

STRUCTURAL DESIGN CRITERIA

ALL DESIGNS SHALL CONFORM TO THE PROVISIONS OF THE INTERNATIONAL BUILDING CODE, 2012 EDITION.

1.0 DESIGN LOADS

1.1 DEAD LOADS

1.1.1 ROOF DEAD LOADS

	MAXIMUM GRAVITY LOADS	MINIMUM GRAVITY LOADS
ROOFING MATERIAL	7 PSF	6 PSF
ROOF DECK	3 PSF	3 PSF
TRUSSES	7 PSF	4 PSF
INSULATION	3 PSF	2 PSF
CEILING	2 PSF	2 PSF
MISCELLANEOUS (MECH., ELEC.)	8 PSF	
	30 PSF	17 PSF

1.2 LIVE LOADS (PER IBC 2012 EDITION)

1.2.1 ROOF LIVE LOADS	20 PSF
1.2.2 FIRST FLOOR LIVE LOADS	
MECHANICAL / ELECTRICAL	150 PSF
ALL OTHER AREAS	100 PSF

1.3 SNOW LOAD (PER IBC 2012 EDITION)

1.3.1 DESIGN PARAMETERS

FLAT ROOF SNOW LOAD = 10 PSF
SNOW LOAD IMPORTANCE FACTOR, I = 1.10
SNOW EXPOSURE FACTOR = 1.0

1.4 WIND LOAD (PER IBC 2012 EDITION, ASCE 7-10)

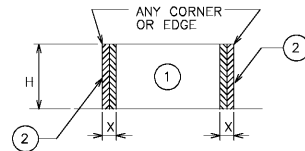
1.4.1 BASIC WIND SPEED $V_{ULT} = 133$ MPH (3 SECOND GUST)
EXPOSURE C; RISK CATEGORY III

1.4.2 DESIGN WIND PRESSURE - MAIN WIND FORCE RESISTING SYSTEM

LOCATION	HORIZONTAL PRESSURES				VERTICAL PRESSURES				X (FT)
	WALL		ROOF		WINDWARD		LEEWARD		
	END ZONE	INTERIOR ZONE	END ZONE	INTERIOR ZONE	END ZONE	INTERIOR ZONE	END ZONE	INTERIOR ZONE	
ALL AREAS, UNO	37.3 PSF	24.8 PSF	-20.0 PSF	-11.5 PSF	-44.8 PSF	-31.2 PSF	-25.5 PSF	-19.7 PSF	16

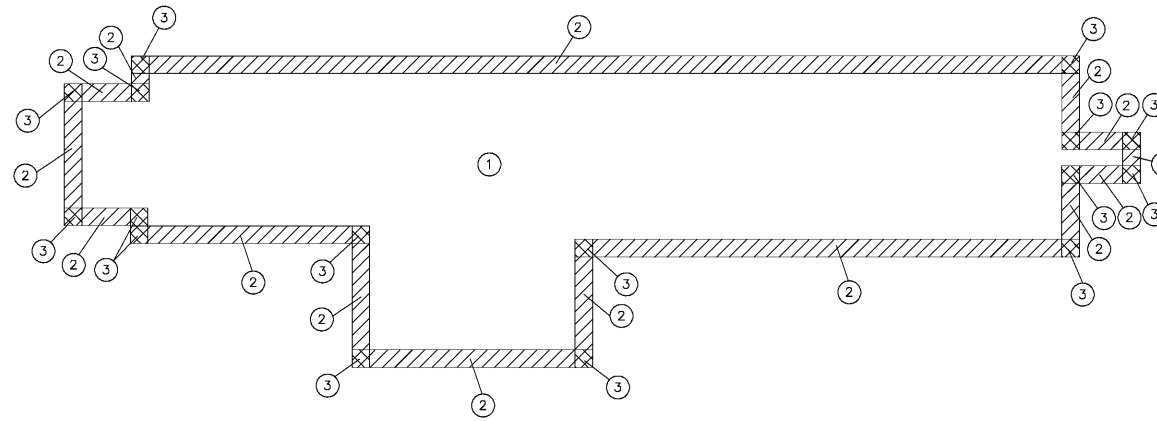
1.4.3 DESIGN WIND PRESSURE - WALL COMPONENTS & CLADDING

EXTERIOR WALL SYSTEMS & THEIR ATTACHMENTS TO THE PRIMARY STRUCTURE SHALL BE DESIGNED FOR THE PRESSURES SHOWN IN THE DIAGRAM BELOW:



PRESSURE ON EXTERIOR WALL SYSTEMS FOR BUILDINGS WITH MEAN ROOF HEIGHT (H) = AS SHOWN

LOCATION	H	WINDWARD PRESSURE psf (INWARD)		LEEWARD PRESSURE psf (OUTWARD)		X (FT)
		①	②	①	②	
		10ft ²	0-20'	42.3	42.3	
20ft ²	0-20'	40.4	40.4	-44.0	-53.0	8.0
50ft ²	0-20'	37.9	37.9	-41.5	-50.0	8.0
100ft ²	0-20'	36.1	36.1	-39.6	-44.0	8.0
500ft ²	0-20'	31.6	31.6	-35.2	-35.2	8.0



1.4.4 DESIGN WIND PRESSURE - ROOF UPLIFT
JOISTS, LIGHT GAGE TRUSSES, ROOF DECK & FASTENERS SHALL BE DESIGNED FOR THE WIND PRESSURES SHOWN BELOW

TRIBUTARY AREA	UPLIFT PRESSURE psf			X (FT)
	ZONE ①	ZONE ②	ZONE ③	
	T (PSF)	T (PSF)	T (PSF)	
10ft ²	17.3 -42.3	17.3 -71.0	17.3 -107.0	8.0
20ft ²	16.2 -41.2	16.2 -63.5	16.2 -88.6	8.0
50ft ²	14.8 -39.8	14.8 -53.5	14.8 -64.4	8.0
100ft ²	13.7 -38.7	13.7 -46.0	13.7 -46.0	8.0

* = TYPICAL ROOF AREA EXCLUDING OVERHANG
*+ = PRESSURES ACTING TOWARD SURFACES
** = PRESSURES ACTING AWAY FROM SURFACES

1.5 SEISMIC LOAD (PER IBC 2012, ASCE 7-10)

1.5.1 RISK CATEGORY:	III (TABLE 1604.5)
1.5.2 SEISMIC IMPORTANCE FACTOR:	$I_e = 1.25$
1.5.3 SPECTRAL ACCELERATION COEFFICIENTS:	$S_s = 0.403$ $S_1 = 0.142$
1.5.4 SPECTRAL RESPONSE COEFFICIENTS:	$S_DS = 0.397$ $S_{D1} = 0.211$
1.5.5 SOIL SITE CLASSIFICATION:	D
1.5.6 BASIC SYSTEM - FORCE RESISTING SYSTEM:	BUILDING FRAME SYSTEM SPECIAL REINFORCED MASONRY SHEAR WALLS
1.5.7 DESIGN BASE SHEAR ANALYSIS PROCEDURE:	$V = 154K$ EQUVALENT LATERAL FORCE PROCEDURE, TABLE 1616.6.3
1.5.8 SEISMIC DESIGN CATEGORY:	D
1.5.9 SEISMIC RESPONSE COEFFICIENT:	$C_s = 0.099$
1.5.10 RESPONSE MODIFICATION COEFFICIENT:	$R = 5.5$

2.0 FOUNDATION DESIGN CRITERIA

- 2.1 MINIMUM FOOTING BEARING DEPTH BELOW GRADE IS 18 INCHES.
- 2.2 MINIMUM FACTOR OF SAFETY FOR STABILITY AGAINST SLIDING, OVERTURNING AND UPLIFT FOR INDIVIDUAL COMPONENTS IS 1.5
- 2.3 ALLOWABLE SOIL BEARING CAPACITY = 2000 PSF
- 2.4 MODULUS OF SUBGRADE $K = 175$ PSI/IN

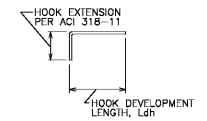
CONCRETE MATERIALS SCHEDULE		
STRUCTURAL ELEMENT	f'_c CONCRETE COMPRESSIVE STRENGTH @ 28 DAYS (PSI)	REMARKS
ALL FOOTINGS U.N.O.	3500	
SLAB-ON-GRADE	3500	
ALL OTHER CONCRETE	3500	

NOTES:
1. ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE, (150 PCF) (U.N.O.)

STEEL MATERIALS SCHEDULE		
STRUCTURAL ELEMENT	FY YIELD STRENGTH (KSI)	REMARKS
BEAMS & GIRDERS	50	ASTM A572
COLUMNS	50	ASTM A572
CONNECTIONS, PLATES, & ALL OTHERS	36	ASTM A36
ANCHOR BOLTS	36	ASTM A36 ASTM A307
TUBING	46	ASTM A500 GRADE B

CONCRETE COVER SCHEDULE		
MINIMUM CONCRETE COVER PROTECTION FOR REINFORCEMENT BARS SHALL BE AS FOLLOWS (SEE ACI 318-11 SECTION 7.7 FOR CONDITIONS NOT NOTED). DIMENSIONS FOR BAR PLACEMENT GIVEN IN SECTIONS AND DETAILS SHALL SUPERSEDE MINIMUM COVER REQUIREMENTS GIVEN HERE.		
FOOTINGS (EARTH FORMED)	3 INCHES	
COLUMNS / PIERS	1 1/2 INCHES	
GRADE BEAMS OR SLAB TURNED DOWN EDGES:	1 1/2 INCHES	
TOP SIDES (EARTH FORMED)	1 INCHES	
BOTTOM SIDES (EARTH FORMED)	1 INCHES	
SIDES (BOARD FORMED)	#5 BAR & SMALLER 1 1/2 INCHES #6 THRU #11 BAR 2 INCHES	
SLABS-ON-GRADE (NO EXPOSURE TO WEATHER)	1 1/2 INCHES	
SLABS-ON-GRADE (EXPOSURE TO WEATHER)	2 INCHES	
RETAINING WALLS (NO EXPOSURE TO WEATHER)	1 1/2 INCHES	
EARTH SIDE (NO EXPOSURE TO WEATHER)	1 1/2 INCHES	
EARTH SIDE (EXPOSURE TO WEATHER)	2 INCHES	
#5 BAR & SMALLER	1 1/2 INCHES	
#6 THRU #11 BAR	2 INCHES	
PROVIDE STANDARD BAR CHAINS AND SPACERS AS REQUIRED TO MAINTAIN PROTECTION SPECIFIED		

BAR SIZE	STANDARD HOOKS PER ACI 318-11	
	f'_c 4000 PSI	f'_c 3000 PSI
#3	7	9
#4	10	11
#5	12	14
#6	15	17
#7	17	19
#8	19	22
#9	22	25
#10	24	28
#11	27	31



MINIMUM LAP SPICES OF REINFORCING BARS IN TENSION (PER ACI 318-11)					
BAR SIZE	CENTER TO CENTER BAR SPACING	TOP BARS		OTHER BARS	
		LESS THAN 4db	4db OR MORE	LESS THAN 4db	4db OR MORE
#3	21	21	16	16	1 1/2 "
#4	30	28	23	22	2"
#5	46	35	36	27	2 1/2 "
#6	66	43	51	33	3"
#7	89	50	69	39	3 1/2 "
#8	117	66	90	51	4"
#9	148	83	114	64	4 1/2 "
#10	188	106	145	81	5"
#11	231	130	178	100	5 5/8 "

- NOTES:
1. YIELD STRENGTH OF REINFORCEMENT, f_y , IS 60 KSI (LAP SPICE LENGTH IS IN INCHES).
2. CONCRETE IS NORMAL WEIGHT (150 PCF).
3. TOP BAR INDICATES HORIZONTAL REINFORCEMENT WHICH IS PLACED ABOVE 12" OR MORE OF FRESH CONCRETE.
4. UNLESS NOTED OTHERWISE COLUMNS & PIERS UTILIZE TENSION LAP SPICES.
5. STRAIGHT DEVELOPMENT LENGTH OF AN UNLAPPED BAR IS EQUAL TO VALUE FROM TABLE DIVIDED BY 1.3.
6. CATEGORY FOR BARS SPACED LESS THAN 4d, ON CENTER CORRESPONDS TO CATEGORY 1 IN THE CRSI HANDBOOK WHEREAS FOR BARS SPACED 4d OR MORE ON CENTER CORRESPOND TO CATEGORY 5.

BROWNSTONE
1310 LADY STREET - SUITE 204 - COLUMBIA, SOUTH CAROLINA, 29201

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SOUTH CAROLINA
NO. 16718
EXPIRES 12/31/2015

Client
ALLENDALE - FAIRFAX COUNTY SCHOOL DISTRICT

Project
ALLENDALE PRIMARY SCHOOL

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No.	Item	Date

Key Plan

Sheet Title
BASIS OF DESIGN

MMSA
Michael M. Simpson & Associates, Inc.
Consulting Structural Engineers
30 Palmetto Drive, Suite 100
Greenville, S.C. 29615
(864) 331-1201

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