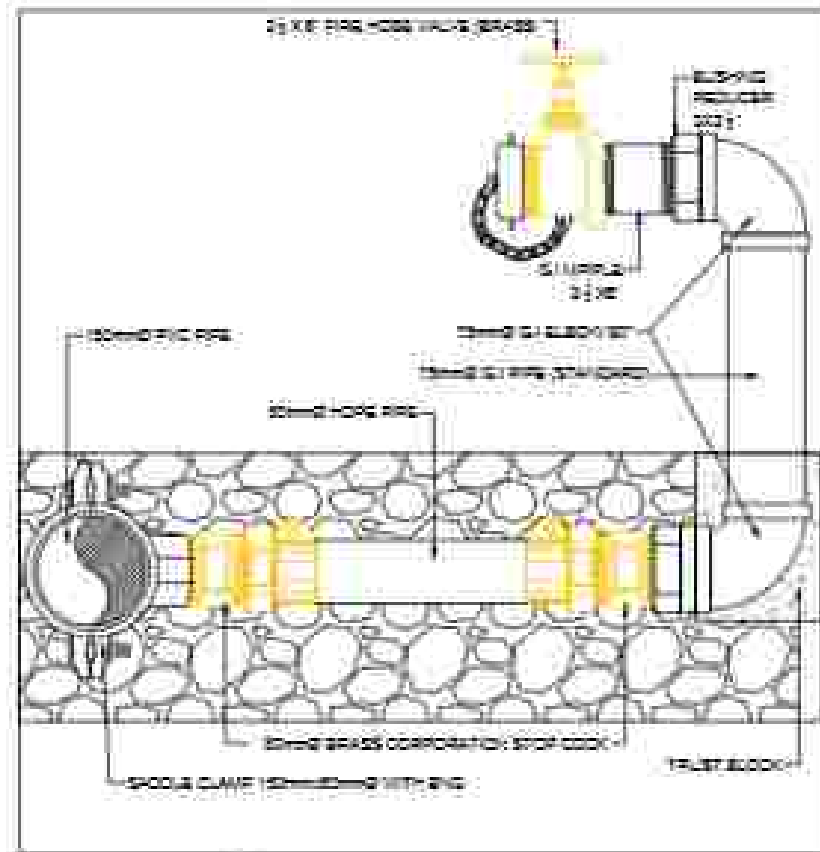


INTERCONNECTION DETAIL

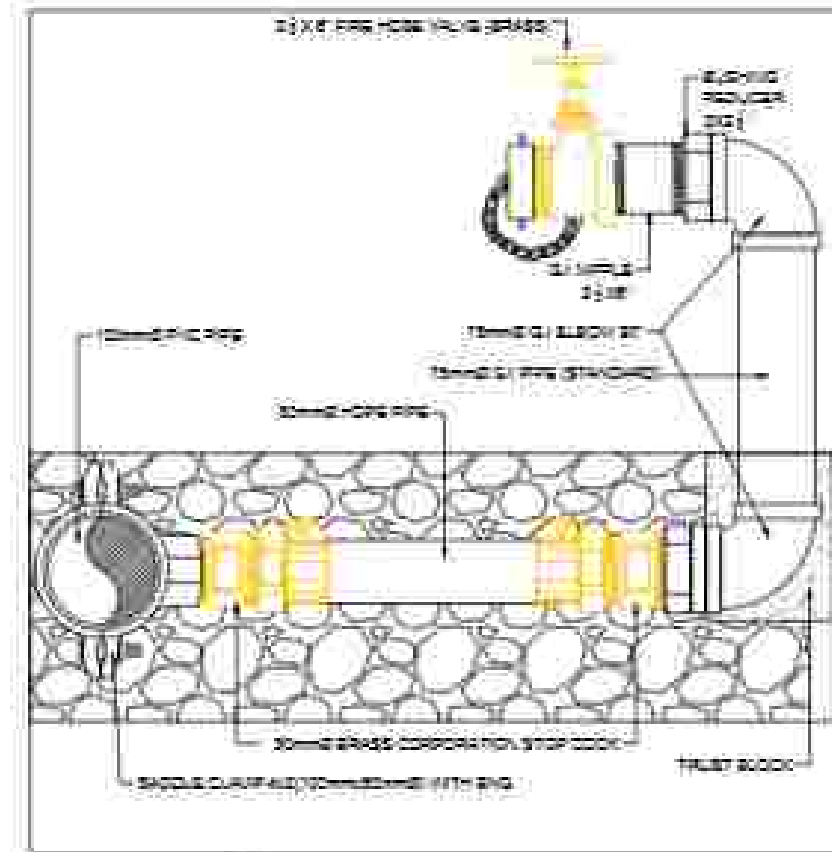
PIPELINE INTERCONNECTION DETAIL
CMT 3

 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING CITY OF SAN DIEGO DISTRICT ENGINEERING OFFICE	PROJECT: RECONSTRUCTION OF WATER SUPPLY AND WASTE PIPES IN SAN JOSE, CALIFORNIA, INCLUDING CITY OF SAN JOSE	PROJECT: PIPELINE INTERCONNECTION DETAIL	DESIGNED BY: [Signature] CHECKED BY: [Signature] APPROVED BY: [Signature]	DESIGNED BY: [Signature] CHECKED BY: [Signature] APPROVED BY: [Signature]	DESIGNED BY: [Signature] CHECKED BY: [Signature] APPROVED BY: [Signature]	DESIGNED BY: [Signature] CHECKED BY: [Signature] APPROVED BY: [Signature]	DESIGNED BY: [Signature] CHECKED BY: [Signature] APPROVED BY: [Signature]	2 3	19 23
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[illegible]



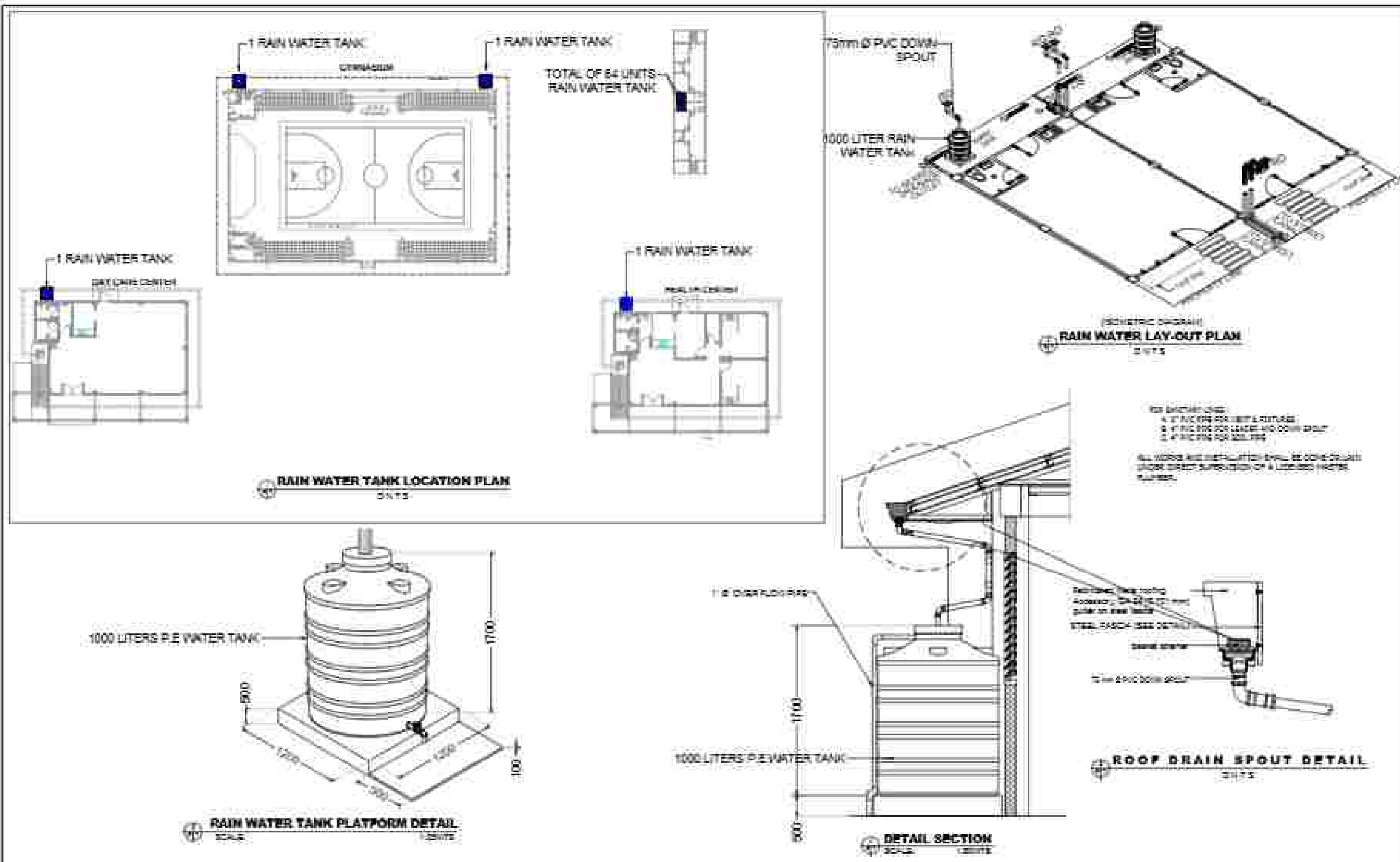
1
P/S
FIRE HYDRANT DETAIL 'A'
DATE



2
P/S
FIRE HYDRANT DETAIL 'B'
DATE

 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS DIVISION OFFICE - MARIKINA CITY DISTRICT ENGINEERING OFFICE MARIKINA CITY	PROJECT TITLE: CONSTRUCTION OF WATER SUPPLY SYSTEM, PURKAS BRIDGE, MARIKINA CITY, MARIKINA CITY, MARIKINA CITY	PROJECT NO.: FIRE HYDRANT DETAIL 'A' FIRE HYDRANT DETAIL 'B'	DESIGNED BY:  CHECKED BY:  APPROVED BY: 	DATE:  DATE:  DATE: 	DATE:  DATE:  DATE: 	DATE:  DATE:  DATE: 	DATE:  DATE:  DATE: 	DATE: 2 3	DATE: 21 25/23
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 DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS BUREAU OF ROADS DISTRICT ENGINEERING OFFICE CAGAYAN DE ORO	PROJECT TITLE: CONSTRUCTION OF WATER SUPPLY SYSTEM, CUPUKAN, BAYAN, CAGAYAN DE ORO, CAGAYAN	PROJECT NO: 2014-01-01	DATE: 2014-01-01	APPROVED BY: 	APPROVED BY: 	APPROVED BY: 	APPROVED BY: 	DATE: 2014-01-01	DATE: 2014-01-01
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DEPARTMENT OF PUBLIC WORKS AND ENGINEERING CITY OF MANILA DISTRICT ENGINEERING OFFICE DIVISION OFFICE	DESIGNER: <i>[Signature]</i> CHECKER: <i>[Signature]</i> DATE: 01/12/15	PROJECT: RAIN WATER TANK LOCATION PLAN SCALE: 1/8"=1'-0"	APPROVED: <i>[Signature]</i> DATE: 01/12/15	DESIGNED BY: <i>[Signature]</i> CHECKED BY: <i>[Signature]</i> DATE: 01/12/15	PROJECT: RAIN WATER TANK LOCATION PLAN SCALE: 1/8"=1'-0"	DESIGNED BY: <i>[Signature]</i> CHECKED BY: <i>[Signature]</i> DATE: 01/12/15	DESIGNED BY: <i>[Signature]</i> CHECKED BY: <i>[Signature]</i> DATE: 01/12/15	DATE: 01/12/15	DATE: 01/12/15
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