

COLUMN RETROFIT

E-GLASS FRP SYSTEM		
ROUND COLUMN, NUMBER OF LAYERS (Min)		
COLUMN DIAMETER	N1	N2
12"	4	2
24"	7	4
36"	11	6
48"	14	7
60"	17	9
72" Max	21	11

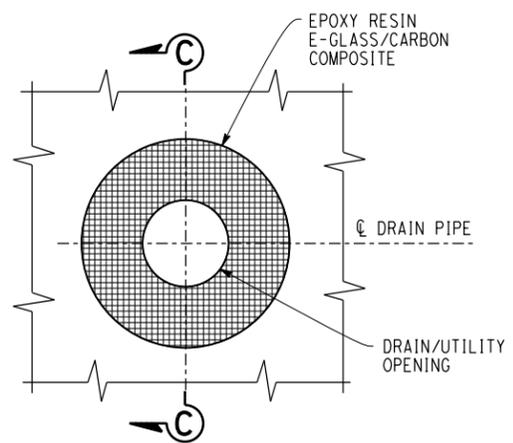
CARBON FRP SYSTEM		
ROUND COLUMN, NUMBER OF LAYERS (Min)		
COLUMN DIAMETER	N1	N2
12"	3	3
24"	6	3
36"	8	4
48"	11	6
60"	14	7
72" Max	16	8

E-GLASS FRP SYSTEM		
RECTANGULAR COLUMN, NUMBER OF LAYERS (Min)		
COLUMN WIDTH	N1	N2
12"	6	3
18"	8	4
24"	11	6
30"	13	7
36" Max	16	8

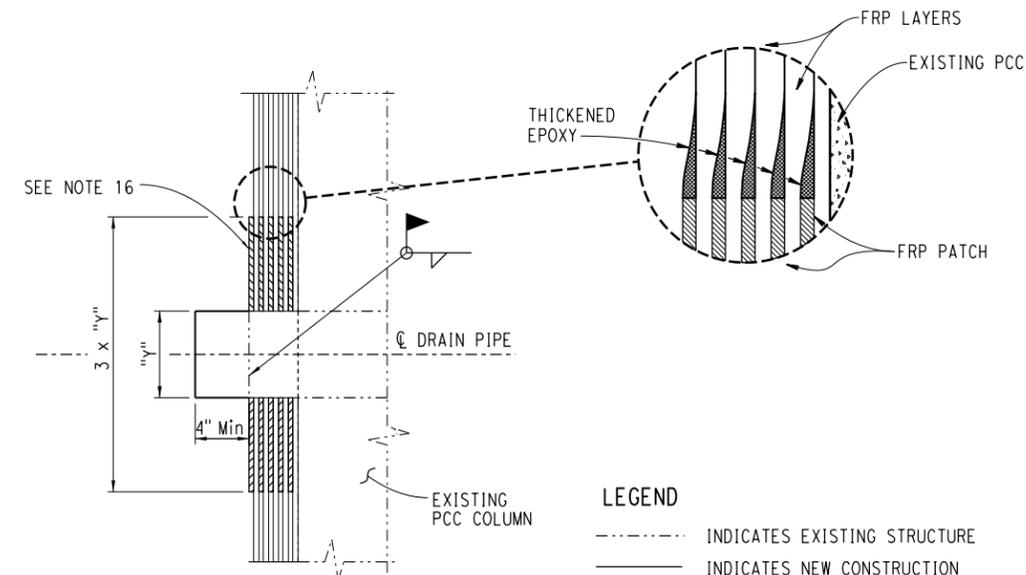
CARBON FRP SYSTEM		
RECTANGULAR COLUMN, NUMBER OF LAYERS (Min)		
COLUMN WIDTH	N1	N2
12"	4	3
18"	6	3
24"	8	4
30"	10	5
36" Max	12	6

E-GLASS/CARBON NOTES:

- For all subsequent notes, surfaces shall be defined as the surface to receive the composite. Fabric refers to the unidirectional or bi-directional fiber. Fiber Reinforced Polymer (FRP) composite is either E-Glass or Carbon fiber and Epoxy resin
- All surfaces shall be prepared for bonding by means of abrasive blasting or grinding
- All surfaces shall be cleaned by hand or by oil-free compressed air. All surfaces shall be free of moisture, oils, loose material, debris, or dust
- All cutting of fabrics, mixing of epoxy, and wetting out of fabric and handling, shall be done in a manner to ensure that the composite materials are free of moisture, oils, debris or dust
- For non-circular columns remove any sharp corners/edges to a 1 1/2" radius minimum
- A primer coat of epoxy shall be applied to the surface and allowed to cure for a minimum of one hour
- Surfaces shall be free of voids, protrusions, and sharp edges. Any voids or uneven surfaces shall be filled with a thickened epoxy
- E-Glass or Carbon composite system used shall be selected from a list of Caltrans Prequalified composite systems
- Fabric shall be completely saturated prior to application to the surface. No dry fiber placement is allowed, unless fabric used has removable backing or procedure has been approved by prequalification
- The composite casing shall adhere firmly to the existing column surface
- Detail/feather all fabric edges, including termination points, edges and seams with a thickened epoxy. Detailing/feathering shall extend a minimum of 6"
- Each composite section shall be wrapped using continuous fabric not less than 2'-0" in height. All wraps of continuous weave shall be terminated a minimum of 12" past the starting point of the initial wrap. Subsequent wraps shall be started (butted) at the ending point of the last wrap
- The casing thickness shall taper evenly over the full length of the transition zone
- For non-circular columns use number of layers specified in the "RECTANGULAR COLUMN" table
- Existing non-circular column surfaces shall be straight or slightly convex outward at all areas, otherwise, the surface shall be filled with thickened epoxy
- Drainage opening reinforcement shall be the same fiber and resin material used for the column casing. Alternate continuous layer with local bi-axial weave patch at drainage opening
- Minimum number of layers for Carbon System is based on minimum effective fiber layer thickness of 0.0065 inches. Fewer number of layers can be installed for effectively thicker (fiber) layers provided that an equivalent stiffness is maintained



E-GLASS/CARBON OPENING



SECTION C-C

LEGEND

--- INDICATES EXISTING STRUCTURE

— INDICATES NEW CONSTRUCTION

N1,N2 DENOTES MINIMUM NUMBER OF LAYERS INSIDE THE PLASTIC HINGE ZONE AND OUTSIDE THE PLASTIC HINGE ZONE

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

NO SCALE