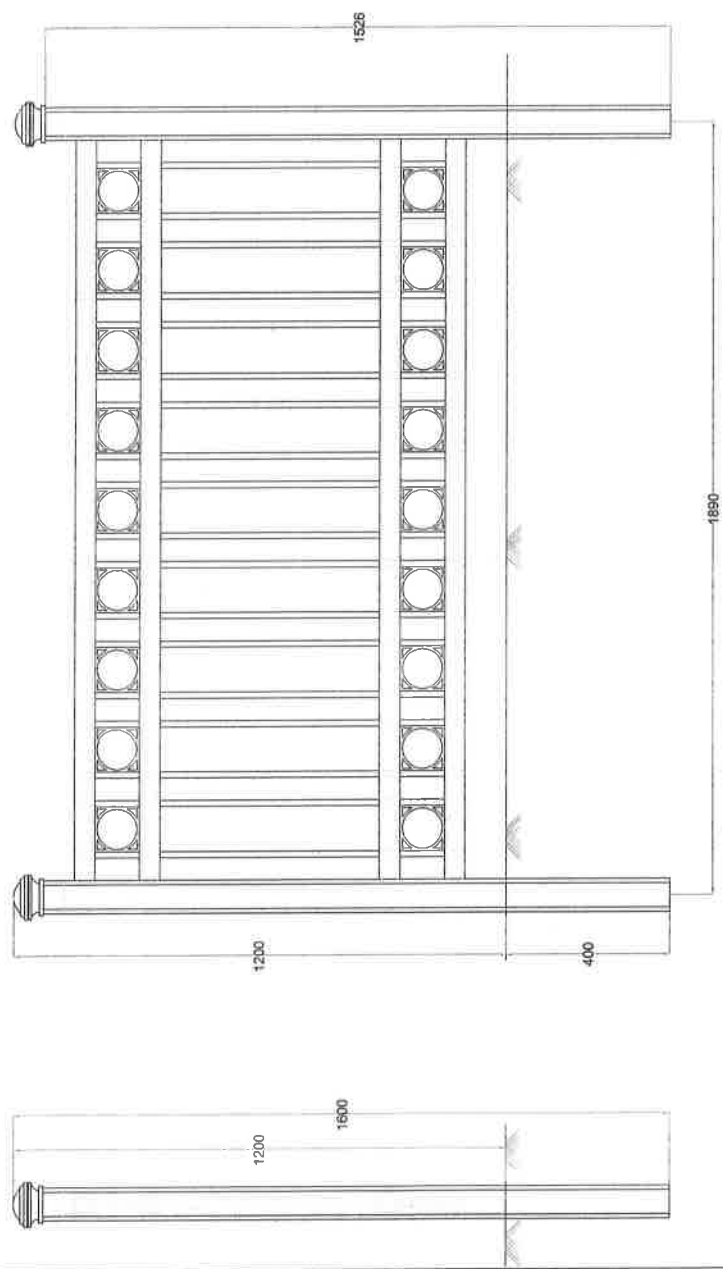
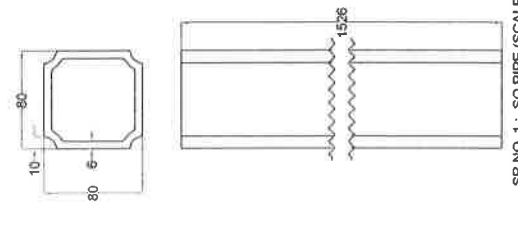


2000
 1890

TOP VIEW

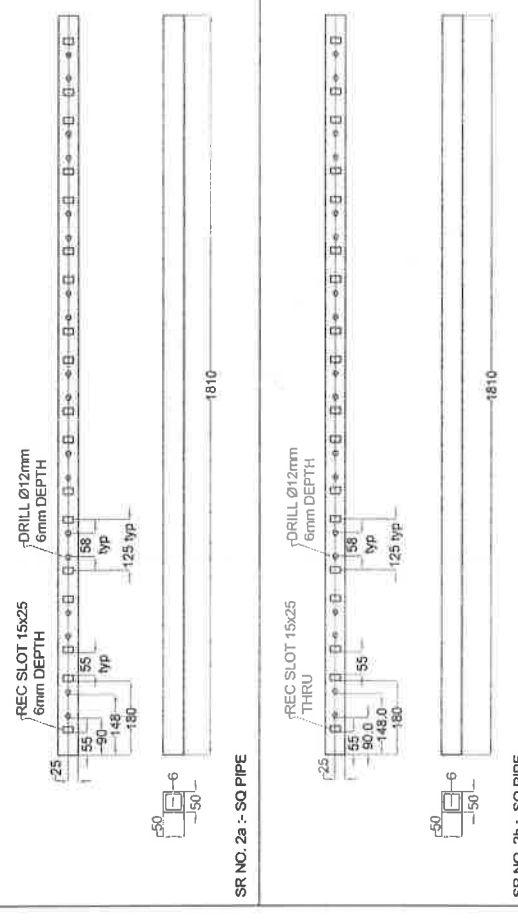


LHS VIEW



SR NO. 1 :- SQ PIPE (SCALE 1:3)

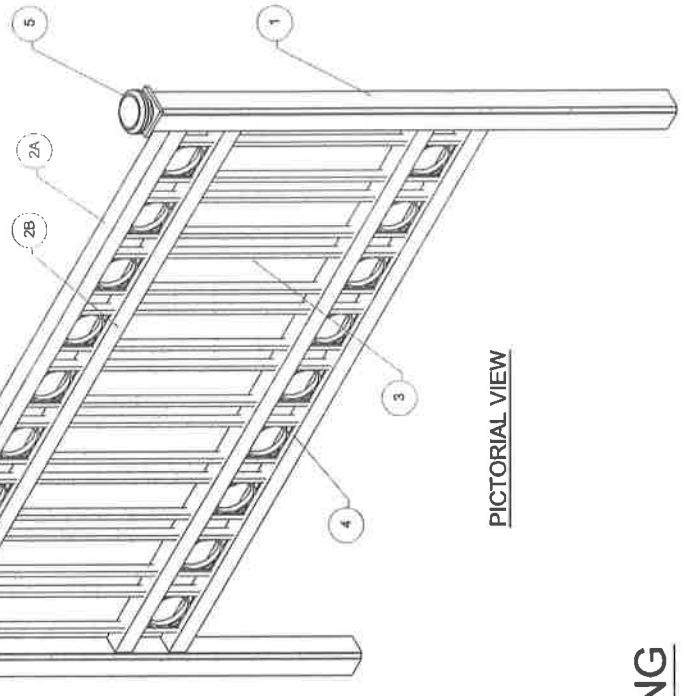
FRONT VIEW



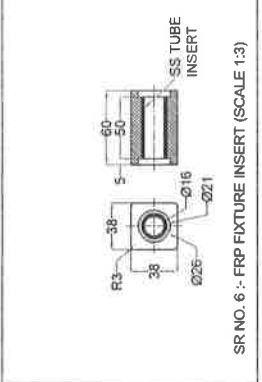
SR NO. 2a :- SQ PIPE

ASSEMBLY DRAWING

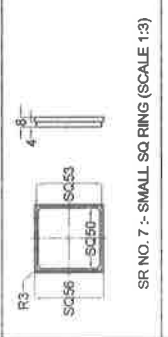
ITEM NO.	PROFILE	LENGTH	QTY.	TOTAL
1	SQ PIPE 80x80x6	1526mm	2 Nos	3.052Mtrs
2	SQ PIPE 50x50x6	1810mm	4 Nos	7.24Mtrs
3	REC ROD 15x25	939mm	18 Nos	16.902Mtr
4	SQ RING 110x6	15mm	18 Nos	0.27Mtrs
5	SPHERE 74 HT	74mm	2 Nos	-
6	FRP FIXTURE	60mm	8 Nos	-
6	SMALL SQ RING	-	8 Nos	-



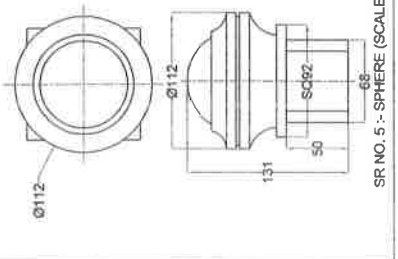
PICTORIAL VIEW



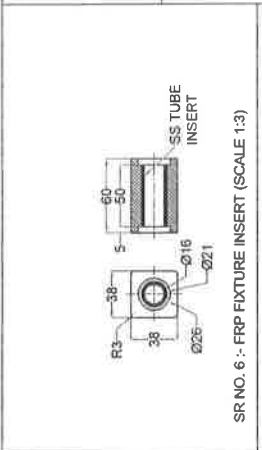
SR NO. 6 - FRP FIXTURE INSERT (SCALE 1:3)



SR NO. 7 - SMALL SQ RING (SCALE 1:3)



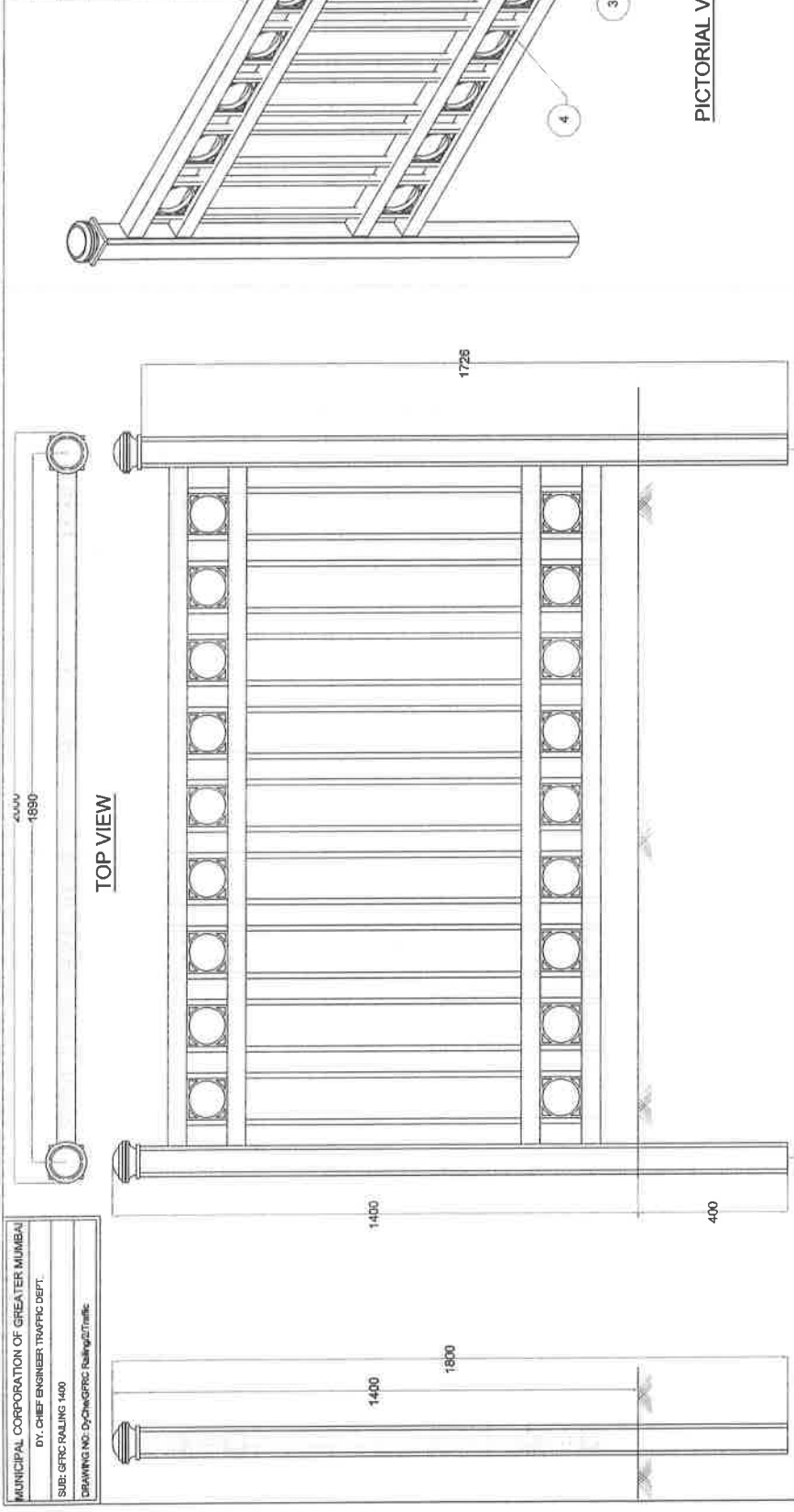
SR NO. 5 - SPHERE (SCALE 1:3)



SR NO. 4 - SQ RING (SCALE 1:3)

MUNICIPAL CORPORATION OF GREATER MUMBAI
 DY. CHIEF ENGINEER TRAFFIC DEPT.
 SUB: GFRIC RAILING 1400
 DRAWING NO: Dy-Chief GFRIC Railing 27/m/c

ITEM NO.	PROFILE	LENGTH	QTY.	TOTAL
1	SQ PIPE 80x60x6	1726mm	2 Nos	3.452Mtrs
2	SQ PIPE 50x50x6	1810mm	4 Nos	7.24Mtrs
3	REC ROD 15x25	1139mm	18 Nos	20.502Mtr
4	SQ RING 110x6	15mm	18 Nos	0.27Mtrs
5	SPHERE 74 HT	74mm	2 Nos	-
6	FRP FIXTURE	60mm	8 Nos	-
6	SMALL SQ RING	-	8 Nos	-



PICTORIAL VIEW

ASSEMBLY DRAWING

SR NO. 1 - SQ PIPE (SCALE 1:3)

SR NO. 2a - SQ PIPE (SCALE 1:3)

SR NO. 2b - SQ PIPE (SCALE 1:3)

SR NO. 3 - SQ PIPE (SCALE 1:3)

SR NO. 4 - SQ RING (SCALE 1:3)

SR NO. 5 - SPHERE (SCALE 1:3)

SR NO. 6 - FRP FIXTURE INSERT (SCALE 1:3)

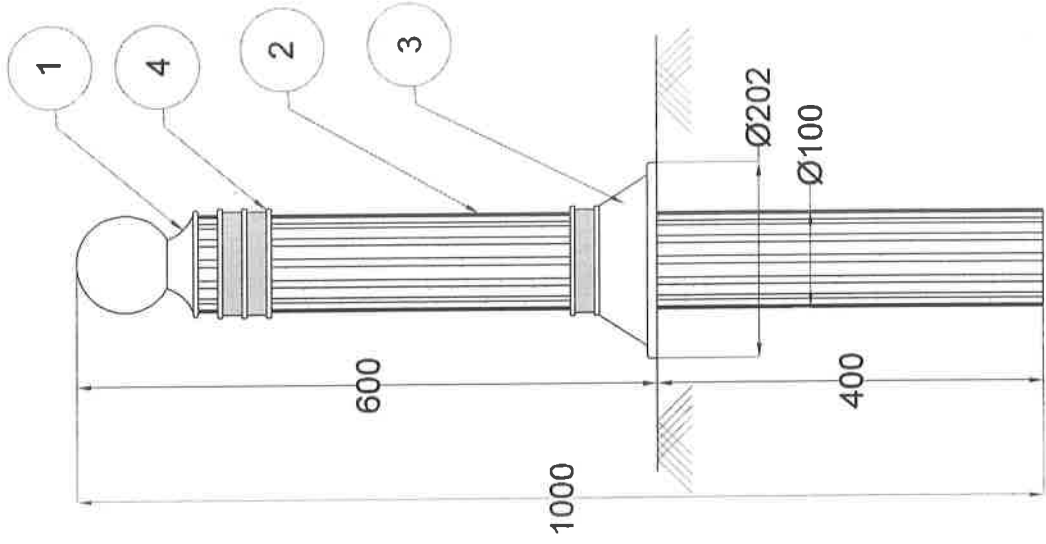
SR NO. 7 - SMALL SQ RING (SCALE 1:3)

MUNICIPAL CORPORATION OF GREATER MUMBAI

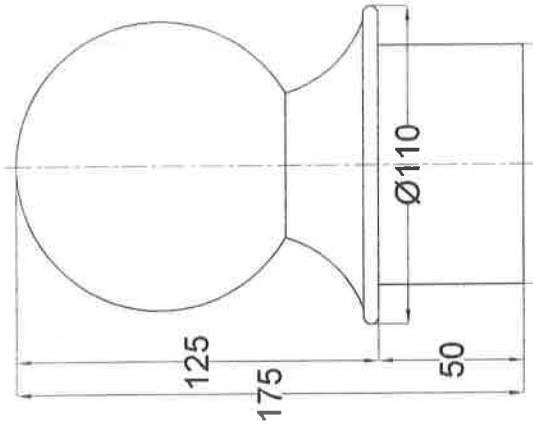
DY. CHIEF ENGINEER TRAFFIC DEPT.

SUB: GFRC BOLLARD 600

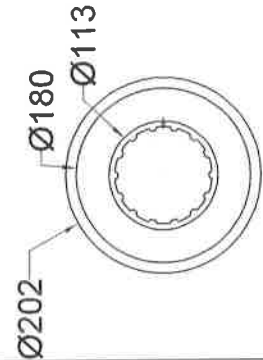
DRAWING NO: DyChe/GFRC Bollard/3/Traffic



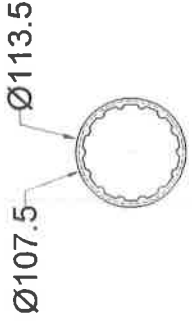
ASSEMBLY DRAWING



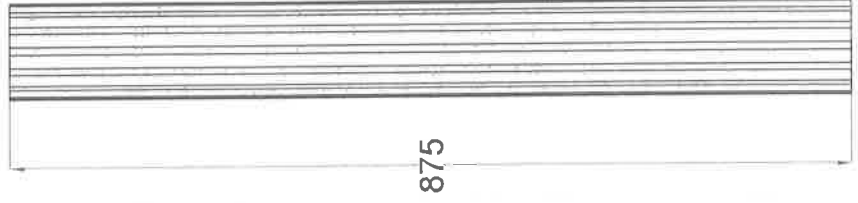
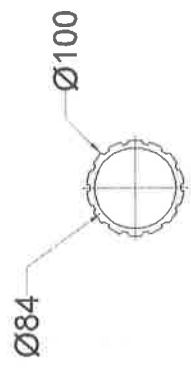
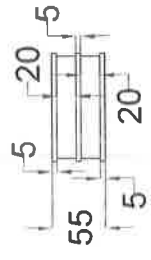
SR NO. 1 :- DOME (SCALE 1:3)



SR NO. 3 :- BASE PLATE

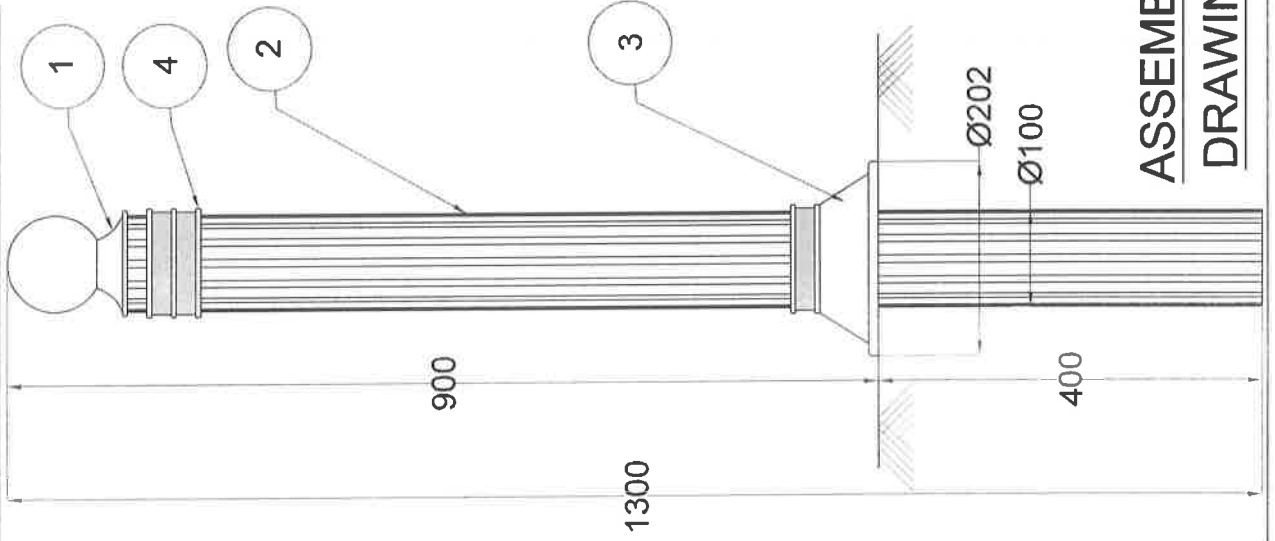


SR NO. 4 :- REFL RING

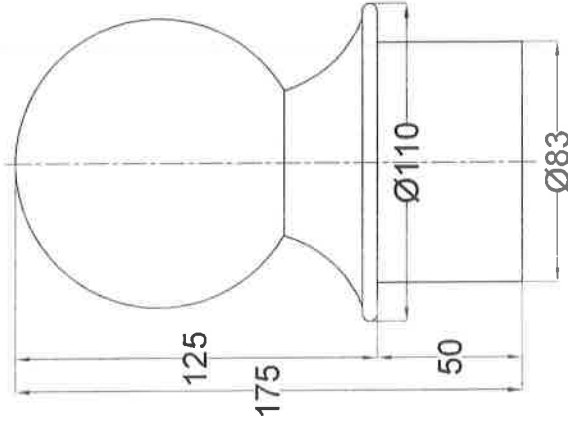


SR NO. 2 :- PROFILE RD PIPE

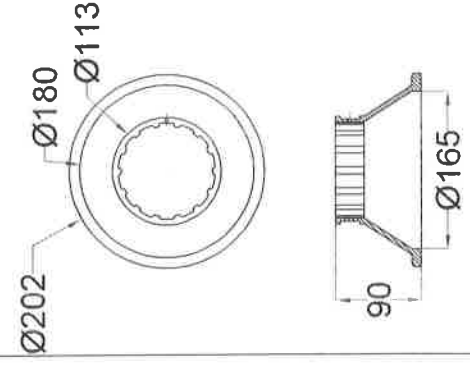
MUNICIPAL CORPORATION OF GREATER MUMBAI
 DY. CHIEF ENGINEER TRAFFIC DEPT.
 SUB: GFRC BOLLARD 900
 DRAWING NO: DyChe/GFRC Bollard/4/Traffic



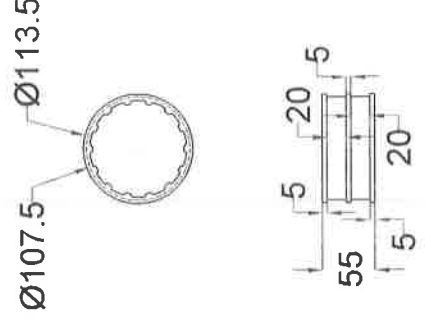
**ASSEMBLY
 DRAWING**



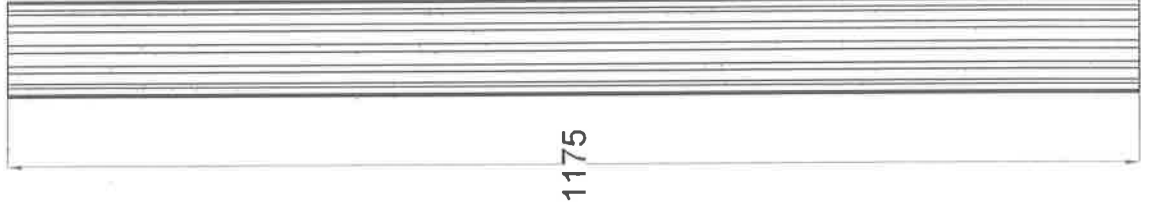
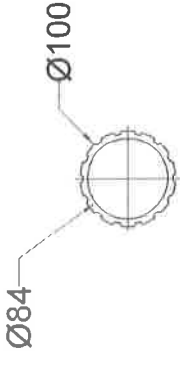
SR NO. 1 :- DOME (SCALE 1:3)



SR NO. 3 :- BASE PLATE



SR NO. 4 :- REFL RING



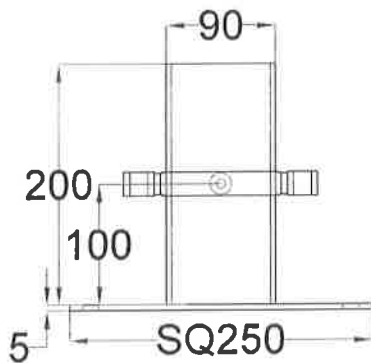
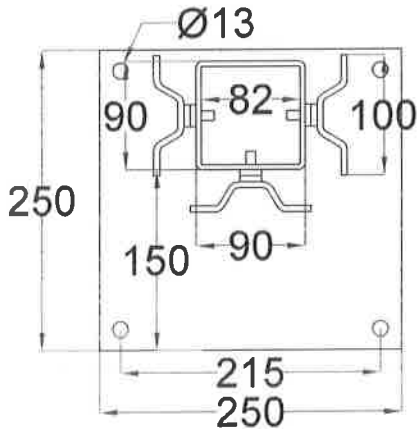
SR NO. 2 :- PROFILE RD PIPE

MUNICIPAL CORPORATION OF GREATER MUMBAI

DY. CHIEF ENGINEER TRAFFIC DEPT.

SUB: FOUNDATION DETAIL RAILING

DRAWING NO: DyChe/Foundation Railing/5/Traffic



1200

GR LVL

CONCRETE

400

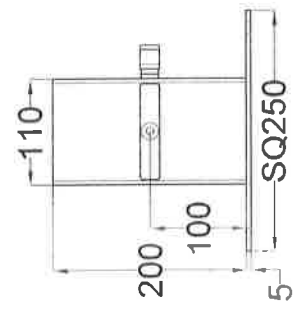
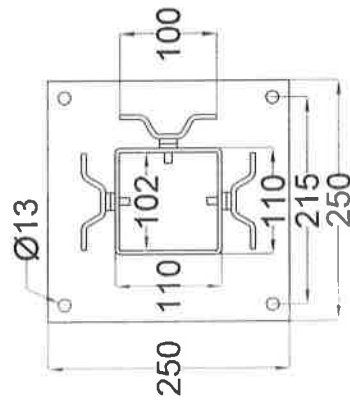
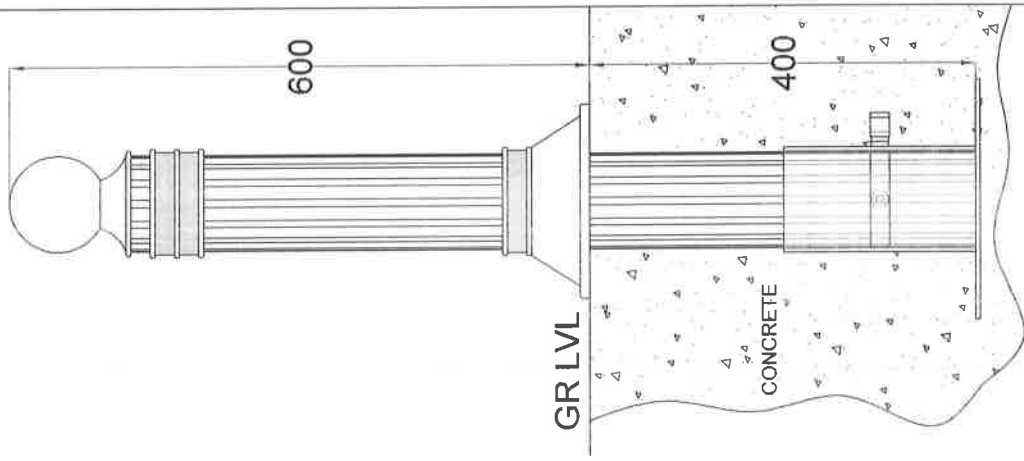
BASE PLATE FOR GROUTING IN CONCRETE

MUNICIPAL CORPORATION OF GREATER MUMBAI

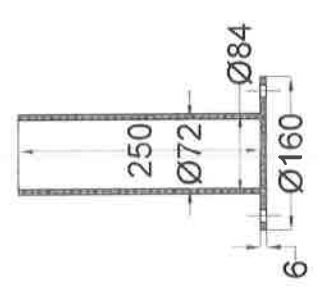
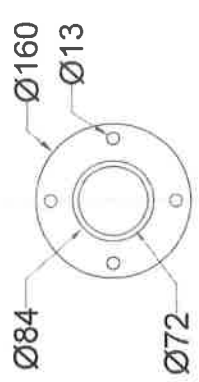
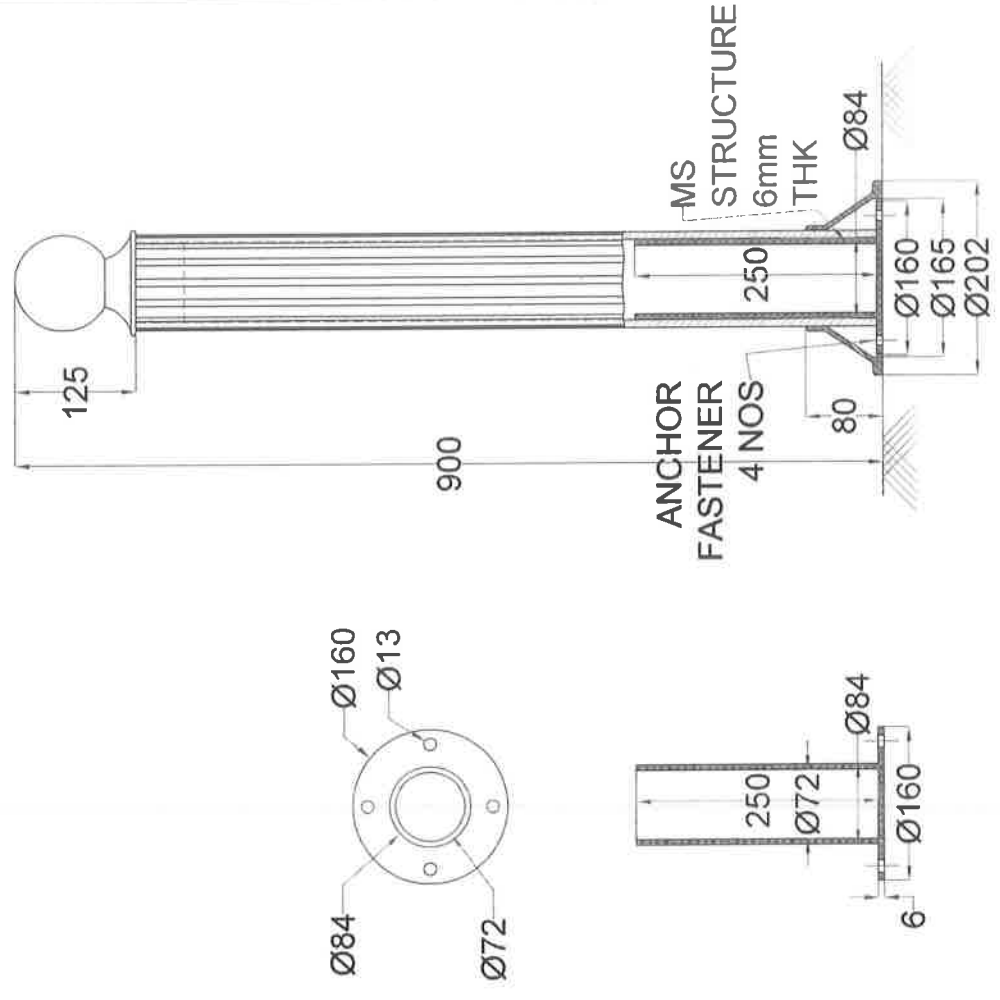
DY. CHIEF ENGINEER TRAFFIC DEPT.

SUB: FOUNDATION DETAIL BOLLARD

DRAWING NO: DyChel/Foundation Bollard/6/Traffic



BASE PLATE FOR GROUTING IN CONCRETE



BASE PLATE FOR FIXING ABOVE CONCRETE

GFRC Footpath Fencing -1200 & Median Fencing – 1400 Specifications as per Drawing No. Dyche/GFRC Railing/1/Traffic, Dyche/GFRC Railing/2/Traffic & Dyche/Foundation Railing/5/Traffic

Material: Glass Fiber Reinforced Composite pultruded profiles.

A).Profiles and component details of fencing:

- 1.80x80x8mm corner inverted profile used for fencing Column.
- 2.50x50x6mm profiles slotted for rod insertion, used as horizontal members.
- 3.25x15mm rods for vertical members.
- 4.SMC/BMC moulded decorative square ring as decorative feature.
- 5.SMC/BMC moulded cap on column as decorative feature.
- 6.SMC/BMC cover ring for 50x50 tube.

1. M.S. Base plate for column fixing with two Coates of red oxide.

All above items should be as per above drawings Nos.

All the GFRC profiles shall be smooth finish and free from cracks, blisters, pinholes or any other surface defects.

All the profiles shall be free from twist or warp in its plane.

All the GRFC profiles shall be cut and machined properly to have perfect matching during fabrication and assembly work.

All above components to be painted with Black colour paint specifications given below.

All the component surface shall be prepared as per guidelines to achieve the bonding strength between substrate and paint.

Paint Specifications: Two component polyurethane paint, half mat semigloss finish.

Third party Test reports:

B).Material properties.

Every lot should be tested for following properties for confirmation.

1.Properties of pultruded profiles

- a. Fiberglass content- 65+/-5% as per annexure -1
- b. Resin system used... Isophthalic grade
- c. Water absorption @27 degree Celsius -0.5% tested as per annexure-2
- d. Tensile strength 4000kg per square centimetre as per IS:1998-62
- e. Cross breaking strength-1000kg per square centimetre as per IS:1998-62

- f. Specific gravity 1.85 gm per cubic centimetre as per ASTM-D-792
- g. Barcol Hardness - 40-50 as per ASTM:2583-67

1. Properties of SMC/BMC moulded components.

- a. Fiberglass content- 25+/-3% as per annexure -1
- b. Resin system used... Isophthalic grade
- c. Water absorption @27 degree Celsius -0.5% tested as per annexure-2
- d. Tensile strength 650kg per square centimetre as per IS:1998-62
- e. Specific gravity 1.8 gm per cubic centimetre as per ASTM-D-792

All the GFRC components of GFRC fencing, shall be tested for their properties mentioned in specifications for every 1000 meters of fencing.

C) Hardware Specifications:

SS304, shaft with rubber ring

SS304 insert moulded SMC socket/ Aluminium block

Socket and spigot joint should be suitable for curvilinear as well as sloping road

D) Installation process

Base plate mounting on 100mm PCC in the pit

Pit dimensions: 400x400x500mm deep

Concrete: M35 grade for embedment of fencing column.

Column embedment-400mm

All the columns and horizontal members should be verified for plumb and alignment during installation

GFRC Bollard -900 / GFRC Bollard -600 Specifications as per Drawing No. Dyche/GFRC Bollard/4/Traffic, Dyche/GFRC Bollard/3/Traffic & Dyche/Foundation Bollard/6/Traffic

Material: Glass Fiber Reinforced Composite pultruded profiles.

A).Profiles and component details of fencing:

1. Dia 100 mm decorative serrated tube, 8 mm thick
 2. SMC/BMC moulded reflector tape ring pasted with 2 Nos. of MICRO PRISMATIC GRADE retro reflective base tape yellow colour confirming to type XI standards of I.R.C. 67 2012 CODE. Size 345.576mm*19mm
 3. SMC/BMC moulded cap on bollard as decorative feature.
 4. SMC/BMC Base cover plate pasted with 1 No. of MICRO PRISMATIC GRADE retro reflective base tape yellow colour confirming to type XI standards of I.R.C. 67 2012 CODE. Size 345.576mm*19mm
 - 5.M.S. Base plate for column fixing with two Coates of red oxide.
- All above items should be as per above drawings Nos.

GFRC profiles shall be smooth finish and free from cracks, blisters, pinholes or any other surface defects.

Bollard profile shall be free from twist or warp in its plane.

All above components to be painted with Black colour paint specifications given below.

All the components surface shall be prepared as per guidelines to achieve the bonding strength between substrate and paint.

Paint Specifications: Two component polyurethane paint, half mat semigloss finish.

Third party Test reports

B).Material properties.

Every lot should be tested for following properties for confirmation.

1. Properties of pultruded profiles
 - a. Fiberglass content- 65+/-5% as per annexure -1
 - b. Resin system used... Isophthalic grade
 - c. Water absorption @27 degree Celsius -0.5% tested as per annexure-2
 - d. Tensile strength 4000kg per square centimetre as per IS:1998-62
 - e. Cross breaking strength-1000kg per square centimetre as per IS:1998-62
 - f. Specific gravity 1.85 gm per cubic centimetre as per ASTM-D-792
 - g. Barcol Hardness - 40-50 as per ASTM:2583-67

1. Properties of SMC/BMC moulded components.

- a. Fiberglass content- 25+/-3% as per annexure -1
- b. Resin system used... Isophthalic grade
- c. Water absorption @27 degree Celsius -0.5% tested as per annexure-2
- d. Tensile strength 650kg per square centimetre as per IS: 1998-62
- e. Specific gravity 1.8 gm per cubic centimetre as per ASTM-D-792

All the GFRC components of GFRC bollard, shall be tested for the properties mentioned in specifications for every 500 Nos.

C) Hardware Specifications:

SS304 screws

D) Installation process

Base plate mounting on 100mm PCC in the pit

Pit dimensions: 400x400x500mm deep

Concrete: M35 grade for embedment of fencing column.

Column-embedment-400mm

All the columns and horizontal members should be verified for plumb during installation.

ANNEXURE -1

Test piece shall be cut to size 50 x 50 mm from the product. The exposed edges of the test pieces shall be coated with resin/lacquer to prevent inter-laminar attack by water. The test piece is dried at 50 + 3 deg. C for 24 hours in an air oven, then allowed to cool in a desiccators. Then weighed accurately (W1). Then the test piece is immersed in distilled water for 24 hours at 27 + 2 Deg. C. The test piece is taken out, and the water is wiped out with a piece of dry cloth and then weighed accurately. (W2).

$$\text{The \% of water absorption} = \frac{(W2-W1) \times 100}{W1}$$

ANNEXURE -2

GLASS FIBRE CONTENT:

This method is not suitable for determining the fiber glass content if the filler is not removable by washing with Hydrochloric acid. In such a situation FRP manufacturer shall indicate the test method.

At least two specimens cut from two different sections shall be selected for checking fibre glass content.

Specimens of size 50 x 50 mm / 10 gms of the moulding cut from the corners of the product tested for fibre glass content.

A silica dish of appropriate dimensions shall be heated in a muffle furnace at 575 + 25 Deg. C for 15 minutes, cooled in a desiccator and weighed (W1). The test specimen shall then be placed in the dish and the whole unit heated at 105 Deg. C for 2 hours cooled in a desiccator and weighed (W2).

The sample with dish shall then be heated in a ventilated muffle furnace at a temperature of 575 + 25 Deg. C for 30 minutes, cooled in a desiccator and weighed (W3). This process is repeated until difference in weight in successive weighing is less than 0.01 gm.

The contents in the dish shall be treated with concentrated HCL and the acid shall be removed by washing. The contents remaining in the dish shall then be dried at 105 Deg. C for 2 hours and weighed (W4). This process shall be repeated until the difference in weigh is less than 0.01 gm. The contents shall be examined to find whether filler particles still remain within the contents. If filler particles are not present, the fibre content shall be calculated as follows:

$$\text{Fibre content (\%)} = 100 \times \frac{(W4 - W1)}{(W2 - W1)}$$