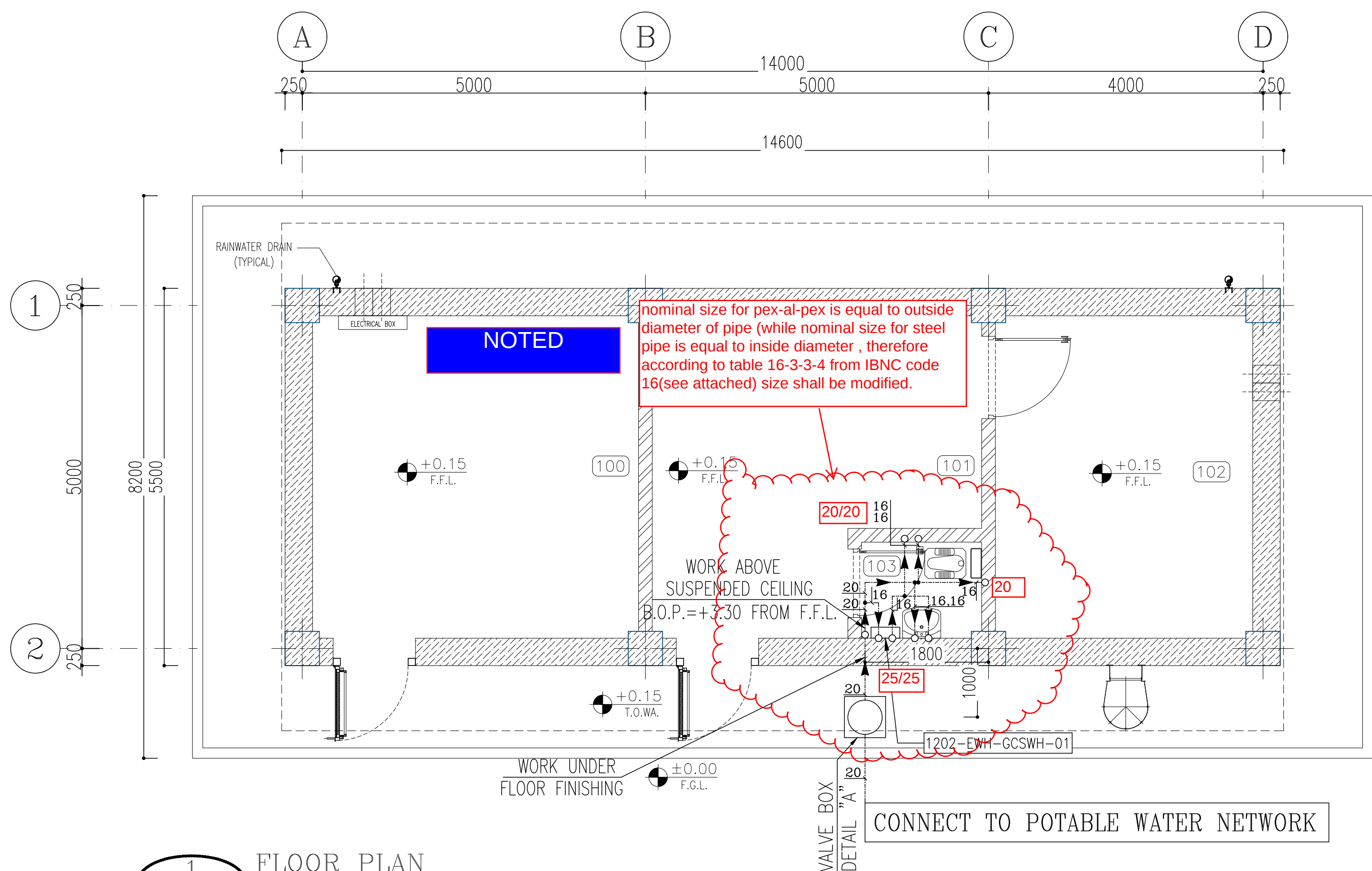




To add water heater calculation :

$$q_i = Q_h c_p \rho \Delta t / \eta$$

q_i = heater input, W
 Q_h = flow rate, mL/s
 c_p = specific heat of water = 4.1868 kJ/(kg · K)
 ρ = density of water = 1.0 kg/L
 Δt = temperature rise, K
 η = heater efficiency

0.9 for electrical

to write in SI UNIT L/H

Hot Water Demand per Fixture (Industrial Plant)			
Fixture	Demand (GPH)	Quantity	Total Demand (GPH)
Basin, privet lavatory	2	1	2
Demand Factor	0.4		
Storage Factor	1		2

$V = 2 \times 0.4 \times 1 \times 3.785 = 3.028 \text{ Lit}$

AUTOMATIC ELECTRICAL WATER HEATER

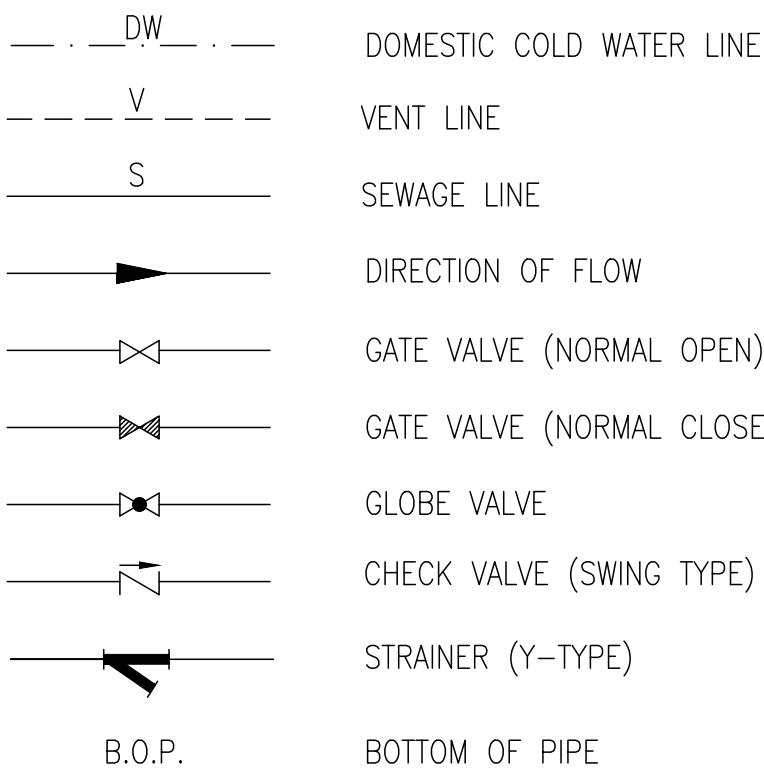
EQUIPMENT NO.	QTY	INSTALLATION AREA	TYPE	NOMINAL STORAGE TANK CAPACITY (Liter)	STORAGE TANK MATERIAL CONSTRUCTION	ELECTRIC POWER SUPPLY V/PH/Hz	HEATING ELEMENT POWER (kW)	INCLUDING
1202-EWH-GCSWH-01	1	TOILET	WALL MOUNTED	10	GALVANIZED STEEL	230/1/50	1.7	STANDARD THERMOSTATS (A SAFETY CUT-OUT) PREVENTING THE ELECTRICALLY-LIVE PARTS TO BE IN CONTACT WITH WATER. AND EQUIPPED WITH DRAIN VALVE, TEMPERATURE GAGE AND ALL STANDARD ACCESSORIES

NOTES

GENERAL NOTES

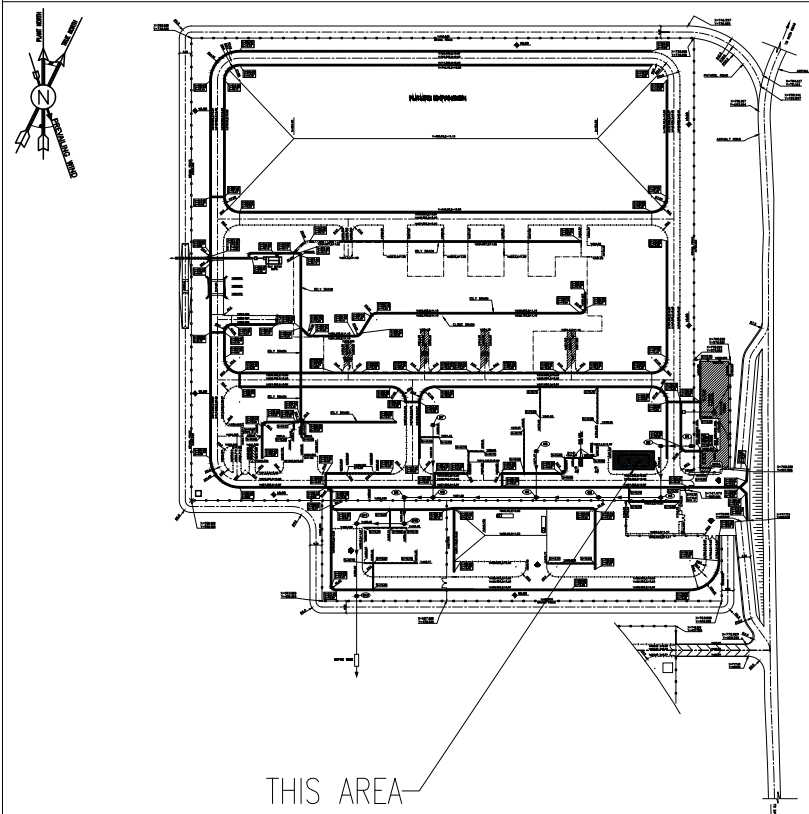
1. ALL DIMENSIONS ARE IN MILLIMETER & ALL ELEVATIONS ARE IN METER UNLESS NOTED OTHERWISE.
2. ALL DIMENSIONS AND ELEVATIONS SHALL BE CHECKED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
3. THIS DWG. SHOULD BE WORKED TOGETHER WITH THE OTHER MECHANICAL, ARCHITECTURAL, ELECTRICAL DWGS. FOR ANY CONFLICT SHOULD CLARIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
4. ALL HORIZONTAL DOMESTIC WATER PIPES IN THE BUILDING SHALL RUN ABOVE THE FALSE CEILING UNLESS OTHERWISE SPECIFIED.
5. MATERIAL OF DOMESTIC COLD AND HOT WATER PIPES OUTSIDE BUILDING ARE GALVANIZED STEEL IN ACCORDANCE WITH ASTM A53 AND FITTINGS ARE IN ACCORDANCE WITH ASME B16.12.
6. DOMESTIC HOT WATER PIPING INSIDE THE BUILDING WILL BE COVERED WITH INSULATION (WATER PIPE INSULATION) ACCORDING TO INR TP02 16.
7. DOMESTIC COLD WATER PIPING OUTSIDE THE BUILDING SHALL BE COVERED WITH ELASTOMERIC INSULATION (NIP 254M)
8. TOP OF THE SUPPORT STEEL STRUCTURE SHALL BE CONSIDERED AS B.O.P.
9. MATERIAL OF SANITARY SEWER, VENT PIPES AND FITTINGS SHALL BE PVC-U (80-TYPE) IN ACCORDANCE WITH EN 1451.
10. EXPOSED VENT PIPE AT ROOF LEVEL SHALL BE PROTECTED FROM SUNLIGHT BY PAINTING, COATING OR INSULATION.
11. SLOPE OF SEWAGE PIPES ARE 1.5% ~ 2% TO DRAIN.
12. MATERIAL OF DOMESTIC COLD AND HOT WATER PIPES INSIDE BUILDING SHALL BE FIVE LAYERED POLYETHYLENE PE - XL-PE ACCORDING TO ASTM F1281/182 AND FITTINGS SHALL BE ACCORDING TO ASTM F1281/182P.
13. MATERIAL OF HOT DIPPED GALVANIZED STEEL PIPE SHALL BE ACCORDING TO ASTM A53 OR B AND FITTINGS SHALL BE ACCORDING TO ASTM A234 OR WPE.
14. ALL VALVES ABOVE THE FALSE CEILING SHALL HAVE ACCESS DOOR.
15. THE WASTE FROM BUILDING TO WASTE WATER TREATMENT OR PITS IN PLANT SHALL DISCHARGE BY GRAVITY FLOW.
16. FINAL ROUTE FOR PLUMBING SHALL NOT BE OVER AND NEAR THE ELECTRICAL & CONTROL PANEL.

LEGEND



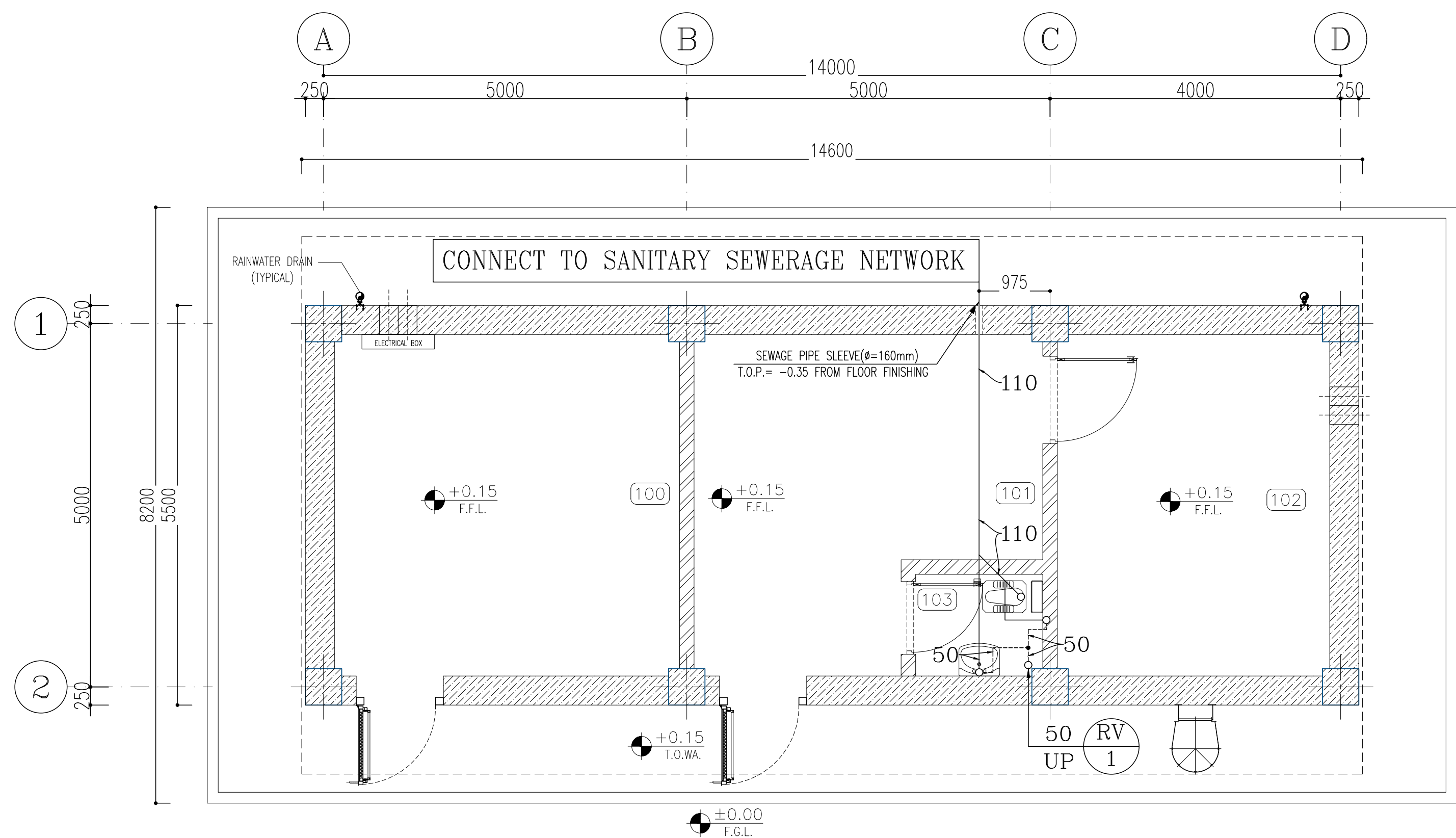
REFERENCE DRAWING	DRG. No.
HVAC & PLUMBING DESIGN CRITERIA	BK-GNARL-PEDCO-000-HV-DC-0001
SPECIFICATION FOR HVAC EQUIPMENT	BK-GNARL-PEDCO-000-HV-SF-0001
SPECIFICATION FOR DUCT WORK & PIPE WORK	BK-GNARL-PEDCO-000-HV-SF-0002
STANDARD DRAWING FOR HVAC & PLUMBING	BK-GNARL-PEDCO-000-HV-DW-0001
SYMBOL & LEGEND FOR HVAC & PLUMBING	BK-GNARL-PEDCO-000-HV-DW-0002
ARCHITECTURAL DETAIL DRAWING FOR GCS WAREHOUSE	BK-GCS-PEDCO-120-AR-DW-0012
U/G PIPING PLAN	BK-GCS-PEDCO-120-PI-DW-0005
SITE SEWERAGE SYSTEM LAYOUT & DETAILS	BK-GCS-PEDCO-120-CV-PY-0001
UNIT PLOT PLAN DRAWING	BK-PPL-PEDCO-120-PI-PY-0001

KEY PLAN



100	STORAGE
101	INSTRUMENT WORKSHOP
102	INSTRUMENT STORAGE
103	TOILET
104	ROOF
105	WALKWAY

[illegible]



100	STORAGE
101	INSTRUMENT WORKSHOP
102	INSTRUMENT STORAGE
103	TOILET
104	ROOF
105	WALKWAY

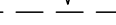
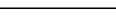
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NOTES

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER & ALL ELEVATIONS ARE IN METER UNLESS NOTED OTHERWISE.
2. ALL DIMENSIONS AND ELEVATIONS SHALL BE CHECKED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
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4. ANY CONFLICT SHOULD CLARIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
5. ALL HORIZONTAL DOMESTIC WATER PIPES IN THE BUILDING SHALL RUN ABOVE THE FALSE CEILING UNLESS OTHERWISE SPECIFIED.
6. MATERIAL OF DOMESTIC COLD AND HOT WATER PIPES OUTSIDE BUILDING ARE GALVANIZED STEEL IN ACCORDANCE WITH ASTM A53 AND FITTINGS ARE IN ACCORDANCE WITH ASME B16.12.
7. DOMESTIC HOT WATER PIPING INSIDE THE BUILDING WILL BE COVERED WITH THERMAL INSULATION (WATER PIPE INSULATION) ACCORDING TO NISR TOPIC 16.
7. DOMESTIC COLD WATER PIPING OUTSIDE THE BUILDING SHALL BE COVERED WITH ELASTOMERIC INSULATION (MIN 25MM)
8. TOP OF THE SUPPORT STRUCTURE SHALL BE CONSIDERED AS B.O.P.
9. MATERIAL OF SANITARY SEWER, VENT PIPES AND FITTINGS SHALL BE PVC-U (BO-PYE) IN ACCORDANCE WITH EN 1451.
10. EXPOSED VENT PIPE AT ROOF LEVEL SHALL BE PROTECTED FROM SUNLIGHT BY PAINTING, COATING OR INSULATION.
11. SLOPE OF SEWAGE PIPES ARE 1.5% ~ 2% TO DRAIN.
12. MATERIAL OF DOMESTIC COLD AND HOT WATER PIPES INSIDE BUILDING SHALL BE FIVE LAYERED POLYETHYLENE PIPE -AL- PEX ACCORDING TO ASTM F1281/1282 AND FITTINGS SHALL BE ACCORDING TO ASTM F1281/1282.
13. MINIMUM SLOPE OF RIPPED GALVANIZED STEEL PIPE SHALL BE ACCORDING TO ASTM A53 OR B AND FITTINGS SHALL BE ACCORDING TO ASTM A234 OR WPR.
14. ALL VALVES ABOVE THE FALSE CEILING SHALL HAVE ACCESS DOOR.
15. THE WATER FROM BUILDING TO WASTE WATER TREATMENT OR PITS IN PLANT SHALL DISCHARGE BY GRAVITY FLOW.
16. FINAL ROUTE FOR PLUMBING SHALL NOT BE OVER AND NEAR THE ELECTRICAL & CONTROL PANEL.

LEGEND

	DOMESTIC COLD WATER LINE
	VENT LINE
	SEWAGE LINE
	DIRECTION OF FLOW
	GATE VALVE (NORMAL OPEN)
	GATE VALVE (NORMAL CLOSE)
	GLOBE VALVE
	CHECK VALVE (SWING TYPE)
	STRAINER (Y-TYPE)
	B.O.P.

REFERENCE DRAWING	DRG. No.
HVAC & PLUMBING DESIGN CRITERIA	BK-GHNRAL-PEDCO-000-HV-DC-0001
SPECIFICATION FOR HVAC EQUIPMENT	BK-GHNRAL-PEDCO-000-HV-SP-0001
SPECIFICATION FOR DUCT WORK & PIPE WORK	BK-GHNRAL-PEDCO-000-HV-SP-0002
STANDARD DRAWING FOR HVAC & PLUMBING	BK-GHNRAL-PEDCO-000-HV-HW-0001
SYMBOL & LEGEND FOR HVAC & PLUMBING	BK-GHNRAL-PEDCO-000-HV-HW-0002
ARCHITECTURAL DETAIL DRAWING FOR GCS WAREHOUSE	BK-GCS-PEDCO-120-AR-DW-0012
U/G PIPING PLAN	BK-GCS-PEDCO-120-PI-DW-0005
SITE SEWERAGE SYSTEM LAYOUT & DETAILS	BK-GCS-PEDCO-120-CV-PY-0001
UNIT FLOOR PLAN DRAWING	BK-PPL-PEDCO-120-FI-PY-0001

KEY PLAN

