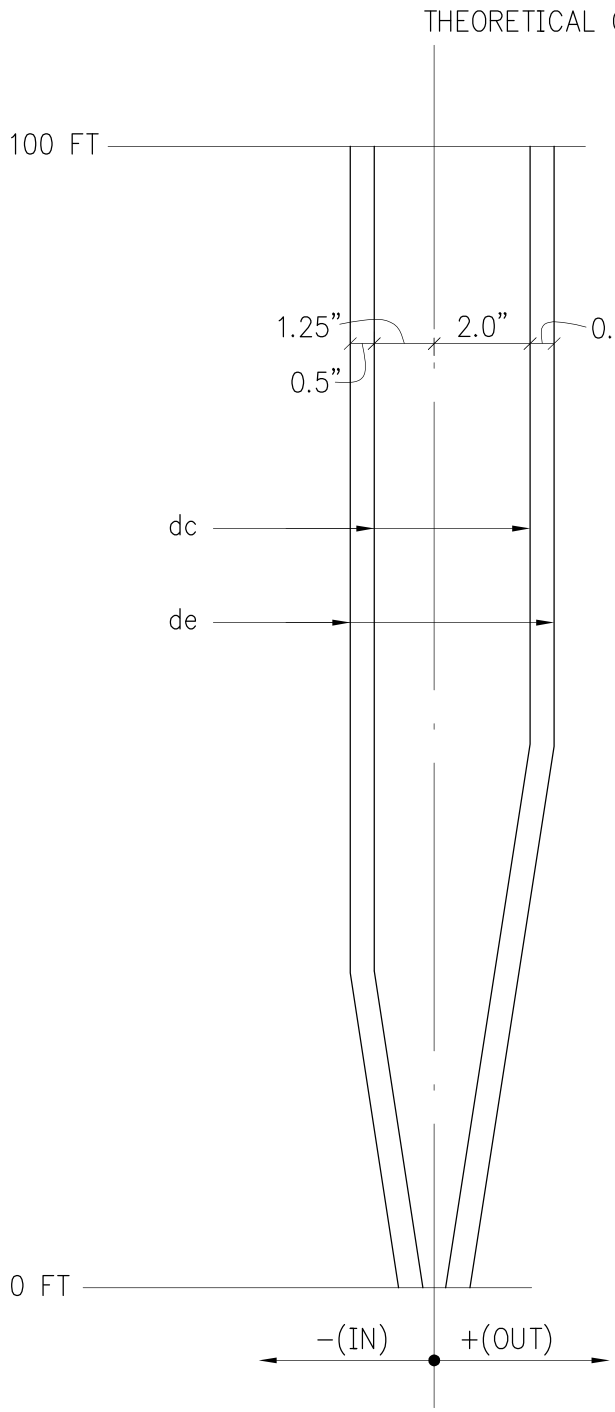

NOTE: IF SUFFICIENT EDGE ANGLE/BENT PLATE TO SPANDREL BEAM/GIRDER 'OVERLAP' (do) IS SPECIFIED, dc & de ARE NOT ADDITIVE WHEN ESTABLISHING THE EDGE OF SLAB/DECK TO EXTERIOR WALL SYSTEM 'GAP' (dgap) – do ACCOUNTS FOR dc & ELIMINATES dc FROM CONCERN W/ RESPECT TO THE EXTERIOR WALL SYSTEM.

NOTES:

dc = dc1 (COLUMN STARTING POINT TOLERANCE) + dc2 (COLUMN PLUMB TOLERANCE)

de = EDGE SPANDREL BEAM/GIRDER OR ANGLE/BENT PL SWEEP TOLERANCE

SEAC

FIGURE 1.1 : STRUCTURAL STEEL TOLERANCES (dc & de ADDITIVE)

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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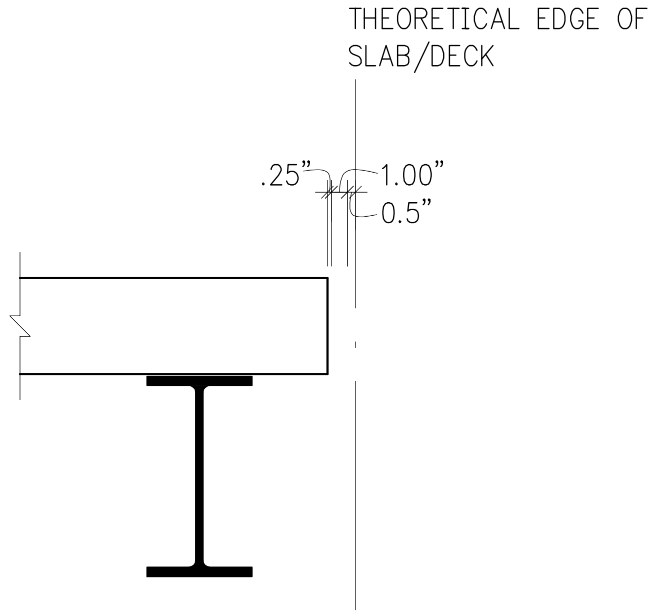
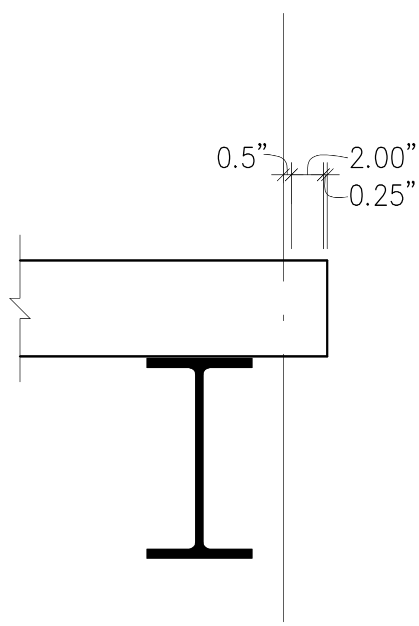


(IN) CONDITION

H = 100ft
BAY = 40ft



NOTE: IF SUFFICIENT EDGE ANGLE/BENT PLATE TO SPANDREL BEAM/GIRDER 'OVERLAP' (do) IS SPECIFIED, dc & de ARE NOT ADDITIVE WHEN ESTABLISHING THE EDGE OF SLAB/DECK TO EXTERIOR WALL SYSTEM 'GAP' (dgap) – do ACCOUNTS FOR dc

(OUT) CONDITION

SEAC

FIGURE 1.2 : STRUCTURAL STEEL TOLERANCES (dc & de ADDITIVE)

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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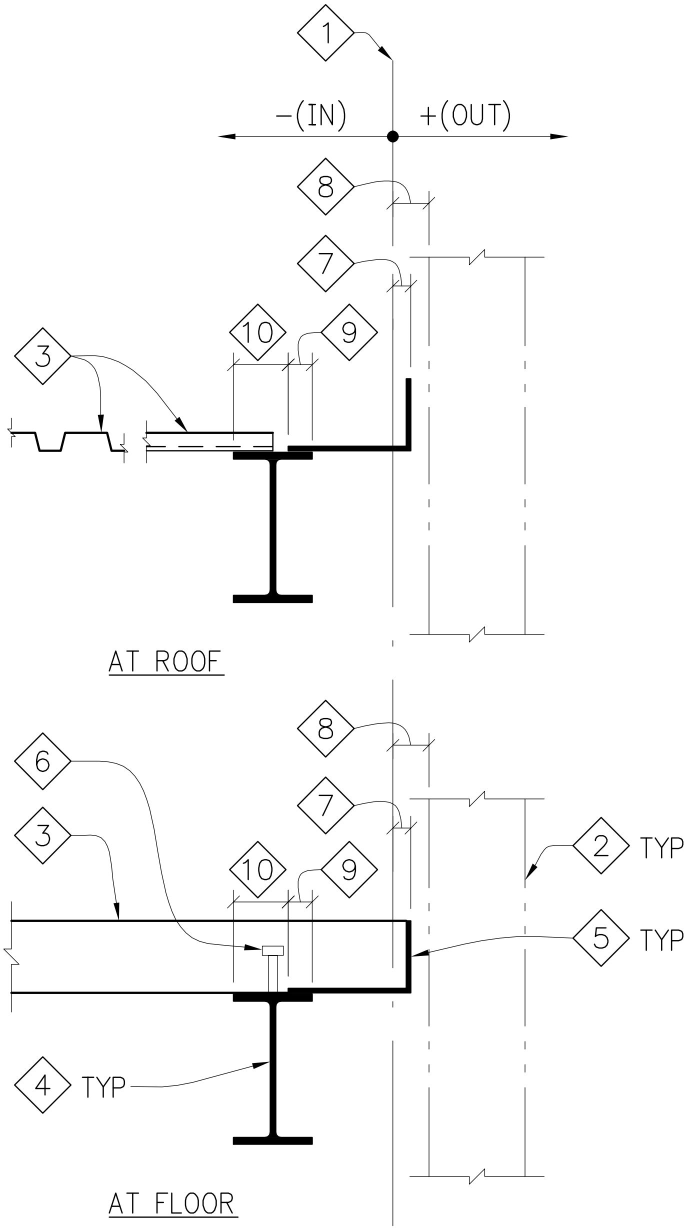


NOTES:

1. THEORETICAL EDGE OF SLAB/DECK.
2. EXTERIOR WALL SYSTEM.
3. SLAB/DECK.
4. SPANDREL BEAM/GIRDER.
5. EDGE ANGLE/BENT PLATE, 1/4" THICK MINIMUM
6. HDAS (3/4"ø IS TYPICAL SIZE).
7. SEE FIGURE 1.1 FOR +/− TOLERANCES. INCLUDES THE CUMULATIVE TOTAL CONSIDERING MILL, FABRICATION, & ERECTION PROCEDURES FOR COLUMN PLUMB 'dc' & EDGE SWEEP 'de'.

COLUMN PLUMB	EDGE SWEEP
dc+ (OUT)	de+ (OUT)
dc− (IN)	de− (IN)

8. EDGE OF SLAB/DECK TO INSIDE FACE OF EXTERIOR WALL SYSTEM SPECIFIED 'GAP' REQUIRED: dgap = (ds+)+(dw−)
   WHERE: ds = de
   SEE FIGURE 1.3b FOR CHART.
   SEE EXTERIOR WALL SYSTEM FIGURES FOR 'dw' VALUES.
9. EDGE ANGLE/BENT PLATE TO SPANDREL BEAM/GIRDER SPECIFIED 'OVERLAP' REQUIRED:
   do = (dc+) + dd
10. SPECIFIED 'WIDTH' REQUIRED ON SPANDREL BEAM/GIRDER FLANGE TO ALLOW FOR SUFFICIENT 'OVERLAP' & SPACE FOR HDAS/DECK CONNECTIONS:
   df = do + dh
   WHERE: dh = SPACE REQUIRED ON SPANDREL BEAM/GIRDER FLANGE FOR HDAS/DECK.

HEIGHT (ft)	dc1 (in)		dc2 (in)		dc (in)		de (in)	
	−(IN)	+(OUT)	−(IN)	+(OUT)	−(IN)	+(OUT)	−(IN)	+(OUT)
10	0.25	0.25	0.24	0.24	0.49	0.49	0.5	0.5
20	0.25	0.25	0.48	0.48	0.73	0.73	0.5	0.5
30	0.25	0.25	0.72	0.72	0.97	0.97	0.5	0.5
40	0.25	0.25	0.96	0.96	1.21	1.21	0.5	0.5
50	0.25	0.25	1.00	1.20	1.25	1.45	0.5	0.5
60	0.25	0.25	1.00	1.44	1.25	1.69	0.5	0.5
70	0.25	0.25	1.00	1.68	1.25	1.93	0.5	0.5
80	0.25	0.25	1.00	1.92	1.25	2.17	0.5	0.5
90	0.25	0.25	1.00	2.00	1.25	2.25	0.5	0.5
100	0.25	0.25	1.00	2.00	1.25	2.25	0.5	0.5

NOTES:
dc1 = COLUMN STARTING POINT TOLERANCE
dc2 = COLUMN PLUMB TOLERANCE
dc = dc1 + dc2 (dc1 = 0.125" SPECIFIED IN THE PROJECT SPECIFICATIONS IN COMMON)
de = EDGE SPANDREL BEAM/GIRDER OR ANGLE/BENT PLATE SWEEP TOLERANCE (ASSUMING 40ft BAY WITH SPANDREL BEAM/GIRDER FLANGE WIDTH 6" OR GREATER)

NOTE: IF SUFFICIENT EDGE ANGLE/BENT PLATE TO SPANDREL BEAM/GIRDER 'OVERLAP' (do) IS SPECIFIED, dc & de ARE NOT ADDITIVE WHEN ESTABLISHING THE EDGE OF SLAB/DECK TO EXTERIOR WALL SYSTEM 'GAP' (dgap) – do ACCOUNTS FOR dc & ELIMINATES dc FROM CONCERN W/ RESPECT TO THE EXTERIOR WALL SYSTEM.

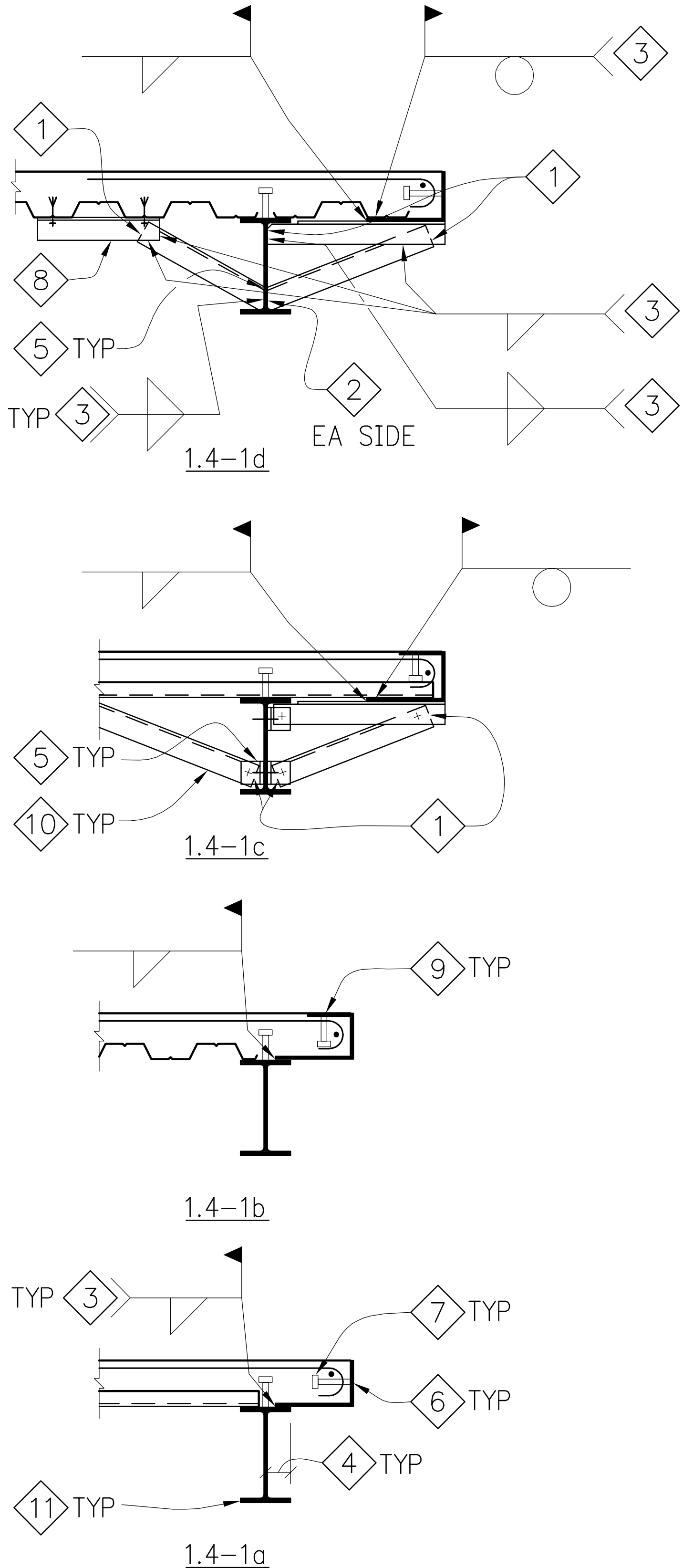
HEIGHT (ft)	dd (in)	do (in)	dh (in)	df (in)
10	1.00	1.49	2.00	3.49
20	1.00	1.73	2.00	3.73
30	1.00	1.97	2.00	3.97
40	1.00	2.21	2.00	4.21
50	1.00	2.45	2.00	4.45
60	1.00	2.69	2.00	4.69
70	1.00	2.93	2.00	4.93
80	1.00	3.17	2.00	5.17
90	1.00	3.25	2.00	5.25
100	1.00	3.25	2.00	5.25

NOTES: dd = RECOMMENDED DESIGN OVERLAP OF EDGE ANGLE/BENT PLATE TO SPANDREL BEAM/GIRDER

do = (dc+) + dd (SEE FIGURE 1.3b for dc+)

dh = SPACE REQUIRED ON SPANDREL BEAM/GIRDER FOR HDAS/DECK

df = do + dh



NOTES:

1. SQUARED ENDS OF PIECES FACILITATE EASE OF FABRICATION.
2. CONNECTION OF PIECES TO ONE SURFACE FACILITATES EASE OF FABRICATION AND/OR ERECTION.
3. DOWN OR SIDE WELDS IN LIEU OF OVERHEAD (FROM UNDERNEATH) WELDS FACILITATE EASE OF FABRICATION AND/OR ERECTION.
4. SUFFICIENT SPACE (SPANDREL BEAM/ GIRDER FLANGE WIDTH) MUST BE PROVIDED FOR CONNECTION OF HDAS/ DECK & ANGLE/BENT PLATE TO BEAM & SUFFICIENT 'OVERLAP' OF ANGLE/ BENT PLATE TO SPANDREL BEAM/GIRDER. SEE AISC SPECIFICATION FOR MINIMUM BEAM WEB THICKNESS REQUIRED TO ALLOW HDAS TO BE OFFSET FROM BEAM WEB.
5. ALLOWANCE OF WELDED OR BOLTED CONNECTIONS ALLOW CUSTOMIZED FABRICATION EFFICIENCIES.
6. ANGLES PROVIDE EASE OF FABRICATION IN LIEU OF BENT PLATES. GAGE METAL IS MORE COST EFFECTIVE THAN PLATE. PROVIDED BY STEEL FABRICATOR/ERECTOR.
7. HDAS PROVIDE EASE OF FABRICATION IN LIEU OF DAS. BY STEEL FABRICATOR.
8. CONNECTION OF KICKER PERPENDICULAR TO DECK SPAN VIA ANGLE, WT, OR BUILT-UP PLATE SECTION W/ ANCHORS INTO SLAB FACILITATES EASE OF FABRICATION & ERECTION OVER SKEWING KICKER TO BE WELDED TO ADJACENT BEAM. BY STEEL FABRICATOR/ERECTOR.
9. EMBED PLATE BY STEEL FABRICATOR.
10. KICKERS BY STEEL FABRICATOR/ ERECTOR.
11. NO CAMBER OF THE SPANDREL BEAM/ GIRDER IS PREFERRED (IF POSSIBLE) TO HELP CONTROL ISSUES OF FLOOR LEVELING AT THE BUILDING PERIMETER.

SEAC

FIGURE 1.4-1 : STRUCTURAL STEEL CONSTRUCTION ISSUES - FLOOR

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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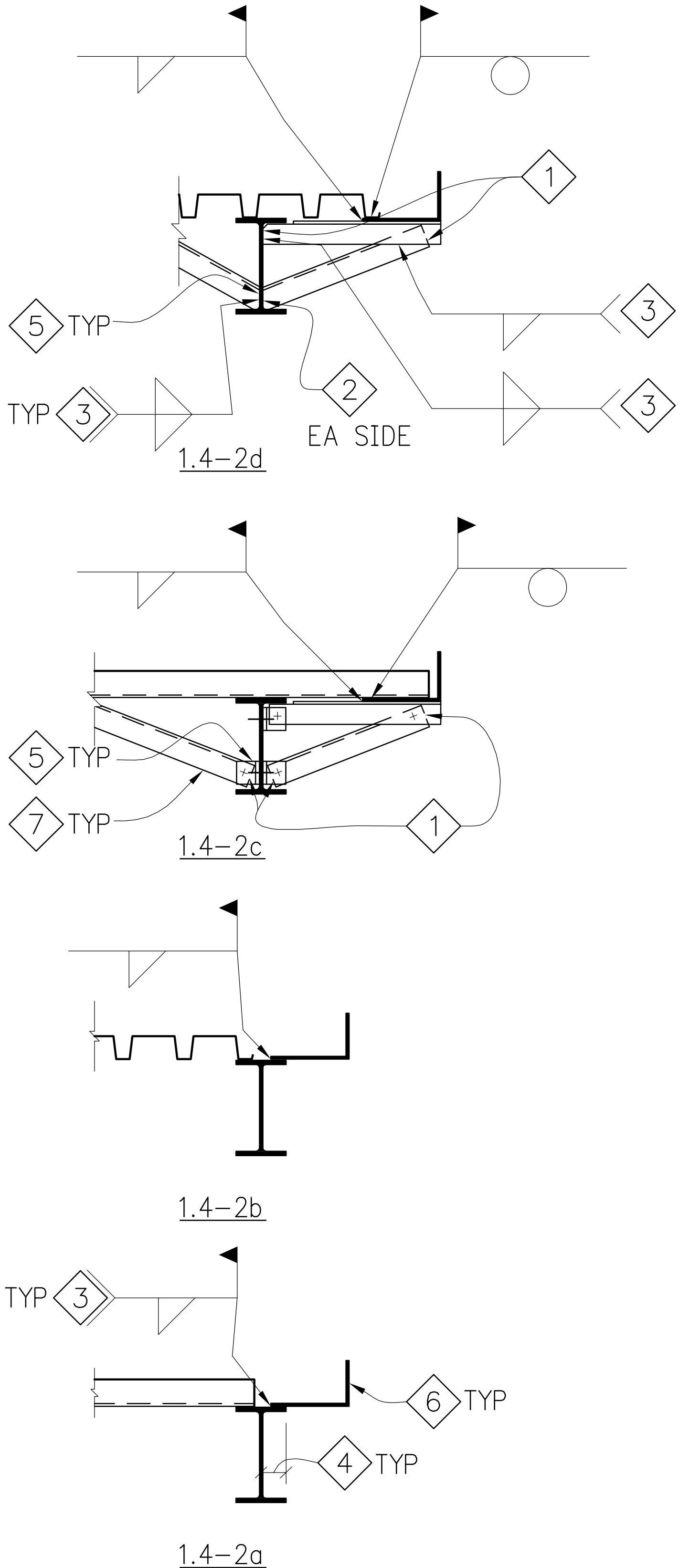

NOTES:

1. SQUARED ENDS OF PIECES FACILITATE EASE OF FABRICATION.
2. CONNECTION OF PIECES TO ONE SURFACE FACILITATES EASE OF FABRICATION AND/OR ERECTION.
3. DOWN OR SIDE WELDS IN LIEU OF OVERHEAD (FROM UNDERNEATH) WELDS FACILITATE EASE OF FABRICATION AND/OR ERECTION.
4. SUFFICIENT SPACE (SPANDREL BEAM/ GIRDER FLANGE WIDTH) MUST BE PROVIDED FOR CONNECTION OF ANGLE/ BENT PLATE TO BEAM.
5. ALLOWANCE OF WELDED OR BOLTED CONNECTIONS ALLOW CUSTOMIZED FABRICATION EFFICIENCIES.
6. ANGLES PROVIDE EASE OF FABRICATION IN LIEU OF BENT PLATES. GAGE METAL IS MORE COST EFFECTIVE THAN PLATE. BY STEEL FABRICATOR/ERECTOR.
7. KICKERS BY STEEL FABRICATOR/ ERECTOR.

SEAC

FIGURE 1.4-2 : STRUCTURAL STEEL CONSTRUCTION ISSUES - ROOF

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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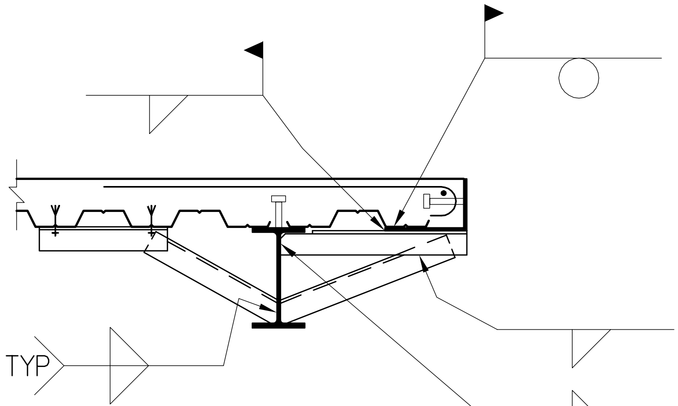
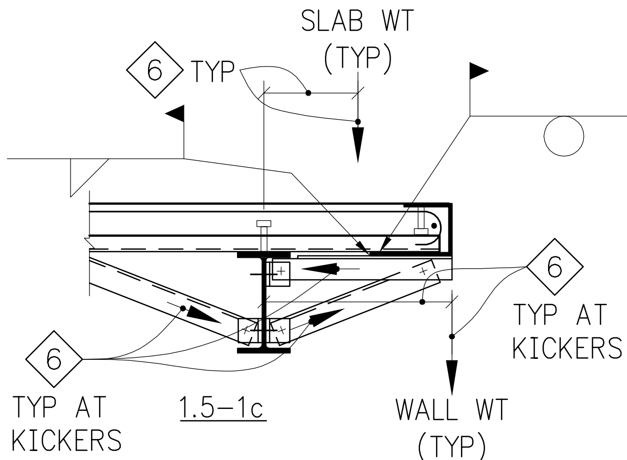
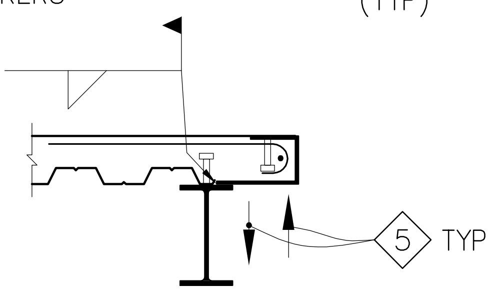


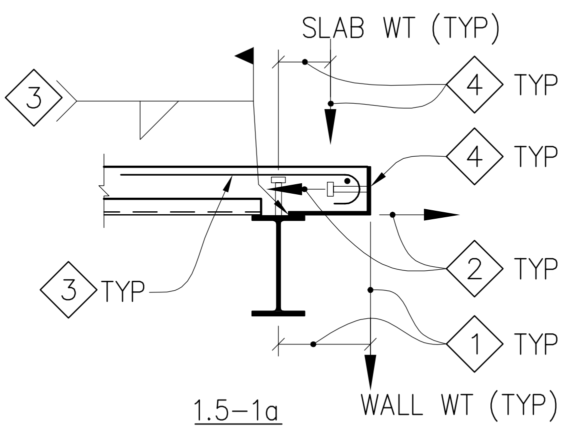
1.5–1d



1.5–1c



1.5–1b



1.5–1a

NOTES:

1. SEE EXTERIOR WALL SYSTEM SKETCHES. EXTERIOR WALL SYSTEM DESIGNED FOR ECCENTRICITY FROM EXTERIOR WALL SYSTEM CENTER OF GRAVITY TO EDGE OF SLAB.
2. FOR EXTERIOR WALL SYSTEM CONNECTIONS TO FACE OF EDGE OF SLAB: DESIGN ANGLE/BENT PLATE, HDAS/DAS, AND CONNECTIONS FOR EXTERIOR WALL SYSTEM WEIGHT APPLIED AT CORRESPONDING ECCENTRICITY TO EDGE OF SLAB.
3. DESIGN SLAB REINFORCING TO TAKE EXTERIOR WALL SYSTEM WEIGHT APPLIED AT CORRESPONDING ECCENTRICITY TO BEAM CENTERLINE.
4. DESIGN EDGE OF SLAB ANGLE/BENT PLATE & CONNECTIONS FOR SLAB WET CONCRETE WEIGHT APPLIED FROM CENTER OF MASS BEYOND THE BEAM FLANGE TO THE BEAM CENTERLINE.
5. FOR EXTERIOR WALL SYSTEM CONNECTIONS TO EMBED PLATES IN TOP OF SLAB: DESIGN ANGLE/BENT PLATE, HDAS/DAS, AND CONNECTIONS FOR EXTERIOR WALL SYSTEM WEIGHT APPLIED AT CORRESPONDING ECCENTRICITY TO EDGE OF SLAB.
6. KICKERS AND CONNECTIONS DESIGNED FOR EXTERIOR WALL SYSTEM + SLAB WET CONCRETE WEIGHT APPLIED AT CORRESPONDING ECCENTRICITY TO BEAM CENTERLINE.

SEAC

FIGURE 1.5-1 : STRUCTURAL STEEL ENGINEERING ISSUES - FLOOR

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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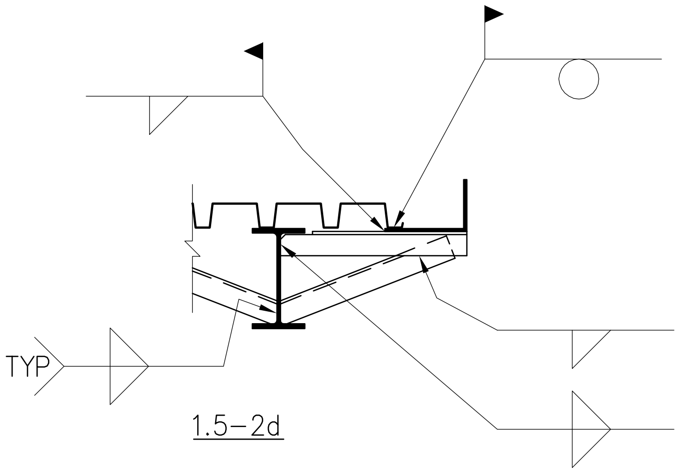
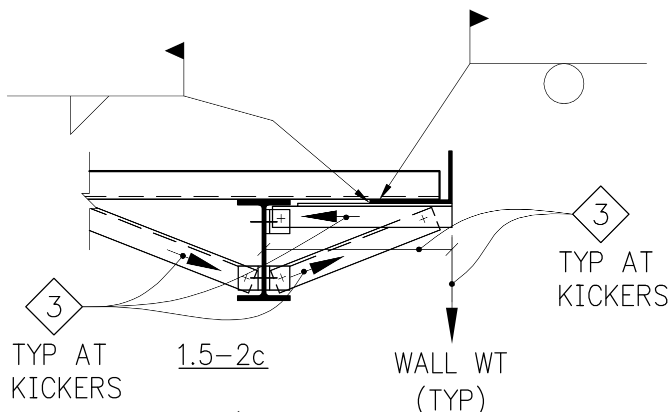
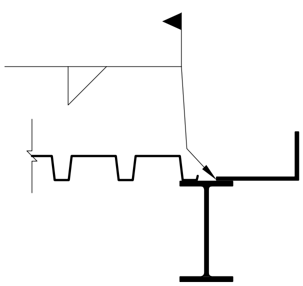


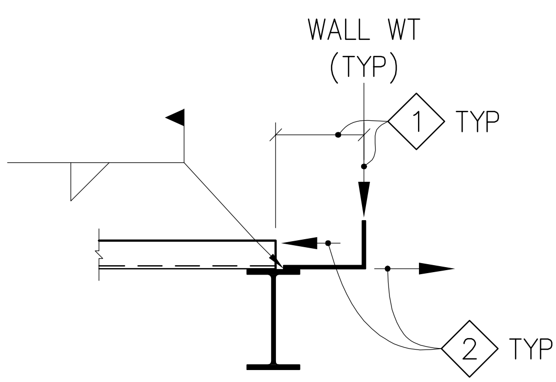
1.5–2d



1.5–2c



1.5–2b



1.5–2a

NOTES:

1. SEE EXTERIOR WALL SYSTEM SKETCHES. EXTERIOR WALL SYSTEM DESIGNED FOR ECCENTRICITY FROM EXTERIOR WALL STYSTEM CENTER OF GRAVITY TO EDGE OF DECK.

2. DESIGN ANGLE/BENT PLATE, HDAS/DAS, AND CONNECTIONS FOR EXTERIOR WALL SYSTEM WEIGHT APPLIED AT CORRESPONDING ECCENTRICITY TO EDGE OF SLAB.

3. KICKERS AND CONNECTIONS DESIGNED FOR EXTERIOR WALL SYSTEM WEIGHT APPLIED AT CORRESPONDING ECCENTRICITY TO BEAM CENTERLINE.

SEAC

FIGURE 1.5-2 : STRUCTURAL STEEL ENGINEERING ISSUES - ROOF

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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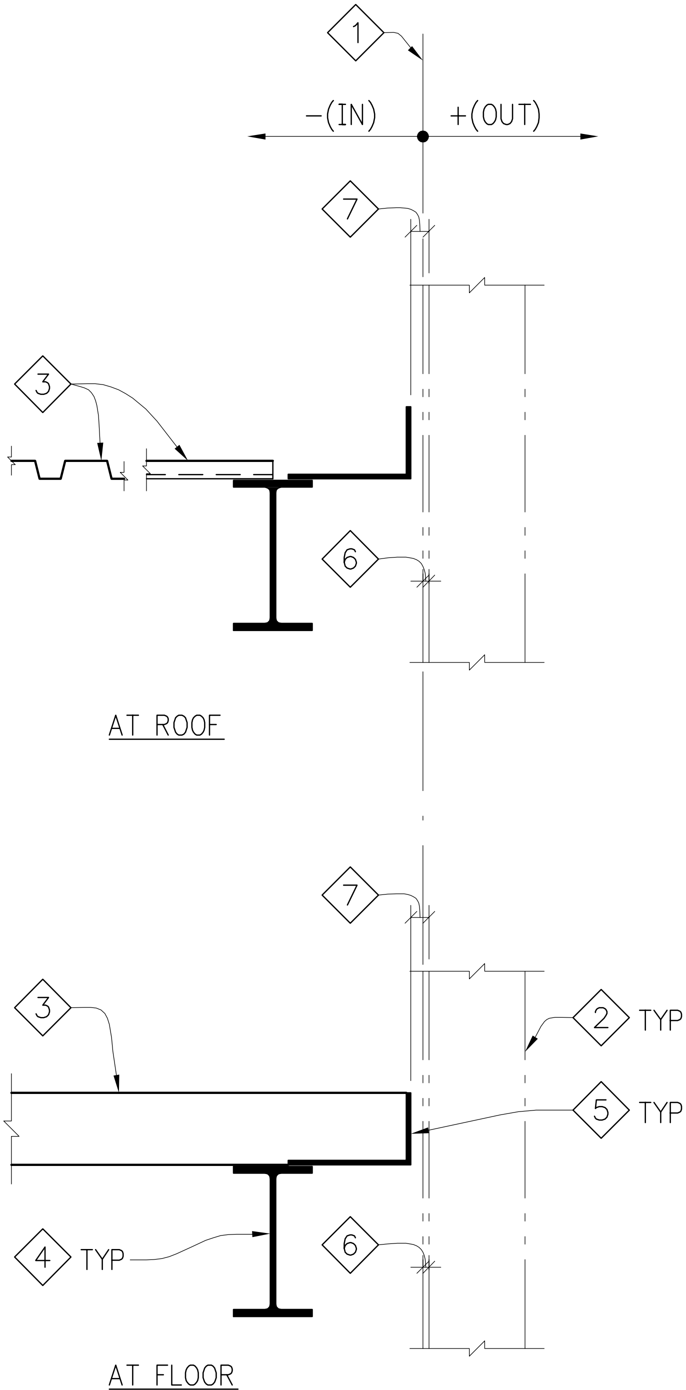

NOTES:

1. THEORETICAL INSIDE FACE OF METAL STUD SYSTEM.
2. METAL STUD SYSTEM.
3. SLAB/DECK.
4. SPANDREL BEAM/GIRDER.
5. EDGE ANGLE/BENT PLATE.
6. METAL STUD SYSTEM ± TOLERANCE. SEE FIGURE 2.1b FOR CHART.
7. EDGE OF SLAB/DECK TO INSIDE FACE OF METAL STUD SYSTEM GAP 'dgap' REQUIRED:
   dgap = (ds+) + (dw−).
   SEE FIGURE 2.1b FOR CHART.

SEAC

FIGURE 2.1a : METAL STUD TOLERANCES

STRUCTURAL STEEL BUILDING − EXTERIOR WALL INTERFACE ISSUES

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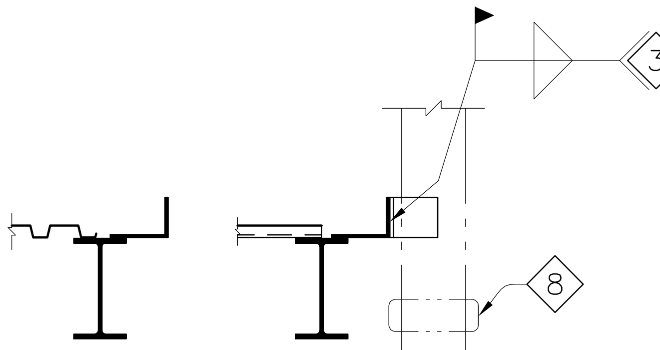
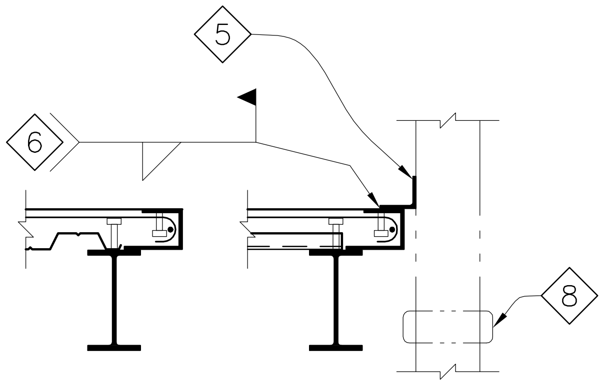
HEIGHT (ft)	ds (in)		dw (in)		dgap (in)	e (in)
	−(IN)	+(OUT)	−(IN)	+(OUT)		
10	0.5	0.5	0.13	0.13	0.63	1.25 + c
20	0.5	0.5	0.13	0.13	0.63	1.25 + c
30	0.5	0.5	0.13	0.13	0.63	1.25 + c
40	0.5	0.5	0.13	0.13	0.63	1.25 + c
50	0.5	0.5	0.13	0.13	0.63	1.25 + c
60	0.5	0.5	0.13	0.13	0.63	1.25 + c
70	0.5	0.5	0.13	0.13	0.63	1.25 + c
80	0.5	0.5	0.13	0.13	0.63	1.25 + c
90	0.5	0.5	0.13	0.13	0.63	1.25 + c
100	0.5	0.5	0.13	0.13	0.63	1.25 + c

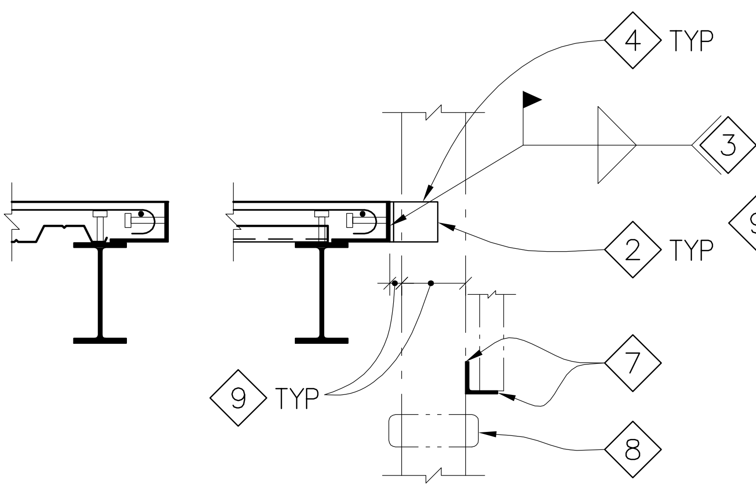
NOTES:
ds = de (VALUES TAKEN FROM CHART IN FIGURE 1.3b)
dw = EXTERIOR WALL SYSTEM TOLERANCE
dgap = (ds+) + (dw−)
dgap = 0.75" IS COMMON SPECIFIED 'GAP'
e = ds + dgap + c
SEE FIGURES 2.3 FOR GRAPHIC DEPICTION OF 'e' & 'c'



AT ROOF



AT FLOOR – PANELIZED METAL STUDS



AT FLOOR – STICK BUILT METAL STUDS

NOTES:

1. SEE FIGURES 1.4 FOR STEEL FRAMING NOTES.

2. METAL STUD CLIP BY METAL STUD SUPPLIER. CLIP IS EITHER DESIGNED TO DELIVER THE WALL WEIGHT TO THE EDGE ANGLE/BENT PLATE OR IS DESIGNED TO SLIP VERTICALLY.

3. CLIP EITHER FIELD WELDED OR SCREW /ANCHOR FASTENED TO EDGE ANGLE/ BENT PLATE BY METAL STUD WALL SUPPLIER.

4. CLIP/SUPPORT ANGLE TO METAL STUD BY METAL STUD SUPPLIER.

5. CONTINUOUS STRONGBACK ANGLE SUPPLIED BY STEEL FABRICATOR & INSTALLED BY METAL STUD SUPPLIER.

6. SUPPORT STRONGBACK ANGLE TO SLAB/FRAME BY METAL STUD SUPPLIER.

7. BRICK LEDGER ANGLES ARE SUPPLIED BY STEEL FABRICATOR. STEEL ERECTORS PREFER NOT TO HAVE TO FIELD WELDING TO METAL STUDS INCLUDED IN THEIR SCOPE.

8. CAPABILITY FOR ALLOWING VERTICAL SLIP IN THE METAL STUD WALL SYSTEM AT SOME LOCATION BETWEEN FLOORS IS REQUIRED TO ENSURE THAT RELATIVE DEFLECTIONS OF FLOORS/ ROOF DO NOT LOAD/CRUSH METAL STUD WALL SYSTEM.

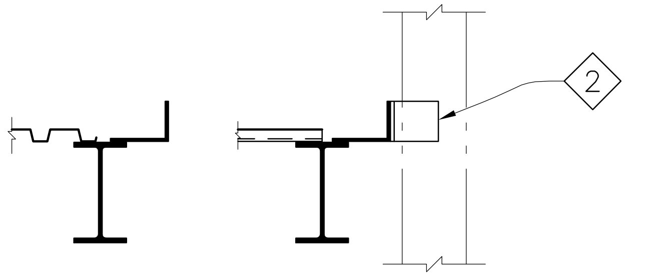
9. DEPENDING ON THE GOVERNING JURISDICTION, FIRE–SAFING MAY BE REQUIRED FROM THE OUTSIDE FACE OF ANGLE/BENT PLATE TO THE INSIDE OR OUTSIDE FACE OF METAL STUD WALL SYSTEM.

FIGURE 2.2-1 : METAL STUD CONSTRUCTION ISSUES - CASE A: BALLOON FRAMING

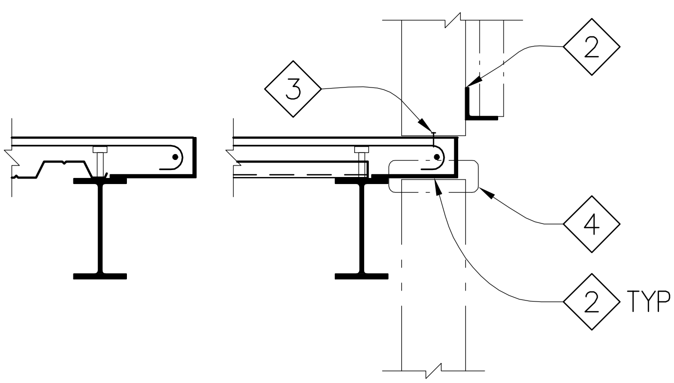
STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

NOTES:

1. SEE FIGURES 1.4 FOR STEEL FRAMING NOTES.
2. SEE FIGURE 2.2–1 FOR NOTES.
3. METAL STUD SCREW/ANCHOR FASTENED TO SLAB BY METAL STUD SUPPLIER.
4. CAPABILITY FOR ALLOWING VERTICAL SLIP IN THE METAL STUD WALL SYSTEM IS REQUIRED TO ENSURE THAT RELATIVE DEFLECTIONS OF FLOORS/ROOF DO NOT LOAD/CRUSH METAL STUD WALL SYSTEM.

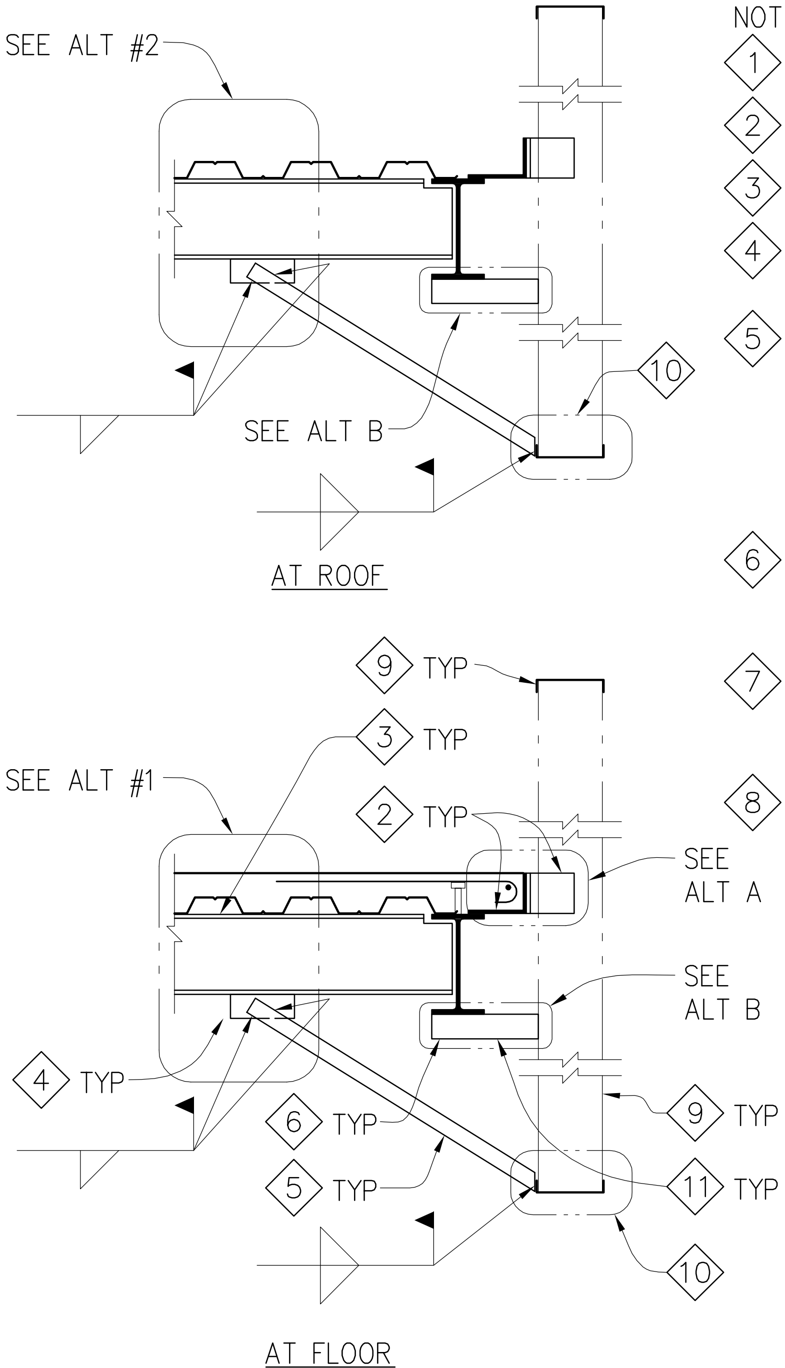


AT ROOF



AT FLOOR

SEAC	**FIGURE 2.2-2 : METAL STUD CONSTRUCTION ISSUES - CASE B: INFILL FRAMING** STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES	RMSCA ROCKY MOUNTAIN STEEL CONSTRUCTION ASSOCIATION



NOTES:

1. SEE FIGURES 1.4 FOR STEEL FRAMING NOTES.
2. SEE FIGURE 2.2-1 FOR NOTES.
3. BEAM.
4. PLATE, ANGLE OR WT SHOP WELDED OR BOLTED TO BEAM, 1/4" MINIMUM.
5. KICKER - METAL STUDS (BY METAL STUD SUPPLIER) OR ANGLES (SUPPLIED BY STEEL FABRICATOR & INSTALLED BY METAL STUD SUPPLIER) AT BEAMS OR BEAMS & INTERMITTENT LOCATIONS (ALT #1 & ALT #2) BY METAL STUD SUPPLIER.
6. METAL STUD (BY METAL SUPPLIER) OR ANGLE (SUPPLIED BY STEEL FABRICTOR & INSTALLED BY METAL STUD SUPPLIER) SUPPORT BRACKET.
7. ANGLE, WT, OR BUILT-UP PLATE SECTION ANCHORED INTO SLAB BY STEEL FABRICATOR/ ERECTOR.
8. ANGLE OR WT SPANNING FROM BEAM TO BEAM BY STEEL FABRICATOR/ERECTOR.
9. METAL STUD FRAME (BY METAL STUD SUPPLIER) OR CHANNEL/TUBE FRAME BY (STEEL FABRICATOR/ ERECTOR) W/ METAL STUD INFILL.
10. CAPABILITY FOR ALLOWING VERTICAL SLIP IN THE METAL STUD WALL SYSTEM IS REQUIRED TO ENSURE THAT RELATIVE DEFLECTIONS OF FLOORS/ROOF DO NOT LOAD/CRUSH METAL STUD WALL SYSTEM.
11. BRACKETS/CONNECTIONS HERE COMPLICATE FIRE-PROOFING & FIRE SAFING SEQUENCING. SUPPLIED BY STEEL FABRICATOR & INSTALLED BY METAL STUD SUPPLIER.

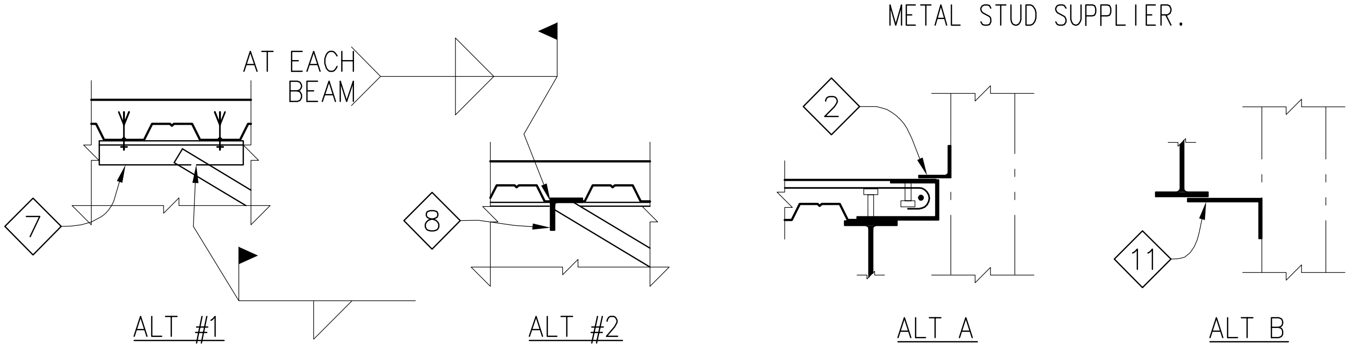


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FIGURE 2.2-3 : METAL STUD CONSTRUCTION ISSUES - CASE C: STRIP WINDOW PANELS

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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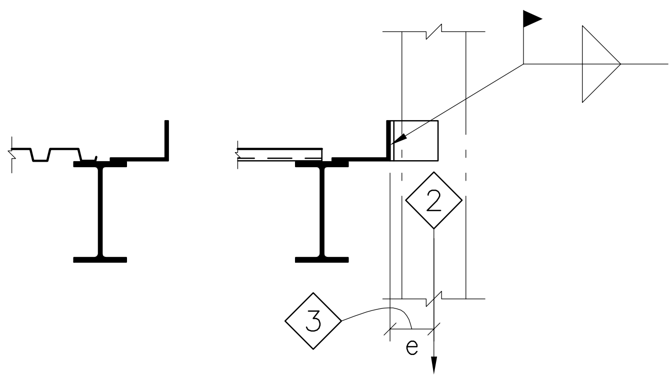
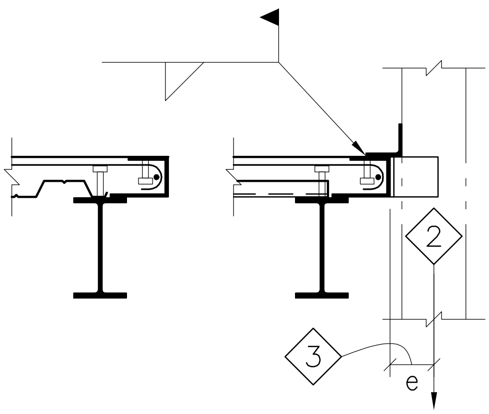
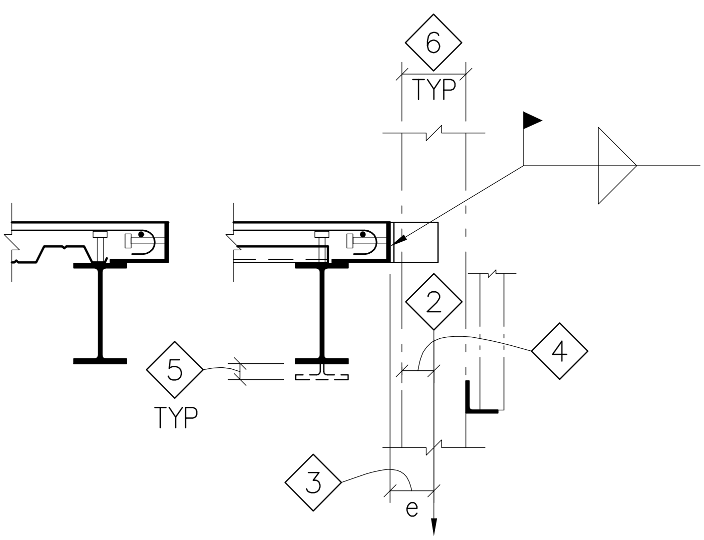


AT ROOF



AT FLOOR – OPTION B



AT FLOOR – OPTION A

NOTES:

1. SEE FIGURES 1.5 FOR STEEL FRAMING NOTES.
2. METAL STUD WALL WEIGHT (INCLUDING CONNECTIONS, LEDGER ANGLES, VENEER, ETC.) AT CENTER OF GRAVITY OF METAL STUD WALL SYSTEM.
3. TYPICAL ECCENTRICITY 'e' FOR WHICH METAL STUD WALL SYSTEM & CONNECTIONS TO STEEL ARE DESIGNED (NON-VERTICAL SLIP CLIP CONDITION).
   e = ds + dgap + c
   SEE CHART IN FIGURE 2.1b FOR VALUES.
4. DISTANCE FROM CENTER OF GRAVITY OF METAL STUD WALL SYSTEM TO INSIDE FACE OF METAL STUD WALL SYSTEM 'c'.
5. TYPICAL MAXIMUM LIVE LOAD DEFLECTIONS SHOULD BE LIMITED TO 3/8".
6. METAL STUD WALL SYSTEM THICKNESS 't'.

SEAC

FIGURE 2.3-1 : METAL STUD ENGINEERING ISSUES - CASE A: BALLOON FRAMING

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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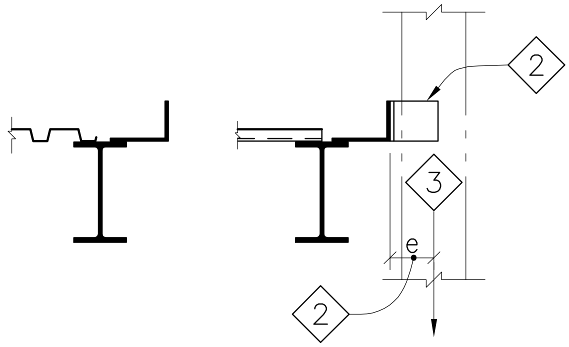
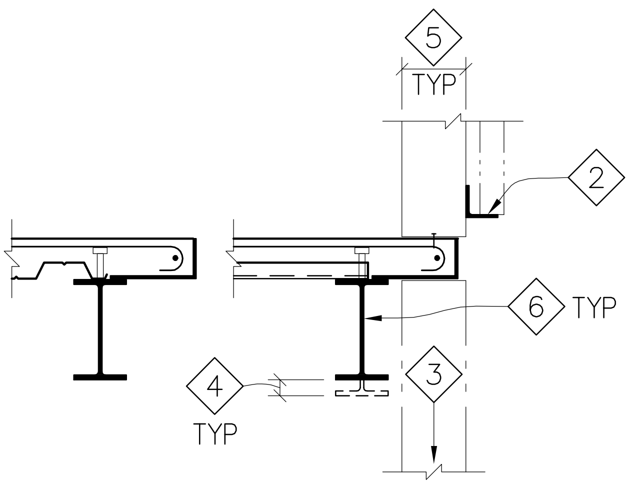


AT ROOF



AT FLOOR

NOTES:

1. SEE FIGURES 1.5 FOR STEEL FRAMING NOTES.
2. SEE FIGURE 2.3-1 FOR NOTES.
3. METAL STUD WALL WEIGHT (INCLUDING CONNECTIONS, LEDGER ANGLES, VENEER, ETC.) AT CENTER OF GRAVITY OF METAL STUD WALL SYSTEM.
4. TYPICAL MAXIMUM LIVE LOAD DEFLECTIONS SHOULD BE LIMITED TO 3/8".
5. METAL STUD WALL SYSTEM THICKNESS 't'.
6. FIRE-PROOFING MUST GO ON STEEL PRIOR TO INSTALLING METAL STUD WALL SYSTEM.

SEAC

FIGURE 2.3-2 : METAL STUD ENGINEERING ISSUES - CASE B: INFILL FRAMING

STRUCTURAL STEEL BUILDING - EXTERIOR WALL INTERFACE ISSUES

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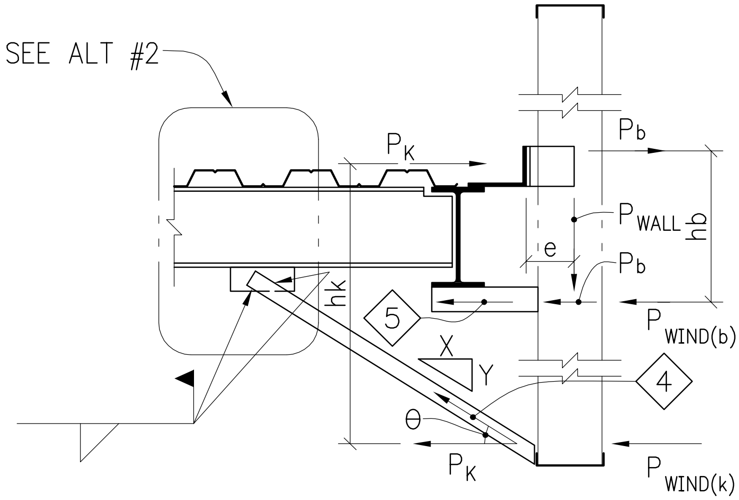


AT ROOF

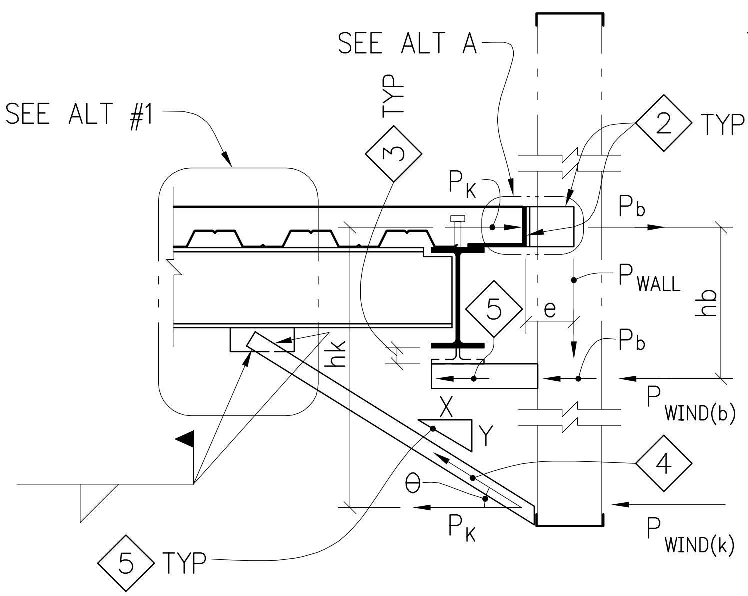
NOTES:

1. SEE FIGURES 1.5 FOR STEEL FRAMING NOTES.
2. SEE FIGURE 2.3–1 FOR NOTES. VERTICAL SLIP CLIP CANNOT BE SPECIFIED.
3. TYPICAL MAXIMUM LIVE LOAD DEFLECTIONS SHOULD BE LIMITED TO 3/8".
4. KICKER LOAD:

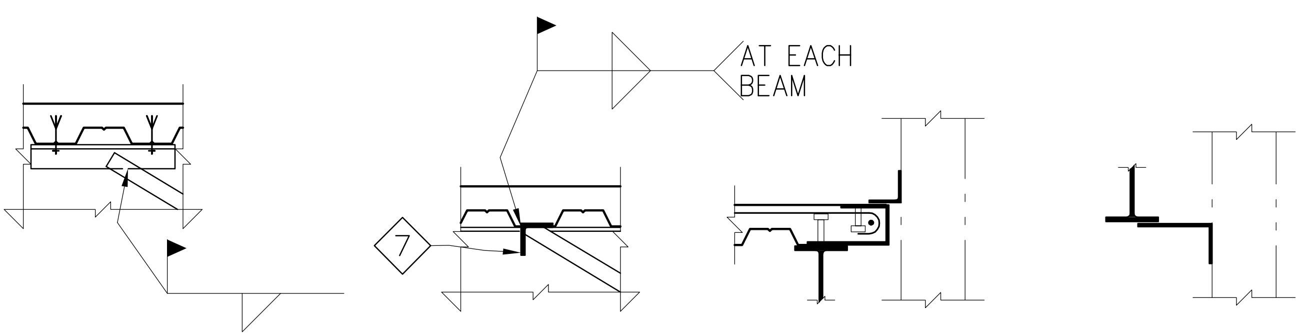
$$T/C = \frac{[P_k + P_{WIND(k)}]}{\cos\theta}$$

WHERE: $P_k = (P_{WALL})(e/hk)$

5. MINIMIZING Y/X REDUCES HORIZONTAL THRUST INDUCES IN METAL STUD WALL DUE TO BEAM VERTICAL DEFLECTIONS.



AT FLOOR



ALT #1 ALT #2 ALT A ALT B

SEAC

FIGURE 2.3-3 : METAL STUD ENGINEERING ISSUES - CASE C: STRIP WINDOW CENTER PANELS

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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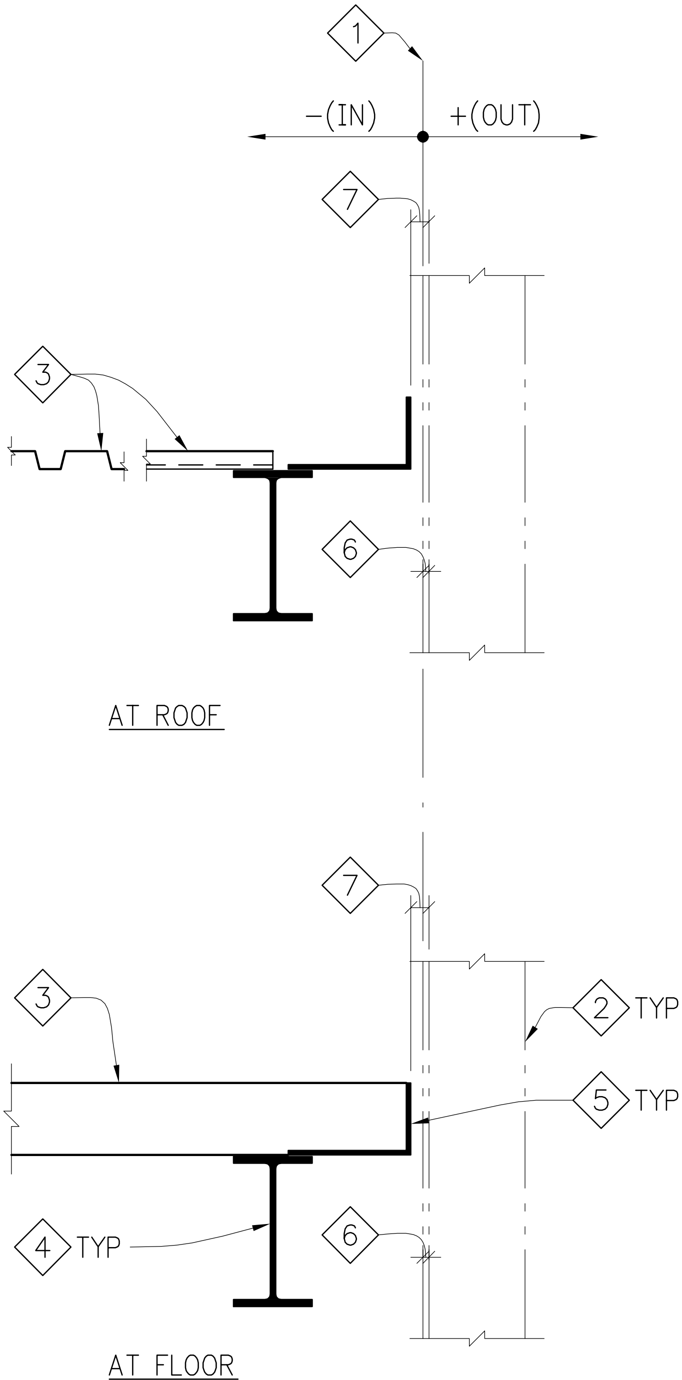

NOTES:

1. THEORETICAL INSIDE FACE OF PRECAST CONCRETE SYSTEM.
2. PRECAST CONCRETE SYSTEM.
3. SLAB/DECK.
4. SPANDREL BEAM/GIRDER.
5. EDGE ANGLE/BENT PLATE.
6. PRECAST CONCRETE SYSTEM ± TOLERANCE. SEE FIGURE 3.1b FOR CHART.
7. EDGE OF SLAB/DECK TO INSIDE FACE OF PRECAST CONCRETE SYSTEM GAP 'dgap' REQUIRED:
   dgap = (ds+) + (dw−).
   SEE FIGURE 3.1b FOR CHART.

SEAC

FIGURE 3.1a : PRECAST CONCRETE TOLERANCES

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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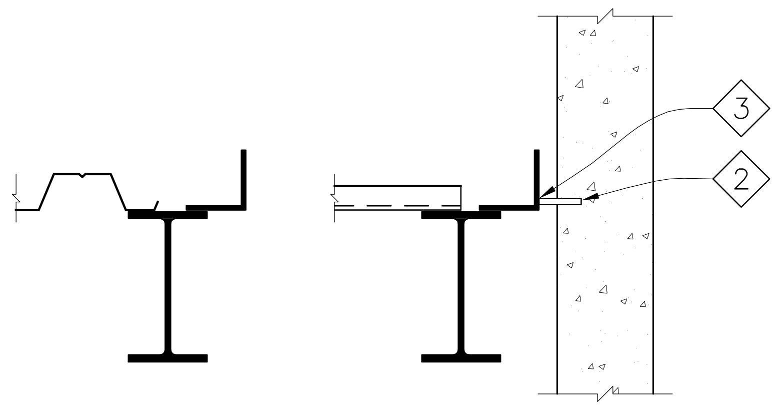
HEIGHT (ft)	ds (in)		dw (in)		dgap (in)	e (CASE C) (in)
	−(IN)	+(OUT)	−(IN)	+(OUT)		
10	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
20	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
30	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
40	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
50	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
60	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
70	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
80	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
90	0.5	0.5	0.25	0.25	0.75	1.25 + t/2
100	0.5	0.5	0.25	0.25	0.75	1.25 + t/2

NOTES:

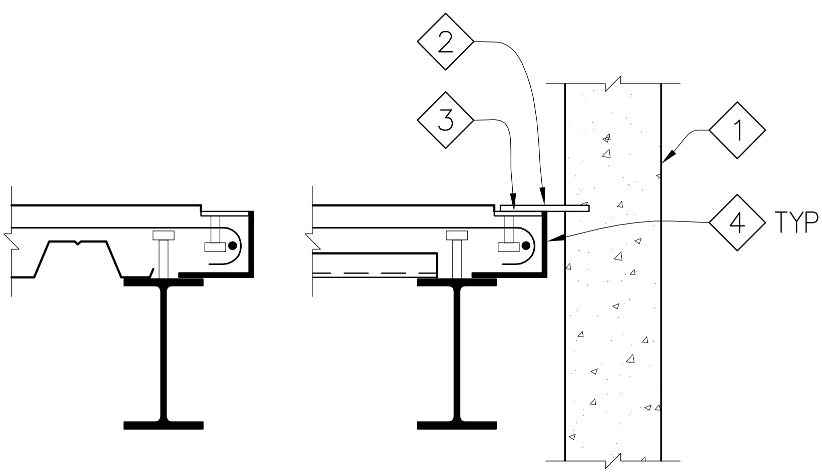
ds = de (VALUES TAKEN FROM CHART IN FIGURE 1.3b)
dw = EXTERIOR WALL SYSTEM TOLERANCE
dgap = (ds+) + (dw−)
dgap = 0.75" IS COMMON SPECIFIED 'GAP'
e = ds + dgap + t/2
SEE FIGURES 3.3 FOR GRAPHIC DEPICTION OF 'e' & 't'

NOTES:

1. SEE FIGURES 1.4 FOR STEEL FRAMING NOTES.
2. SLOTTED INSERT. INSERT ALLOWS FOR VERTICAL SLIP AND ROTATION OF PRECAST CONCRETE WITH RESPECT TO STEEL FRAMING BY PRECAST CONCRETE SUPPLIER.
3. CONNECTION TO STEEL BY PRECAST CONCRETE SUPPLIER.
4. EDGE ANGLE/BENT PLATE, 1/4" THICK MINIMUM.



AT ROOF



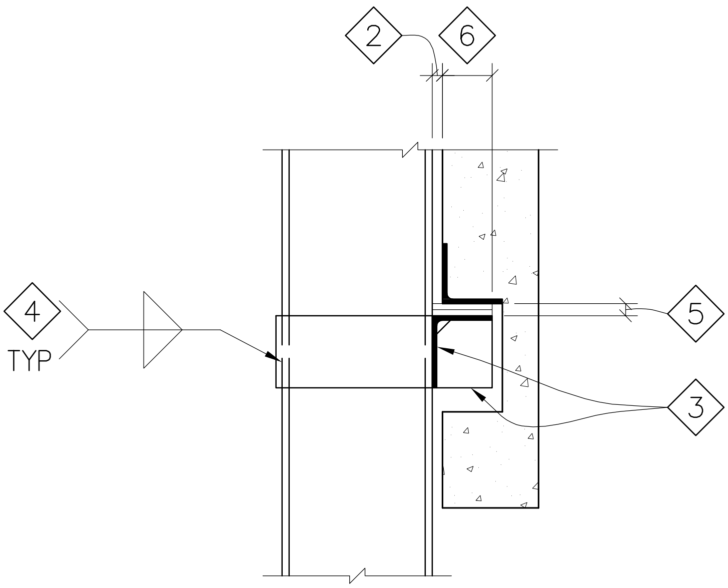
AT FLOOR

SEAC

FIGURE 3.2-1 : PRECAST CONCRETE CONSTRUCTION ISSUES - CASE A

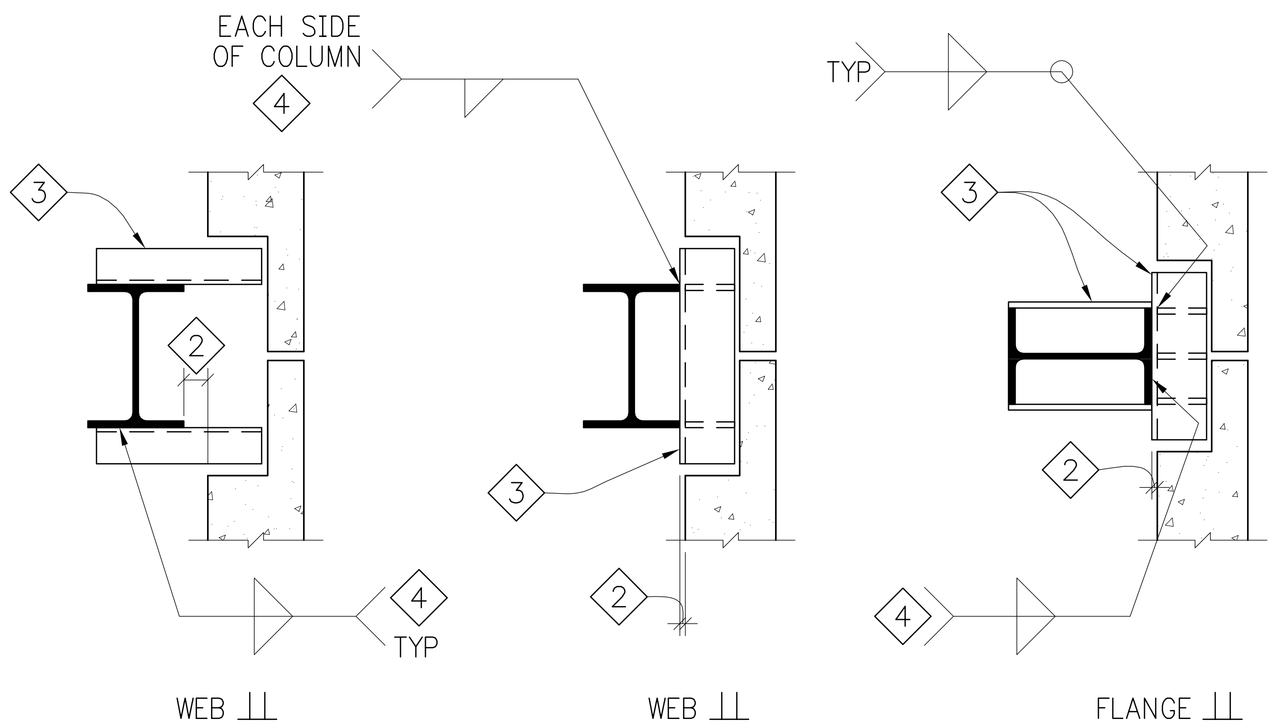
STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

RMSCA ROCKY MOUNTAIN STEEL CONSTRUCTION ASSOCIATION



NOTES:

1. SEE FIGURES 1.4 FOR STEEL FRAMING NOTES.
2. 'dgap' REQUIRED = VALUE OBTAINED FROM FIG. 3.1b
3. STEEL BRACKET (ANGLES, WT'S, WIDE FLANGES, TUBES, CHANNELS, ETC.) IF INSTALLED IN SHOP, BY STEEL FABRICATOR. IF INSTALLED IN FIELD, BY PRECAST CONCRETE SUPPLIER. TYPICALLY IT IS MORE EFFICIENT & COST EFFECTIVE FOR THE PROJECT TO INSTALL BRACKETS IN THE SHOP.
4. CONNECTION IN SHOP (BY STEEL FABRICATOR) OR IN FIELD (BY PRECAST CONCRETE SUPPLIER).
5. SHIM STACK FOR FIELD ADJUSTMENT (TYPICALLY 1" THICK) BY PRECAST CONCRETE SUPPLIER. IT IS SIGNIFICANTLY MORE EFFICIENT & COST EFFECTIVE TO PROVIDE A SHIM STACK TO AVOID ELEVATION ERRORS & THUS, COSTLY REPAIRS IN THE FIELD.
6. 2" MIN BEARING TYPICALLY REQUIRED BY PRECAST CONCRETE SUPPLIER.



SEAC

FIGURE 3.2-2a : PRECAST CONCRETE CONSTRUCTION ISSUES - CASE B

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

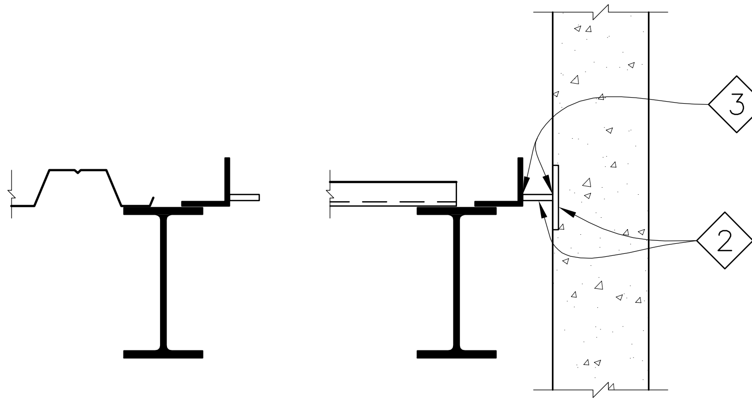
RMSCA
ROCKY MOUNTAIN STEEL CONSTRUCTION ASSOCIATION

NOTES:

1. SEE FIGURES 1.4 FOR STEEL FRAMING NOTES.

2. LATERAL SUPPORT FOR PRECAST CONCRETE TYPICALLY AT 4'-0" OC. MATERIAL AND CONNECTIONS BY PRECAST CONCRETE SUPPLIER. INSERT ALLOWS FOR VERTICAL SLIP AND ROTATION OF PRECAST CONCRETE WITH RESPECT TO STEEL FRAMING.

3. CONNECTION TO STEEL BY PRECAST CONCRETE SUPPLIER.



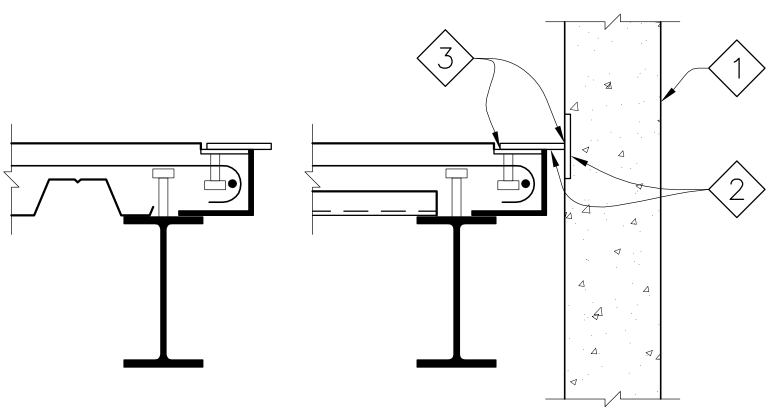


FIGURE 3.2-2b

SEAC	**FIGURE 3.2-2b : PRECAST CONCRETE CONSTRUCTION ISSUES - CASE B**	RMSCA ROCKY MOUNTAIN STEEL CONSTRUCTION ASSOCIATION
	STRUCTURAL STEEL BUILDING - EXTERIOR WALL INTERFACE ISSUES	

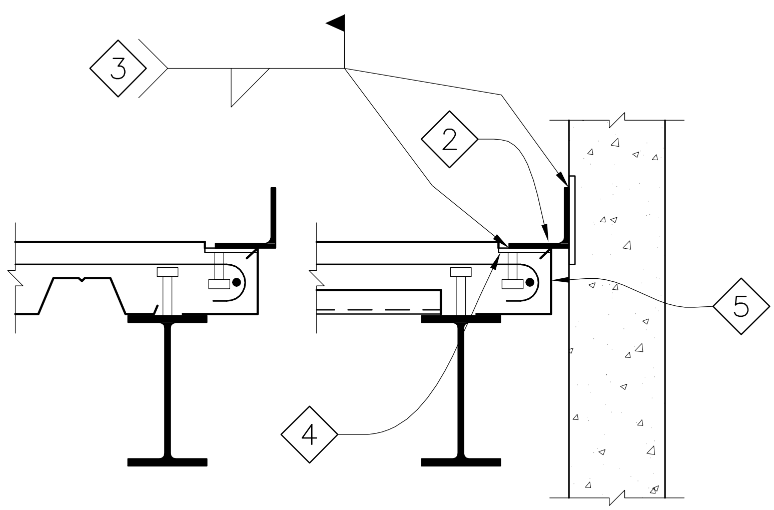
NOTES:

1. SEE FIGURES 1.4 FOR STEEL FRAMING NOTES.

2. CONTINUOUS STRONG-BACK MEMBER (ANGLE, TUBE, WIDE FLANGE, ETC.) PROVIDED BY PRECAST CONCRETE SUPPLIER.

3. WELD FROM PRECAST CONCRETE TO STRONG-BACK TO STEEL FRAMING BY PRECAST CONCRETE SUPPLIER.

4. EMBED PLATE BY PRECAST CONCRETE SUPPLIER. TYPICALLY SUPPORTS FOR WEIGHT OF PRECAST CONCRETE ARE PROVIDED AT 2 LOCATIONS NEAR THE ENDS OF THE STEEL SPANDREL BEAM/GIRDER.



SEAC

FIGURE 3.2-3 : PRECAST CONCRETE CONSTRUCTION ISSUES - CASE C

STRUCTURAL STEEL BUILDING - EXTERIOR WALL INTERFACE ISSUES

RMSCA

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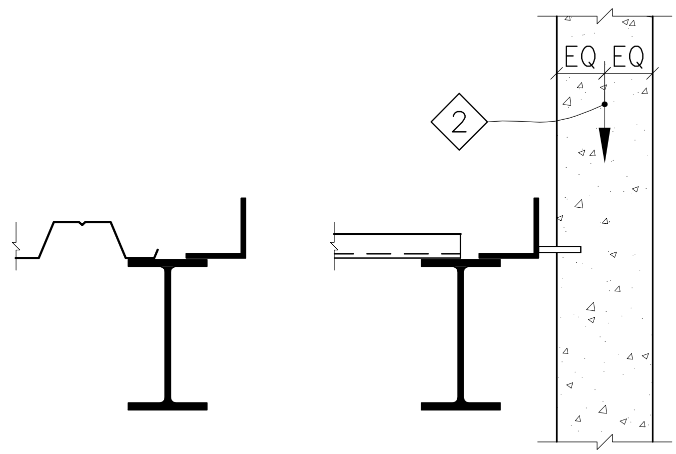
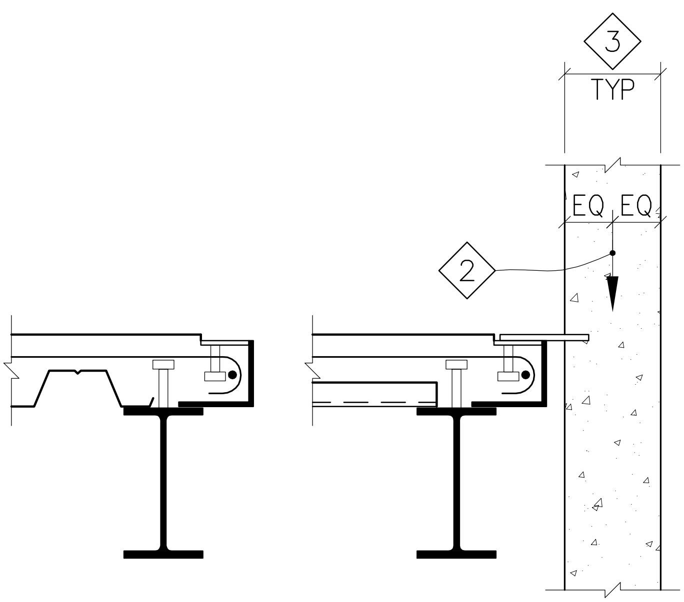
NOTES:

1. SEE FIGURES 1.5 FOR STEEL FRAMING NOTES.
2. PRECAST CONCRETE WALL WEIGHT CARRIED BY BUILDING FOUNDATION.
3. PRECAST CONCRETE THICKNESS 't'.



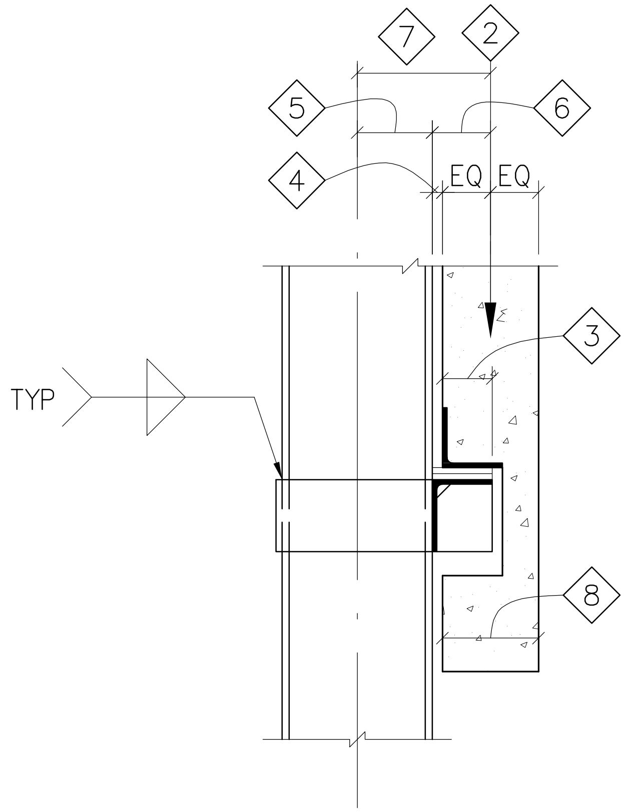


SEAC

FIGURE 3.3-1 : PRECAST CONCRETE ENGINEERING ISSUES - CASE A

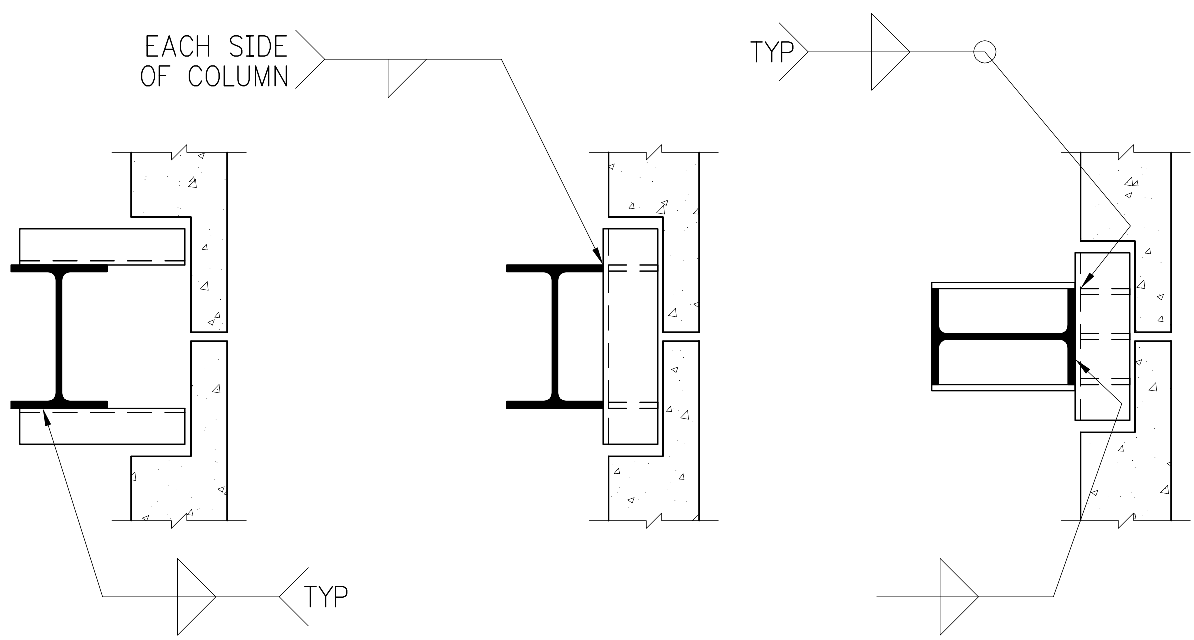
STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

RMSCA
ROCKY MOUNTAIN STEEL CONSTRUCTION ASSOCIATION



NOTES:

1. SEE FIGURES 1.5 FOR STEEL FRAMING NOTES.
2. PRECAST CONCRETE WALL WEIGHT.
3. 2" MINIMUM BEARING.
4. PRECAST CONCRETE WALL TO STEEL COLUMN FACE SPACE 'dp'.
5. STEEL COLUMN WIDTH/2 'dcol/2'.
6. TYPICAL ECCENTRICITY 'e' FOR WHICH BRACKET & CONNECTION STEEL COLUMN ARE DESIGNED FOR:
   e = t/2 + dp
7. TYPICAL ECCENTRICITY FOR WHICH THE COLUMN IS DESIGNED FOR:
   e = t/2 + dp + dcol/2
8. PRECAST CONCRETE THICKNESS 't'.



WEB ⊥⊥ | WEB ⊥⊥ | FLANGE ⊥⊥

SEAC

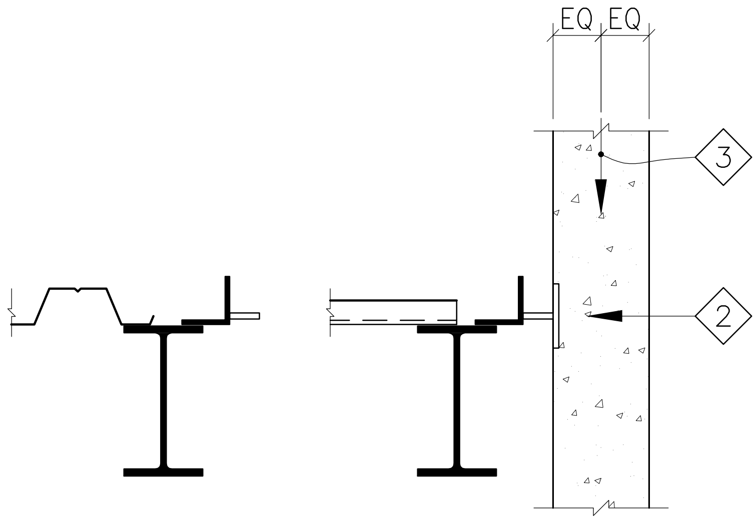
FIGURE 3.3-2a : PRECAST CONCRETE ENGINEERING ISSUES - CASE B

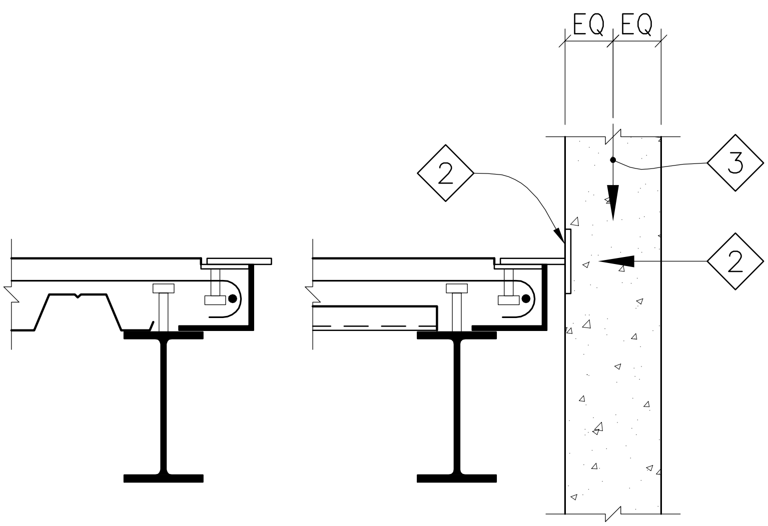
STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

RMSCA
ROCKY MOUNTAIN STEEL CONSTRUCTION ASSOCIATION

NOTES:

1. SEE FIGURES 1.5 FOR STEEL FRAMING NOTES.
2. LATERAL FORCE DUE TO WIND AND REQUIREMENTS FOR LATERALLY BRACING THE PRECAST CONCRETE FOR GRAVITY LOADS.
3. PRECAST CONCRETE WALL WEIGHT CARRIED BY STEEL COLUMNS.





SEAC

FIGURE 3.3-2b : PRECAST CONCRETE ENGINEERING ISSUES - CASE B

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

RMSCA
ROCKY MOUNTAIN STEEL CONSTRUCTION ASSOCIATION

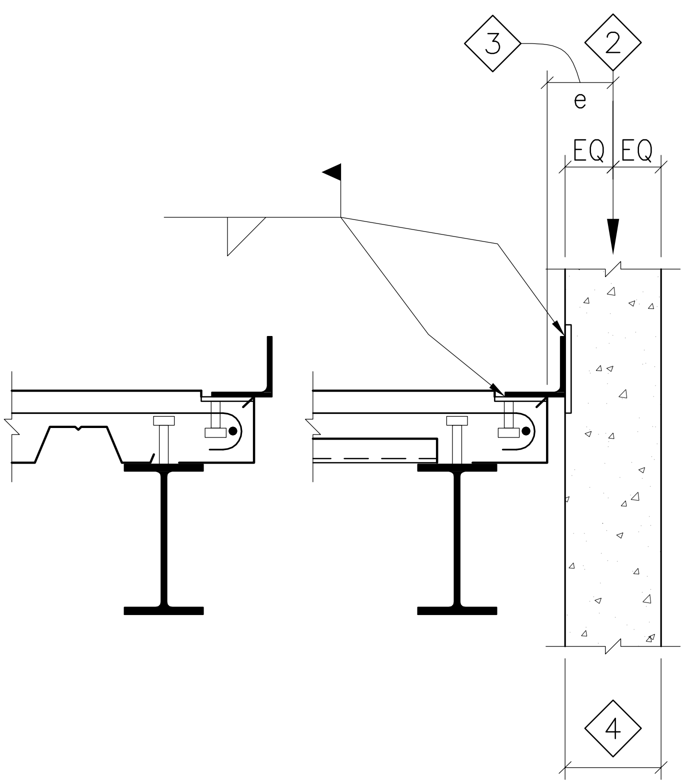
NOTES:

1. SEE FIGURES 1.5 FOR STEEL FRAMING NOTES.

2. PRECAST CONCRETE WALL WEIGHT.

3. TYPICAL ECCENTRICITY 'e' FOR WHICH CONTINUOUS STRONG-BACK MEMBER TO STEEL & CONNECTIONS ARE DESIGNED FOR:
   e = ds + dgap + t/2
   SEE CHART IN FIGURE 3.1b FOR VALUES.

4. PRECAST CONCRETE THICKNESS 't'.



SEAC

FIGURE 3.3-3 : PRECAST CONCRETE ENGINEERING ISSUES - CASE C

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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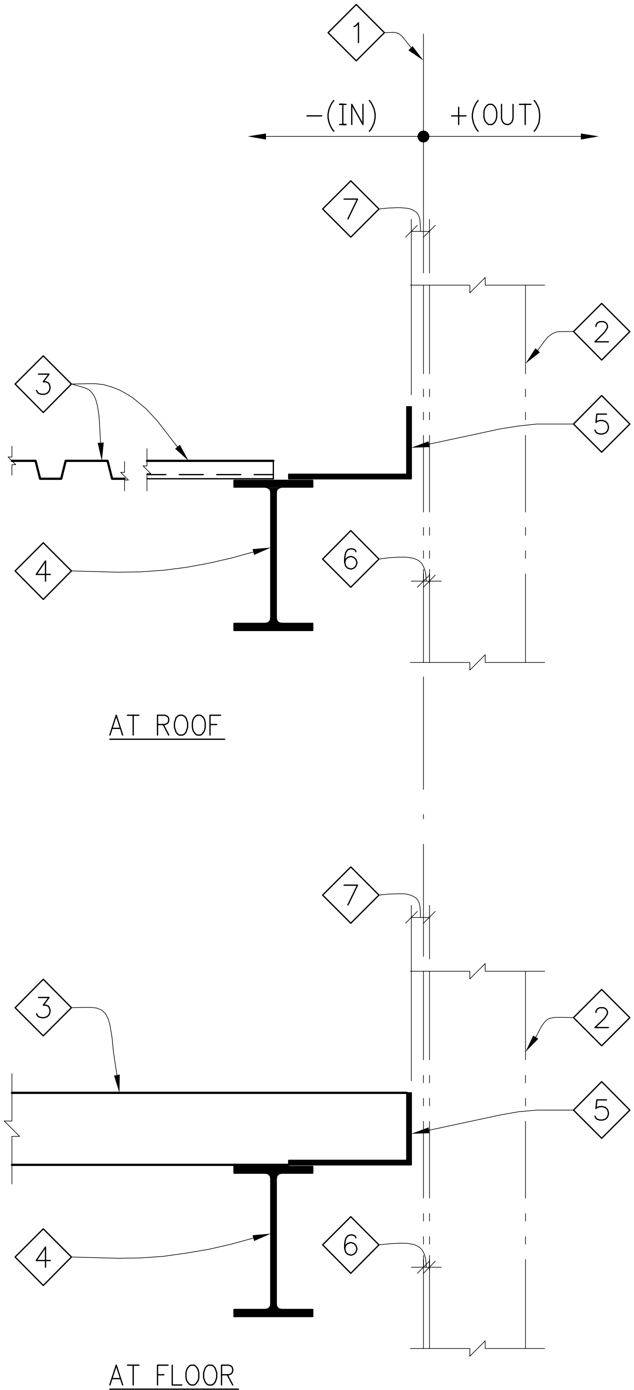

NOTES:

1. THEORETICAL INSIDE FACE OF CURTAIN WALL SYSTEM.
2. CURTAIN WALL SYSTEM.
3. SLAB/DECK.
4. SPANDREL BEAM/GIRDER.
5. EDGE ANGLE/BENT PLATE.
6. CURTAIN WALL SYSTEM ± TOLERANCE. SEE FIGURE 4.1b FOR CHART.
7. EDGE OF SLAB/DECK TO INSIDE FACE OF CURTAIN WALL SYSTEM GAP 'dgap' REQUIRED:
   dgap = (ds+) + (dw-)
   SEE FIGURE 4.1-1b FOR CHART.

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FIGURE 4.1-1a : CURTAIN WALL TOLERANCES

STRUCTURAL STEEL BUILDING - EXTERIOR WALL INTERFACE ISSUES

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HEIGHT (in)	ds (in)		dw (in)		dgap (in)	e (in)
	−(IN)	+(OUT)	−(IN)	+(OUT)		
10	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
20	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
30	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
40	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
50	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
60	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
70	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
80	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
90	0.5	0.5	0.06	0.06	0.56	1.25 + t/2
100	0.5	0.5	0.06	0.06	0.56	1.25 + t/2

NOTES:
ds = de (VALUES TAKEN FROM CHART IN FIGURE 1.3b)
dw = EXTERIOR WALL SYSTEM TOLERANCE
dgap = (ds+) + (dw−)
dgap = 0.75" IS A COMMON SPECIFIED 'GAP'
e = ds + dgap + t/2
SEE FIGURE 4.3−1 FOR GRAPHIC DEPICTION OF 'e' & 't'

SEAC

FIGURE 4.1-1b : CURTAIN WALL TOLERANCES

STRUCTURAL STEEL BUILDING − EXTERIOR WALL INTERFACE ISSUES

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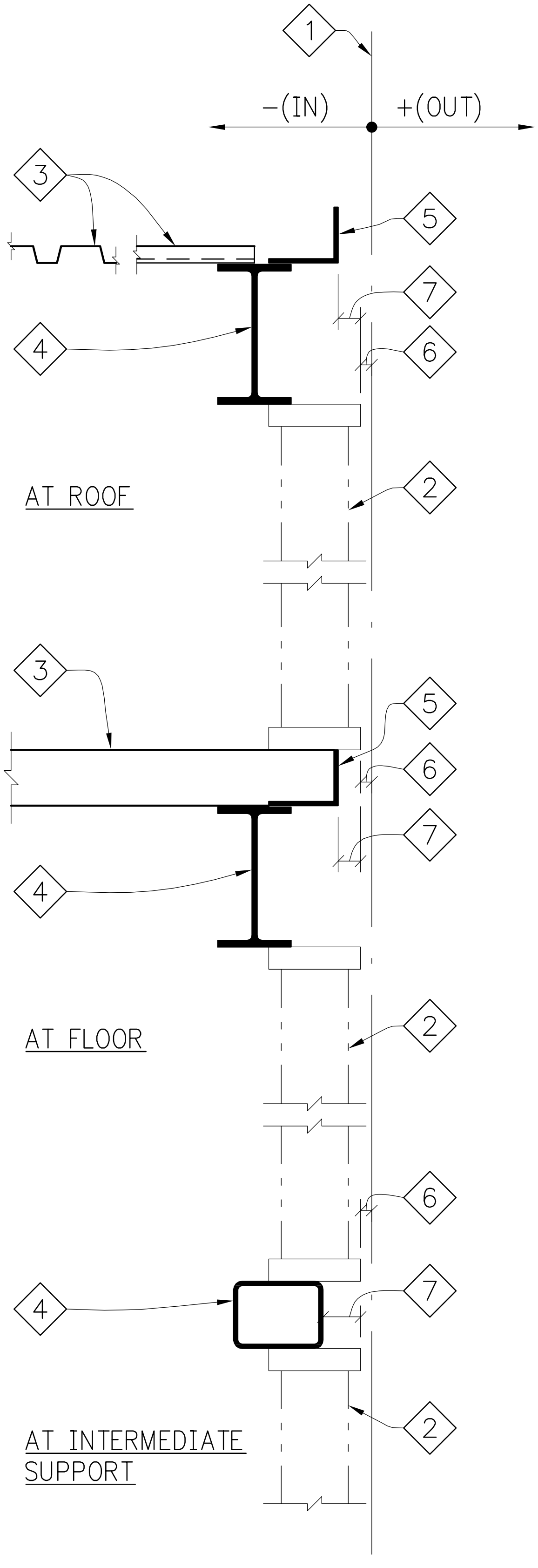


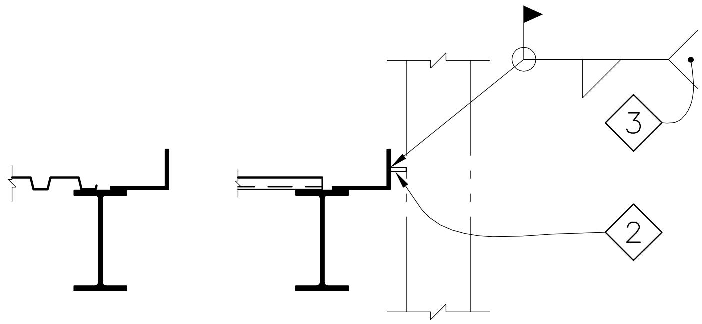
NOTES:

1. THEORETICAL INSIDE FACE OF STOREFRONT SYSTEM.
2. STOREFRONT SYSTEM.
3. SLAB/DECK.
4. SPANDREL BEAM/GIRDER/GIRT.
5. EDGE ANGLE/BENT PLATE.
6. STOREFRONT SYSTEM ± TOLERANCE. SEE FIGURE 4.1-2b FOR CHART.
7. EDGE OF SLAB/DECK/GIRT TO OUTSIDE FACE OF STOREFRONT SYSTEM GAP 'dgap' REQUIRED. SEE FIGURE 4.1-2b FOR CHART.
   dgap = ds(OUT) + dw(IN).

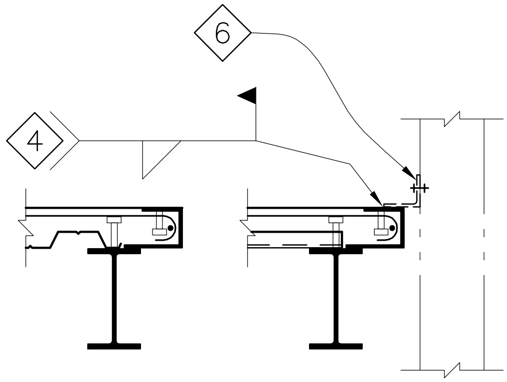
SEAC	**FIGURE 4.1-2a : STOREFRONT TOLERANCES**	RMSCA ROCKY MOUNTAIN STEEL CONSTRUCTION ASSOCIATION
	STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES	

HEIGHT (in)	ds (in)		dw (in)		dgap (in)	e (in)
	−(IN)	+(OUT)	−(IN)	+(OUT)		
10	0.5	0.5	0.06	0.06	0.56	N/A
20	0.5	0.5	0.06	0.06	0.56	N/A
30	0.5	0.5	0.06	0.06	0.56	N/A
40	0.5	0.5	0.06	0.06	0.56	N/A
50	0.5	0.5	0.06	0.06	0.56	N/A
60	0.5	0.5	0.06	0.06	0.56	N/A
70	0.5	0.5	0.06	0.06	0.56	N/A
80	0.5	0.5	0.06	0.06	0.56	N/A
90	0.5	0.5	0.06	0.06	0.56	N/A
100	0.5	0.5	0.06	0.06	0.56	N/A

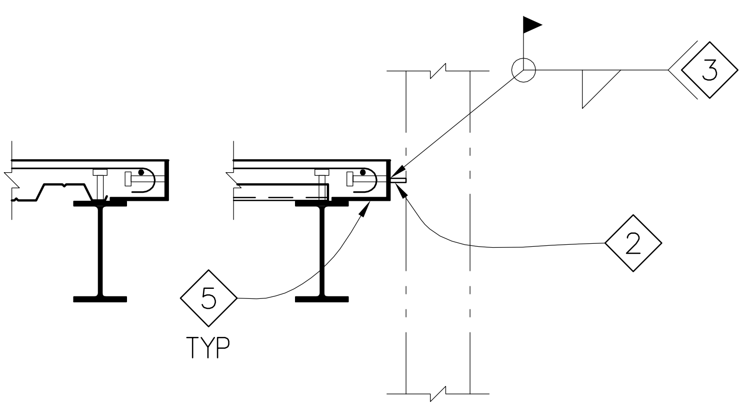
NOTES: ds = de (VALUES TAKEN FROM CHART IN FIGURE 1.3b)
dw = EXTERIOR WALL SYSTEM TOLERANCE
dgap = (ds+) + (dw−)
dgap = 0.75" IS A COMMON SPECIFIED 'GAP'
SEE FIGURE 4.3−1 FOR GRAPHIC DEPICTION OF 'e'



AT ROOF



AT FLOOR – OPTION B



AT FLOOR – OPTION A

NOTES:

1. SEE FIGURE 1.4 FOR STEEL FRAMING NOTES.
2. TYPICALLY 1/4" OR 3/8" DIAMETER (1/2" DIAMETER ANCHORS ARE USED FOR UNCONVENTIONAL/HEAVY SYSTEMS) CURTAIN WALL ANCHORS (BY CURTAIN WALL SUPPLIER), ANCHORED TO MID-HEIGHT OF EDGE ANGLE/ BENT PLATE.
3. ANCHORS ARE FIELD WELDED BY CURTAIN WALL SUPPLIER TO THE VERTICAL FACE OF THE EDGE ANGLE/ BENT PLATE AT EACH MULLION (WELD IS BY CURTAIN WALL SUPPLIER).
4. FIELD WELD/ANCHOR/SCREW BY CURTAIN WALL SUPPLIER.
5. EDGE ANGLE/BENT PLATE, 1/4" THICK MINIMUM.
6. ANGLE OR PLATE & ATTACHMENT TO CURTAIN WALL BY CURTAIN WALL SUPPLIER.

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FIGURE 4.2-1 : CURTAIN WALL CONSTRUCTION ISSUES

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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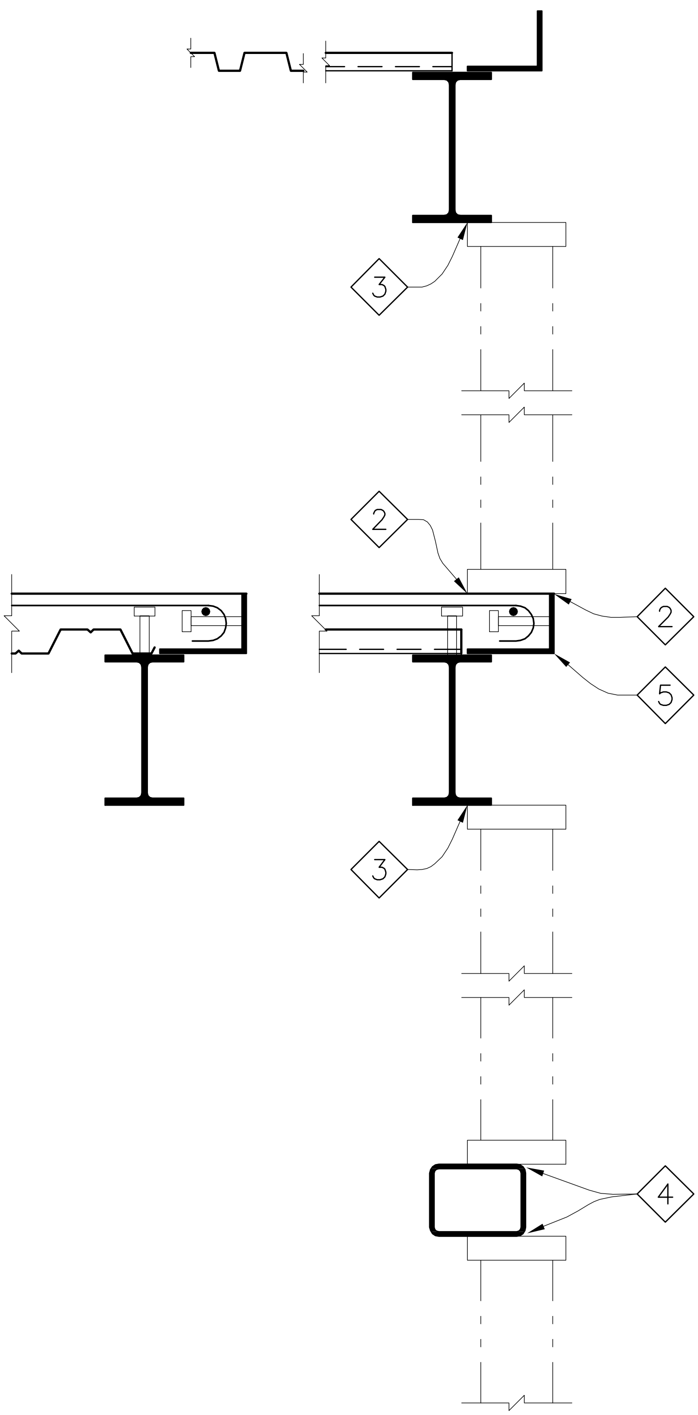

NOTES:

1. SEE FIGURE 1.4 FOR STEEL FRAMING NOTES.
2. CONNECTION TO EDGE ANGLE/BENT PLATE VIA WELDS, CLIPS, ETC. CONNECTION TO SLAB VIA EXPANSION ANCHORS, WELD TO EMBED PLATES, ETC. BY STOREFRONT SUPPLIER.
3. CONNECTION TO BEAMS/GIRDERS VIA CLIPS THAT ALLOW VERTICAL SLIP TO ACCOUNT FOR ROOF/FLOOR LIVE LOAD DEFLECTIONS BY STOREFRONT SUPPLIER.
4. CONNECTION TO GIRTS VIA CLIPS, WELDS, ETC. BY STOREFRONT SUPPLIER.
5. EDGE ANGLE/BENT PLATE, 1/4" MINIMUM.

SEAC

FIGURE 4.2-2 : STOREFRONT CONSTRUCTION ISSUES

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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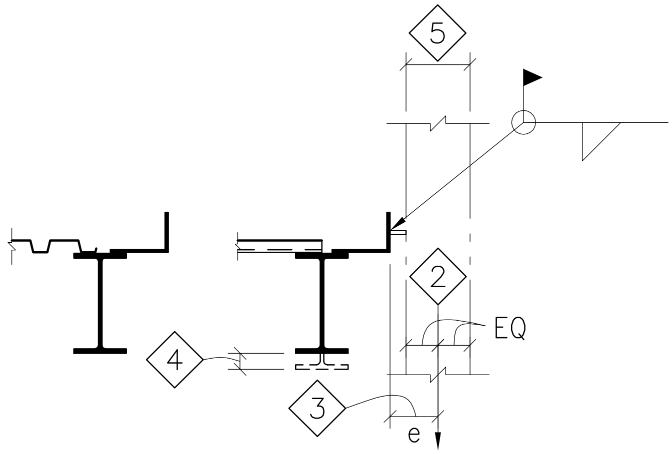
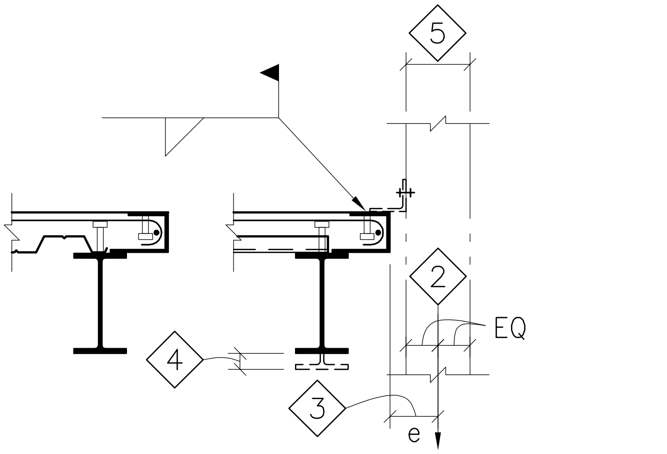
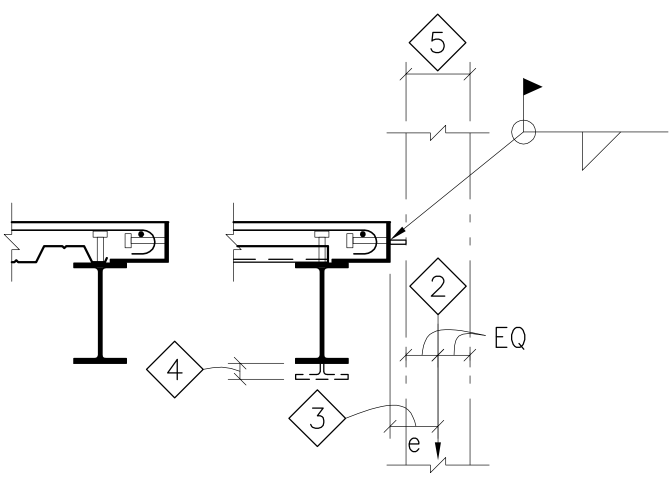


AT ROOF



AT FLOOR – OPTION B



AT FLOOR – OPTION A

NOTES:

1. SEE FIGURE 1.5 FOR STEEL FRAMING NOTES.

2. CURTAIN WALL SYSTEM WEIGHT (INCLUDING CONNECTIONS).

3. TYPICALLY ECCENTRICITY 'e' FOR WHICH CURTAIN WALL FRAMING & CONNECTIONS TO STEEL ARE DESIGNED FOR:
   $e = ds + dgap + t/2$.
   SEE CHART IN FIGURE 4.1–1b FOR VALUES.

4. TYPICAL MAXIMUM LIVE LOAD DEFLECTIONS SHOULD BE LIMITED TO 1/4".

5. CURTAIN WALL THICKNESS 't'.

SEAC

FIGURE 4.3-1 : CURTAIN WALL ENGINEERING ISSUES

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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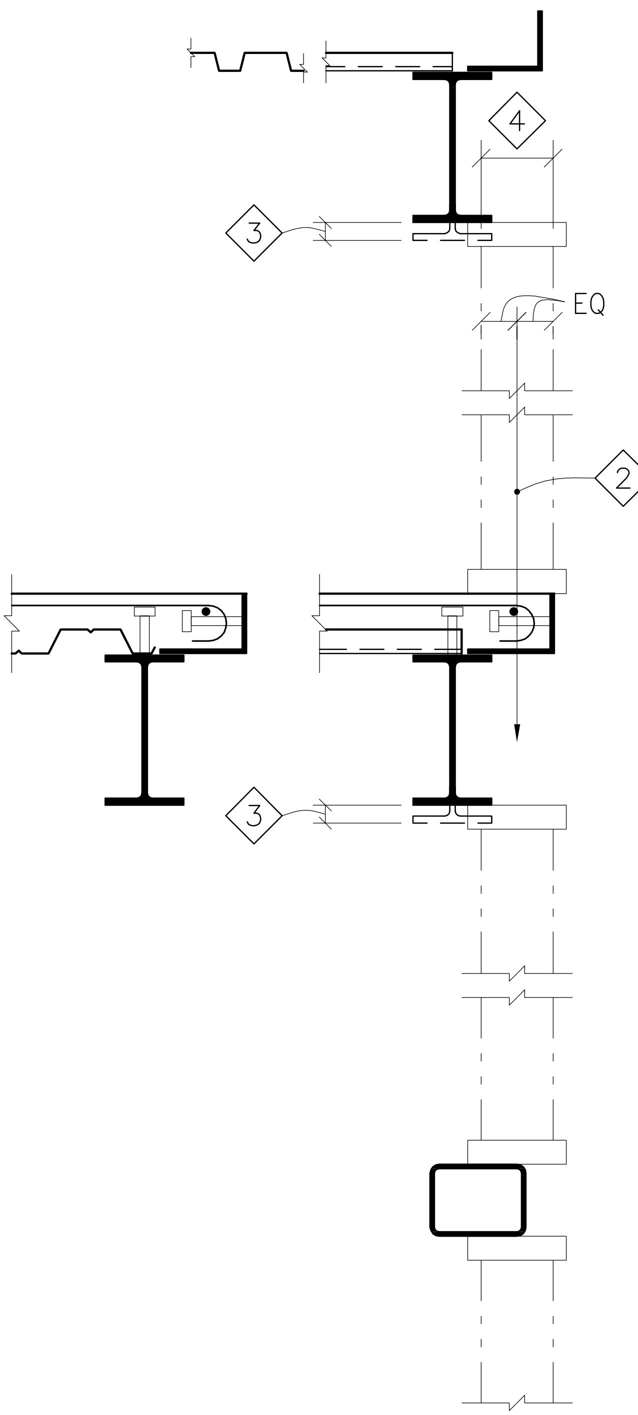

NOTES:

1. SEE FIGURES 1.5 FOR STEEL FRAMING NOTES.
2. STOREFRONT SYSTEM WEIGHT (INCLUDING CONNECTIONS).
3. TYPICAL MAXIMUM LIVE LOAD DEFLECTIONS SHOULD BE LIMITED TO 1/4".
4. STOREFRONT THICKNESS 't'.

SEAC

FIGURE 4.3-2 : STOREFRONT ENGINEERING ISSUES

STRUCTURAL STEEL BUILDING – EXTERIOR WALL INTERFACE ISSUES

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