

A Beginner's Guide to Structural Engineering

DORMITORY BUILDING

General Notes:

- I. Design criteria
- A. Design and construction shall be in conformance with the International Building Code (IBC) latest edition, and these plans and specifications. Where explicit details are not shown or described the minimum requirements of the above code shall apply. Contact the structural engineer if interpretation of structural documents is necessary.
- B. Gravity live loads:
1. Construction 20 psf
 2. Hotel/Multi Fam Private Rms & Corridors ... 40 psf
 3. Hotel/Multi Fam Public Rms & Corridors 100 psf
- C. Gravity dead loads:
1. Roof 50 psf of roof area
 2. Floor @ Construction 60 psf of floor area
 2. Floor in Use 60 psf of floor area
 3. Exterior Walls 50 psf of wall area
 4. Interior Walls 12 psf of wall area
 - Or Interior Walls 20 psf of floor area
- D. Snow Load
1. Ground Snow Load 60 psf
 2. Exposure Type C
- E. Seismic force:
1. Occupancy Category III
 2. Framing system:
N/S = Special steel conc. braced frame (R = 5)
E/W = Special steel moment frame (R = 8)
 3. Spectral Response Factors: $S_1 = 0.665$, $S_s = 1.783$
 4. Site Class D
- F. Wind:
1. 3 sec gust velocity 120 mph
 2. Exposure type C
- II. Structural Steel
- A. All member and connection design is to be in accordance with latest version of the American Institute of Steel Construction (AISC) Specification for Structural Steel Buildings and the AISC Specification for Structural Joints using ASTM A325 or A490 bolts as found in the AISC Steel Construction Manual (SCM).
- B. All steel is the preferred type for each shape as indicated in the Steel Construction Manual unless otherwise noted or specified in problem statements.
- C. All bolts are 3/4" dia. A325-N unless otherwise noted or specified in problem statements.
- E. All welds to be performed by welders currently certified according to AWS D1.1 using qualified welding procedures. Unless otherwise state in a problem statement, use weld electrodes having an ultimate strength $F_u = 70$ ksi.

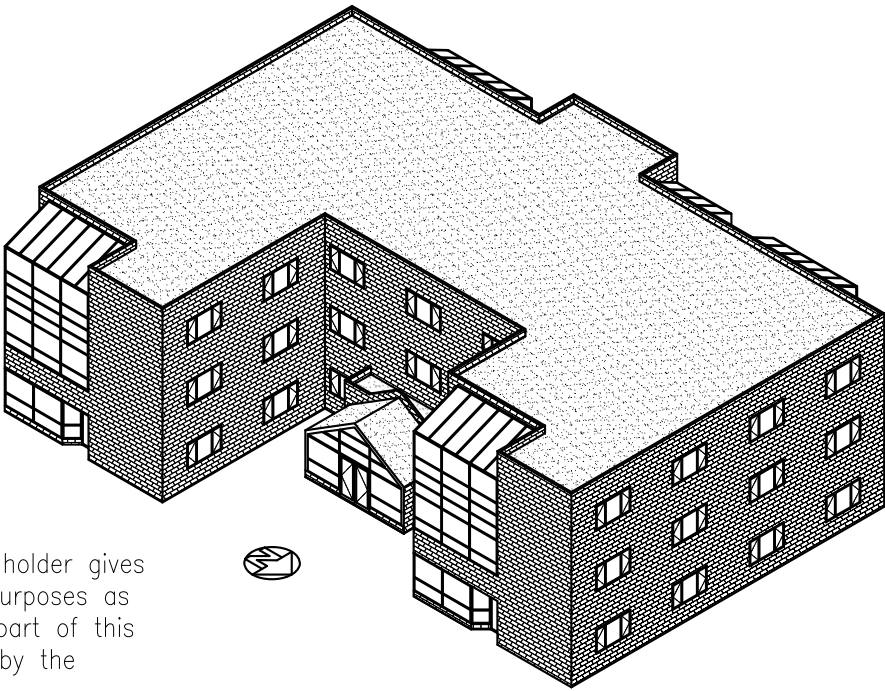
- III. Structural Concrete
- A. Materials and design shall comply with the standards specified in the latest edition of ACI 318, "Building Code Requirements for Reinforced Concrete".
- B. 28 Day compressive strengths, f'_c , per ASTM C94 shall be as follows:
- a. Footings 3,000 psi
 - b. Slabs 4,000 psi
- C. Reinforcement steel
- a. Deformed Bars: ASTM A615, grade 60
 - b. Weldable Deformed Bars: ASTM A706, grade 60
- D. Maximum size of aggregate shall not be more than 3/4 of the clear distance between reinforcing bars or between bars and forming surfaces.
- IV. Miscellaneous:
- A. The drawings presented here are schematic in nature. Actual member and bolt types and sizes and connection configurations are subject to change during problem completion.
- B. These drawings are intended for use in teaching structural engineering and are not intended for actual construction.

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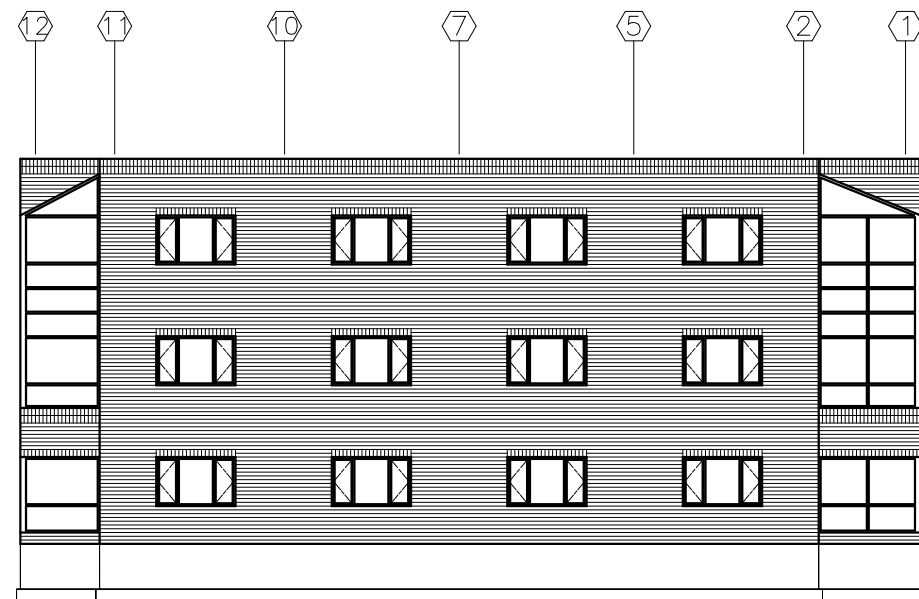
- A1 Architectural Elevations
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A3 2nd & 3rd Floor Plans
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0. 8/23/07	COVER SHEET	Date: _____
1. 11/30/07		
By: TBQ	Checked:	Scale: -----
	Date: 2007	Date: _____

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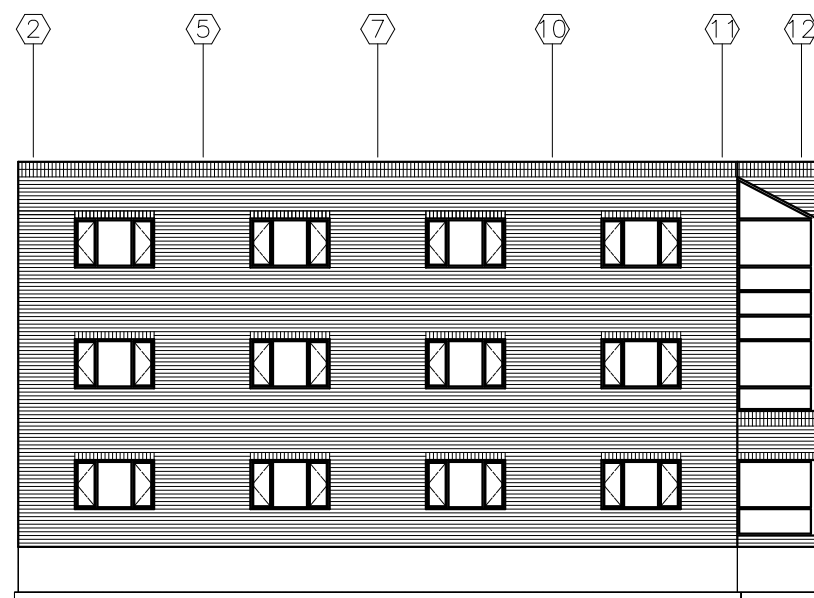
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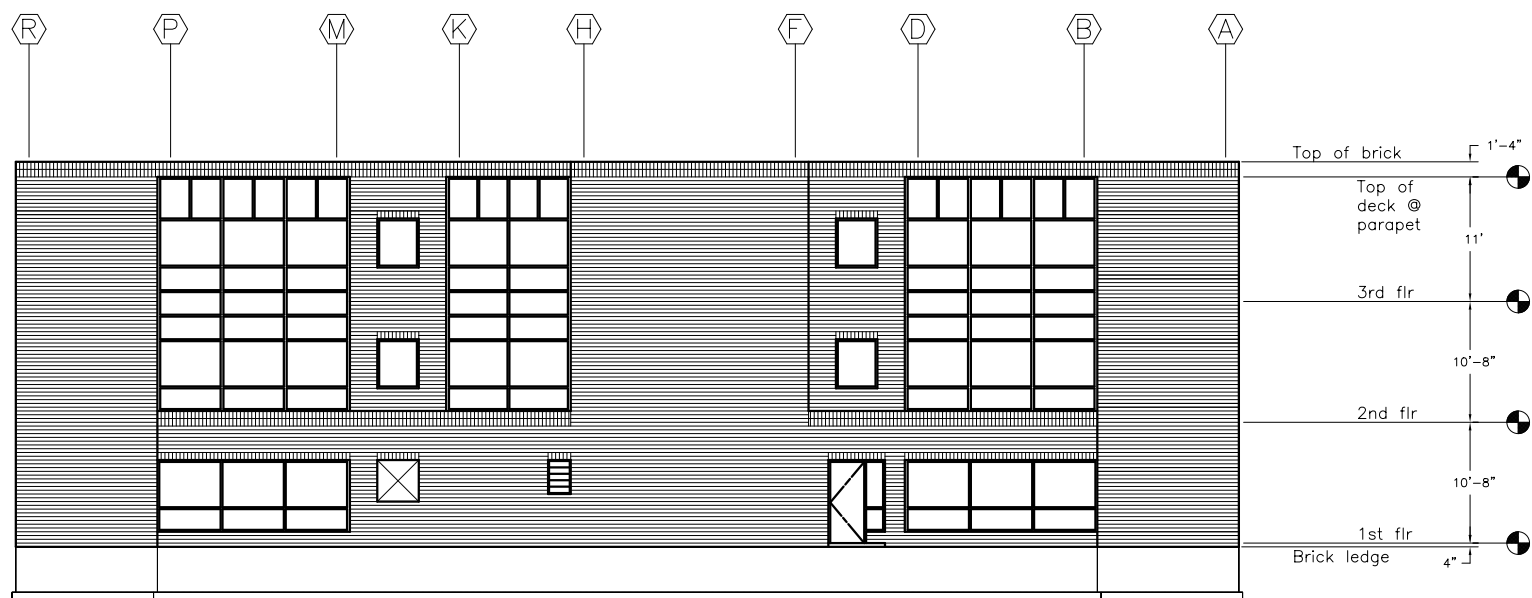
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BGSE: Dorm



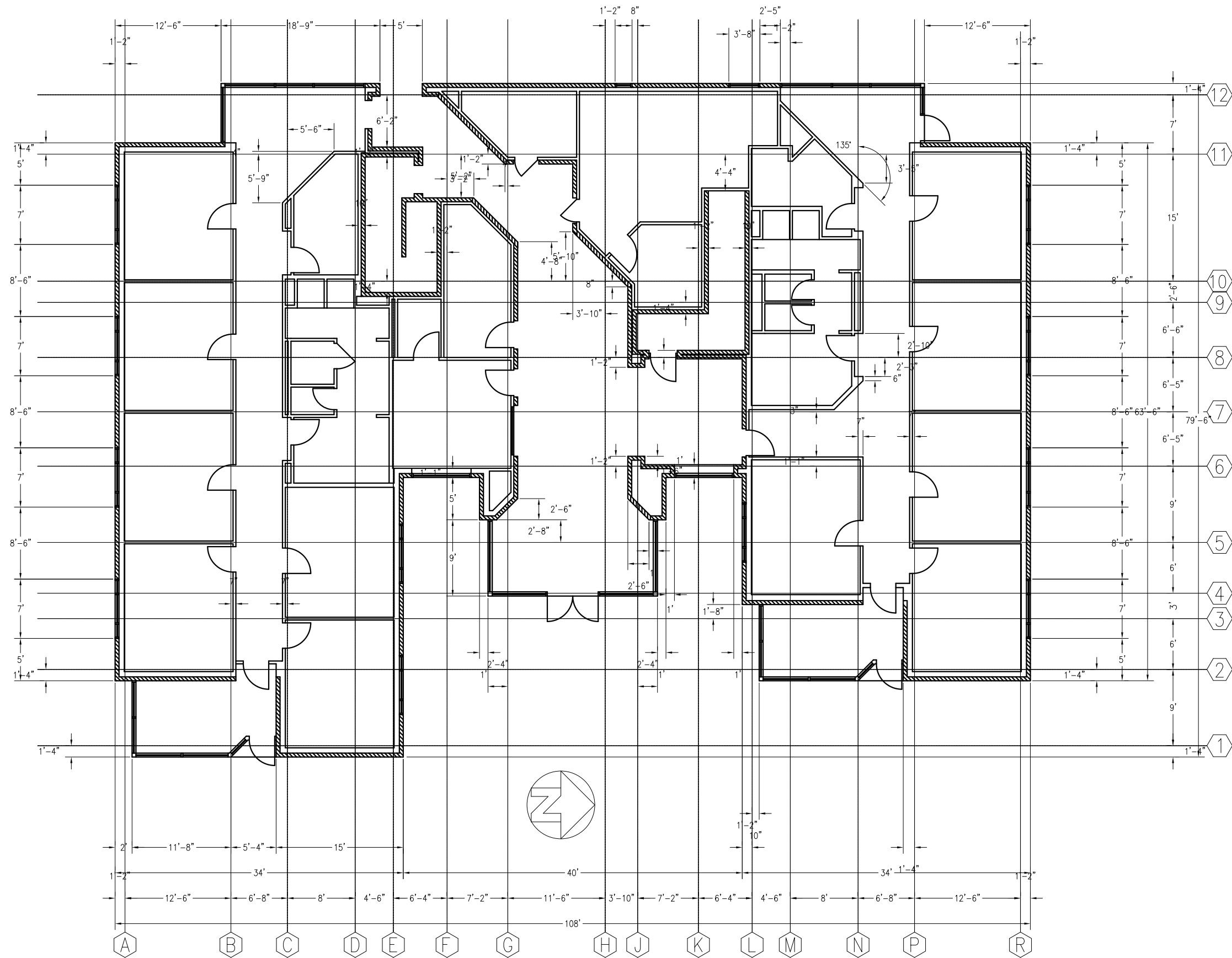
2 WEST ELEVATION
BGSE: Dorm



3 SOUTH ELEVATION
BGSE: Dorm



4 EAST ELEVATION
BGSE: Dorm



1 FIRST FLOOR PLAN
BGSE: Dorm

SCALE: 1:150

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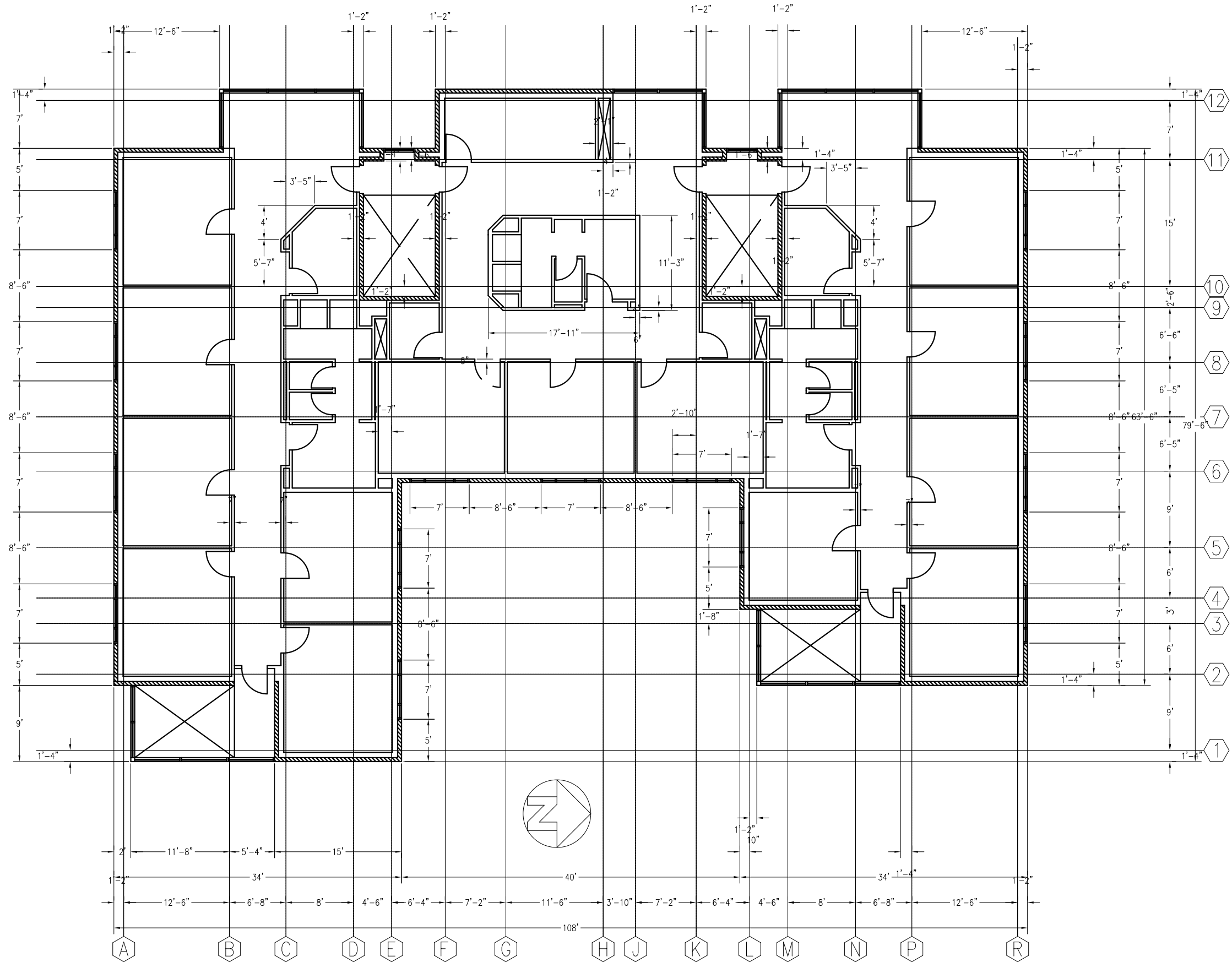
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FIRST FLOOR PLAN

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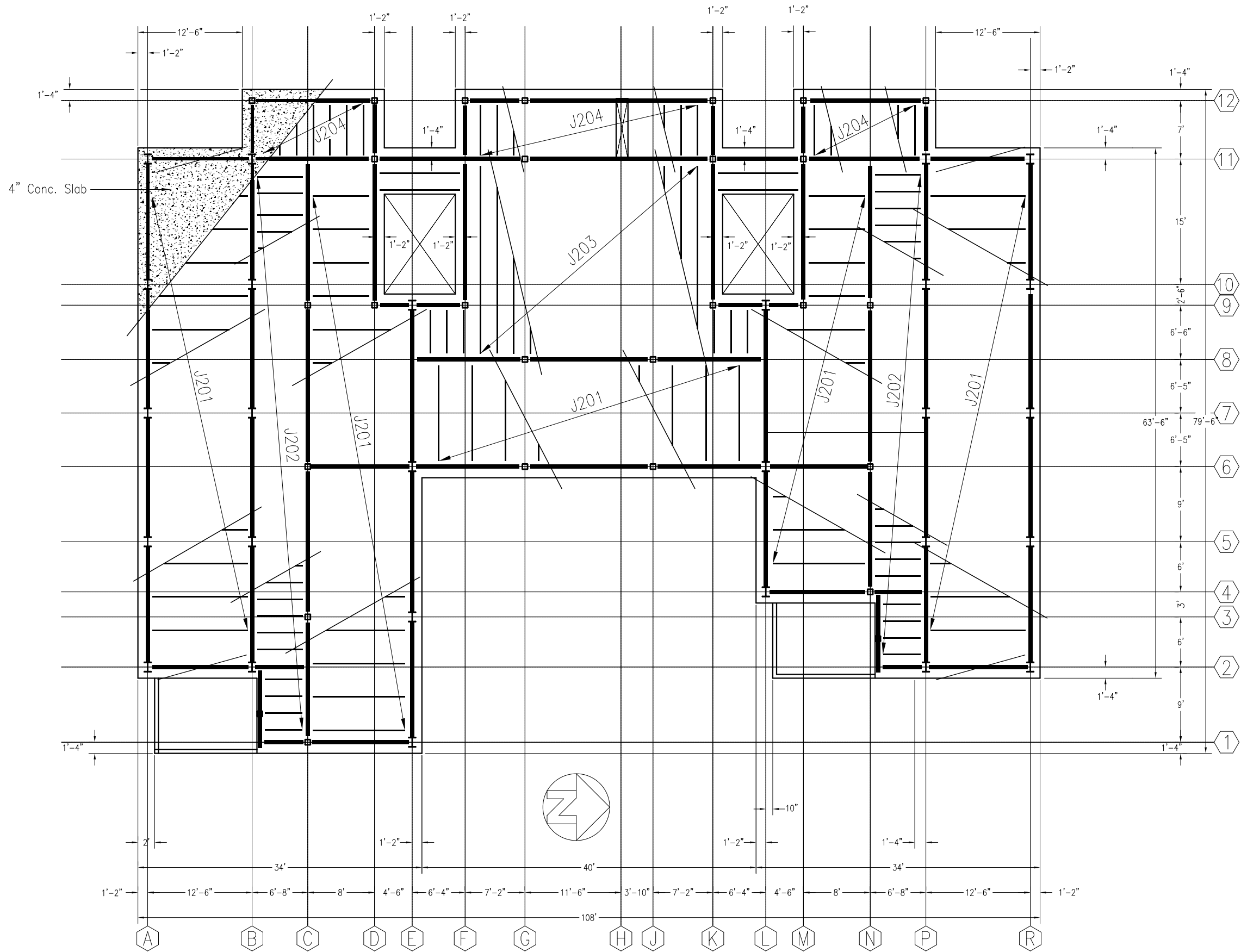
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1 2ND & 3RD FLOOR PLAN
BGSE: Dorm

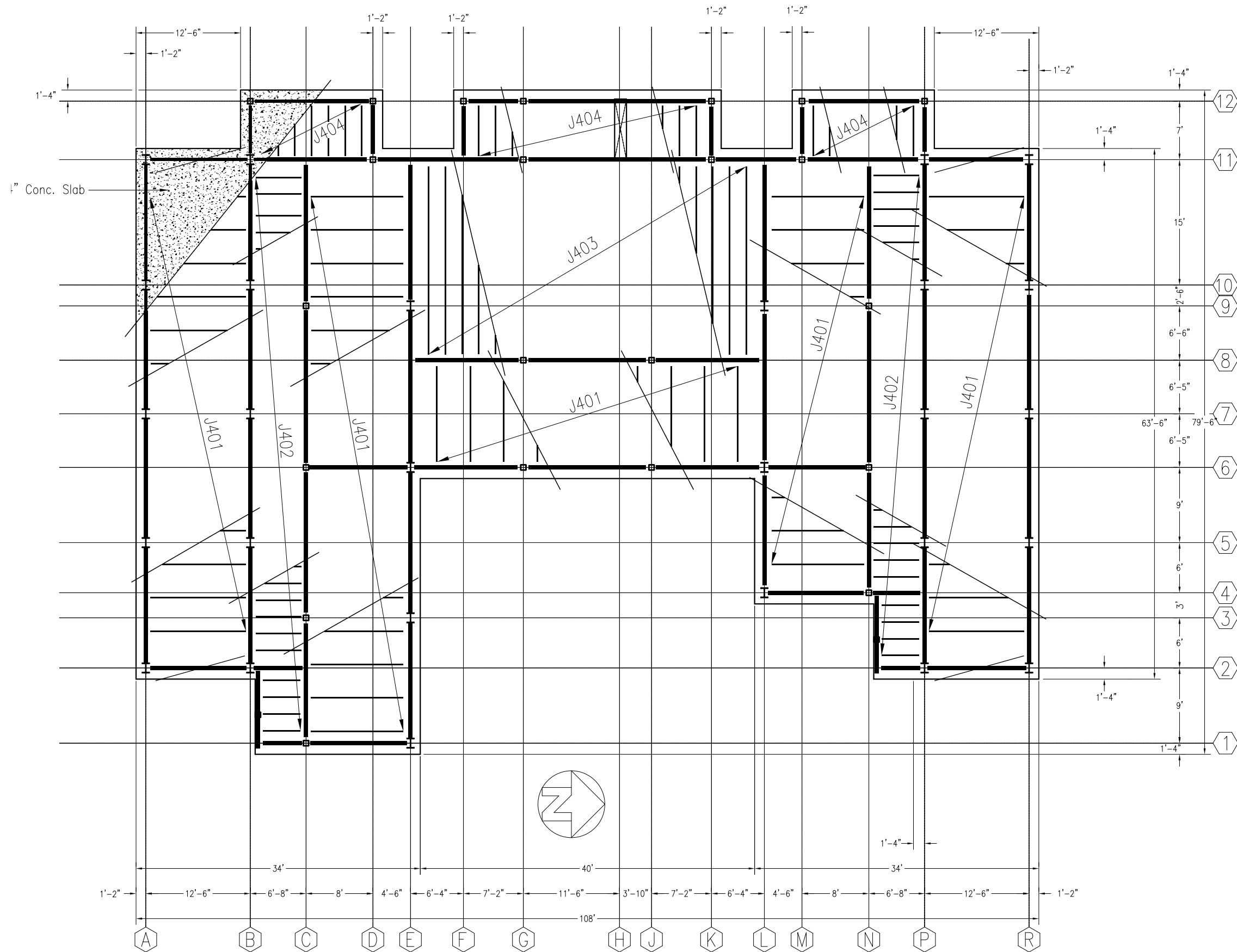
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2nd & 3rd FLOOR PLAN	
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1 2nd & 3rd Floor Framing Plan
BGSE: Dorm
SCALE: 1:150

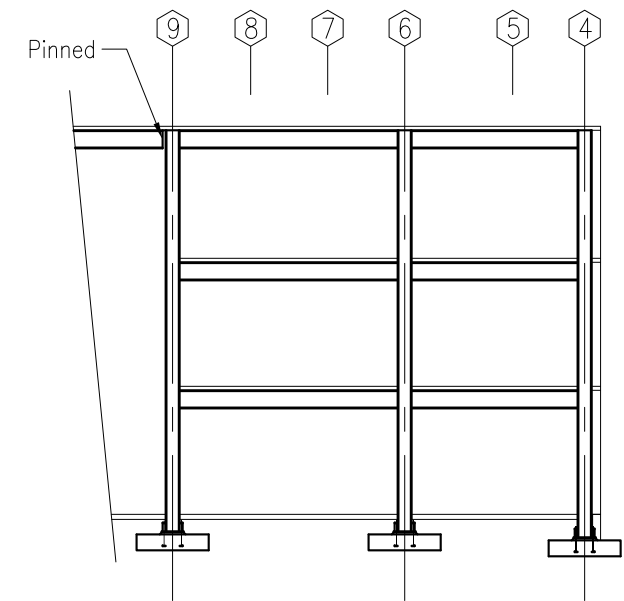
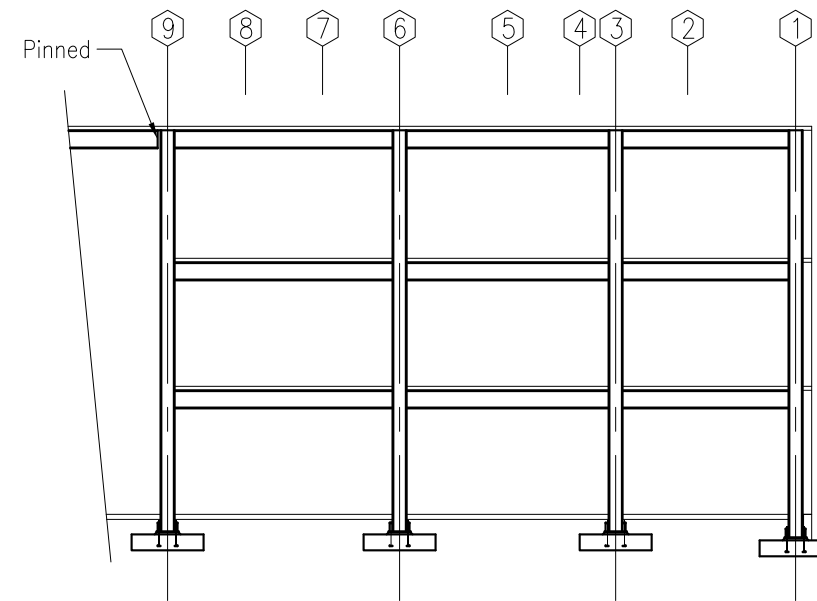
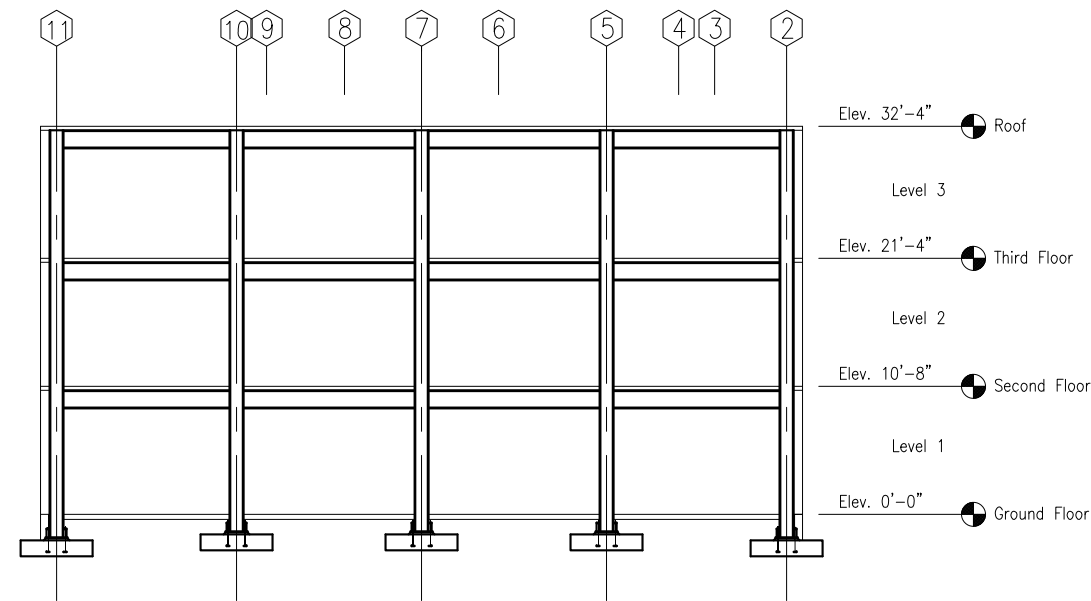
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1 Roof Framing Plan
BGSE: Dorm

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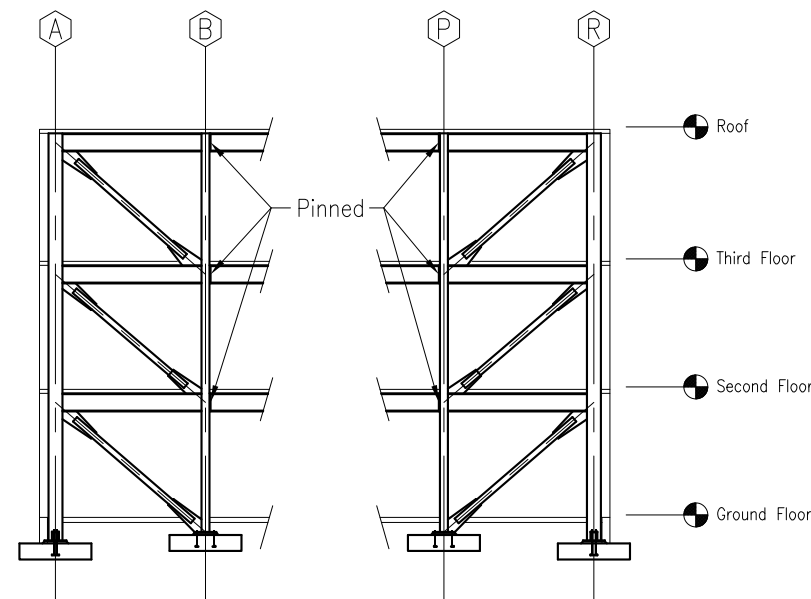
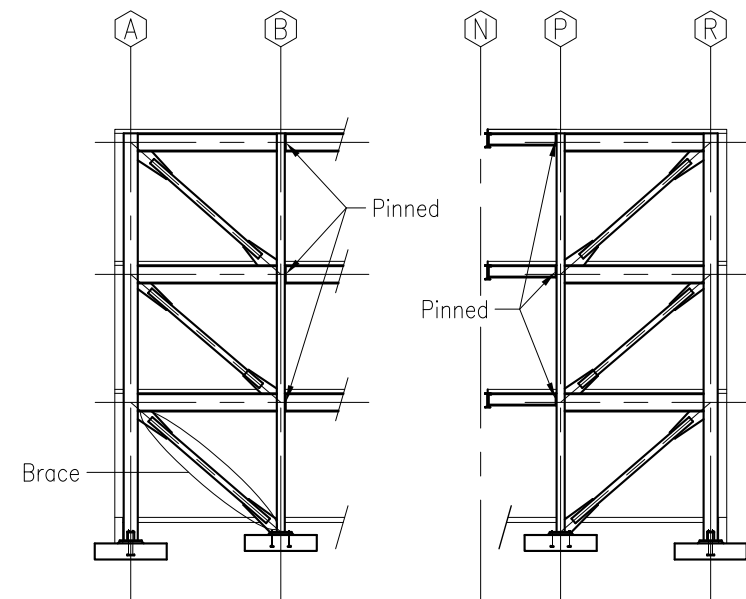
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ROOF FRAMING PLAN			
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1 FRAME ELEVATION – GRIDS A,B, & P
BGSE: Dorm SCALE: 1/16" = 1'-0"

2 FRAME ELEVATION – GRID E
BGSE: Dorm SCALE: 1/16" = 1'-0"

3 FRAME ELEVATION – GRID L
BGSE: Dorm SCALE: 1/16" = 1'-0"



4 FRAME ELEVATION – GRID 2
BGSE: Dorm SCALE: 1/16" = 1'-0"

5 FRAME ELEVATION – GRID 11
BGSE: Dorm SCALE: 1/16" = 1'-0"

Sheet Notes:

1. All Beam–Column connections in the plane of the frame are moment resisting except as noted.
2. All Brace end connections are considered to be pinned.
3. All connections out of plane are considered to be pinned.

TYPICAL BRACE FORCES (kips)

Level	Seismic	Wind
3rd Floor	72.69	5.67
2nd Floor	134.44	8.66
1st Floor	186.48	9.07

The braces don't carry gravity loads

FRAME LATERAL FORCES (kips)

Frame	On Grid	2	2	11	11	A	B	E	L	P	R
	Btwn Grids	A,B	P,R	A,B	P,R	2,11	2,11	1,9	4,9	2,11	2,11
Seismic	Roof	54.57	54.57	54.57	54.57	10.00	24.73	36.72	32.61	22.35	10.00
	3rd Floor	47.70	47.70	47.70	47.70	8.75	21.62	32.10	28.51	19.54	8.75
	2nd Floor	29.59	29.59	29.59	29.59	5.42	13.41	19.91	17.68	12.12	5.42
Wind	Roof	4.25	4.25	4.25	4.25	1.67	3.57	6.93	6.93	3.57	1.67
	3rd Floor	6.59	6.59	6.59	6.59	2.59	5.54	10.75	10.75	5.54	2.59
	2nd Floor	6.41	6.41	6.41	6.41	2.53	5.39	10.48	10.48	5.39	2.53