



Project Location:
Houston, Texas

Project Facts:
3-story Addition to an existing industrial manufacturing facility built in 1972 for Hydrotex Dynamics.
Consists of 7,000 SF of new construction and 5,000 SF of interior office renovation in the existing building.

This project as of the time of this presentation is in the Permit Phase and is being permitted through Harris County.

Project Design Team

Architecture:	Proem Design-Build, Inc.
Geotechnical:	The Murillo Company
Civil:	De Anda Engineering
Structural:	Enight, Inc.
MEP:	T&D Engineering

Student Analysis Team

Athavale, Ninad
Buys, Ryan Earl
Messick, T. Keith
Shrivastava, Suruchi
Singh, Tanya

HYDROTEx DYNAMICS:

ANALYZING THE SUCCESSFUL COMBINATION OF TWO STRUCTURAL SYSTEMS

INTERNATIONAL BUILDING
CODES FOR STRUCTURE
2006 EDITION

Governing Building Code for Structural Design

- The structure is designed in accordance with the International Building Code, **2006 edition**.
- Structures are classified with respect to occupancy in one or more of the groups listed as in section 302.1 of International Building Code i.e. Business group B (section 304)
- The Ground Snow load 'pg' For this area is 5 psf or less.
- Per the city of Houston amendments to the IBC, all structures in this jurisdiction shall be assigned to seismic design category A.
- The floor system has been designed to withstand a concentrated load of 2000 pounds placed upon any space 2'-6" square, in accordance with section 1607.4 of the International Building Code.

- The design gravity loads are as follows:

Superimposed Dead Loads	
Ceiling + mechanical	10 psf
Built up Roof	6 psf

Live Loads	
Roof	20 psf
Partitions	20 psf
Office space	50 psf
Corridors above first floor	80 psf
Assembly areas	100 psf
Finishes	As required
Mechanical & Piping loads	As required

- ❑ International Building codes for reduction in LIVE LOADS(1607.9)
- ❑ Except for areas of public assembly, and except for live loads which exceed 100 psf, floor uniform live loads are reduced in accordance with section 1607.9 of the International Building Code.
- ❑ International Building codes for WIND PRESSURES (1607.9)
- ❑ As per section 1609.1.1 of the International Building Code, the structure has been designed to withstand the wind pressures specified in chapter 6 of ASCE 7, using the following information:
- ❑ basic wind speed 110 mph
- ❑ wind importance factor 1.00
- ❑ building category ii
- ❑ wind exposure b
- ❑ internal pressure coefficient ± 0.18
- ❑ basic wind speed is 3-second gust speed at a reference elevation of 33 feet above the ground.

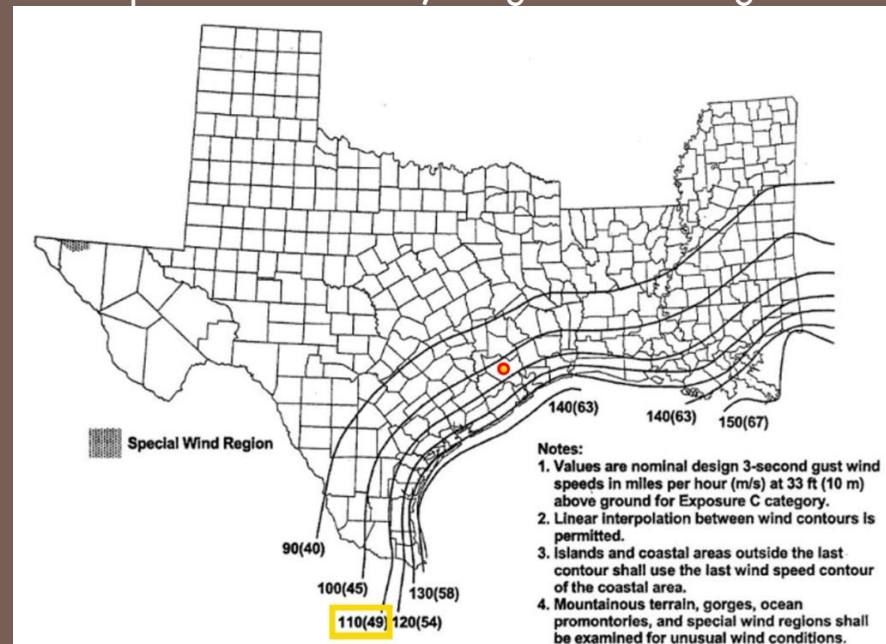


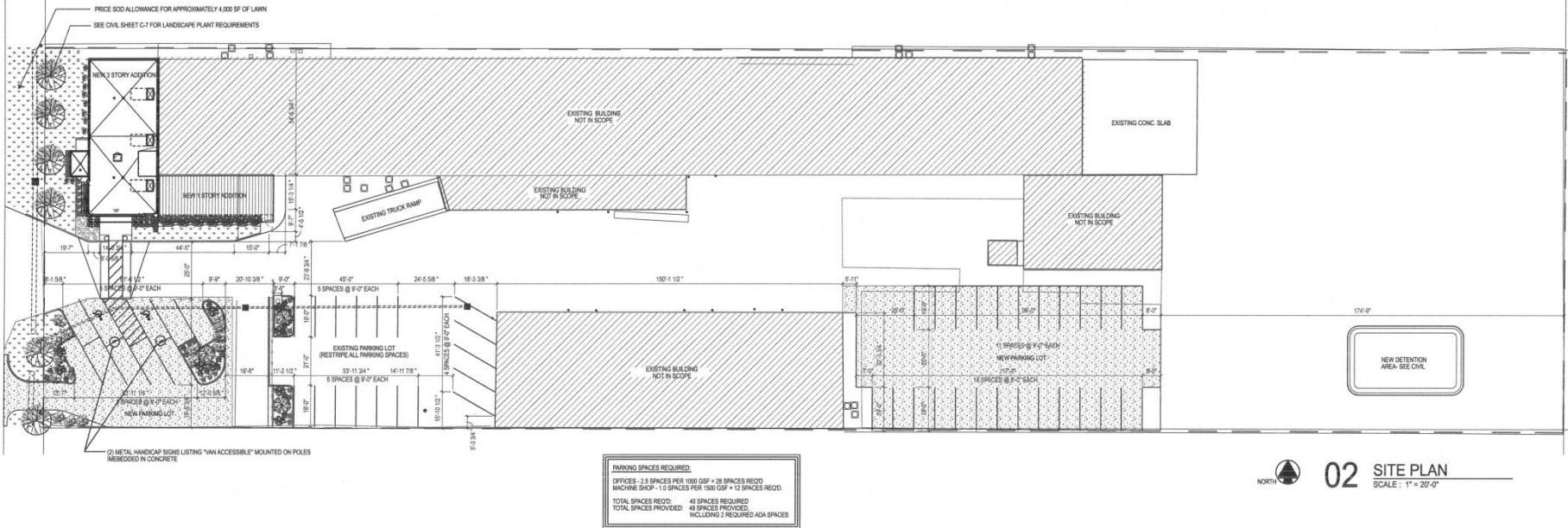
FIGURE 1609— continued
BASIC WIND SPEED (3-SECOND GUST) WESTERN GULF OF MEXICO HURRICANE COASTLINE"

□ Stairs, guardrails & handrails (1607.1)

- All stairs are designed to safely resist loading as indicated in table 1607.1 of the International Building Code. Stair structure is designed to support a uniform live load of 100 psf.
- Individual treads is designed to resist a minimum concentrated load of 300 pounds on an area of 4 square inches in a position which would cause maximum stress, whichever case may govern.
- Guardrails at exit facilities and balconies are designed to safely resist loading as indicated in section 1607.7.1 of the International Building Code. Railings are designed to support a horizontal load of 50 lbs. per linear foot, or a 200 lb. force acting in any direction, whichever is greater. Forces are to be applied to the top rail.
- Handrails are designed to safely resist loading as indicated in section 1607.7.1.1 of the International Building Code. Handrails are designed to support a concentrated load of 200 lbs. applied in any direction at any point along the top of the rail.
- Intermediate rails are designed to withstand the loading as specified in section 1607.7.1.2 of the International Building Code. Intermediate rails are designed to resist a horizontally applied normal load of 50 lbs. on an area not to exceed one square foot including openings and space between rails.



CUNNINGHAM ROAD

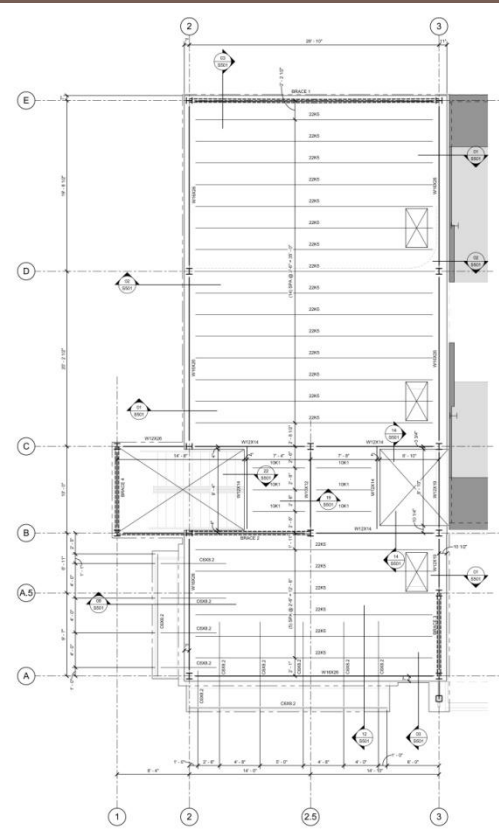


Site Plan

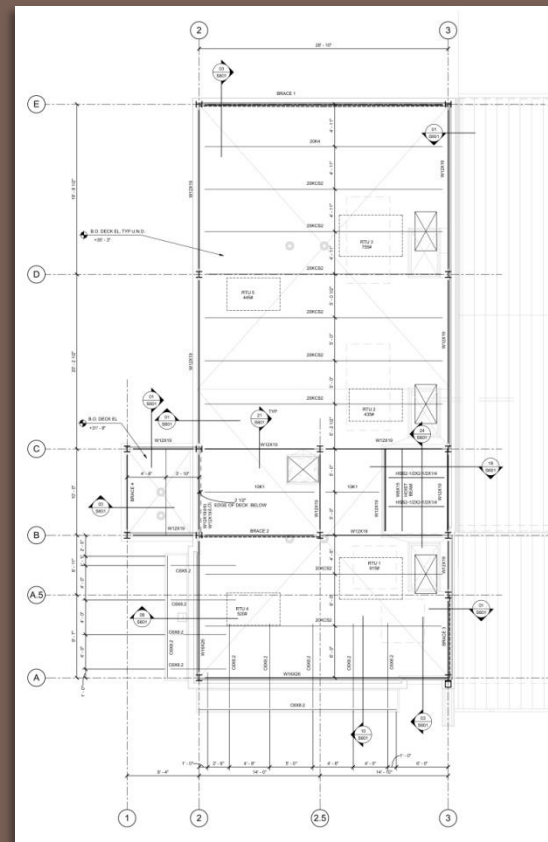
Design Team had to overcome Site Constraints

- Property Lines,
- Storm Drainage,
- Overhead Power Lines
- Parking & Landscape Requirements



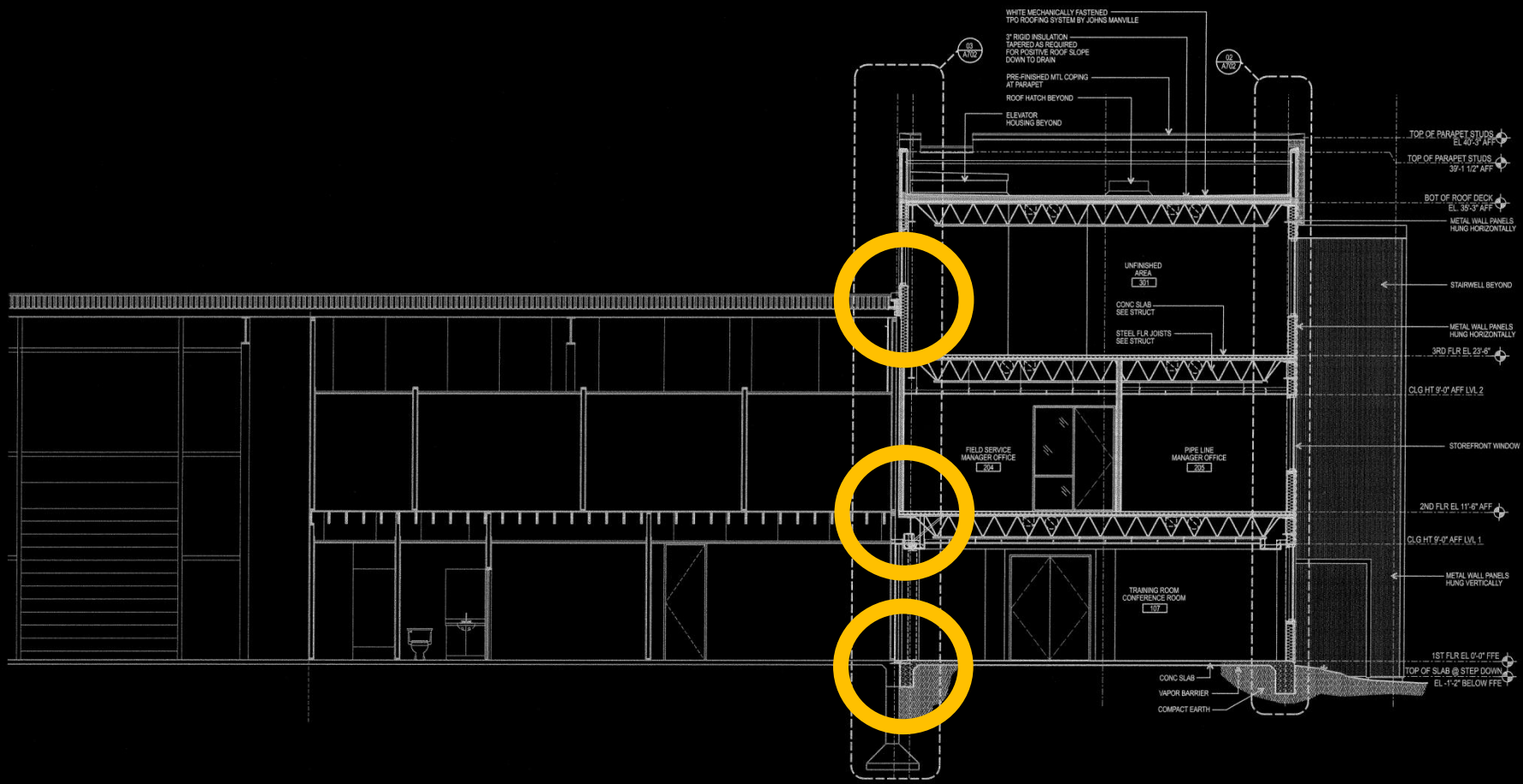


Third Floor Framing Plan

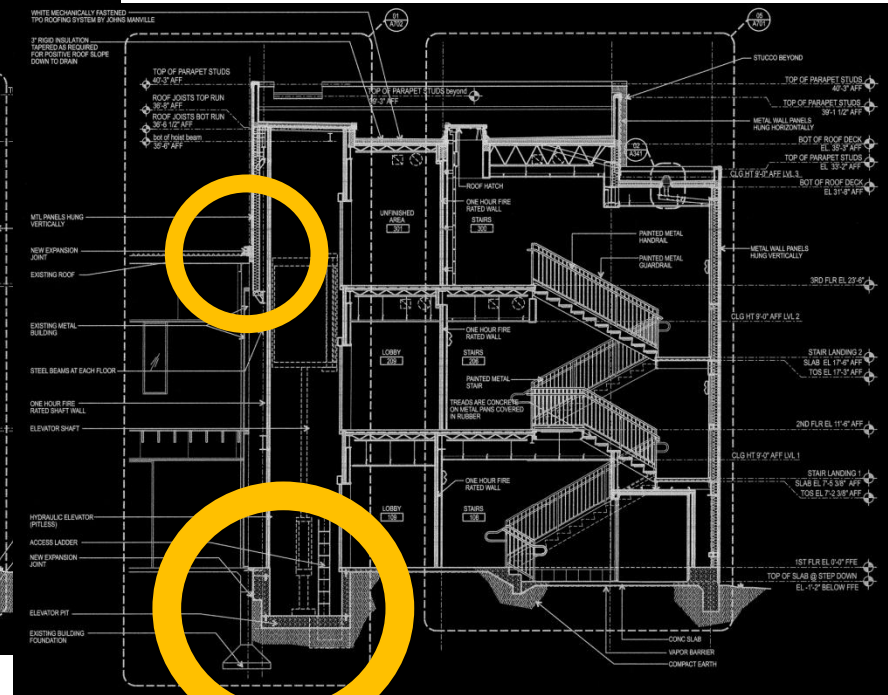
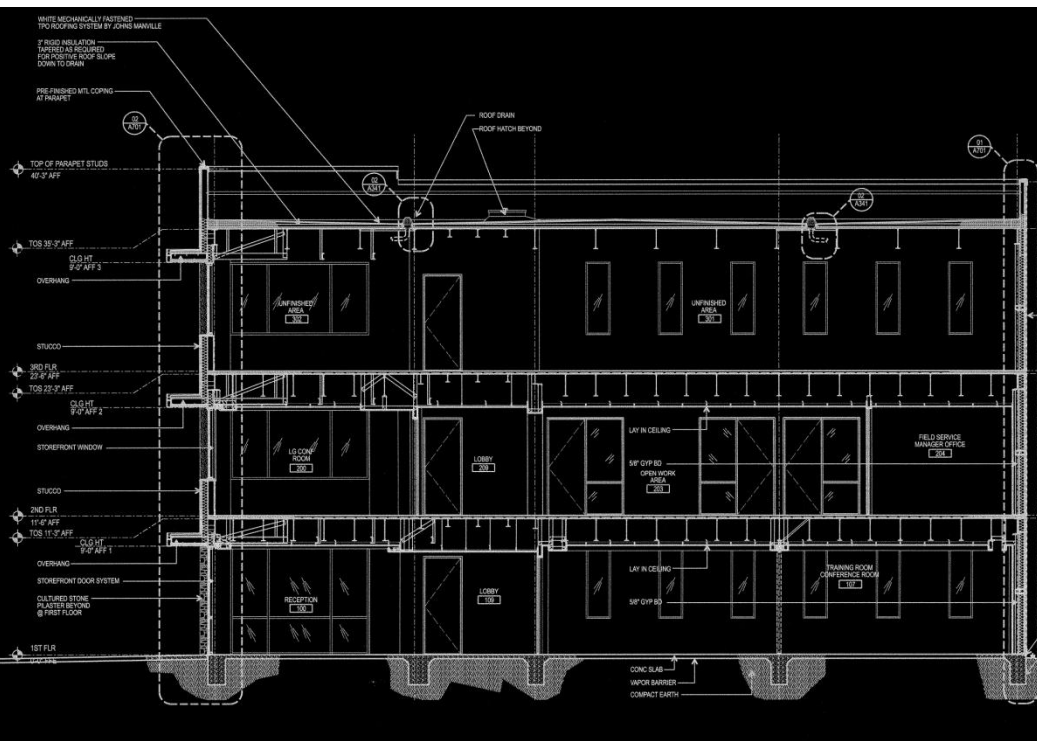


Roof Level Framing Plan

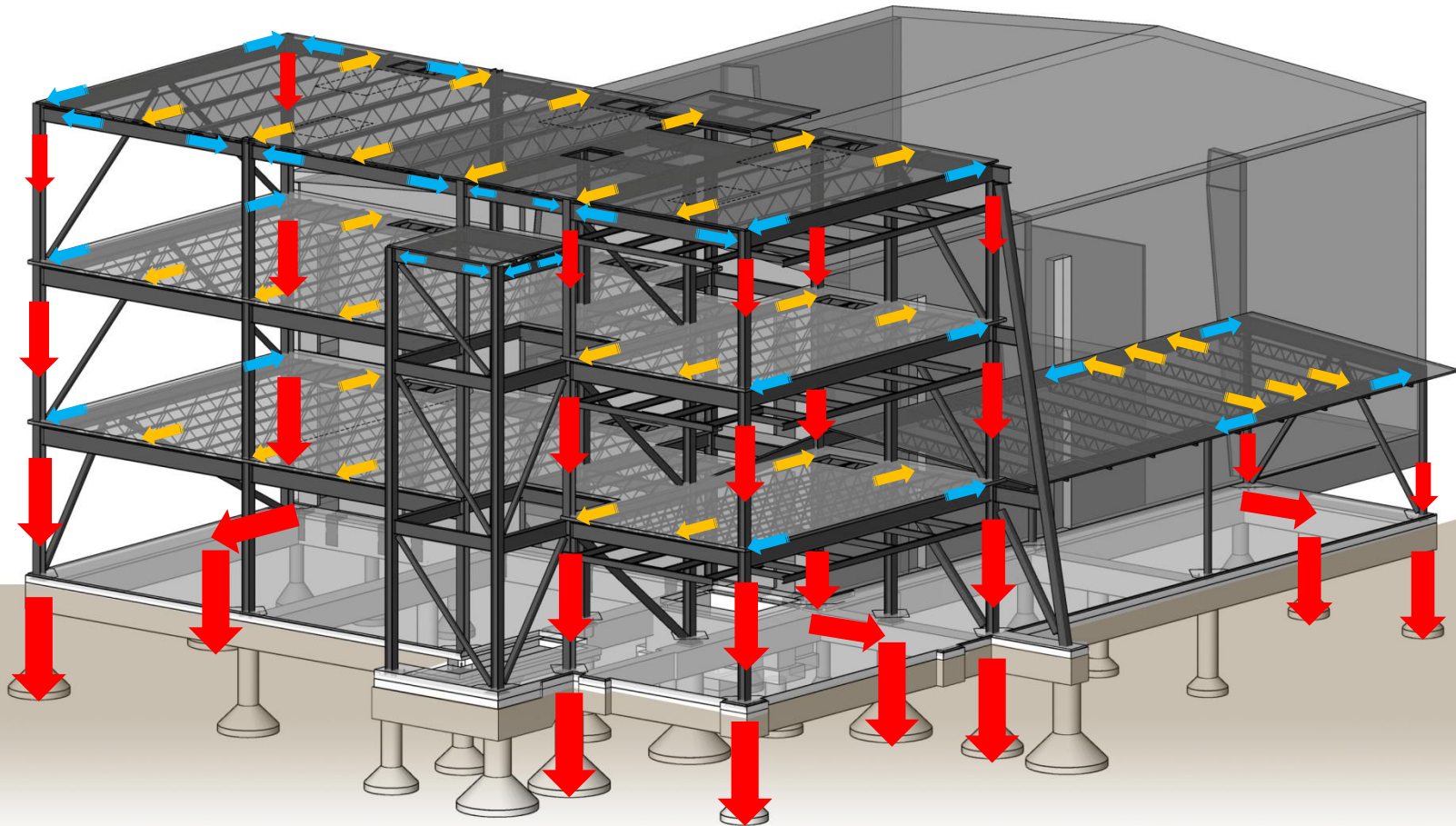
Structural Floor Framing Plans



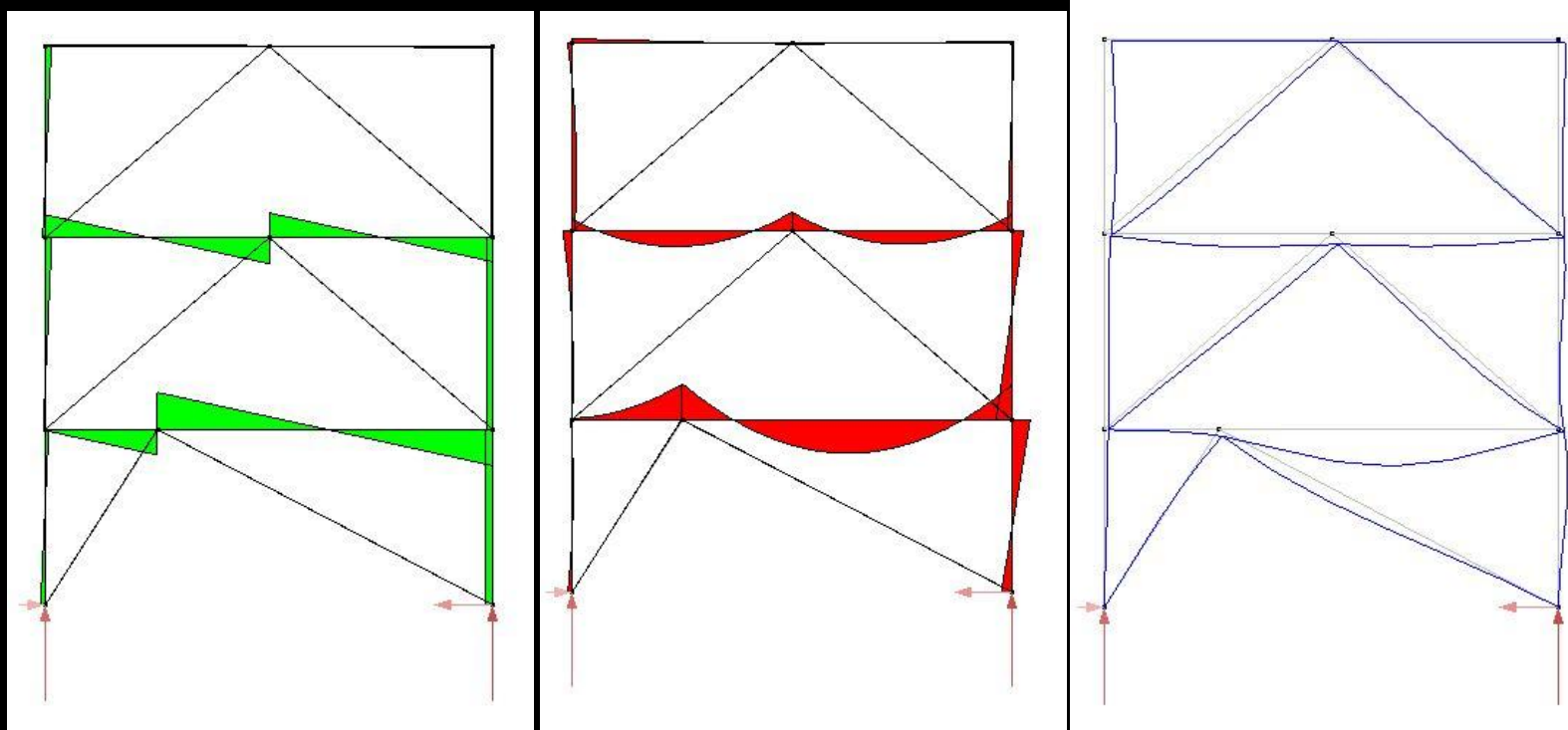
Building Section Thru Existing & New Structures



Building Sections Thru Addition

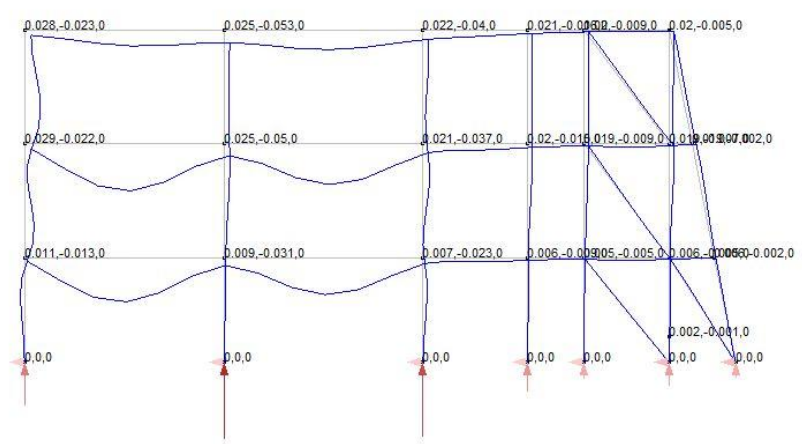
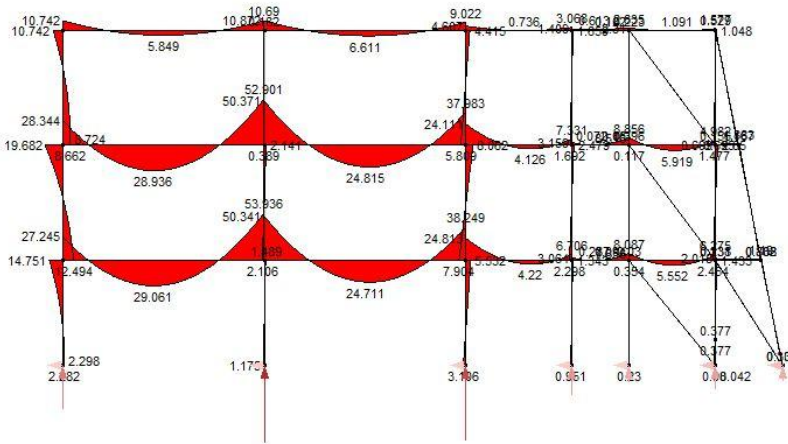
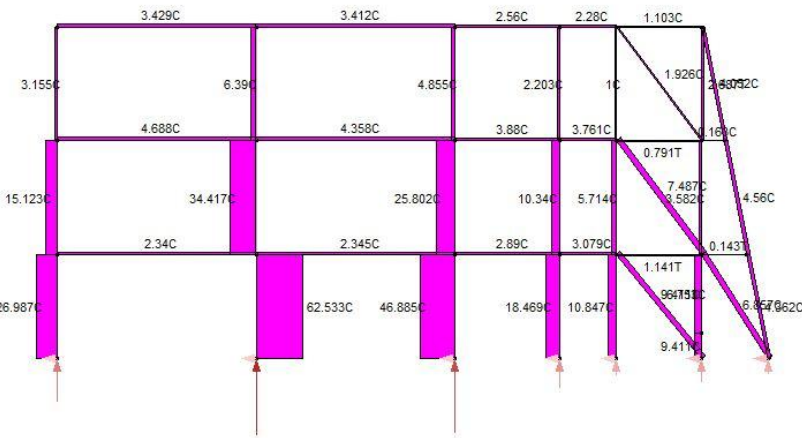
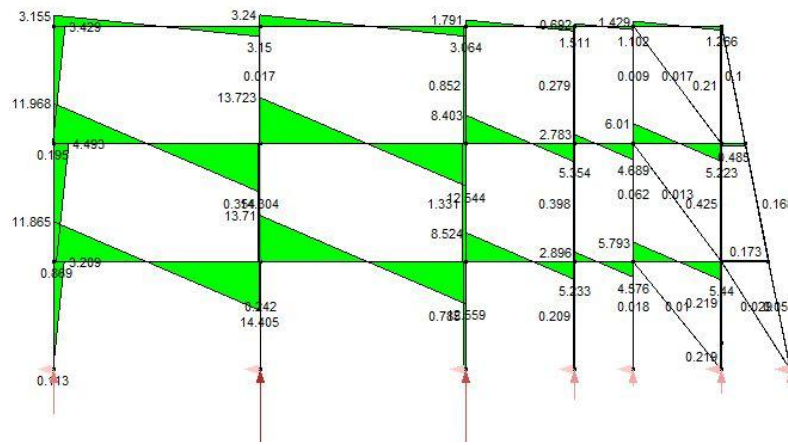


Structural Axonometric



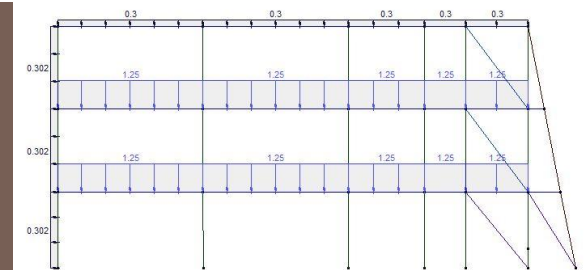
Multi-Frame End Bay Diagonal Bracing Analysis

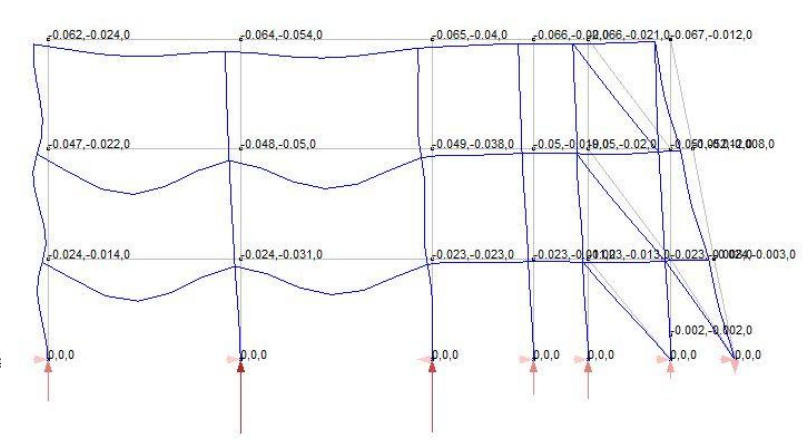
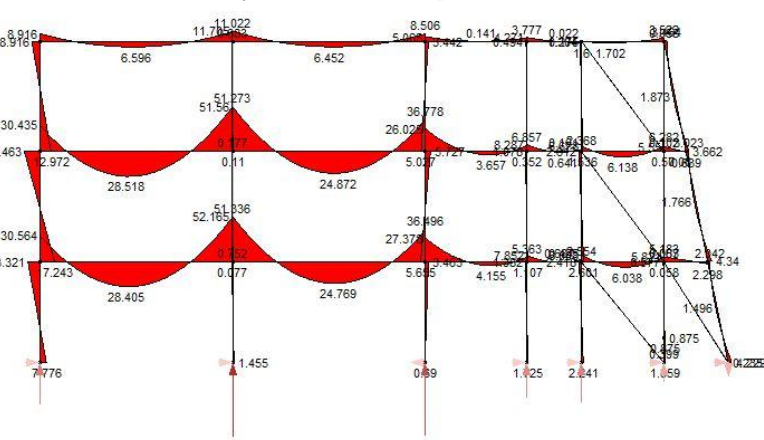
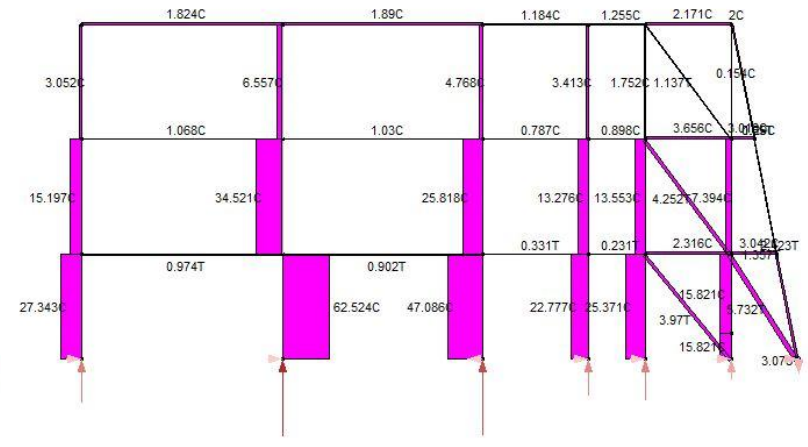
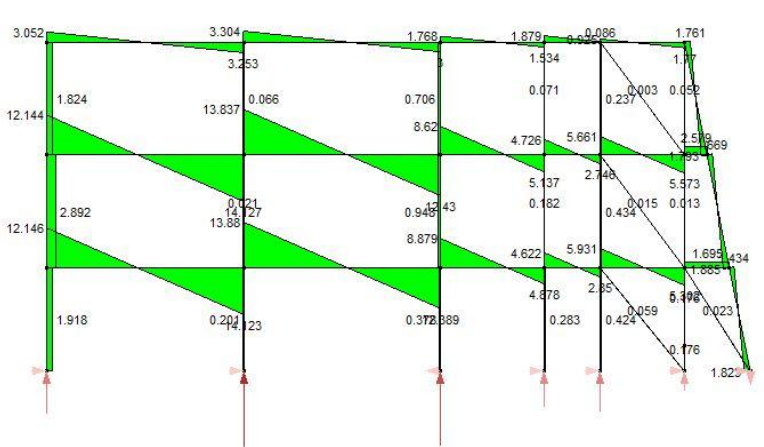
110 mph Wind load analyzed from west (left)
Self weight, live load and dead load included



Multi-Frame Multi-Bay Analysis Along Grid Line

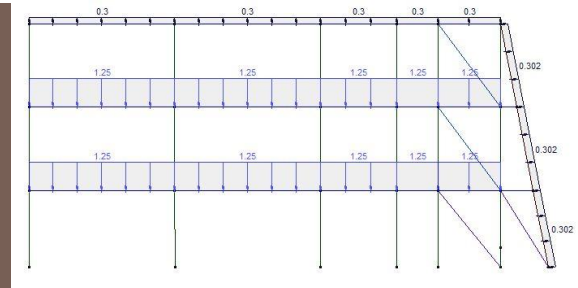
110 mph Wind load analyzed from north (left)
Self weight, live load and dead load included





Multi-Frame Multi-Bay Analysis Along Grid Line

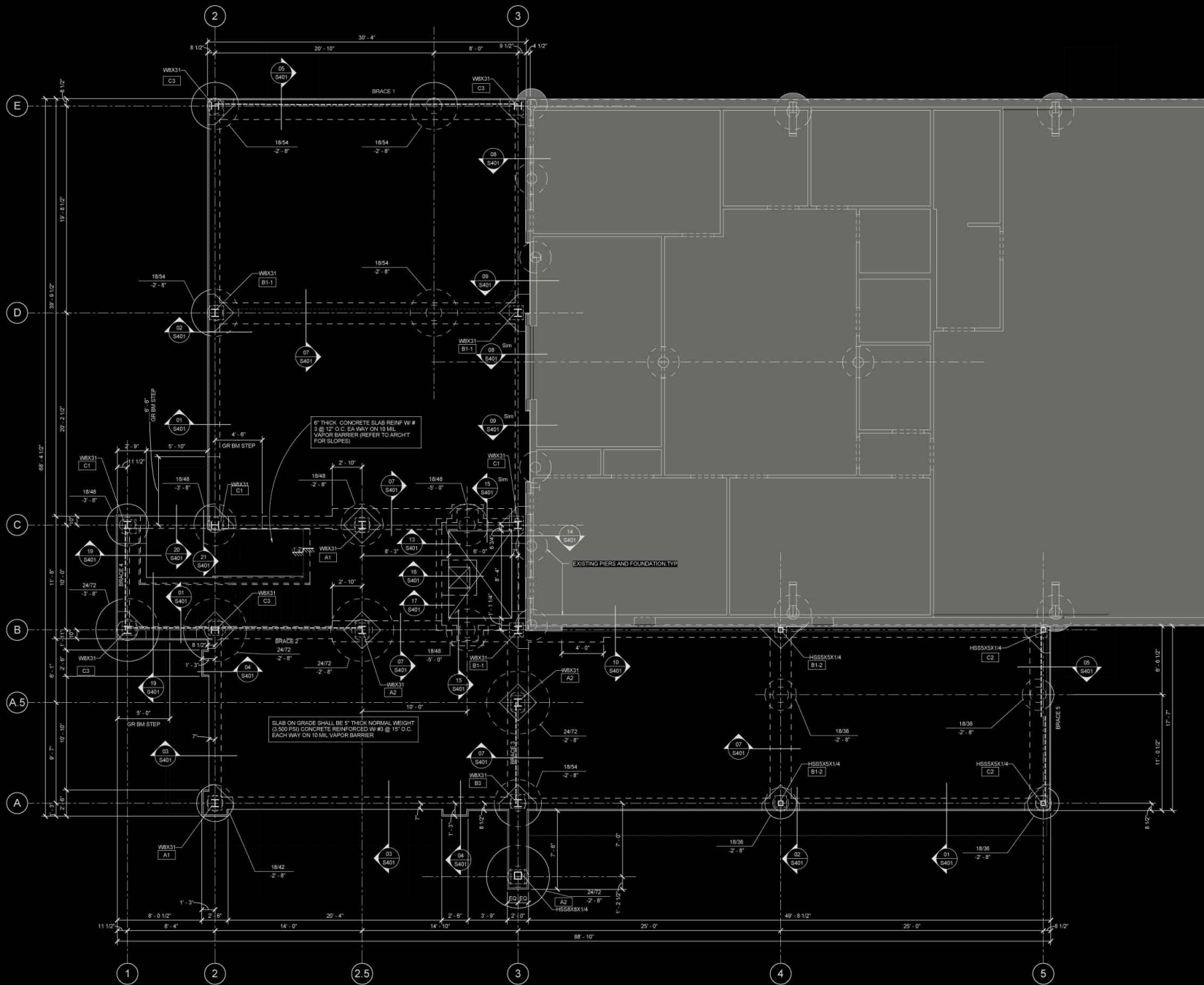
110 mph Wind load analyzed from south (right)
 Self weight, live load and dead load included



CONNECTIONS TO THE
EXISTING STRUCTURAL
SYSTEM AND FUNCTIONALITY



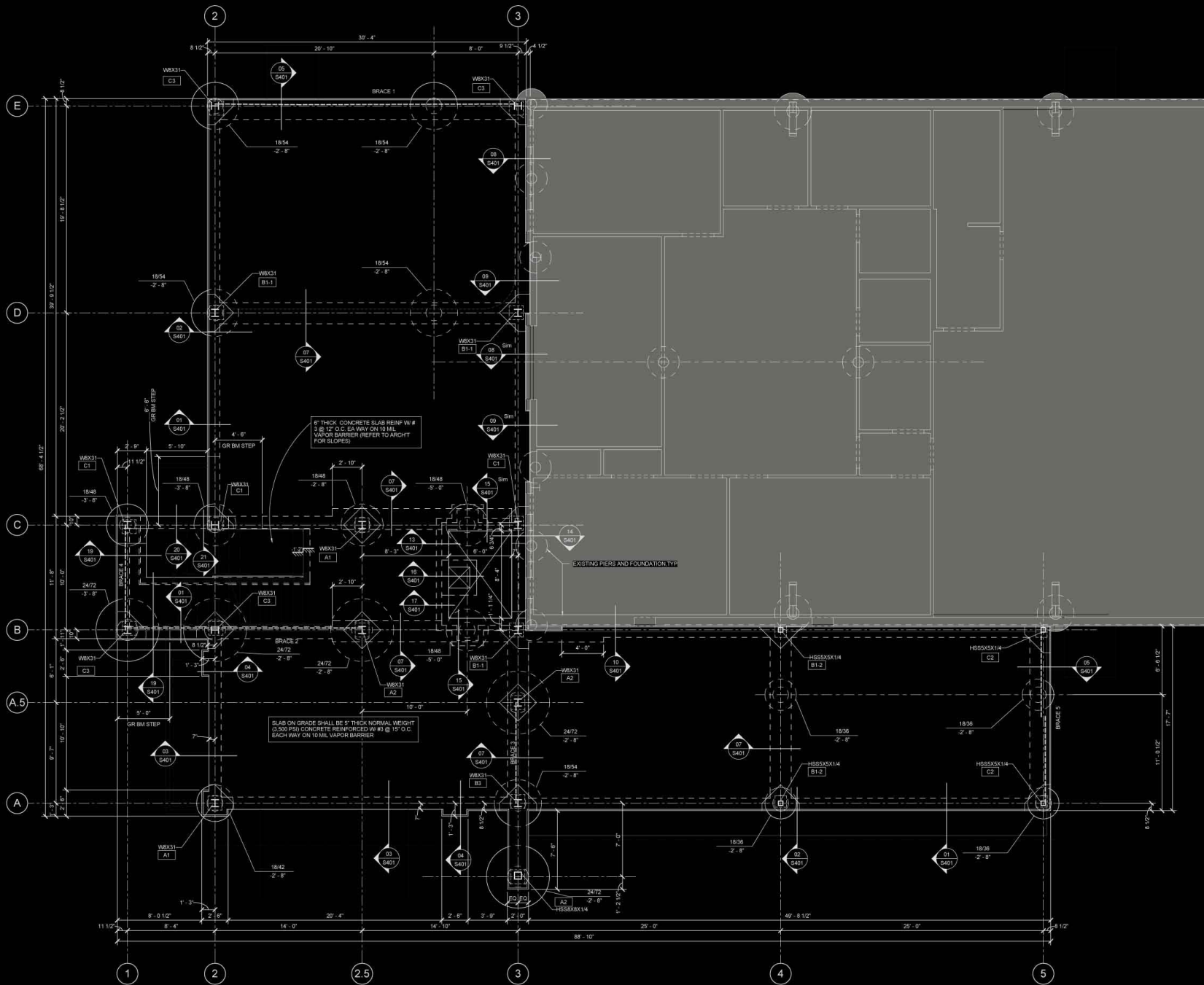
FOUNDATION TREATMENT BETWEEN EXISTING AND NEW BUILDING

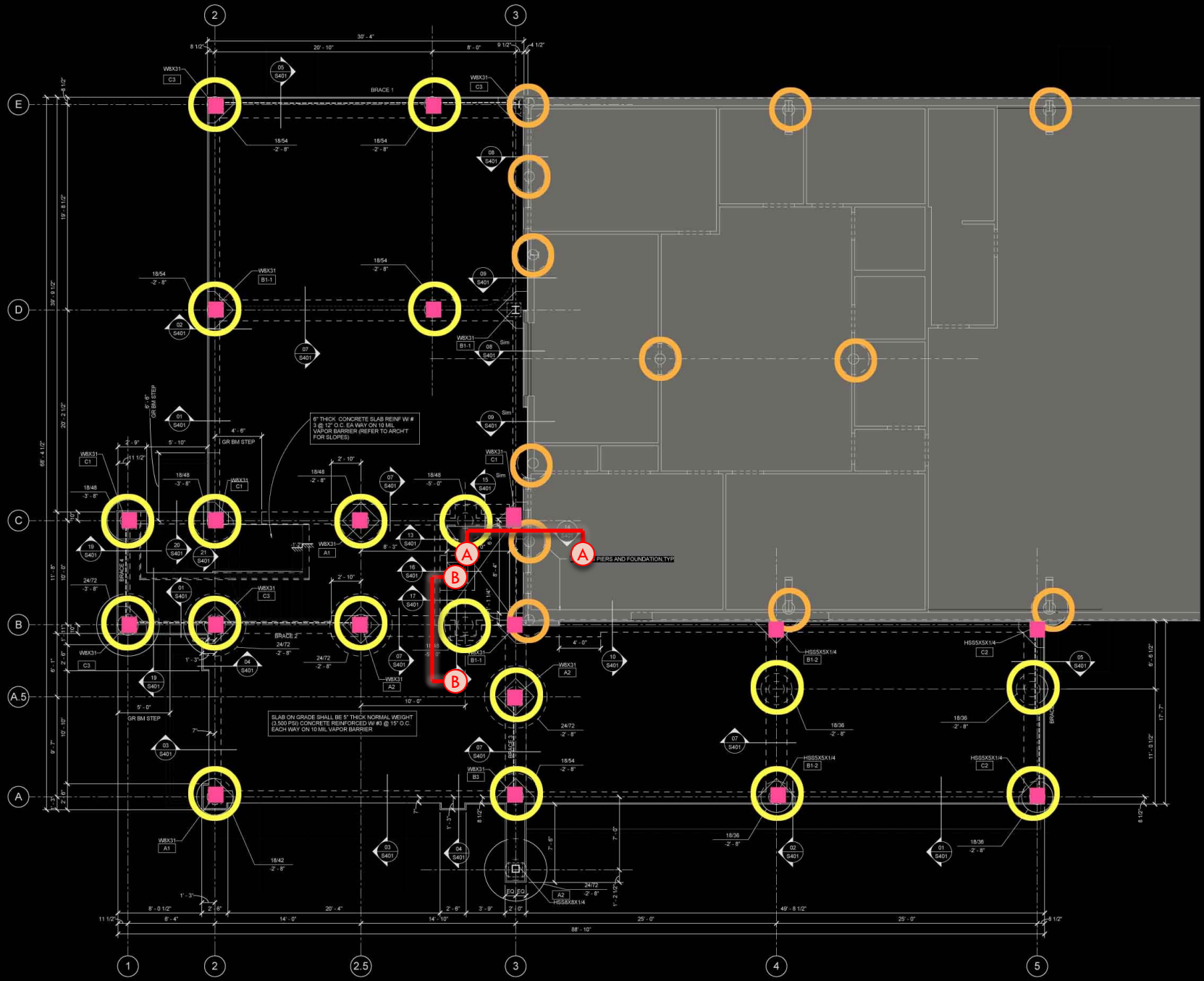


6" THICK CONCRETE SLAB REINF W/ # 3 @ 12" O.C. EA WAY ON 10 MIL VAPOR BARRIER (REFER TO ARCHT FOR SLOPES)

SLAB ON GRADE SHALL BE 6" THICK NORMAL WEIGHT (1500 PSI) CONCRETE REINFORCED W/ #3 @ 15" O.C. EACH WAY ON 10 MIL VAPOR BARRIER

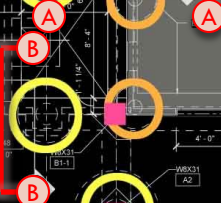
EXISTING PIERS AND FOUNDATION TYP



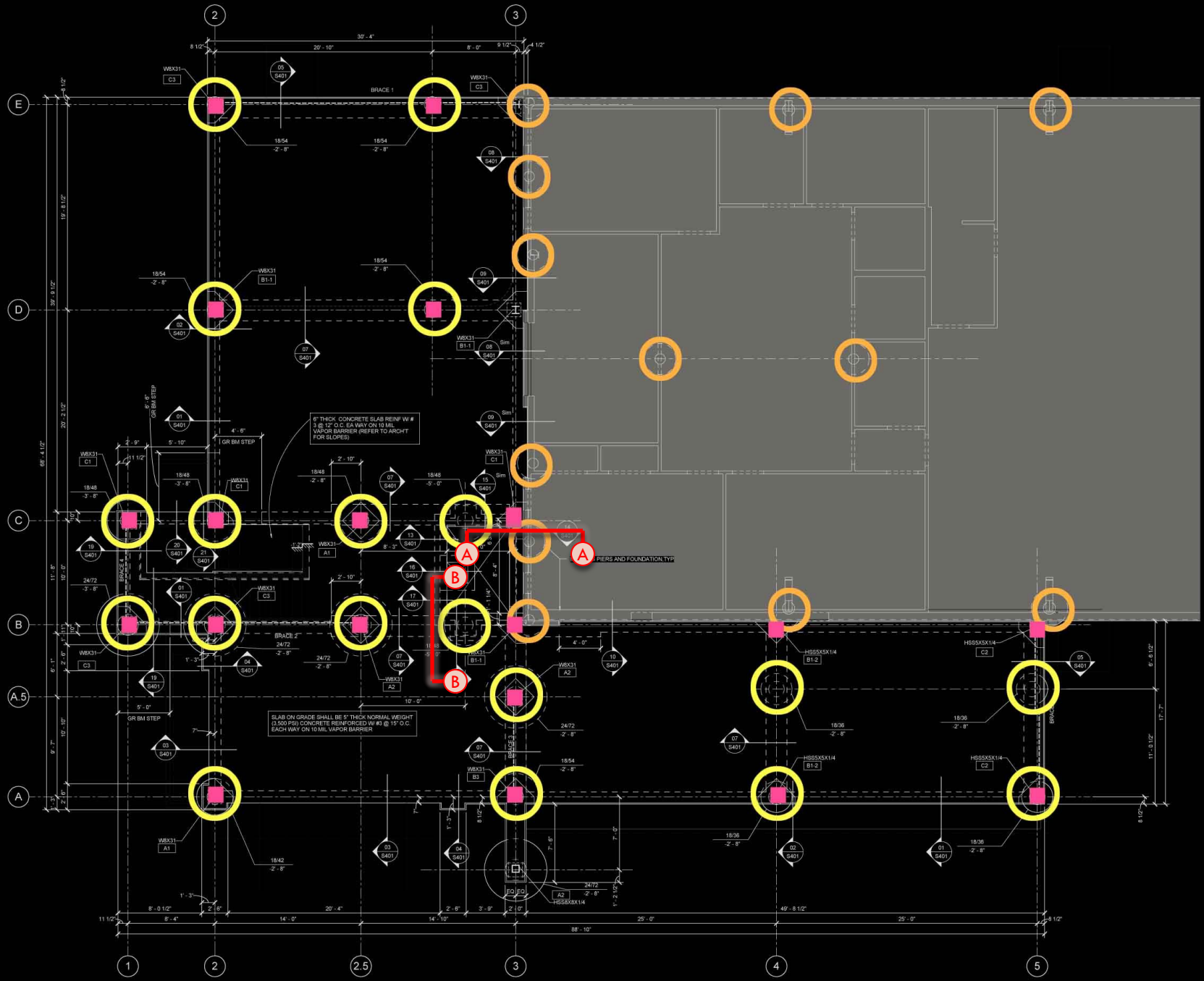


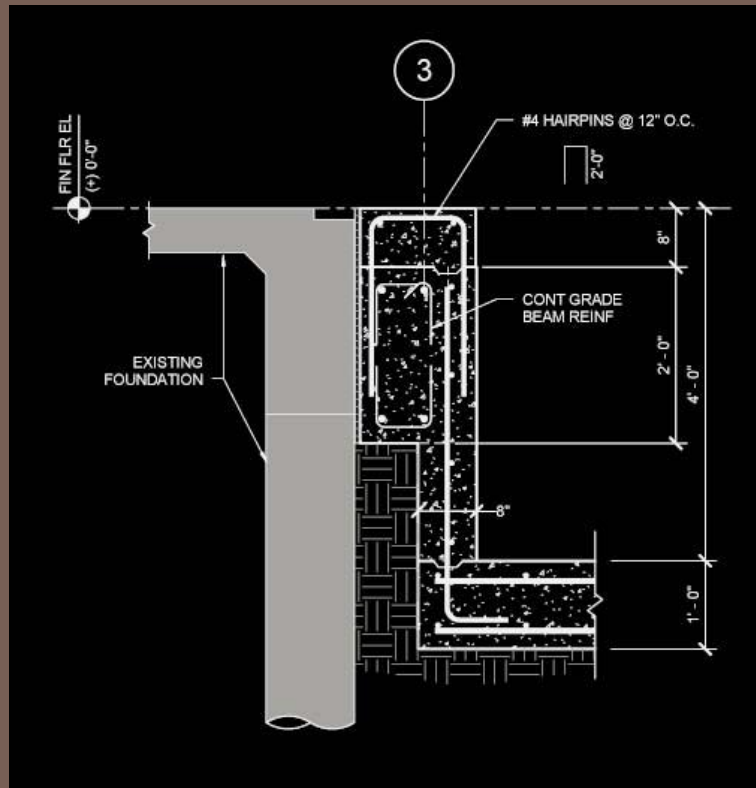
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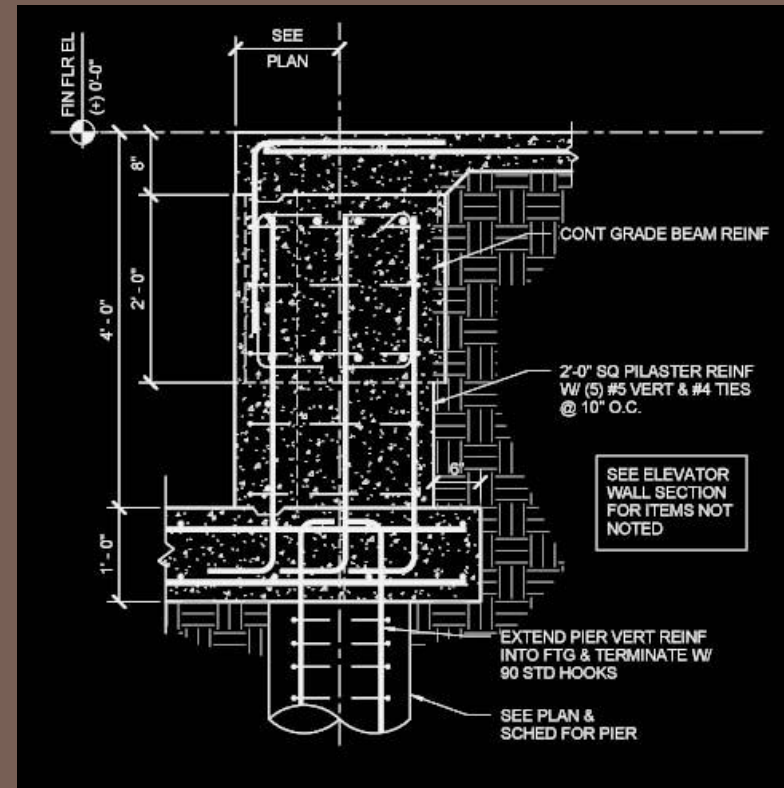


PIERS AND FOUNDATION TYP





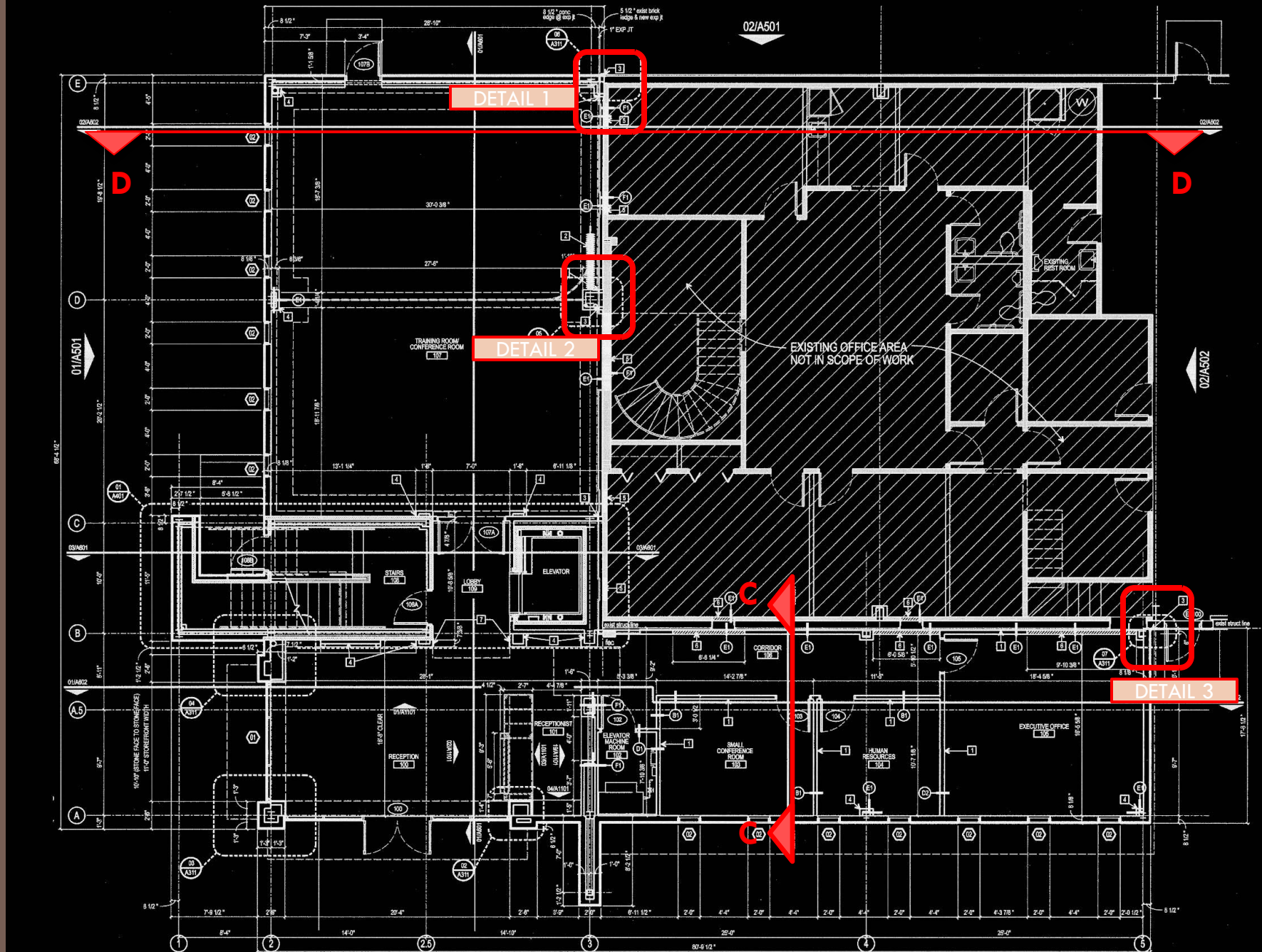
SECTION A-A



SECTION B-B

Sections Through Foundation Pier and Plinth beam ???

EXPANSION JOINTS BETWEEN EXISTING AND NEW BUILDING



DETAIL 1

DETAIL 2

DETAIL 3

02/A501

01/A501

02/A502

D

D

C

E

D

C

B

A.5

A

1

2

2.5

3

4

5

TRAINING ROOM
CONFERENCE ROOM

EXISTING OFFICE AREA
NOT IN SCOPE OF WORK

STAIRS
108

ELEVATOR

CORRIDOR
106

SMALL
CONFERENCE
ROOM
103

HUMAN
RESOURCES
104

EXECUTIVE OFFICE
105

RECEPTION
100

RECEPTIONIST
101

SMALL
CONFERENCE
ROOM
102

ELEVATOR
MACHINE
ROOM
107

LOBBY
109

LOBBY
109A

LOBBY
109B

LOBBY
109C

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109D

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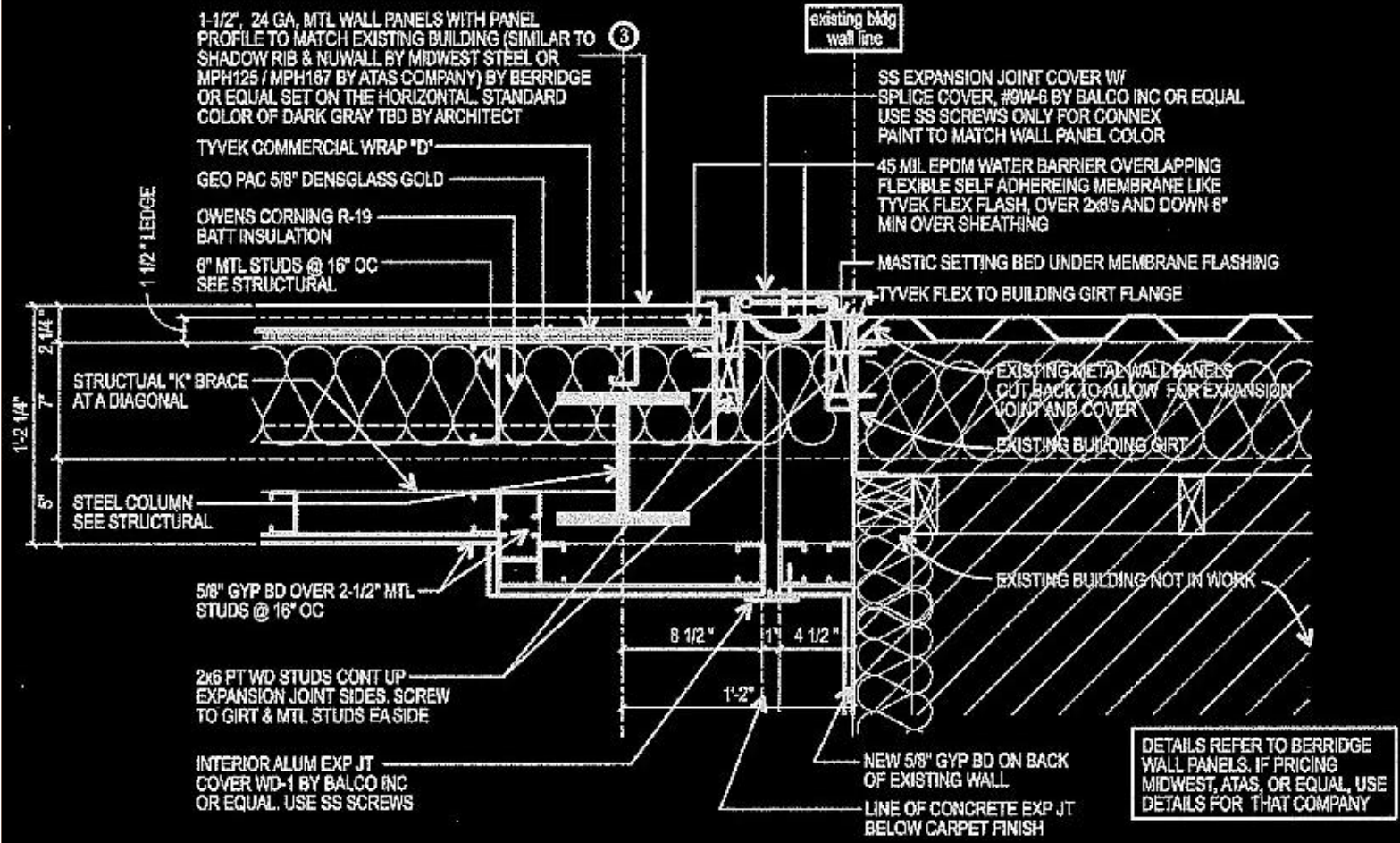
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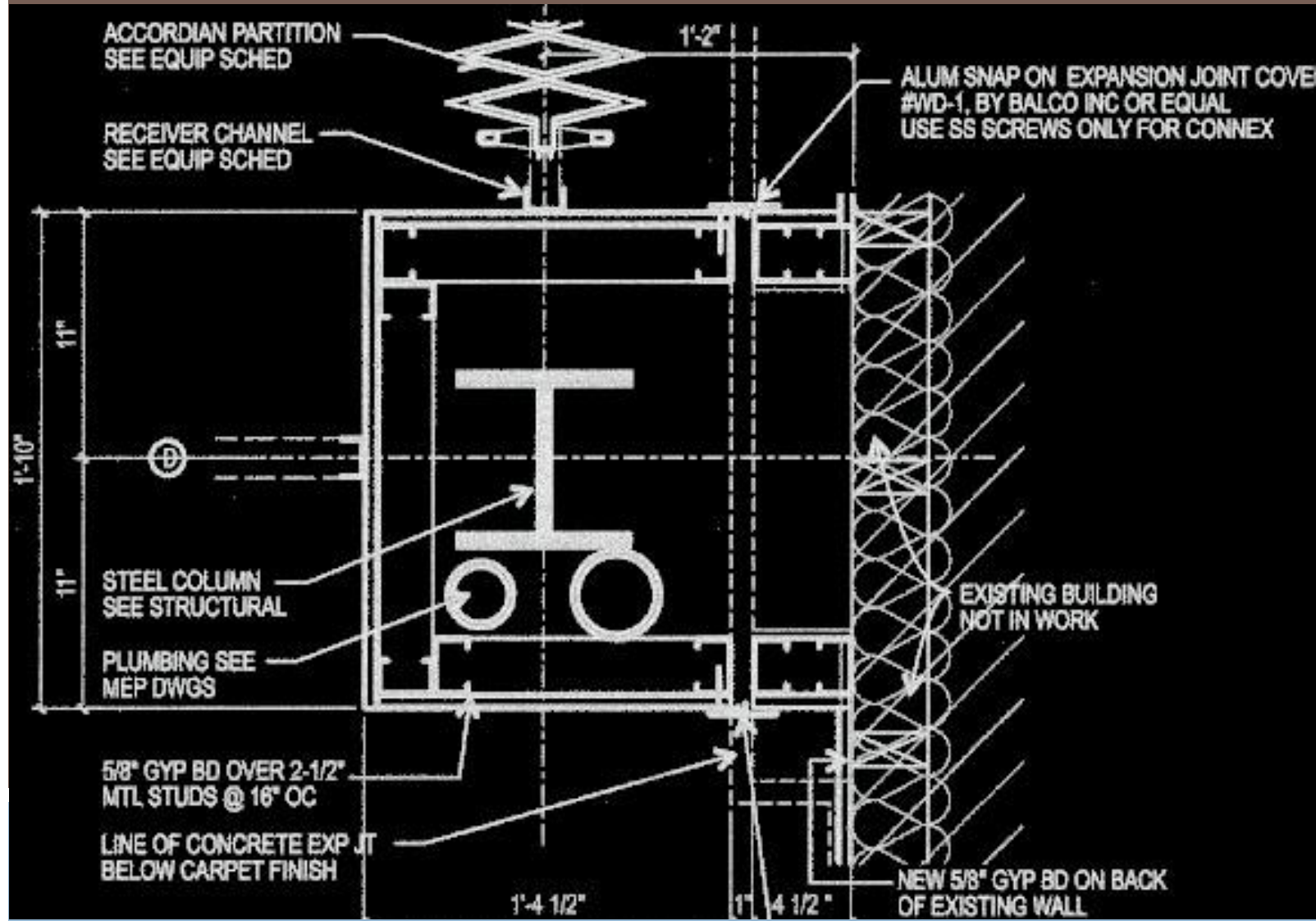
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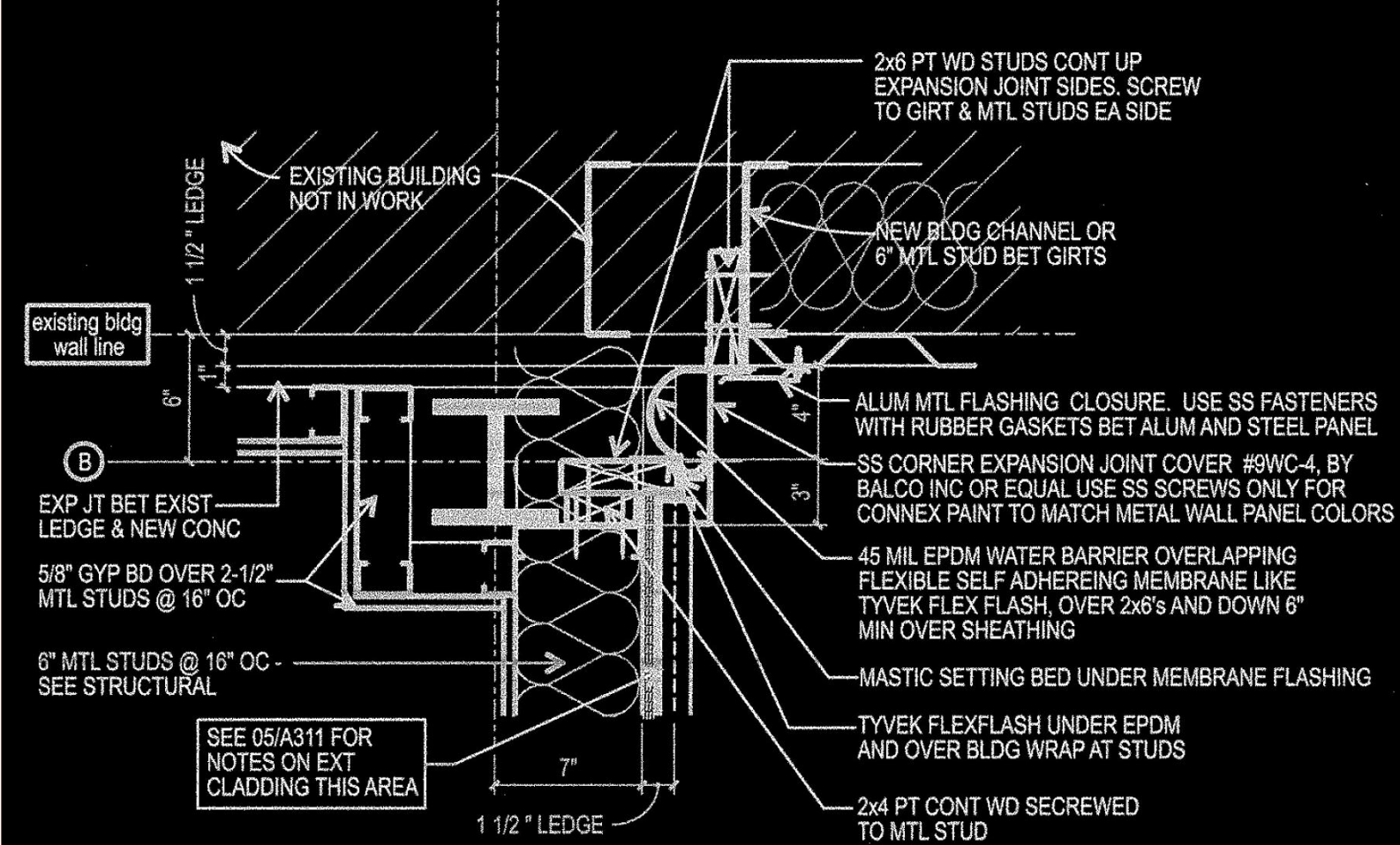
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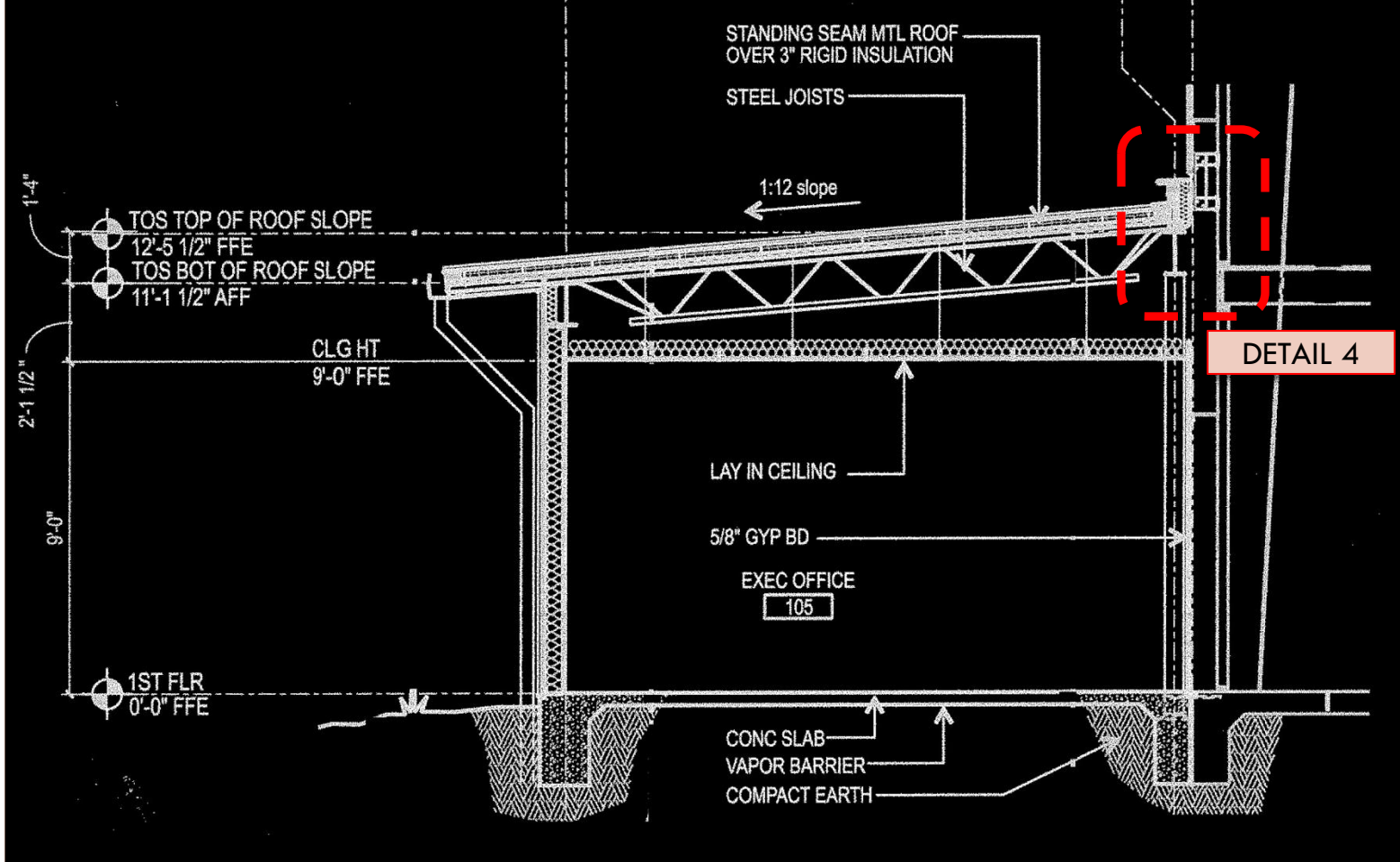
Detail 1-Vertical expansion joint in plan



Detail-2 -Vertical expansion joint in plan

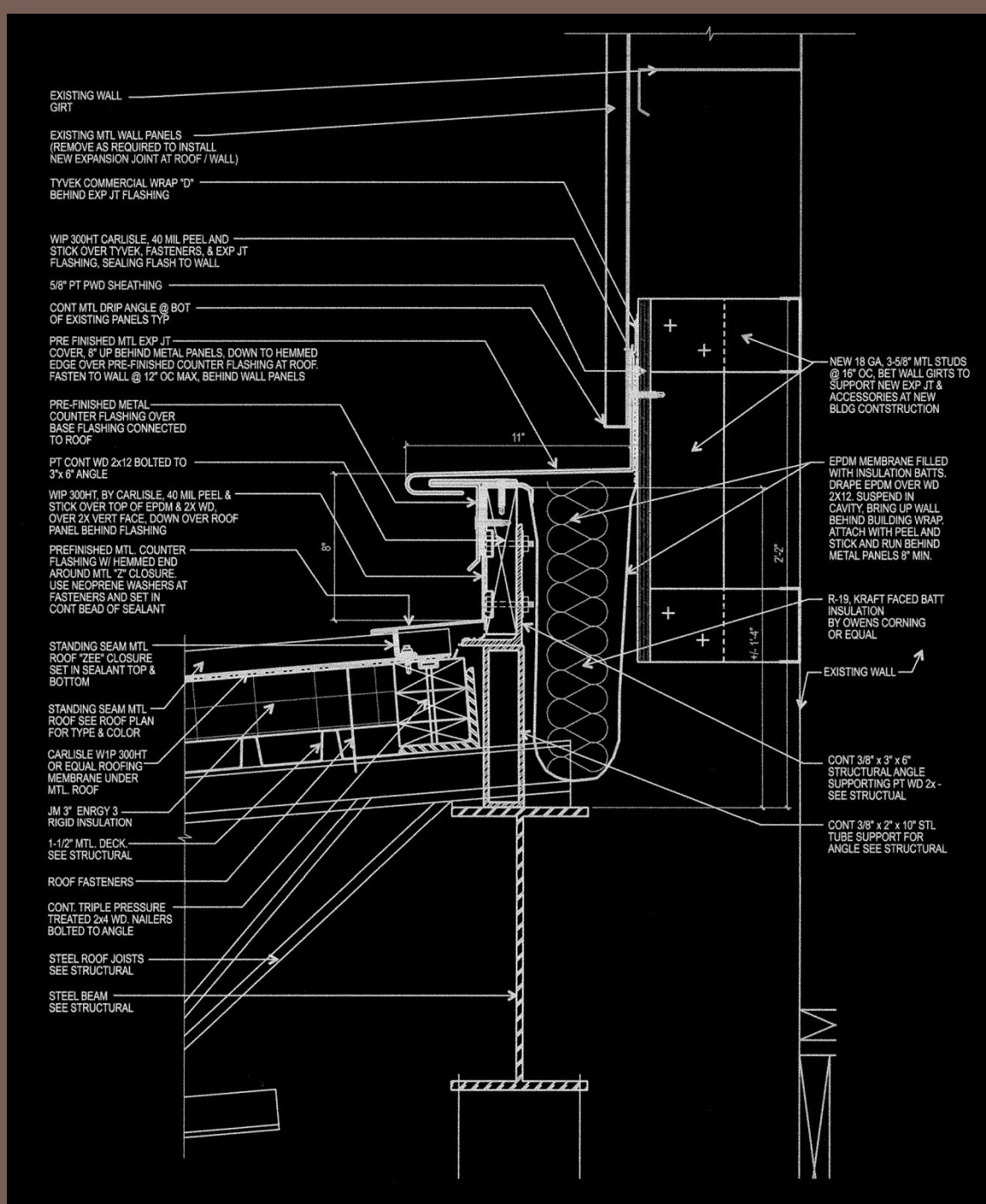


Detail 3-Plan detail through...?

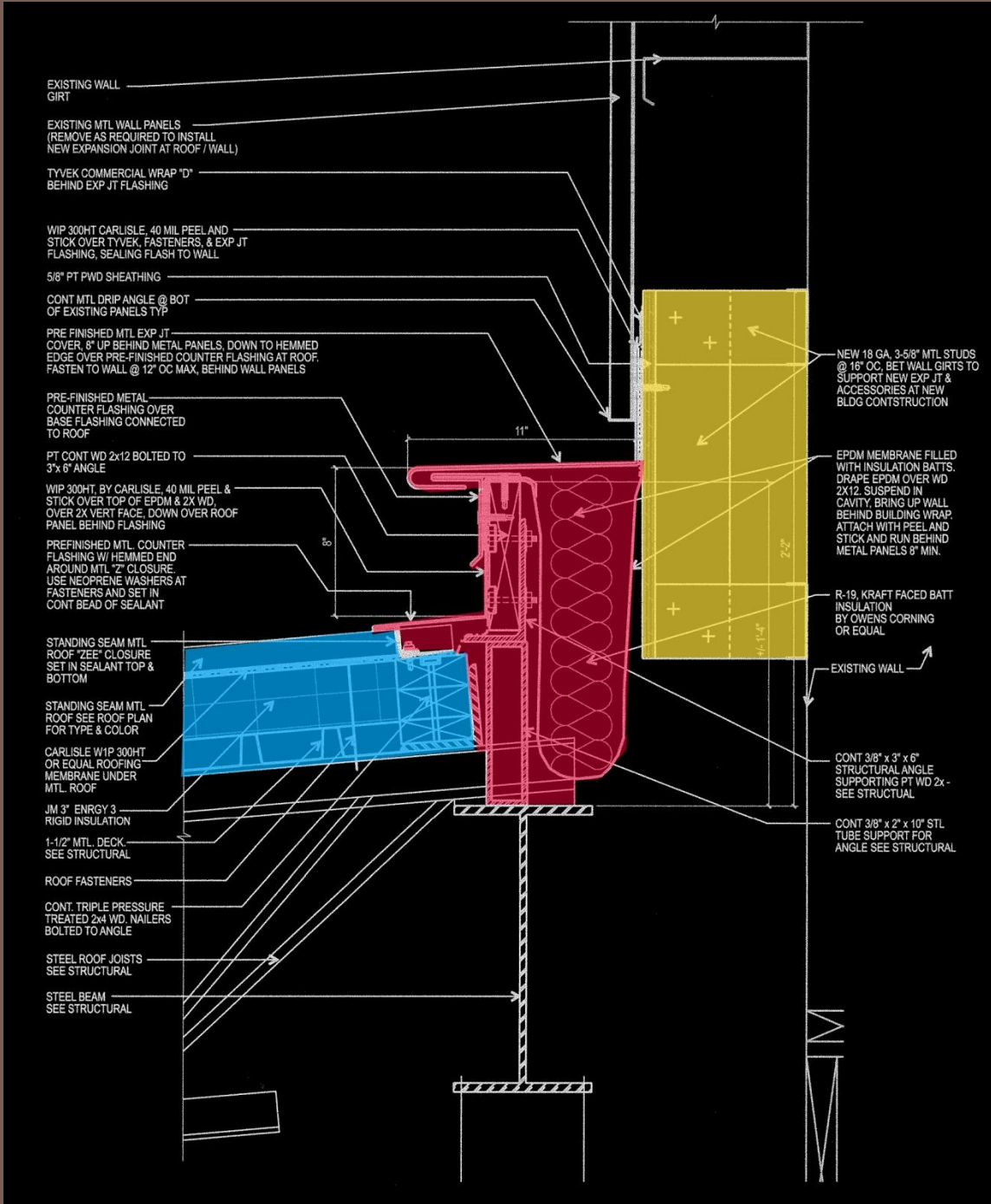


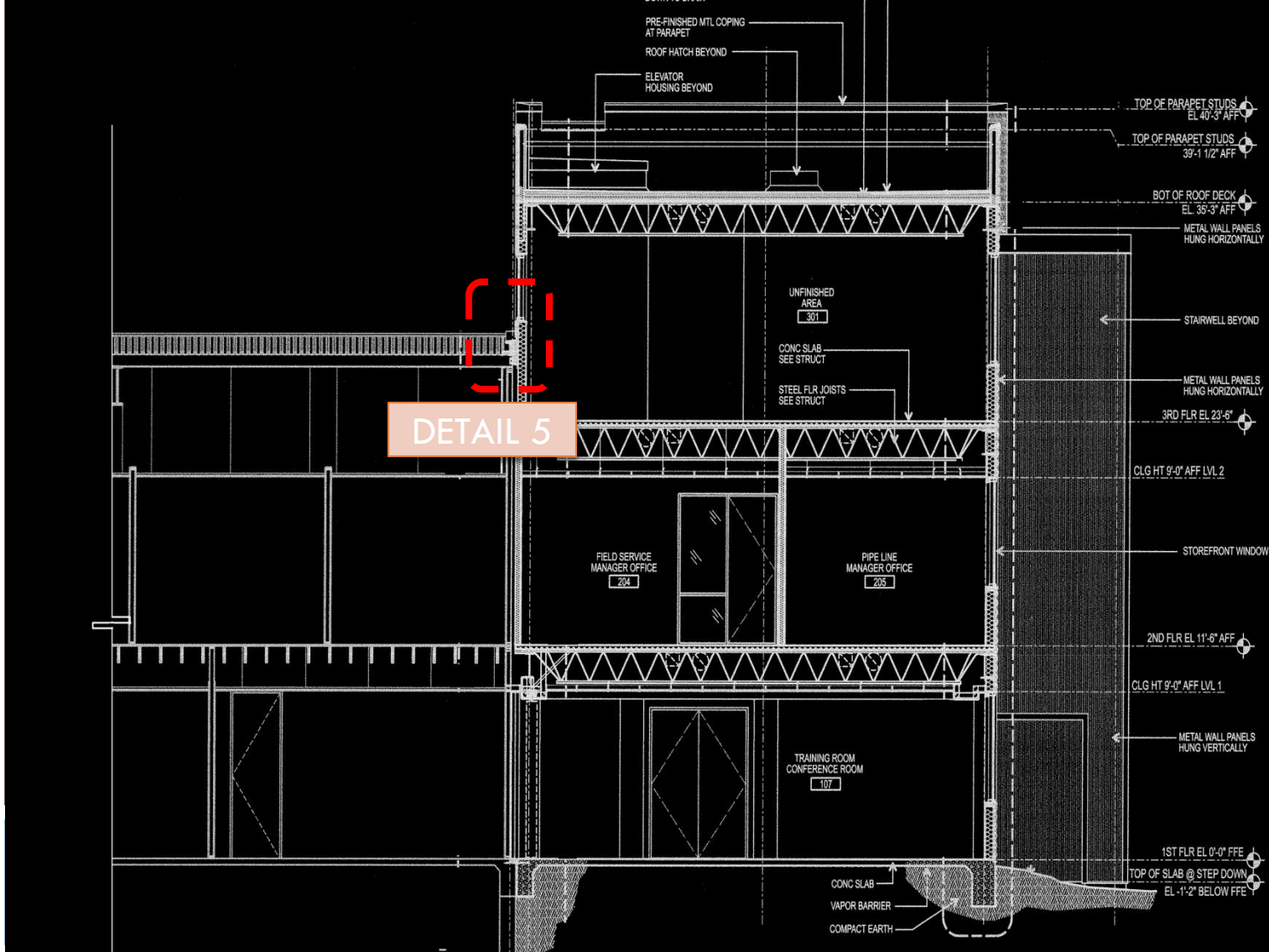
Section through the connection between existing building and new construction

DETAIL 4-EXPANSION JOINT DETAIL



DETAIL 4-EXPANSION JOINT DETAIL





SECTION D-D

METAL WALL PANEL HUNG
VERTICALLY ALONG EXP JT

TYVEK COMMERCIAL WRAP "D"
BEHIND EXP JT FLASHING

CARLISLE WIP 300HT,
40 MIL PEEL AND STICK OVER TYVEK,
FASTENERS, & EXP JT FLASHING,
SEALING FLASH TO WALL

CONT MTL DRIP ANGLE
@ BOT OF PANELS TYP

PRE FINISHED MTL EXP JT
COVER, 8" UP BEHIND METAL PANELS, DOWN TO HEMMED
EDGE OVER PRE-FINISHED COUNTER FLASHING AT ROOF.
FASTEN TO WALL @ 12" OC MAX, BEHIND WALL PANELS

PRE-FINISHED METAL
COUNTER FLASHING OVER
BASE FLASHING CONNECTED
TO ROOF

PT CONT WD 2x12 BOLTED TO
CONT 3/8" x 3"x 6" ANGLE

CARLISLE WIP 300HT, 40 MIL PEEL & STICK OVER
TOP OF EPDM & 2X WD, OVER 2X VERT FACE,
DOWN OVER ROOF PANEL BEHIND FLASHING

PREFINISHED MTL. COUNTER
FLASHING FASTENED
THROUGH HEMMED END, TO
EXISTING ROOF. USE
NEOPRENE WASHERS AT
FASTENERS AND SET IN EDGE
OF FLASHING IN CONT BEAD
OF SEALANT.

EXISTING RAKE END OF
EXISTING BUILDING

NEW STEEL ANGLE
CONNECTED TO EXISTING
ROOF PURLINS
SUPPORTING NEW
STEEL ANGLE

8" MIN

9"

5"

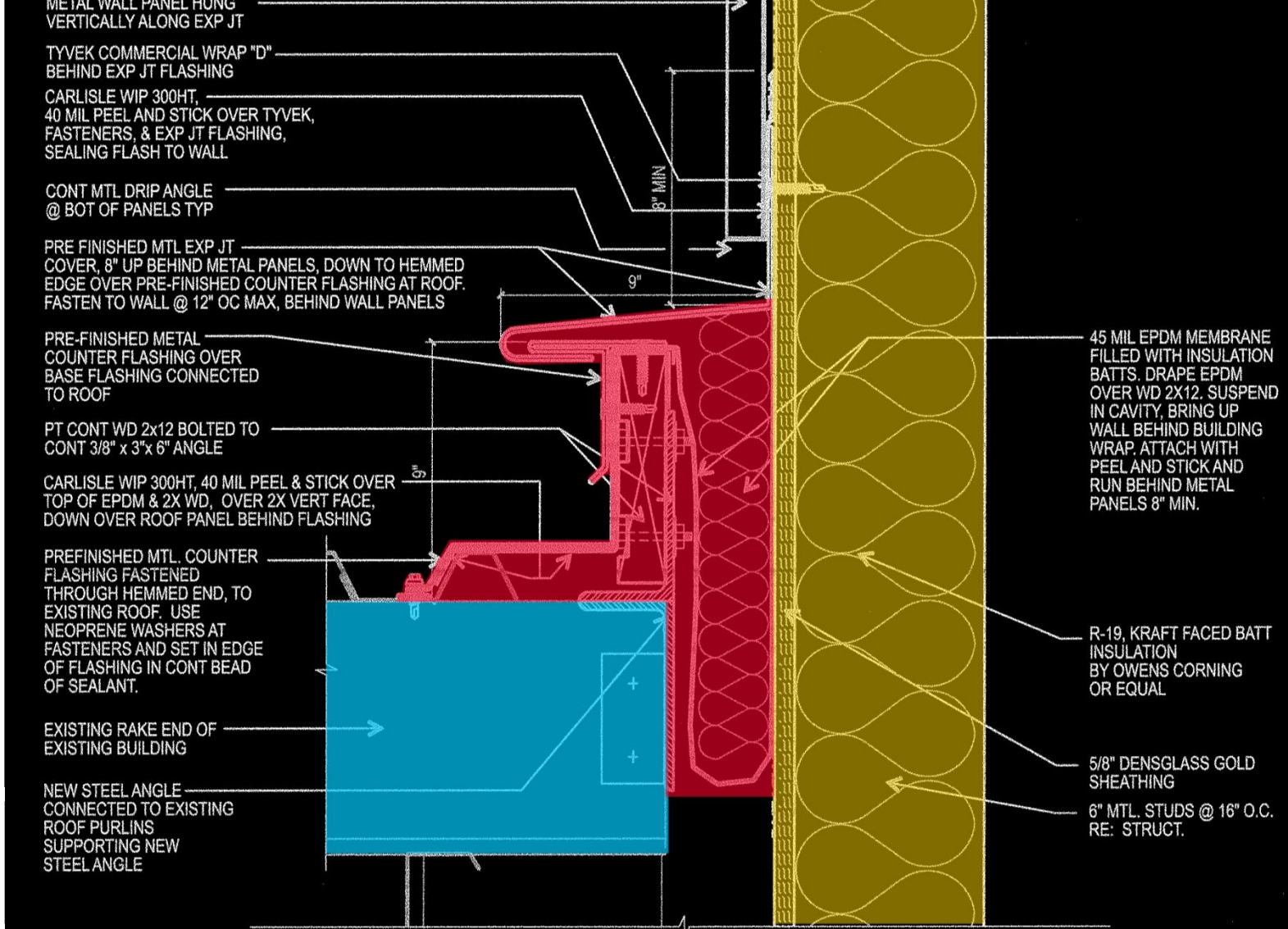
45 MIL EPDM MEMBRANE
FILLED WITH INSULATION
BATTS. DRAPE EPDM
OVER WD 2X12. SUSPEND
IN CAVITY, BRING UP
WALL BEHIND BUILDING
WRAP. ATTACH WITH
PEEL AND STICK AND
RUN BEHIND METAL
PANELS 8" MIN.

R-19, KRAFT FACED BATT
INSULATION
BY OWENS CORNING
OR EQUAL

5/8" DENSGLOSS GOLD
SHEATHING

6" MTL. STUDS @ 16" O.C.
RE: STRUCT.

DETAIL 5-EXPANSION JOINT DETAIL



DETAIL 5-EXPANSION JOINT DETAIL