



1 RAIN FALL CALCUAIONS  
1/8" = 1'-0"

ROOF DRAINAGE AREAS						
	ROOF/ZONE	ROOF SQUARE FOOTAGE	PARAPET SQUARE FOOTAGE	*ZONE 6 TOTAL AREA	TOTAL SQUARE FOOTAGE	ALLOWABLE AREA BASED ON 6" PLAIN RECTANGULAR DOWNSPOUT
LOW ROOF	ZONE 1	1,355 SQ.FT.	312 SQ.FT.	-	1,667 SQ.FT.	3,120 SQ.FT.
	ZONE 2	1,440 SQ.FT.	381 SQ.FT.	-	1,821 SQ.FT.	3,120 SQ.FT.
HIGH ROOF	ZONE 3	2,274 SQ.FT.	243 SQ.FT.	-	2,517 SQ.FT.	3,120 SQ.FT.
	ZONE 4	1,630 SQ.FT.	184 SQ.FT.	-	1,814 SQ.FT.	3,120 SQ.FT.
	ZONE 5	1,659 SQ.FT.	276 SQ.FT.	448	2,383 SQ.FT.	3,120 SQ.FT.
	*ZONE 6	339 SQ.FT.	109 SQ.FT.	-	448 SQ.FT.	3,120 SQ.FT.
						ALLOWABLE AREA BASED ON 3" Ø PLAIN ROUND DOWNSPOUT
SLOPED ROOF	ZONE 7	280 SQ.FT.	60 SQ.FT.	-	340 SQ.FT.	919 SQ.FT.
	ZONE 8	239 SQ.FT.	56 SQ.FT.	-	295 SQ.FT.	919 SQ.FT.

\*NOTE:  
WATER FROM ZONE 6 WILL DRAIN TO ZONE 5 THROUGH  
PRIMARY AND SECONDARY SCUPPERS THROUGH PARAPET

LEGEND:

SLOPED ROOF AREA

PARAPET AREA

FLAT ROOF AREAS

ZONE BOUNDARY

GUTTER WITH DOWNSPOUTS

4"X 6" RECTANGULAR PRIMARY DRAIN WITH SECONDARY SCUPPERS TYP.

DOWNSPOUT CALCULATIONS

HIGH FLAT ROOF

- CALCULATIONS ARE BASED ON SMACNA MANUAL 5TH EDITION AND DESIGNED FOR 100 YEAR FLOOD (PG 1.1-1.5)
- THE PLAN AREA OF THIS ROOF IS 5,902 SQ. FT.
- CNNA WILL CONSIDER A 1.5 SAFETY FACTOR MAKING NEW DESIGN AREA 8,853 SQ. FT. (5,902 SQ.FT. X 1.5)
- SINCE THE PITCH OF THE ROOF IS LEVEL TO 3 INCH PER FOOT, A FACTOR OF 1 IS USED (TABLE 1-1), MAKING THE DESIGN AREA 8,853 SQ.FT.
- THUS EACH OF THE 3 DOWNSPOUTS WILL SERVE AN AVERAGE AREA OF 2,951 SQ. FT. (2,951 DIVIDE BY 3)
- FROM COLUMN B TABLE 1-2, SOUTH CAROLINA CHARLESTON, IT IS FOUND THAT 1 SQ. IN. OF DOWNSPOUT WILL DRAIN TO 130 SQ. FT. OF ROOF AREA (FOR 100 YEAR FLOOD)
- DIVIDE 2,951 BY 130 TO DETERMINE THAT EACH DOWNSPOUT SHOULD HAVE A MINIMUM AREA OF 22.7 SQ. IN. PER SQ. FT.
- FROM TABLE 1-3 IT IS FOUND THAT THERE IS A CHOICE OF 6" PLAIN RECTANGULAR DOWNSPOUT.
- ALLOWABLE AREA FOR 4"x6" PLAIN RECTANGULAR D.S. (24 SQ. IN. X AREA 130 SQ. FT. PER SQ. IN. = 3,120 SQ. FT.)
- THEREFORE CNNA RECOMMENDS A 4" X 6" PLAIN RECTANGULAR DOWNSPOUT AT EACH LOCATION

LOW FLAT ROOF

- CALCULATIONS ARE BASED ON SMACNA MANUAL 5TH EDITION AND DESIGNED FOR 100 YEAR FLOOD (PG 1.1-1.5)
- THE PLAN AREA OF THIS ROOF IS 2,795 SQ. FT.
- CNNA WILL CONSIDER A 1.5 SAFETY FACTOR MAKING NEW DESIGN AREA 4,192.5 SQ.FT. (2,795 SQ.FT. X 1.5)
- SINCE THE PITCH OF THE ROOF IS LEVEL TO 3 INCH PER FOOT, A FACTOR OF 1 IS USED (TABLE 1-1) MAKING THE DESIGN AREA 4,192.5 SQ. FT.
- THUS EACH OF THE 2 DOWNSPOUTS WILL SERVE AN AVERAGE AREA OF 2,096.25 SQ. FT. (4,192.5 DIVIDE BY 2)
- FROM COLUMN B TABLE 1-2, SOUTH CAROLINA CHARLESTON, IT IS FOUND THAT 1 SQ. IN. OF DOWNSPOUT WILL DRAIN TO 130 SQ. FT. OF ROOF AREA (FOR 100 YEAR FLOOD)
- DIVIDE 2,096.25 BY 130 TO DETERMINE THAT EACH DOWNSPOUT SHOULD HAVE A MINIMUM AREA OF 16.125 SQ. IN. PER SQ. FT.
- FROM TABLE 1-3 IT IS FOUND THAT THERE IS A CHOICE OF 5" PLAIN RECTANGULAR DOWNSPOUT
- THEREFORE CNNA RECOMMENDS A 4" X 6" PLAIN RECTANGULAR DOWNSPOUT AT EACH LOCATION AS INDICATED TO BE CONSISTENT WITH OTHER RECTANGULAR DOWNSPOUTS

SLOPED ROOF

- CALCULATIONS ARE BASED ON SMACNA MANUAL 5TH EDITION AND DESIGNED FOR 100 YEAR FLOOD (PG 1.1-1.5)
- THE PLAN AREA OF THIS ROOF IS 519 SQ. FT.
- CNNA WILL CONSIDER A 1.5 SAFETY FACTOR MAKING NEW DESIGN AREA 778.5 SQ. FT. (519 SQ. FT. X 1.5)
- SINCE THE PITCH OF THE ROOF IS 3:12, A FACTOR OF 1 IS USED (TABLE 1-1) MAKING DESIGN AREA 778.5 SQ. FT.
- THUS EACH OF THE 2 DOWNSPOUTS WILL SERVE AN AVERAGE AREA OF 389.25 SQ. FT. (778.5 DIVIDE BY 2)
- FROM COLUMN B TABLE 1-2, SOUTH CAROLINA CHARLESTON, IT IS FOUND THAT 1 SQ. IN. OF DOWNSPOUT WILL DRAIN TO 130 SQ. FT. OF ROOF AREA (FOR 100 YEAR FLOOD)
- DIVIDE 389.25 BY 130 TO DETERMINE THAT EACH DOWNSPOUT SHOULD HAVE A MINIMUM AREA OF 2.99 SQ. IN. PER SQ. FT.
- FROM TABLE 1-3 IT IS FOUND THAT THERE IS A CHOICE OF 3" Ø PLAIN ROUND DOWNSPOUT
- ALLOWABLE AREA FOR 3" Ø PLAIN ROUND DOWNSPOUT (7.07 SQ. IN.X AREA 130 SQ. FT. PER SQ. IN. = 919.1)
- THEREFORE CNNA RECOMMENDS A 3" Ø PLAIN ROUND DOWNSPOUT AT EACH LOCATION AS INDICATED

GUTTER CALCULATIONS SLOPED ROOF

- CALCULATIONS ARE BASED ON SMACNA MANUAL 5TH EDITION AND DESIGNED FOR 100 YEAR FLOOD (PG 1.1-1.6)
- FOLLOWING FACTORS ARE CONSIDERED:
  - 1. AREA TO BE DRAINED. (A, CHART 1-1)
    - AVG. AREA TO BE DRAINED PER D.S. = SQ.FT.
    - IA (RAINFALL INTENSITY X AREA)  
9.4 X 389.25 = 3,658.95
  - 2. RAINFALL INTENSITY PER HOUR. (I, CHART 1-1)
    - TABLE 1-2 COL. B = 10.9 IN/HR
  - 3. LENGTH OF GUTTER IN FT. (L, CHART 1-1)
    - 34'-8 7/8" (LENGTH OF BUILDING) / 2 D.S. = 17'-4 1/2"
  - 4. RATIO OF DEPTH TO WIDTH OF GUTTER. (M, CHART 1-1)
    - M = 0.75
- BASED ON THE FACTORS ABOVE & CHART 1-1 GUTTER DIMENSIONS ARE:
  - M= D/W 0.75 = D/4" 0.75X4" = 3.75"
  - W (WIDTH) = 4 IN.
  - D (DEPTH) = 3.75 IN.

NEW RETAIL BUILDING  
KITTIES CROSSING  
21 BLUFFTON ROAD  
BLUFFTON, SC, 29910  
CNNA ARCHITECTS, INC.

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RAIN FALL  
CALCULATIONS

Sheet No.