

**1) GENERAL**

- NOTES ON THIS SHEET ARE FOR REFERENCE ONLY AND ARE SUPPLEMENTED BY PROJECT SPECIFICATIONS.
- STRUCTURAL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACT DOCUMENTS - INCLUDING ARCHITECTURAL, MECHANICAL, ELECTRICAL AND CIVIL DRAWINGS, GEOTECHNICAL REPORTS AND SPECIFICATIONS.
- ALL DIMENSIONS ARE IN MILLIMETERS AND ELEVATIONS IN METRES (UNLESS INDICATED OTHERWISE).
- DO NOT SCALE THESE DRAWINGS.
- ALL WORK MUST COMPLY WITH THE PROVISIONS OF THE ONTARIO BUILDING CODE (2012), OCCUPATIONAL HEALTH & SAFETY ACT, MUNICIPAL BYLAWS AND BEST CODE PRACTICES.
- DETAILS OF EXISTING CONDITIONS AND CONSTRUCTION ARE SHOWN BASED ON INFORMATION AVAILABLE AT THE TIME OF PREPARING DESIGN DRAWINGS. IF, DURING CONSTRUCTION, CONDITIONS ARE REVEALED THAT DIFFER FROM THE ASSUMED CONDITIONS, ADVISE THE ENGINEER BEFORE PROCEEDING.
- DO NOT CUT OPENINGS THROUGH STRUCTURAL ELEMENTS UNLESS APPROVED IN WRITING BY THE STRUCTURAL ENGINEER.
- SPECIFIC NOTES AND DETAILS ON THESE DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.

**2) GENERAL DESIGN INFORMATION**

- THE INFORMATION PRESENTED ON THESE DRAWINGS HAS BEEN DESIGNED AND ANALYZED IN ACCORDANCE WITH THE 2012 ONTARIO BUILDING CODE. CONSTRUCTION IS TO BE PERFORMED IN ACCORDANCE WITH THIS AND ALL OTHER APPLICABLE CODES.
  - LIGHTWEIGHT STEEL STRUCTURE IS DESIGNED IN ACCORDANCE WITH CSA S136-07 & A1S1 S200 SERIES.

- THE SUSPENDED CEILING HAS BEEN DESIGNED IN CONFORMANCE WITH THE ONTARIO BUILDING CODE SECTION 4.1.8.18 CATEGORY 7, ELEMENTS OF STRUCTURES AND NON STRUCTURAL COMPONENTS AND EQUIPMENT.

**3. SEISMIC SYSTEM LOADING DATA**

- 2012 OBC CLAUSE 4.1.8.18 Vp = 0.3FaSat(0.2)esSpWp
- SEISMIC IMPORTANCE FACTOR:** (2012 OBC CLAUSE 4.1.8.5)
  - IE = 1.0 NORMAL
- REFERENCE CITY:** OTTAWA, ONTARIO
- SITE CLASS:** THE NOTED SITE CLASSIFICATION FOR SEISMIC SITE RESPONSE AND SHEAR STRENGTH PARAMETERS INDICATED ARE ASSUMED BELOW.

□ A □ B ■ C □ D □ E □ F

- PGA: 0.32
- RESPONSE SPECTRUM DATA:**
- 5% DAMPED SPECTRAL RESPONSE ACCELERATION VALUES FOR REFERENCE CITY:** (2012 OBC SUPPLEMENTARY STANDARD SB-1)
  - Sa(0.2) = 0.630
  - Sa(0.5) = 0.310
  - Sa(1.0) = 0.140
  - Sa(2.0) = 0.046

- 2012 OBC CLAUSE 4.1.8.18 CATEGORY 7

Sp = CpArAvRp  
 Cp = 1.0  
 Ar = 1.0  
 Av = 1+2h/m = 2.5  
 Rp = 2.5  
 Sp = 1.0

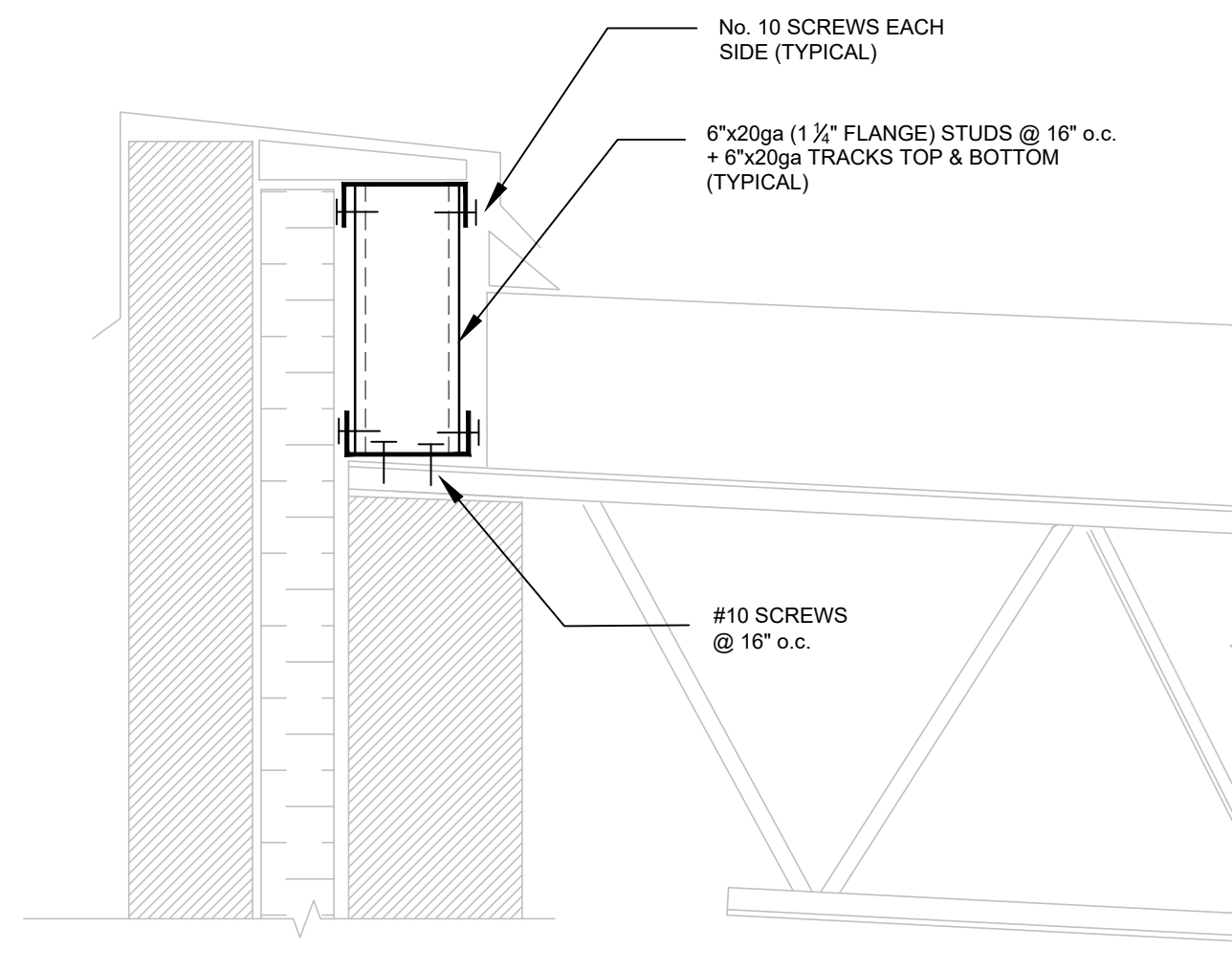
- WEIGHT OF SUSPENDED CEILING:** Wp = 0.20 kPa
- WEIGHT OF WALL/BULKHEAD:** Wp = 0.30 kPa

**3) STRUCTURAL METAL STUD FRAMING**

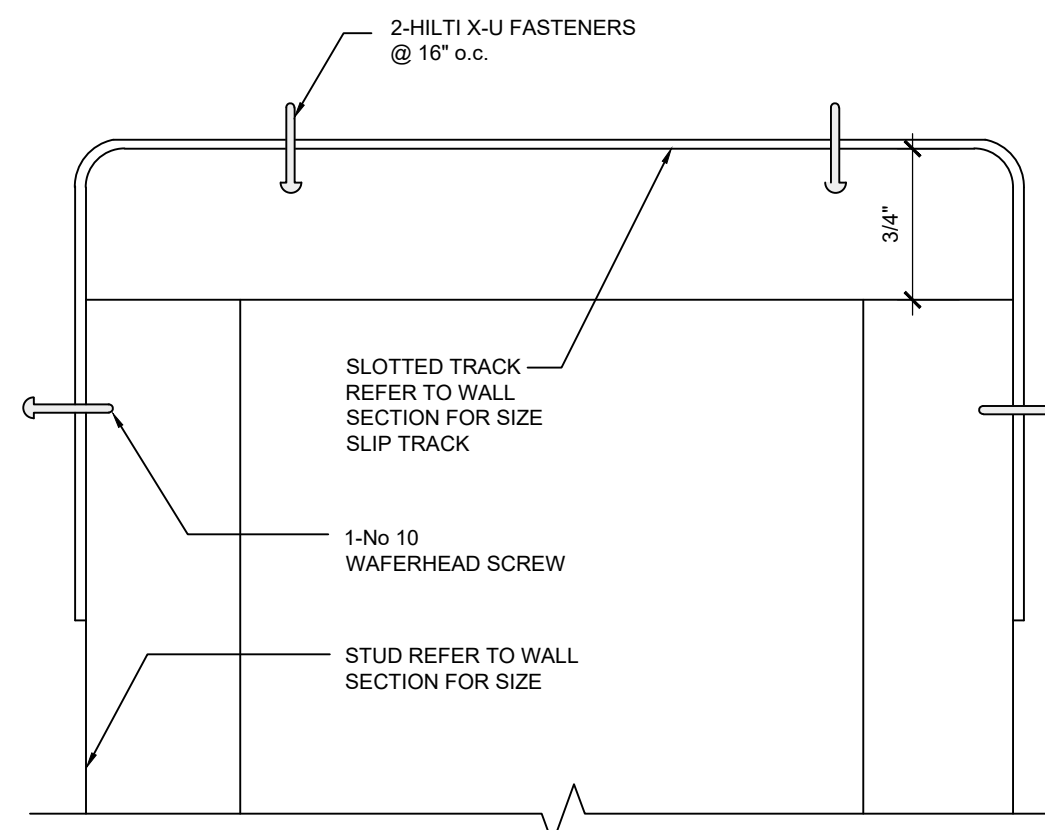
- THESE DRAWINGS INDICATE PRIMARY STRUCTURAL METAL STUD FRAMING ELEMENTS - INCLUDING STUD AND JOIST SIZES AND SPACINGS, CROSS-BRACED WALL PANEL LOCATIONS AND ASSOCIATED FORCES.
- STEEL SHALL CONFORM TO THE REQUIREMENTS OF CAN/CSA-S136 AND SHALL BE IDENTIFIED AS TO SPECIFICATION, GRADE, MECHANICAL PROPERTIES AND COATING TYPE AND THICKNESS.
- MINIMUM YIELD STRENGTH OF STEEL SHALL BE AS FOLLOWS:
  - MINIMUM THICKNESSES UP TO 1.14MM (43 MILS): 230MPA
  - MINIMUM THICKNESSES OVER 1.14MM (43 MILS): 245MPA
- METAL STUD FRAMING ELEMENTS ARE DESIGNATED IN ACCORDANCE WITH THE UNIVERSAL (IMPERIAL) FOUR-PART DESIGNATOR SYSTEM. E.G. 800 S 182-54
  - FIRST PART: MEMBER DEPTH IN 1/100THS OF AN INCH
  - SECOND PART: STYLE S = STUD OR JOIST, T = TRACK, L = ANGLE;
  - THIRD PART: FLANGE WIDTH IN 1/100THS OF AN INCH
  - FOURTH PART: MINIMUM THICKNESS IN 1/1000THS OF AN INCH
- STANDARD THICKNESSES FOR LIGHTWEIGHT STEEL FRAMING COMPONENTS ARE GIVEN IN MILS. THE FOLLOWING TABLE MAY BE USED FOR CONVERSION:

DESIGNATION THICKNESS (MILS)	MINIMUM BASE STEEL THICKNESS		DESIGN THICKNESS		STEEL FRAMING GAUGE NO.
	(IN.)	(MM)	(IN.)	(MM)	
43	0.0428	1.087	0.0451	1.146	18
54	0.0538	1.367	0.0566	1.438	16
68	0.0677	1.720	0.0713	1.811	14
97	0.0966	2.454	0.1017	2.583	12

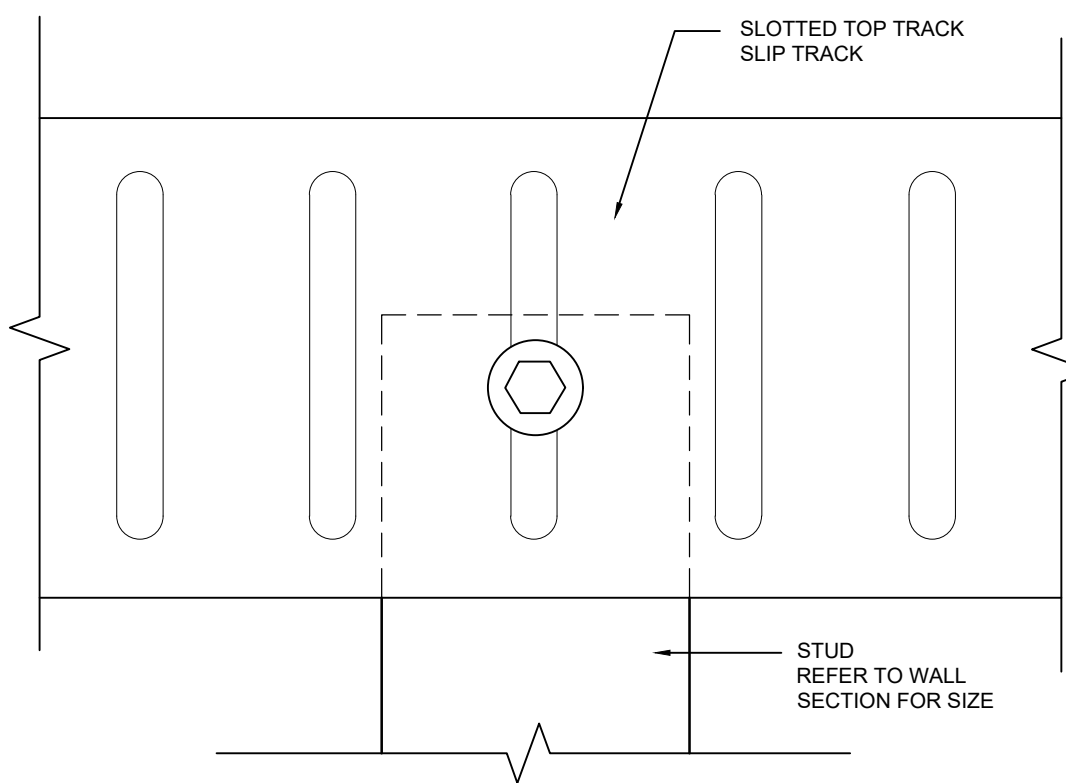
- PROVIDE BRIDGING AT THE FOLLOWING MAXIMUM SPACINGS, SPACED AT EQUAL INTERVALS OVER THE LENGTH OF THE MEMBER:
  - WIND BEARING STUDS: 1524 MM O.C. MAXIMUM;
  - AXIAL LOAD BEARING STUDS: 1219 MM O.C. MAXIMUM;
  - JOISTS: 2134 MM O.C. MAXIMUM.
- PROVIDE 40mm STUD OR FURRING CHANNEL SECURED BETWEEN STUDS FOR ATTACHMENT OF FIXTURES INCLUDING LAVATORY BASINS, GRAB BARS, TOWEL RAILS, ELECTRICAL BOXES ETC.
- TOUCH UP WELDS WITH ZINC RICH PRIMER.



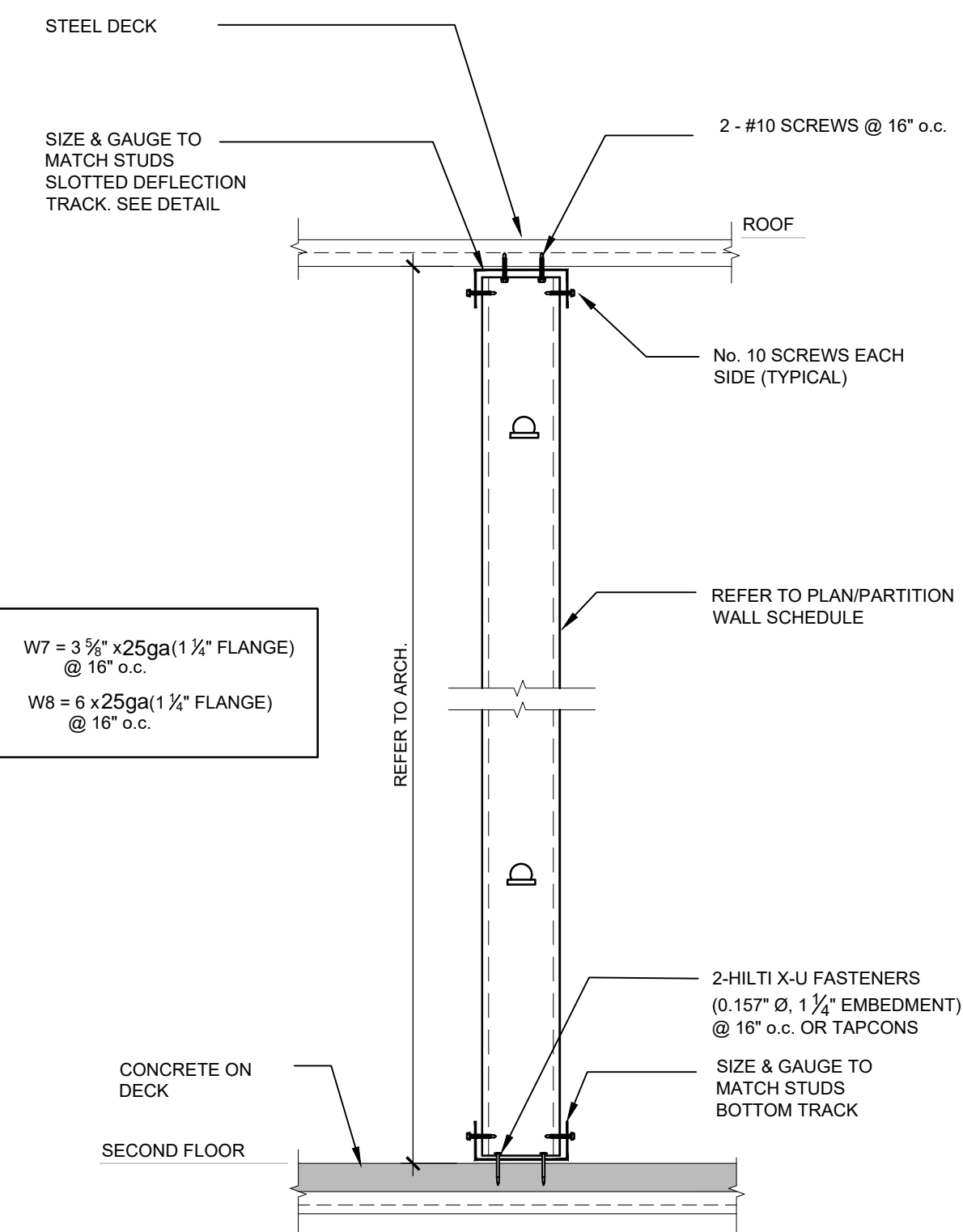
**4** DETAIL: PARAPET  
 S1 SCALE: N.T.S.



**3** SECTION: TOP TRACK DEFLECTION  
 S1 SCALE: N.T.S. (FRONT VIEW)



**2** SECTION: TOP TRACK DEFLECTION  
 S1 SCALE: N.T.S. (SIDE VIEW)



W7 = 3 3/8" x 25ga (1 1/2" FLANGE) @ 16" o.c.  
 W8 = 6" x 25ga (1 1/2" FLANGE) @ 16" o.c.

**1** SECTION: INTERIOR DEMISING WALLS  
 S1 SCALE: N.T.S.

**DRAWING REVIEW**  
 The review of this drawing does not in any way relieve the Contractor of responsibility from its actions and compliance with the Contract Documents

ID: Carleton Place Arena	Contract #: 7558
X No Comment	Submission #: 1
Reviewed as Noted	Review By: SC
Rejected See Remarks	Date: 2020-12-07

Comments:  
 1. Contractor to verify all dimensions prior to fabrication.  
 2. All work to the 2012 Ontario Building Code.  
 3. Refer to EEG drawings S0 & S6 for full notes and details.

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IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ENGINEER.  
 ALL CONTRACTORS MUST COMPLY WITH ALL PERTINENT CODES AND BY-LAWS.  
 DO NOT SCALE DRAWINGS.  
 COPYRIGHT RESERVED.

DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS  
 REFER TO ARCH. FOR LOCATION/ELEVATIONS

1	SEPT 08/20	ISSUED FOR REVIEW
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PROFESSIONAL SEAL:

NORTH ARROW:

CLIENT:



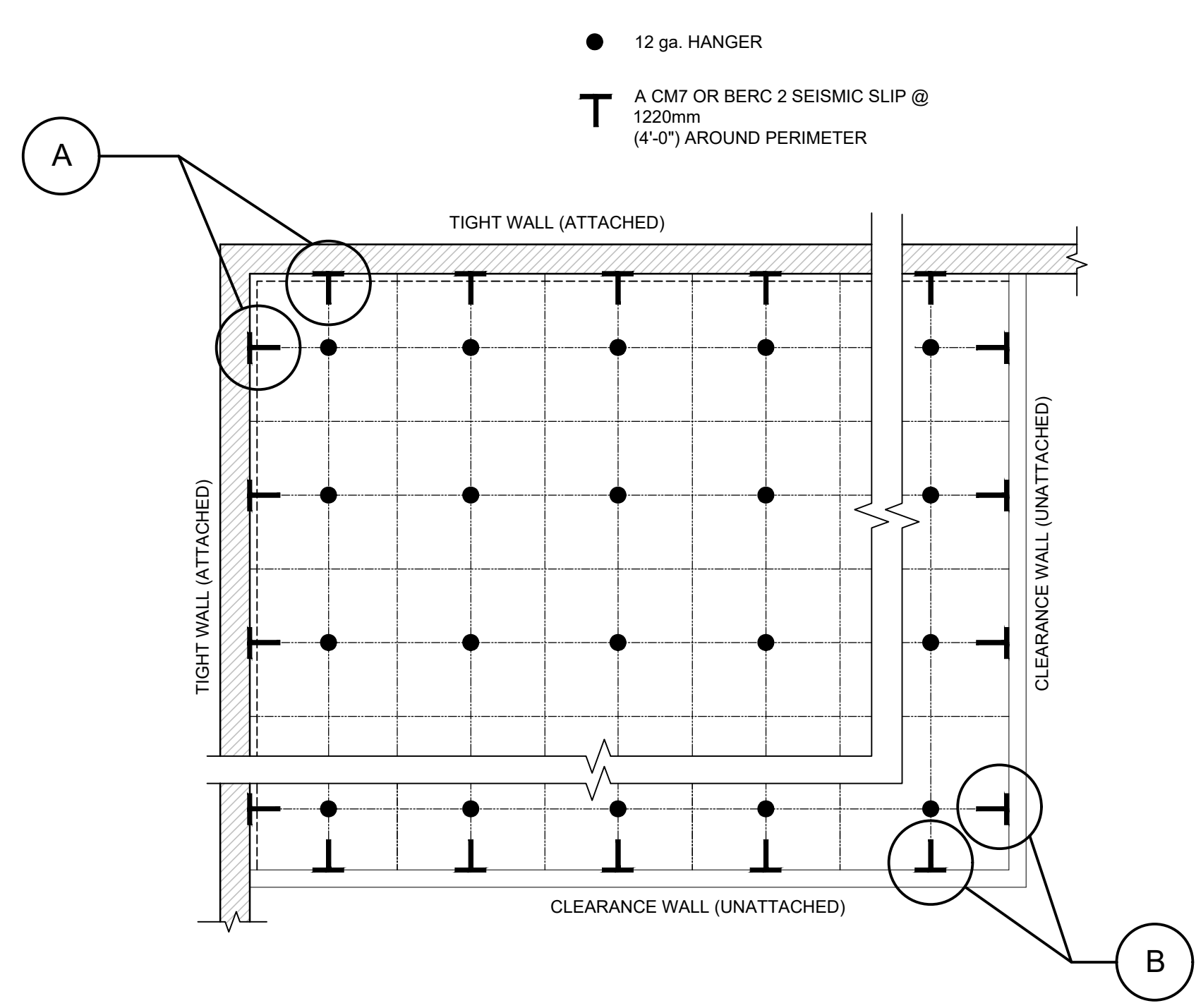
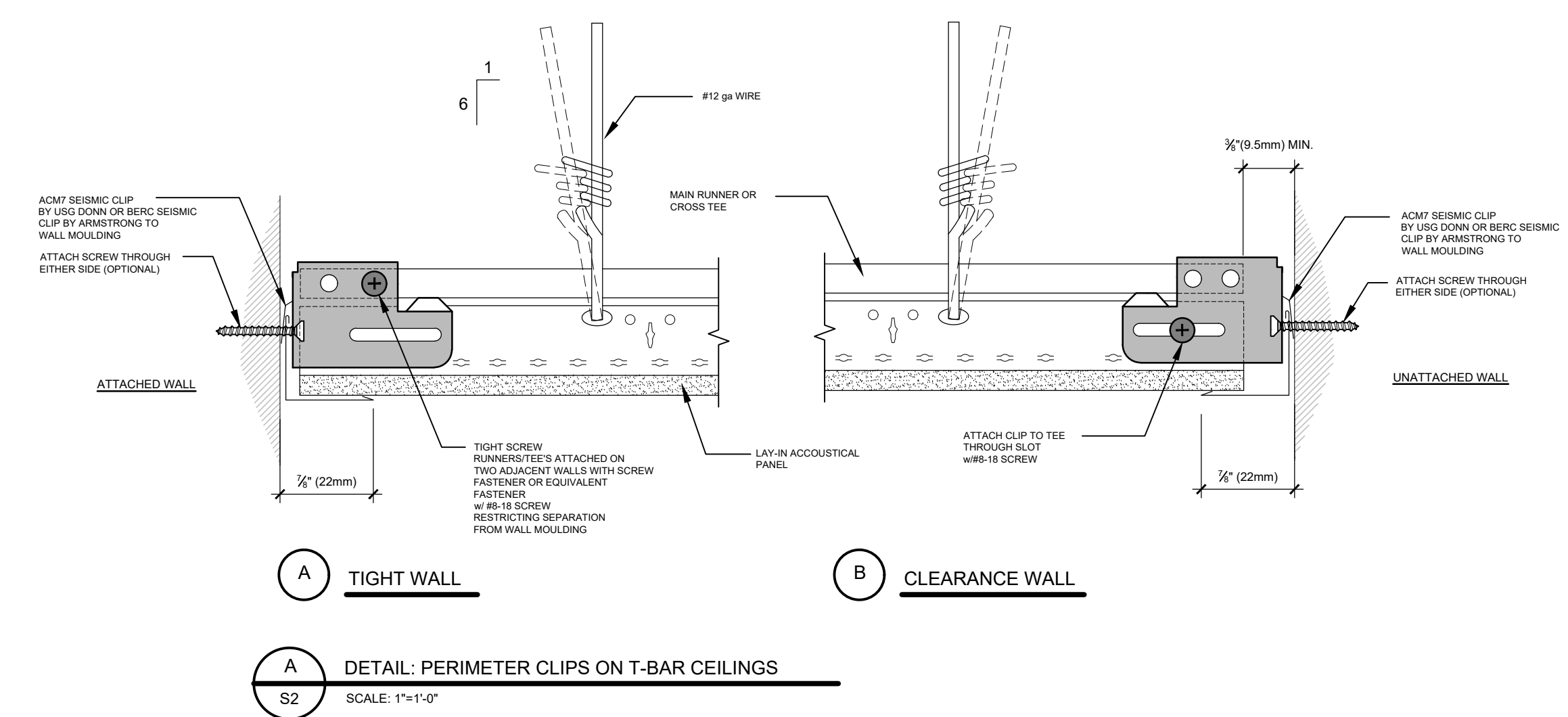
PROJECT TITLE:  
**CARLETON PLACE ARENA ADDITION AND RENOVATION**

SHEET TITLE:  
**GENERAL NOTES AND DETAILS**

DRAWN: A.V.	CHECKED: J.V.
SCALE: AS SHOWN	SHEET No. <b>S1</b>
PROJECT No. S219-20	

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ENGINEER.  
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**SEISMIC CATEGORY C**  
 MAIN T'S (MIN. INTERMEDIATE-DUTY) @ 1200mm (4'-0") o.c.  
 CROSS T'S @ 610mm (2'-0") o.c.  
 TEE SYSTEM TO RESIST A MIN. FACTORED COMPRESSION FORCE OF 200 lbs  
 • 12ga. SUSPENSION WIRE @ 1200mm (4'-0") o.c.  
 -MIN. 3 TURNS  
 -MAX SLOPE 1 IN 6  
 SEISMIC DESIGN IN ACCORDANCE WITH 2012 ONTARIO BUILDING CODE AND THE ONTARIO BUILDING CODE TABLE 4.1.8.18  
 $V_p = 0.3 F_a S_a(0.2) i_e S_p W_p$  FOR ELEMENTS OF THE STRUCTURE  
 THE CEILING SYSTEM CANNOT BE USED TO PROVIDE LATERAL SUPPORT FOR WALL AND PARTITION. WALLS MUST BE ATTACHED FROM FLOOR SLAB TO FLOOR SLAB OR BRACED FROM THE TOP OF THE WALL TO THE STRUCTURE.  
 -A CEILING AREA OF 13.4m<sup>2</sup> (144ft<sup>2</sup>) OR LESS, SURROUNDED BY WALLS THAT CONNECT DIRECTLY TO THE STRUCTURE ABOVE SHALL BE EXEMPT FROM THE PRACTICE.  
 -ALL PERIMETER CLOSURE ANGLES OR CHANNELS SHALL PROVIDE A SUPPORT LEDGE OF APPROXIMATELY 22.2mm (7/8") OR GREATER  
 MAIN RUNNERS AND CROSS RUNNERS TO BE TIGHT TO THE PERIMETER MEMBERS ON 2 ADJACENT WALLS. A CLEARANCE OF 9.5mm (3/8") SHALL BE MAINTAINED BETWEEN THE RUNNERS AND THE PERIMETER MEMBERS ON THE 2 REMAINING WALLS.  
 -LIGHT FIXTURES WITHIN THE CEILING:  
 LIGHT FIXTURES PER THE FOLLOWING:  
 SURFACE MOUNTED: ATTACH TO MAIN/SECONDARY RUNNERS + SAFETY WIRES (BY OTHERS)  
 FIXTURES < 10 lbs: ATTACH TO MAIN/SECONDARY RUNNERS  
 FIXTURES < 56 lbs: +2-12ga HANGERS FROM FIXTURE (BY OTHERS)  
 FIXTURES > 56 lbs: SUPPORT DIRECTLY FROM STRUCTURE (BY OTHERS)  
 -SERVICE WITHIN THE CEILING:  
 SERVICE WITHIN THE CEILING PER THE FOLLOWING:  
 UNITS < 20 lbs: ATTACH TO MAIN/SECONDARY RUNNERS  
 UNITS 20 lbs < 56 lbs: ATTACH TO MAIN/SECONDARY RUNNERS  
 UNITS > 56lbs: SUPPORT DIRECTLY FROM STRUCTURE (BY OTHERS)  
 + ADD 12ga HANGERS (BY OTHERS)

- SEISMIC CEILING NOTES:**
1. CEILINGS WITH AN AREA OF 144ft<sup>2</sup> OR LESS, SURROUNDED BY WALLS THAT CONNECT DIRECTLY TO THE STRUCTURE ABOVE ARE EXEMPT FROM THESE REQUIREMENTS.
  2. CEILINGS WITH AN AREA OF 2500ft<sup>2</sup> OR MORE REQUIRE A SEISMIC SEPARATION JOINT OR FULL HEIGHT PARTITION THAT BREAKS THE CEILING UP INTO AREAS NOT EXCEEDING 2500ft<sup>2</sup>.
  3. EACH 2500ft<sup>2</sup> AREA REQUIRES PERIMETER ANGLE AND HORIZONTAL RESTRAINTS.
  4. PROVIDE MINIMUM 6 INCHES OF CLEARANCE BETWEEN RESTRAINTS AND ANY UNRESTRAINED DUCT/PIPE IN THE CEILING SPACE.
  5. WIRES MUST BE CONNECTED TO THE STRUCTURE ABOVE.
  6. USE ACM7 OR BERC 2 SEISMIC CLIPS AROUND PERIMETER
  7. No. 12 GAUGE PERIMETER SUPPORT WIRES TO BE INSTALLED WITHIN 8 INCHES FROM WALL MOULDING.

NOTES:  
 PIPES, CONDUITS, ETC. TO HAVE SEPARATE SUPPORT BY OTHERS.  
 SECURE ALL HANGERS TO BUILDING STRUCTURE, TRAPEZE AROUND DUCTWORK AND OTHER LARGE OBSTRUCTIONS



1 SEPT 08/20 ISSUED FOR REVIEW

PROFESSIONAL SEAL:

NORTH ARROW:

CLIENT:



PROJECT TITLE:  
**CARLETON PLACE  
 ARENA ADDITION AND  
 RENOVATION**

SHEET TITLE:  
**SEISMIC DETAILS**

DRAWN: A.V.	CHECKED: J.V.
SCALE: AS SHOWN	SHEET No. <b>S2</b>
PROJECT No. S219-20	



**GENERAL NOTES**

**GOVERNING CODE - ONTARIO BUILDING CODE OF CANADA, 2012 EDITION:**

**1. DESIGN LOADS: (UNFACTORED)**

GROUND SNOW LOAD:	Ss = 2.5 kPa Sr = 0.4 kPa Is = 1.15	} REFER TO DRIFT LOADS
ROOF:	DEAD LOAD = 25 psf SNOW LOAD = 57 psf	
FLOOR LOADS:	DEAD LOAD = 60 psf LIVE LOAD = 100 psf (INCLUDING EXITS)	
WIND LOAD:	q (1/50) = 0.41 kPa Iw = 1.15	
SEISMIC:	Sa (0.2) = 0.49 Sa (0.5) = 0.25 SITE CLASS: "D" - ASSUMED	Sa (1.0) = 0.12 Sa (2.0) = 0.039 PG = 0.23 Ic = 1.3

DESIGN LIVE LOADS TO INCLUDE POINT LOAD REQUIREMENTS AS PER ARTICLE 4.1.6.10 OF THE 2012 ONTARIO BUILDING CODE. FACTORED LOADS SHOWN ON DRAWINGS USE LOAD FACTORS LL = 1.5 AND DL = 1.25 PER ONTARIO BUILDING CODE.

**FOUNDATIONS - GENERAL:**

- THE FOUNDATION HAS BEEN DESIGNED FOR AN ASSUMED ALLOWABLE BEARING CAPACITY OF 2000 psf. A THIRD PARTY GEO-TECHNICAL TESTING COMPANY SHALL BE RETAINED TO CONFIRM THE ACTUAL ALLOWABLE BEARING CAPACITY, LOCAL FROST DEPTH AND THE SITE SOIL CLASSIFICATION. A COPY OF THE GEO-TECHNICAL REPORT SHALL BE PROVIDED TO THE FOUNDATION DESIGNER, ADJUSTMENTS MAY BE REQUIRED.
- FOOTINGS MAY NOT BE POURED INTO AN EARTH-FORMED TRENCH.
- OPEN EXCAVATIONS SHALL BE DE-WATERED AS REQUIRED. MEASURES MAY BE REQUIRED TO PROTECT BEARING MATERIALS FROM DEGRADATION DUE TO EXTREME WEATHER AND CLIMATIC CONDITIONS.
- BOTTOM OF EXTERIOR FOOTINGS SHALL BEAR ON NATIVE SOIL OR SOUND BEDROCK. FOOTING ELEVATIONS MAY NEED TO BE ADJUSTED.
- THE ENGINEER SHALL INSPECT ALL REBAR AND FORMWORK PRIOR TO PLACING CONCRETE. FORMWORK SHALL BE COMPLETE AT THE TIME OF INSPECTION, REINFORCEMENT MUST BE MINIMUM 95% COMPLETE AT TIME OF INSPECTION. PROVIDE MINIMUM 24 HOUR NOTICE AT THE FOLLOWING SCHEDULED EVENTS:
  - FOOTING PLACEMENT
  - FOUNDATION WALL PLACEMENT
  - SLAB ON GRADE PLACEMENT
- WHERE FOUNDATION WALLS ARE TO HAVE EARTH PLACED ON EACH SIDE, PLACE FILL SIMULTANEOUSLY SO AS TO MAINTAIN A COMMON ELEVATION ON EACH SIDE OF THE WALL. ALL FILL TO BE GRANULAR MATERIAL AS APPROVED BY ENGINEER.
- THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ADEQUATE BRACING AND SUPPORT OF FORMWORK TO ENSURE WALLS ARE PLUMB WITHIN ACCEPTABLE LIMITS (1/500).
- GRANULAR FILL SHALL BE MINIMUM 6" GRANULAR "A" COMPACTED TO 98% S.P.D.D. ALL OTHER FILL ON SITE SHALL BE GRANULAR B TYPE II COMPACTED TO 98% S.P.D.D. U.N.O. GRANULAR FILL SHALL BE COMPACTED IN MAXIMUM 10" LIFTS. FILL NOT SPECIFIED ON THE DRAWINGS TO BE SITED ON SITE MUST BE APPROVED BY THE DESIGNER PRIOR TO PLACEMENT.

**CONCRETE:**

- DESIGN OF CONCRETE ELEMENTS SHALL CONFORM TO CSA-A23.3-14. PROVIDE CONCRETE AND PERFORM WORK TO CSA A23.3-14.
- TEST CONCRETE IN ACCORDANCE WITH CSA-A23.3-14.
- CONCRETE REQUIREMENTS:

LOCATION CONDITION	MIN. DESIGN STR. Mpa = TYPE (DAYS) C = COMPRESSION F = FLEXURAL	CEMENT	AIR (%)	MAX AGG. (mm)	EXP.
SLAB ON GRADE	25C (28)	GU	<3	20	N
FOOTINGS	20C (28)	GU	<3	20	N
FOUNDATION WALLS	25C (28)	GU	4-7	20	F-2

- WHERE SPECIFIED STRENGTH EXCEED THOSE IMPLIED BY EXPOSURE CLASS, SPECIFIED STRENGTH GOVERNS.
  - ALL CONCRETE TO BE NORMAL WEIGHT 2400 KG/CUBIC METER
  - WATER CEMENT RATIOS FOR EXPOSURE CLASSES AS PER TABLES 7-9, CAN/CSA-A23.1-14.
  - DO NOT USE ANY ADMIXTURE CONTAINING CHLORIDE FOR CONCRETE WITH S-2 EXPOSURE.
  - NORMAL PORTLAND CEMENT TO BE USED FOR CONCRETE.
- CONTROL JOINTS FOR SLAB ON GRADE: SAWCUT AT LOCATIONS SHOWN ON DRAWINGS BUT NOT EXCEEDING 15'-0" SPACING. UNLESS OTHERWISE NOTED.
  - NO COLUMN OR WALL FORMS SHALL BE REMOVED BEFORE CONCRETE HAS REACHED 10 Mpa FOR ARCHITECTURAL CONCRETE AND 8 Mpa FOR OTHER COLUMNS OR WALLS.
  - NO SLAB FORMS OR BEAM FORMS SHALL BE REMOVED BEFORE CONCRETE HAS REACHED 17 Mpa.
  - STRENGTH OF CONCRETE FOR STRIPPING TO BE DETERMINED BY FIELD-CURED CYLINDERS. ALTERNATE METHODS, IF ACCEPTABLE TO THE STRUCTURAL DESIGN ENGINEER, MAY BE USED.
  - RESHORING TO BE APPROVED BY THE ENGINEER PRIOR TO STRIPPING.
  - ALL SLABS, BEAMS, GIRDERS, ETC. TO BE SHORED UNTIL CONCRETE REACHES DESIGN STRENGTH.
  - BE RESPONSIBLE FOR THE MIX DESIGN. MIX DESIGN SHALL BE PROPORTIONED WITH DUE CONSIDERATION TO EXTREME TEMPERATURES - WINTER OR SUMMER AND CONSULT GENERAL CONTRACTOR TO DETERMINE REQUIREMENTS. ADMIXTURES AND ADDITIVES SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT.

**REINFORCING NOTES:**

- REINFORCING STEEL: NEW DEFORMED BARS TO CSA/G30.18-09 (R2014), "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT", GRADE 400R. BARS TO BE WELDED CONFORM TO CAN/CSA G30.18-09, GRADE 400R. ANCHOR BOLTS TO ASTM A307. EPOXY COATED REBAR TO ASTM A775. PLACE REBAR TO CAN/CSA-A23.1-14.
- PROVIDE CLEAR CONCRETE COVER OVER REBAR AS FOLLOWS:
 

A) SURFACE POURED AGAINST GROUND	75 mm
B) FORMED SURFACES EXPOSED TO GROUND OR WEATHER	40 mm
C) FORMED SURFACES NOT EXPOSED TO GROUND OR WEATHER:	
BEAMS (TO STIRRUPS)	40 mm
COLUMNS (TO VERTICALS)	50 mm
SLABS, WALLS	20 mm
D) PARKING SURFACES AND EXTERIOR TOP OF SLAB:	40 mm
- REINFORCING WORK TO BE INSPECTED BY THE ENGINEER. NOTIFY THE ENGINEER 24 HOURS IN ADVANCE. CONTRACTOR MUST ENSURE MINIMUM 95% STEEL ARE IN PLACE FOR THE INSPECTION.
- REBAR LAP SPlice LENGTHS (UNLESS NOTED ON DRAWINGS)

BAR SIZE	COMP. SPLICES (mm)	TENSION SPLICE "CLASS B"		FOR CONCRETE STRENGTHS (mm)	
		25 Mpa	30 Mpa	35 Mpa	40 Mpa
10M	330	430 (560)	380 (510)	360 (460)	330 (430)
15M	480	610 (790)	535 (790)	510 (660)	480 (610)
20M	580	740 (940)	660 (865)	610 (815)	580 (760)
25M	740	1170 (1525)	1065 (1400)	990 (1295)	940 (1220)

TOP BAR SPlice LENGTHS ARE DENOTED IN BRACKETS AND SHOULD BE USED WHEN HORIZONTAL SPlice BARS ARE PLACED SUCH THAT THERE IS MORE THAN 300mm OF CONCRETE POURED BELOW THE BAR.

REBAR EMBEDMENT LENGTHS (UNLESS NOTED ON DRAWINGS)

BAR SIZE	COMPRESSION EMBEDMENT FOR CONCRETE STRENGTH (mm)			TENSION EMBEDMENT FOR CONCRETE STRENGTH (mm)			
	20 Mpa	25 Mpa	30 Mpa	25 Mpa	30 Mpa	35 Mpa	40 Mpa
10M	250(330)	230 (280)	200 (250)	330 (430)	305 (380)	80 (360)	50 (330)
15M	360 (450)	300 (400)	275 (360)	460 (610)	430 (530)	80 (510)	360 (480)
20M	430 (535)	380 (485)	360 (450)	560 (735)	510 (660)	80 (610)	60 (585)
25M	535 (710)	485 (635)	450 (585)	915 (1170)	840 (1070)	760 (990)	10 (940)
30M	635 (840)	585 (740)	535 (685)	1070 (1400)	90 (1270)	15 (1170)	40 (1120)
35M	760 (990)	685 (900)	635 (810)	1295 (1675)	170 (1525)	090 (1420)	1015 (1320)

TOP BAR DEVELOPMENT LENGTHS ARE DENOTED IN BRACKETS AND SHOULD BE USED WHEN HORIZONTAL BARS ARE PLACED SUCH THAT THERE IS MORE THAN 300 mm OF CONCRETE POURED BELOW THE BAR.

- MIN. REINFORCING AROUND OPENINGS LARGER THAN 300 mm: 2 - 15M EACH SIDE OF OPENING, EXTENDED 600 mm PAST CORNERS.
- DOWELS SHALL BE PLACED BEFORE CONCRETE IS POURED. TEMPLATES SHALL BE USED TO ENSURE CORRECT PLACEMENT OF DOWELS. DOWELS TO MATCH VERTICAL BARS.
- PROVIDE SUFFICIENT CHAIRS AND SUPPORT BARS TO MAINTAIN CONCRETE COVER AS SPECIFIED.

**STRUCTURAL STEEL:**

- FABRICATE AND ERECT STRUCTURAL STEEL TO CAN/CSA S16.1-14. SUBMIT TWO SETS OF PRINTS OF SHOP DRAWINGS SHOWING ALL DETAILS AND MATERIAL SPECS. FOR REVIEW PRIOR TO FABRICATION. SHOP DRAWINGS WILL NOT BE REVIEWED UNLESS SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN ONTARIO. FOR THOSE CONNECTIONS AND COMPONENTS DESIGNED BY THE FABRICATOR, THIS ENGINEER OR HIS REP. SHALL VISIT THE SITE TO SATISFY HIMSELF THAT THESE CONNECTIONS AND COMPONENTS SUBSTANTIALLY COMPLY WITH HIS SEALED SHOP DRAWINGS. THIS ENGINEER SHALL PROVIDE A LETTER TO THE CONSULTANT TO THIS EFFECT. THE ENGINEER SHALL ALSO PROVIDE SEALED SKETCHES FOR ALL FIELD MODIFICATIONS, MADE TO THIS DESIGN.
- PROVIDE STRUCTURAL STEEL TO CSA G40.21-13 WITH THE FOLLOWING GRADES:
 

WIDE FLANGE BEAMS AND COLUMNS	350 W
CHANNELS	350 W
HSS SECTIONS (CLASS II)	350 W
STRUCTURAL BARS, PLATES & ANGLES	300 W
MISCELLANEOUS STEEL	300 W
PIPE COLUMNS	ASTM A53 GR B
- PROVIDE ERECTION BOLTS TO ASTM A325, MINIMUM M20. DESIGN BOLTED CONNECTIONS TO ASTM A325 ASSUMING THREADS IN THE SHEAR PLANE.
- WELD TO CASA W59-13 BY FABRICATORS CERTIFIED TO CSA W47.1-09 WELDING OF REINFORCING BARS SHALL CONFORM TO CSA W186-M1990(R2012).
- MINIMUM WELDS FOR CONNECTIONS SHALL BE 5mm FILLET WELDS AND WHERE EXPOSED IN FINISHED BUILDING WELDS SHALL BE GROUND SMOOTH.
- ALL STUD ANCHORS AND DEFORMED BAR ANCHORS SHALL BE FUSION WELDED TO PLATES AS PER MANUFACTURERS SPECIFICATIONS AND RECOMMENDATIONS.
- CONNECTIONS NOT DETAILED ON THE STRUCTURAL DRAWINGS SHALL BE DESIGNED BY THE STEEL FABRICATOR. MINIMUM BEAM SHEAR IS 70% OF THE TOTAL BEAM LOAD CAPACITY AS LISTED IN "CISC MANUAL BEAM LOADS TABLES" FOR THE GIVEN SPAN OF THE BEAM U.N.O. UNUSUAL LOADINGS SHOWN ON PLANS ARE SPECIFIED LOADS. SEE LEGEND FOR EXPLANATION OF THESE LOADS.
 

UNLESS OTHERWISE NOTED, ALL CONNECTIONS SHALL BE SIMPLE CONNECTIONS. FOR BEAMS TO FACE OF HSS COLUMN CONNECTIONS PROVIDE DOUBLE ANGLE OR TEE-TYPE CONNECTIONS PER CISC HANDBOOK.

FOR CONNECTIONS NOT DESCRIBED ABOVE NOR DETAILED ON THE STRUCTURAL DRAWINGS (I.E. SMALL FRAMING MEMBERS) USE ANY TYPE OF SIMPLE CONNECTION AND DESIGN FOR THE SPECIFIED LOAD SHOWN.

SIMPLE BEAM TO COLUMN CONNECTIONS SHALL BE DESIGNED TO DELIVER SHEAR ONLY TO THE FACE OF THE COLUMN. SEISMIC AND DRAG STRUT CONNECTIONS SHALL BE DESIGNED TO DELIVER SHEAR ONLY TO THE CENTERLINE OF THE COLUMN.

UNLESS OTHERWISE NOTED, CONNECTIONS ARE TO BE WELDED OR BOLTED WITH HIGH STRENGTH BOLTS IN BEARING TYPE CONNECTIONS (MIN. 2 - 20 DIA. BOLTS).

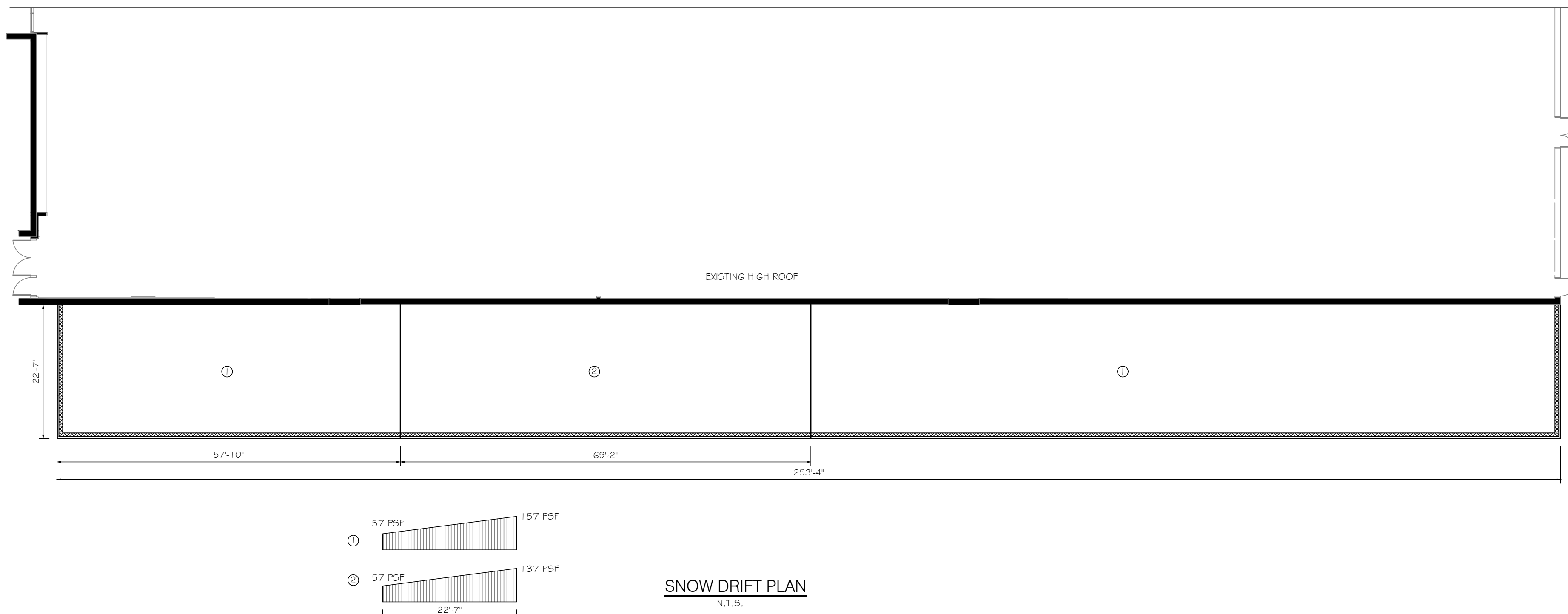
BOLTED CONNECTIONS FOR DRAG STRUT LINES ARE TO BE PRE-TENSIONED. THE PRIME STRUCTURAL CONSULTANT SHALL HAVE FINAL APPROVAL ON ALL CONNECTIONS.
- TEMPORARY BRACING DURING CONSTRUCTION TO BE DESIGNED BY CONTRACTOR (WHOEVER IS RESPONSIBLE FOR ERECTION). CONTRACTOR IS RESPONSIBLE FOR SAFETY ON SITE.
- COORDINATE WITH MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS TO AVOID CONFLICT WITH STRUCTURAL ELEMENTS.
- NO BURNING OF HOLES SHALL BE ALLOWED IN STRUCTURAL STEEL ANYWHERE.
- FOR MISC. STEEL SUCH AS RAILINGS, AWNINGS AND NON-STRUCTURAL ARCH. STEEL NOT DETAILED ON STRUCTURAL DRAWINGS, STRUCTURAL ENGINEER SHALL CHECK SHOP DRAWINGS AND COMMENT ON THE ABILITY OF THE SHOWN MEMBERS AND CONNECTIONS TO RESIST LOADS AND OTHER EFFECTS REQUIRED BY ONTARIO BUILDING CODE 2006. OVERALL DETAILING TO COMPLY WITH ARCHITECTURAL DRAWINGS AND ARE THE SUB-CONTRACTOR'S RESPONSIBILITY. ALL RAILINGS AND STAIR SHOP DRAWINGS TO BE STAMPED BY P.ENG. OF ONTARIO.
- ALL VISUALLY EXPOSED SURFACES OR SURFACES EXPOSED TO WEATHER AND NOT REQUIRING FIREPROOFING SHALL BE PAINTED WITH ONE COAT OF PRIMER TO CISC/CPMA 1-73A (REFER TO ARCHITECTURAL DRAWINGS). ALL SITE WELD AND WELDING CONNECTIONS TO BE TOUCHED-UP WITH ANTI-RUST PAINT.
- PROVIDE NAIL HOLES (2 MIN.) IN MISC. STEEL CAST INTO CONC. TO FACILITATE NAILING TO FORM WORK.
- SEE NOTE "8" IN STEEL DECKING NOTES FOR FRAMING AT OPENINGS.
- CHECK MECHANICAL AND ARCHITECTURAL DRAWINGS FOR OPENINGS, MECHANICAL UNITS, HOLES, ETC. TO BE MADE. OPENINGS SHOWN ON STRUCTURAL DRAWINGS FOR MECHANICAL UNITS, DUCTS AND PIPES ARE APPROXIMATE ONLY IN SIZE AND LOCATION. THE MECHANICAL CONTRACTOR MUST PROVIDE CONFIRMATION OF THE LATEST INFORMATION TO THE GENERAL CONTRACTOR AT THE STRUCTURAL STEEL AND METAL DECK SHOP DRAWING APPROVAL STAGE OF THE PROJECT.
- THE STEEL STRUCTURE IS A NON-Self-SUPPORTING STEEL FRAME AND IS DEPENDENT UPON DIAPHRAGM ACTION THE DECK FLOORS AND ATTACHMENT TO THE WALL SYSTEM FOR STABILITY AND FOR RESISTANCE TO WIND AND SEISMIC FORCES. PROVIDE ALL TEMPORARY SUPPORTS REQUIRED FOR STABILITY AND FOR RESISTANCE TO WIND AND SEISMIC FORCES UNTIL THESE ELEMENTS ARE COMPLETE AND ARE CAPABLE OF PROVIDING THIS SUPPORT.
- THE FABRICATOR IS RESPONSIBLE FOR THE DESIGN OF ALL CONNECTIONS. CONNECTIONS SHOWN ON THE STRUCTURAL DRAWINGS ARE SCHEMATIC AND ARE ONLY INTENDED TO SHOW THE RELATIONSHIP OF MEMBERS CONNECTED. CONNECTION DETAILS INDICATED ON THE DRAWINGS SHALL BE INCORPORATED INTO FABRICATOR'S CONNECTION DESIGN. SEE SPECIFICATIONS. ALL SHOP DRAWINGS SHALL BE SIGNED AND SEALED BY THE FABRICATOR'S ENGINEER WITH THE ENGINEER'S SEAL FOR THE PROVINCE WHERE THE STRUCTURE IS LOCATED. ENGINEER'S SEAL MAY BE QUALIFIED "FOR DESIGN OF CONNECTIONS ONLY".
- REFER TO SCHEDULE ON DWG FOR NON-BEARING WALL LINTELS NOT SHOWN ON STRUCTURAL DWG. REFER TO ARCH. & MECH. DWG. FOR OPENING SIZES AND LOCATIONS.
- PROVIDE HOLES IN STEEL MEMBER FOR ATTACHMENT OF OTHER MATERIALS EXCEPT AT CRITICAL TENSILE SECTIONS OF BEAMS.
- NO SPLICES IN COLUMNS AND BEAMS ARE ALLOWED WITHOUT THE ENGINEER'S APPROVAL. 100% BUTT WELDS IN SPLICES ARE TO BE ULTRASONICALLY TESTED OR EQUAL AND ACCEPTED BY A WELDING INSPECTION COMPANY.
- ALL LINTELS SHALL HAVE A MINIMUM OF 200mm (8") BEARING UNLESS OTHERWISE NOTED.
- PROVIDE MASONRY ANCHORS IN CONFORMANCE WITH THE O.B.C. AT ALL LOCATIONS WHERE COLUMNS, BEAMS OR JOISTS IN CONTACT WITH OR ADJACENT TO MASONRY.
- STEEL BEAMS BEARING ON MASONRY SHALL HAVE 200mm (8") MIN. BEARING UNLESS NOTED AND TO BE ANCHORED TO MASONRY WITH 38x6 (1 1/2" X 1/2") STRAP ANCHOR X 300mm (12") LONG WELDED TO BEAM WEB AT TOP OF BEAM.

**METAL DECK:**

- DESIGN, FABRICATE, AND INSTALL STEEL DECK TO CSA S136-09 AND THE CSSBI 101M84 GRADE A UNLESS OTHERWISE NOTED. FOR ROOFS UNLESS OTHERWISE NOTED ON PLAN. MINIMUM COATING DESIGNATION ZF075 WIRE COAT FINISH. PROVIDE METAL GAUGE AND FASTENERS TO CARRY THE VERTICAL LOADS SPECIFIED ON THE DRAWINGS.
- DECKING PROFILE: AS NOTED ON DRAWING.
- INSTALL DECKING CONTINUOUS OVER 3 SPANS EXCEPT WHERE OTHERWISE APPROVED.
- WELD DECK TO STEEL WITH 20 mm (3/4") FUSION WELDS IN PATTERN 36/11 & @ 150 MM (6") c/c ALONG ALL PERIMETER BEAMS AND JOISTS. LONGITUDINAL WELDS TO BE 300 mm (8") MAX. AND CLINCH SIDE LAPS TO BE 150 mm (6") MAX.
- WELDERS SHALL BE CERTIFIED BY THE CANADIAN WELDERS BUREAU TO THE REQUIREMENTS OF CSA W47.1-09, DIV. 1 OR 2.1. THE INSTALLATION WELDING PROCEDURES SHALL BE APPROVED BY THE CANADIAN WELDING BUREAU. THE WELDERS SHALL HAVE CURRENT QUALIFICATIONS FOR ACT SPOT WELDING BY THE C.W.B.
- SUBMIT TWO SETS OF PRINTS OF SHOP DRAWINGS SHOWING DETAILS, MATERIAL SPECIFICATIONS, FASTENING SCHEDULE AND DESIGN LOADS.
- WATER ON THE STEEL DECK OR BETWEEN THE DECK AND THE SUPPORTING STEEL SHALL BE REMOVED PRIOR TO PUDDLE WELDING OR STUD WELDING.
- CHECK MECHANICAL AND ARCHITECTURAL DRAWINGS FOR OPENINGS, MECH. UNITS, HOLES, ETC. TO BE MADE IN METAL DECKING. OPENINGS SHOWN ON STRUCTURAL DRAWINGS FOR MECHANICAL UNITS, DUCTS AND PIPES ARE APPROXIMATE ONLY IN SIZE, LOCATION AND QUANTITY. THE MECHANICAL CONTRACTOR MUST PROVIDE CONFIRMATION OF THE LATEST INFORMATION TO THE GENERAL CONTRACTOR AT THE STRUCTURAL STEEL AND METAL DECK SHOP DRAWING APPROVAL STAGE OF THE PROJECT. CUT OPENINGS IN DECKING WHERE INDICATED ON THE DRAWINGS AND IN COOPERATION WITH OTHER TRADES. REINFORCE OPENINGS BETWEEN 150 AND 450 WITH 75 X 75 X 6 ANGLE PERPENDICULAR TO FLUTES. OPENINGS LARGER THAN 450mm FRAMED BY STRUCTURAL ERECTOR.
- PERIMETER DECK CLOSURES TO BE PROVIDED BY THE STEEL DECK CONTRACTOR UNLESS STRUCTURAL STEEL DECK CLOSURES ARE SHOWN ON THE DRAWINGS. CLOSURES SHALL PROVIDE STRAIGHT AND TRUE FINISHED EDGE (+/-0.6 mm).
- PROVIDE SUPPORT FOR METAL DECK AT WALLS AND OPENINGS WHERE REQUIRED.

**LOAD BEARING MASONRY WALL:**

- ALL LOAD BEARING HOLLOW BLOCK UNITS TO HAVE AN ULTIMATE COMPRESSIVE STRENGTH 20 MPa (2900 psi.) MIN. UNLESS NOTED.
- MORTAR FOR LOAD BEARING MASONRY TO BE TYPE "S" OR BETTER WITH A MIN. AVERAGE COMPRESSIVE STRENGTH OF 13 Mpa (1900 psi.) @ 28 DAYS MIN.
- ALL AVAILABLE BEARING AREAS OF MASONRY UNITS SHALL BE FULLY COVERED WITH MORTAR SPREAD IN AN EVEN LAYER AND ALL VERTICAL JOINTS INCLUDING JOINT BETWEEN BRICK AND BLOCK) SHALL BE FILLED SOLIDLY WITH MORTAR.
- FOR BONDING OF BRICK AND BLOCK USE HEAVY DUTY TRUSS-TYPE (OR EQUIVALENT ADJUSTABLE TYPE) 'BLOCK-LOC' OR EQUAL @ 400mm (16") c/c VERT. COMPLETELY EMBEDDED IN MORTAR.
- ALL INTERSECTION MASONRY WALL TO HAVE MASONRY BOND OR HEAVY-DUTY 'BLOC-LOC' OR EQUAL @ 400mm (16") c/c VERTICALLY.
- PROVIDE SOLID OR FULLY GROUTED MASONRY PAD UNDER ALL JOISTS AND BEAMS. SEE PLANS AND SCHEDULES FOR BEARING DETAILS.
- PROVIDE 'BLOC-LOC' MASONRY WALL REINFORCING OR EQUAL FOR ALL MASONRY WALLS, INSTALLED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS, AT 400 mm (16") c/c VERT. MAXIMUM.
- REFER TO ARCH. DWGS. FOR LOCATIONS OF CONTROL JOINTS IN MASONRY WALLS.
- ALL MASONRY PIERS TO BE SOLID OR FULLY GROUTED MASONRY.
- ALL MASONRY WALLS TO HAVE A MINIMUM OF 15M @ 24" o.c. VERTICAL REINFORCING STEEL, AT WALL ENDS, CORE BESIDE WINDOW DOOR OR OTHER OPENINGS, AND AT ALL WALL INTERSECTIONS.
- PROVIDE BLOCK WALL CONTROL JOINT AT LOCATION SHOWN ON ARCHITECTS DRAWINGS. MAXIMUM SPACING TO BE AT 15.2 METERS (50'-0"), REINFORCE ON CELL ON EITHER SIDE OF JOINT WITH 2 - 15M VERTICAL GROUT SOLID.
- USE RUNNING BOND BLOCK CONSTRUCTION. KEY ALL MASONRY JOINTS AT WALL CORNERS AND INTERSECTIONS. RAKE BACK WALL CONSTRUCTION WHEN TURNING WALL CORNERS.
- REINFORCE TWO CORES UNDER STEEL BEAM BEARING WITH 2-15M VERTICAL EACH CORE FULL HEIGHT AND GROUT SOLID. PROVIDE 2 SOLID COURSES UNDER LINTEL BEARING. NO DUCT OR VOIDS ALLOWED AT BEARING.
- LINTEL - INSTALL STEEL LINTEL. PROVIDE BLOCK LINTELS ONLY IN SPECIFIC AREAS SPECIFIED IN STRUCTURAL DRAWINGS. BLOCK LINTEL TO BE TWO COURSE 400mm DEEP COMPLETE WITH 4-15M TOP AND BOTTOM FOR OPENINGS 2000mm OR LESS. EXTEND REINFORCING 650mm (24") PAST OPENINGS BOTH SIDES.
- VERTICAL CORE FILLS TO BE CAST IN LIFTS OF 1200mm (4'-0") MAXIMUM. VERTICAL REINFORCING TO HAVE A MAXIMUM LENGTH OF 2000mm (6'-8") WITHOUT SPLICING. ALL LAPS AND ANCHORAGES IN REINFORCING TO BE 40mm DIAMETER MINIMUM UNLESS NOTED OTHERWISE.
- TEMPORARY BRACING AND SHORING TO BE PROVIDED DURING CONSTRUCTION. BRACING AND SHORING DESIGN IS THE CONTRACTORS RESPONSIBILITY.



No.	By	Date	Revisions
2	ED	2017-03-13	FOR CONSTRUCTION
1	ED	2017-03-03	90% SUBMISSION
0	B.O.B.	2016 12 09	FOR REVIEW

No.	By	Date	Revisions

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The contractor must check and verify all dimensions on the job prior to start of construction.

DRAWINGS ARE NOT TO BE SCALED



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DETECTION, LIGHTING & POWER SMALL BUILDINGS  
HOUSE

Project Title:

**CARLETON PLACE ARENA**  
CARLETON PLACE, ONTARIO

Drawing Title:

**STRUCTURAL NOTES**

Design: B.D.C.	Checked: L.A.F.	Approved: L.A.F.	Project No.: 7558
Drawn: B.O.B.	Checked: B.D.C.	Date: 2016 12 09	Contract No.:
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