

**GENERAL:**

- 1. DO NOT SCALE THE DRAWINGS.
2. THE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATIONS. ALL RELATED ARCHITECTURAL, MECHANICAL, ELECTRICAL, PROCESS & CIVIL DRAWINGS, AND OTHER RELEVANT CONTRACT DOCUMENTS.
3. CONTRACTOR SHALL PROVIDE COMPLETE SET OF ARCHITECTURAL, MECHANICAL, ELECTRICAL, CIVIL & PROCESS DRAWINGS & APPLICABLE SPECIFICATION SECTIONS TO THE STRUCTURAL STEEL, JOIST & METAL FABRICATORS CONTRACTORS PRIOR TO SUBMISSION OF ANY RELATED SHOP DRAWINGS.
4. THE DESIGN AND CONSTRUCTION OF ALL WORK ON THIS PROJECT IS TO CONFORM TO THE 2012 EDITION OF THE ONTARIO BUILDING CODE (REGULATION 332/12).
5. THE CONTRACTOR SHALL FIELD CHECK AND VERIFY ALL DIMENSIONS, ELEVATIONS AND CONDITIONS AT THE SITE AND REPORT TO THE ENGINEER ANY DISCREPANCIES OR UNSATISFACTORY CONDITIONS WHICH MAY ADVERSELY AFFECT THE PROPER COMPLETION, COST, SCHEDULE OR QUALITY OF WORK. COMMENCEMENT OF WORK BY THE CONTRACTOR IMPLIES ACCEPTANCE OF THE EXISTING CONDITIONS.
6. THE CONTRACTOR SHALL PROTECT ALL EXISTING STRUCTURES, UNDERGROUND UTILITIES AND OTHER EXISTING SERVICES DURING CONSTRUCTION, AND MAKE GOOD ANY DAMAGE RESULTING FROM THE WORK ON THIS PROJECT TO THE SATISFACTION OF THE OWNER AND ENGINEER.
7. THE CONTRACTOR SHALL PROVIDE, MAINTAIN AND TAKE RESPONSIBILITY FOR ALL TEMPORARY BRACING AND SHORING.
8. TYPICAL DETAILS SHOWN ON DRAWINGS SHALL GOVERN THE WORK. IF DETAILS DIFFER ON OTHER DRAWINGS, THE MOST STRINGENT SHALL GOVERN.
9. WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED.
10. UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS, THE CORING OR CUTTING OF OPENINGS AND HOLES SHOWN ON THE STRUCTURAL DRAWINGS THROUGH THE EXISTING STRUCTURE SHALL NOT CUT ANY REINFORCING BARS. THE CONTRACTOR SHALL LOCATE THE LOCATION, SIZE, LENGTH, ORIENTATION AND POSITION OF EXISTING REINFORCING AND PROVIDE IBI WITH HARD COPIES OF SUCH FOR OUR REVIEW IN THE VICINITY OF THE HOLES AND SLEEVES TO BE CUT OR CORED, AND THE HOLES AND SLEEVES SHALL BE LOCATED TO AVOID CUTTING OF REINFORCING BARS.
11. NEW OPENINGS OR CORING TO BE CUT THROUGH EXISTING FLOOR SLAB OR WALLS SHALL BE CLEARLY MARKED OUT BY THE CONTRACTOR. THE CONTRACTOR SHALL NOTIFY IBI ONCE THE MARKING OUT HAS BEEN COMPLETED SO THAT IBI CAN REVIEW THE PROPOSED LOCATIONS OF ALL NEW OPENINGS. DO NOT PROCEED WITH CUTTING OF NEW OPENINGS WITHOUT THE APPROVAL OF IBI.
12. UNLESS NOTED OTHERWISE ON THE DRAWINGS NEW STRAIGHT SIDED OPENINGS THROUGH EXISTING SLABS AND WALLS SHALL BE SAWCUT WITH NO OVERCUTS. USE CORED HOLES AT THE CORNERS. JACKHAMMERMING SHALL NOT BE PERMITTED REFER TO THE DETAILS AND PROCEDURES INDICATED ON THE STRUCTURAL DRAWINGS FOR THE NEW OPENINGS. ALTERNATES TO THE ABOVE PROCEDURE MUST BE REVIEWED BY IBI PRIOR TO THE START OF DEMOLITION OR CONSTRUCTION.

**DESIGN CRITERIA:**

- 1. STRUCTURE HAS BEEN DESIGNED TO RESIST WIND AND SEISMIC LOADS WHICH ARE IN ACCORDANCE WITH THE USER'S GUIDE - NBC 2015 STRUCTURAL COMMENTARIES (PART 4 OF DIVISION B), FOR THE IMPORTANCE CATEGORY SITED IN NOTE #12. THE WIND AND SEISMIC PARAMETERS FOUND IN NOTE #13, AND FOR SITE CLASS D, F<sub>s</sub>=1.24, F<sub>v</sub>=1.55, I<sub>f</sub>F<sub>s</sub>(0.2) = 0.230, R<sub>w</sub>=1.5, R<sub>s</sub>=1.3 (CONVENTIONAL CONSTRUCTION OF MOMENT-RESISTING FRAMES AND BRACED FRAMES), AND NO IRREGULARITIES, USING STATIC ANALYSIS IN BOTH DIRECTIONS.
2. LATERAL LOADS DUE TO WIND AND SEISMIC FORCES ACT THROUGH THE METAL ROOF DECK DIAPHRAGM, AND ARE RESISTED BY MOMENT-RESISTING FRAMES IN THE NORTH-SOUTH DIRECTION AND BY BRACED FRAMES IN THE EAST-WEST DIRECTION.
3. ROOF ELEMENTS SUCH AS JOISTS, JOISTS GIRDERS, METAL DECK, ETC. AND THEIR CONNECTIONS TO THE SUPPORTING STRUCTURE ARE TO BE DESIGNED FOR UPWARD SUCTION DUE TO WIND. THE GROSS UPWARD DESIGN PRESSURES ARE SHOWN ON THE ROOF LOADING PLAN ON DRAWING
4. ADDITIONAL SNOW ACCUMULATIONS ADJACENT TO HIGHER ROOFS, PENTHOUSES, SCREENS, SKYLIGHTS AND MECHANICAL EQUIPMENT (INCLUDING DUCTS) ARE SHOWN ON THE ROOF LOADING PLAN ON DRAWING G28-184-S5300 IN ACCORDANCE WITH THE USER'S GUIDE - NBC 2015 STRUCTURAL COMMENTARIES (PART 4 OF DIVISION B). FOR CLARITY, NOT ALL ACCUMULATIONS ARE SHOWN ON THE PLAN.
5. ROOF STRUCTURE (INCLUDING JOISTS AND JOIST GIRDERS) IS TO BE DESIGNED FOR PONDING, INCLUDING PONDING INSTABILITY.
6. AS A MINIMUM, WIND LOADS SHALL BE CALCULATED ON THE BASIS OF OPEN TERRAIN AND BUILDING CATEGORY 3 AS DEFINED IN THE USER'S GUIDE - NBC 2015 STRUCTURAL COMMENTARIES (PART 4 OF DIVISION B). IF OTHER PROVISIONS OF SAID COMMENTARIES RESULT IN HIGHER WIND LOADS AND/OR MORE STRINGENT WIND EFFECTS, THESE LOADS AND EFFECTS SHALL BE CONSIDERED IN THE DESIGN.
7. ALL LOADS SHOWN ON DRAWINGS ARE SPECIFIED (NO LOAD FACTOR APPLIED) LOADS UNLESS NOTED OTHERWISE. HOWEVER, (ULS) IMPORTANCE FACTORS ARE APPLIED, UNLESS NOTED OTHERWISE.
8. ALL LOAD EFFECTS (AXIAL FORCES, SHEARS, MOMENTS AND TORSIONS) ARE FACTORED, UNLESS OTHERWISE NOTED.
9. DESIGN SPECIFIED (UNFACTORED) DEAD AND LIVE LOADS ARE SHOWN ON DRAWINGS
10. STRUCTURES ARE NOT STABLE UNTIL ALL COMPONENTS (INCLUDING BUT NOT LIMITED TO MOMENT CONNECTIONS, BRACING, FLOOR & ROOF DECK AND SHEATHING) ARE CONSTRUCTED.
11. MATERIALS:

Table with 2 columns: Material Type and Specification. Includes entries for STRUCTURAL STEEL, COLD-FORMED STEEL, HOLLOW STRUCTURAL SECTIONS (HSS), WELDING, BOLTS, NUTS AND WASHERS, ANCHOR BOLTS, PRIMER, REINFORCING STEEL, WOOD, and PLYWOOD.

- 12. STRUCTURE HAS BEEN ASSIGNED THE NORMAL IMPORTANCE CATEGORY, AS DEFINED IN THE APPLICABLE EDITION OF THE ONTARIO BUILDING CODE.
13. STRUCTURES HAVE BEEN DESIGNED CONSIDERING THE FOLLOWING CLIMATIC AND SEISMIC DATA FOR PROJECT LOCATION OF TORONTO (SCARBOROUGH):

Table with 4 columns: WIND, SEISMIC, SNOW, RAIN. Values include q 1/50 = 0.47 kPa, Sa(0.2) = 0.219, Ss = 1.2 kPa, and ONE DAY = 92 mm.

- 14. NO STRUCTURES HAVE BEEN DESIGNED FOR FUTURE EXPANSION.

**CONCRETE:**

- 1. THE DESIGN AND CONSTRUCTION OF ALL WORK ON THIS PROJECT SHALL CONFORM TO THE APPLICABLE EDITION OF THE FOLLOWING CSA STANDARDS: CSA-A23.1 "CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION"; CSA-A23.2 "TEST METHODS AND STANDARD PRACTICES FOR CONCRETE"; CSA-A23.3 "DESIGN OF CONCRETE STRUCTURES"; CAN/CSA-G30.18 "BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT".
2. UNLESS NOTED OTHERWISE, MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS SHALL BE AS FOLLOWS:
- LEAN CONCRETE FILL ..... 15 MPa
- MUD SLAB ..... 15 MPa (EXPOSURE CLASS F-1)
- FOOTINGS ..... 35 MPa (EXPOSURE CLASS C-1)
- PIERS, WALLS & CURBS ..... 35 MPa (EXPOSURE CLASS C-1)
- SLABS ON GRADE (INTERIOR) ..... 32 MPa (EXPOSURE CLASS N-CF)
- SLABS ON GRADE (EXTERIOR) ..... 35 MPa (EXPOSURE CLASS C-1)
- EXTERIOR APRONS ..... 35 MPa (EXPOSURE CLASS C-1)
3. MINIMUM CONCRETE COVER TO REINFORCING BARS:

Table titled 'CONCRETE CLEAR COVER (CSA A23.1)'. Columns: EXPOSURE CONDITION, EXPOSURE CLASS (N, F-1, C-1). Rows include CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, BEAMS, GIRDERS, COLUMNS AND PILES, SLABS, WALLS, JOISTS, SHELLS AND FOLDED PLATES, RATIO OF COVER TO NOMINAL BAR DIAMETER (#2), and RATIO OF COVER TO NOMINAL MAXIMUM AGGREGATE SIZE.

**NOTES:**

- #1. THIS REFERS ONLY TO CONCRETE THAT WILL BE CONTINUALLY DRY WITHIN THE CONDITIONED SPACE (i.e., MEMBERS ENTIRELY WITHIN THE VAPOUR BARRIER OF THE BUILDING ENVELOPE).
#2. THE COVER FOR A BUNDLE OF BARS SHALL BE THE SAME AS THAT FOR A SINGLE BAR WITH AN EQUIVALENT AREA.
#3. THE SPECIFIED COVER FROM SCREEDED SURFACES SHALL BE AT LEAST 1.5 TIMES THE NOMINAL MAXIMUM AGGREGATE SIZE TO REDUCE INTERFERENCE BETWEEN AGGREGATE AND REINFORCEMENT WHERE VARIATIONS IN BAR PLACEMENT RESULT IN A COVER SMALLER THAN SPECIFIED.
4. DETAIL, BEND, PLACE AND SUPPORT REINFORCING STEEL IN CONFORMANCE WITH THE LATEST RSIC MANUAL OF STANDARD PRACTICE, UNLESS NOTED OTHERWISE.
5. ALTERNATE 90° HOOKS OF CROSSTIES END FOR END OVER HEIGHT OF ALL MEMBERS IN WHICH CROSSTIES ARE SPECIFIED.
6. ALL LAP SPLICES SHALL BE CLASS B TENSION SPLICES. FOR HORIZONTAL REINFORCEMENT THAT WILL BE PLACED IN SUCH A WAY THAT MORE THAN 300 mm OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE SPLICE, BAR LOCATION FACTOR (k/1) EQUAL TO 1.3 SHALL BE APPLIED IN DETERMINING CLASS B TENSION SPLICE LENGTH, IN ACCORDANCE WITH APPLICABLE EDITION OF CSA-A23.3.
7. PLAIN (UNREINFORCED) CONCRETE EXPOSED TO DEICING CHEMICALS SHALL MEET EXPOSURE CLASS C-2 IN ACCORDANCE WITH APPLICABLE EDITION OF CSA-A23.1.
8. REINFORCED CONCRETE EXPOSED TO CHLORIDES SHALL MEET EXPOSURE CLASSIFICATION C-1 IN ACCORDANCE WITH APPLICABLE EDITION OF CSA-A23.1.
9. PROVIDE CORROSION INHIBITOR IN ALL CONCRETE OF EXPOSURE CLASS C-1. REFER TO SPECIFICATIONS FOR CORROSION INHIBITOR DOSAGE RATE.
10. USE TYPE GU PORTLAND CEMENT FOR ALL CONCRETE, UNLESS NOTED OTHERWISE.
11. ALL HORIZONTAL WALL AND GRADE BEAM REINFORCING SHALL BE CONTINUOUS THROUGH PIERS, UNLESS NOTED OTHERWISE, SPLICE TOP BARS AT MID-SPAN AND BOTTOM BARS AT SUPPORTS FOR ALL GRADE BEAMS.
12. WHEREVER OPENINGS OCCUR, INTERRUPTING ONE OR MORE REINFORCING BARS, IN SLABS OR WALLS, PROVIDE ADDITIONAL REINFORCING STEEL EQUAL TO THE REINFORCING STEEL DISPLACED BY THE OPENING UNLESS OTHERWISE SHOWN. DISTRIBUTE REINFORCEMENT EQUALLY ON EACH SIDE OF THE OPENING AND EXTENDING THE FULL SPAN LENGTH.
13. NO SLEEVES, PIPES, HOLES OR NOTCHES SHALL BE PLACED IN OR THROUGH WALLS, COLUMNS, PIERS, BEAMS, GRADE BEAMS, SLABS, FOOTINGS, OR ANY OTHER CONCRETE MEMBER, EXCEPT AS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.
14. DO NOT PLACE CONCRETE FOOTINGS OR ANY OTHER CONCRETE MEMBER UNTIL ALL DESIGNATED REINFORCING STEEL HAS BEEN PLACED AND INSPECTED AND ANY CONDUITS, PIPING OR OTHER EMBEDDED ITEMS ARE INSTALLED AND VERIFIED.
15. MAXIMUM WATER-TO-CEMENTING MATERIALS RATIO (w/cm) SHALL BE 0.55, AND MINIMUM 28-DAY COMPRESSIVE STRENGTH SHALL BE 25 MPa FOR ALL CONCRETE FLOOR SLABS (BOTH SLABS ON GRADE AND SLABS ON DECK).

**FOUNDATION:**

- 1. ALL INT. FOOTINGS SHALL BEAR ON NATIVE MATERIAL OR ENGINEERED FILL WITH MINIMUM SLS BEARING RESISTANCE OF 150 kPa AND MINIMUM ULS BEARING RESISTANCE OF 250 kPa, UNLESS NOTED OTHERWISE.
2. ALL EXT. FOOTINGS SHALL BEAR ON SUITABLE FOUNDING MATERIAL WITH MINIMUM SLS BEARING RESISTANCE OF 150 kPa, MINIMUM ULS BEARING RESISTANCE OF 250 kPa, FRICTION ANGLE OF AT LEAST 35° AND MINIMUM FACTORED SLIDING RESISTANCE OF 150. MAX. ALLOWABLE TOTAL SETTLEMENT TO BE 25 mm. MAX. ALLOWABLE DIFFERENTIAL SETTLEMENT TO BE 25 mm.
3. ALL BEARING VALUES AND GEOTECHNICAL INFORMATION ARE BASED ON GEOTECHNICAL REPORT WHERE AVAILABLE.
4. THE CONTRACTOR SHALL PROTECT SOIL FROM WATER AND FREEZING ADJACENT TO AND BELOW ALL FOOTINGS, GRADE BEAMS AND OTHER CONCRETE POURS WITH MINIMUM 1200 mm SOIL COVER OR EQUIVALENT.
5. ALL EXCAVATIONS AND FOUNDING MATERIAL SHALL BE INSPECTED AND APPROVED BY A QUALIFIED SOILS ENGINEER PRIOR TO CONCRETE PLACEMENT.
6. THE CONTRACTOR SHALL PROVIDE ALL SHORING WHERE REQUIRED DURING EXCAVATION TO PREVENT CAVE-IN.
7. EXCAVATION SHALL NOT EXTEND BELOW A LINE EXTENDING DOWN AND AWAY FROM ANY FOOTING EDGE OR CORNER AT A RATIO OF 7 VERTICAL TO 10 HORIZONTAL.
8. ANY OVER EXCAVATION NECESSITATED BY LOCAL SOFT AREAS OR OTHER DELETERIOUS CONDITIONS SHALL BE MADE GOOD WITH 15 MPa LEAN CONCRETE FILL.
9. FOUNDATION WALL BACKFILL SHALL BE OPSS TYPE 1 GRANULAR 'B' OR APPROVED FREE-DRAINING, IN-SITU MATERIAL COMPACTED, IN LAYERS NOT TO EXCEED 200 mm, TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY.
10. BACKFILL TO PROCEED SIMULTANEOUSLY ON BOTH SIDES OF FOUNDATION WALLS UNLESS TEMPORARY SUPPORT IS PROVIDED. DO NOT BACKFILL UNTIL CONCRETE HAS ATTAINED 75% OF ITS SPECIFIED 28-DAY COMPRESSIVE STRENGTH.
11. CONSTRUCTION JOINTS AND CONTROL JOINTS IN REINFORCED FOUNDATION WALLS SHALL BE LOCATED AT THE EDGE OF PIERS (WHERE PIERS ARE PRESENT), MAXIMUM SPACING OF CONSTRUCTION JOINTS SHALL BE AS REQUIRED, BUT NOT GREATER THAN 20 m, UNLESS NOTED OTHERWISE. MAXIMUM SPACING OF CONTROL JOINTS SHALL BE 6 m, AND 3 m FROM CORNERS.
12. FOUNDATIONS SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS. CONTRACTOR SHALL INCLUDE IN THEIR WORK ALL PROVISIONS, INCLUDING BUT NOT LIMITED TO EXCAVATION AND FORMING, AS REQUIRED TO CONSTRUCT FOUNDATIONS THUS.

**SLAB ON GRADE & PAD:**

- 1. SEE PLAN FOR SLAB ON GRADE & PAD THICKNESS.
2. PLACE SLAB ON GRADE ON MIN. 200 mm OPSS GRANULAR 'A' COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY. SUBGRADE MODULUS k = XX MN/M<sup>2</sup> (XX LBS/IN<sup>2</sup>). REFER TO GEOTECHNICAL REPORT FOR SUB-BASE INFORMATION.
3. PRIOR TO PLACING GRANULAR FILL MATERIALS, PROOF-ROLL EXISTING SUB-GRADE TO IDENTIFY INCONSISTENCIES OR SOFT AREAS. PROCEED WITH GRANULAR PLACEMENT ONLY AFTER THESE AREAS HAVE BEEN REWORKED AND COMPACTED TO THE SATISFACTION OF THE SOILS ENGINEER.
4. DO NOT PLACE CONCRETE UNTIL ALL ELECTRICAL, MECHANICAL AND PROCESS CONDUITS, PIPING OR OTHER EMBEDDED SERVICES ARE INSTALLED AND VERIFIED.
5. AGREE ON LOCATION OF CONSTRUCTION JOINTS WITH ENGINEER PRIOR TO CONSTRUCTION.
6. PROVIDE SAWCUT CONTROL JOINTS AS SHOWN ON PLANS.
7. PROVIDE EXTERIOR COLUMN ISOLATION JOINTS AND SAWCUTTING AS PER DETAILS SHOWN.
8. PERFORM SAWCUTTING FOR CONTROL JOINTS USING DRY METHOD (SOFF-CUT SAW) AS SOON AS POSSIBLE AFTER CONCRETE PLACEMENT WITHOUT LEAVING TREAD MARKS, DISLODGING AGGREGATE AND BEFORE UNCONTROLLED SHRINKAGE OCCURS. FILL CONTROL JOINTS, AS SPECIFIED, NO SOONER THAN 120 DAYS AFTER CONCRETE PLACEMENT.
9. FLOOR FINISH: SEE SPECIFICATIONS.

**METAL DECK:**

- 1. ALL METAL DECK SHALL BE NEW AND SHALL BE DESIGNED, FABRICATED AND INSTALLED TO CONFORM TO THE REQUIREMENTS OF THE APPLICABLE EDITION OF CAN/CSA-S136 "NORTH AMERICAN SPECIFICATIONS FOR THE DESIGN OF COLD FORMED STEEL STRUCTURAL MEMBERS (USING THE APPENDIX B PROVISIONS APPLICABLE TO CANADA)" AND THE REQUIREMENTS OF THE CANADIAN SHEET STEEL BUILDING INSTITUTE.
2. ALL ROOF AND FLOOR DECK SHALL BE DESIGNED AND DETAILED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF ONTARIO, AND SHALL BE OF THICKNESS REQUIRED TO SUPPORT ALL LOADS AND EFFECTS SHOWN ON DRAWINGS BUT SHALL NOT BE LESS THAN THAT SHOWN ON DRAWINGS.
3. SPAN DECK UNITS OVER FOUR OR MORE STRUCTURAL SUPPORTS (MINIMUM 3 CONTINUOUS SPANS) FOR INCREASED RIGIDITY.
4. DESIGN AND CONNECT METAL EDGE AND CLOSURE STRIPS TO SAFELY RESIST CONSTRUCTION LOADS AND PREVENT THE LOSS OF CONCRETE/GROUT WHEN DECK IS CONCRETED.
5. PLACE DECK IN ACCORDANCE WITH MANUFACTURER'S SHOP DRAWINGS. END LAPS SHALL ALWAYS OCCUR OVER SUPPORTS. SIDE LAPS SHALL BE ON HALF CORRUGATION. MINIMUM ROOF DECK END LAP IS 50 mm FOR WELDED ATTACHMENT.
6. ALL CONNECTIONS OF ROOF DECK TO SUPPORTING STRUCTURE SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF ONTARIO TO RESIST ALL LOADS AND EFFECTS SHOWN ON DRAWINGS, BUT SHALL NOT BE LESS THAN THAT SHOWN ON DRAWINGS.
7. ATTACH DECK UNITS TO TOP OF SUPPORTS BY FUSION WELDS WITH A MINIMUM EFFECTIVE DIAMETER OF 19 mm. MAXIMUM SPACING OF FUSION WELDS AND SIDE LAP BUTT CLINCH SHALL BE AS FOLLOWS:
- WELDS AT 150 C/C (EACH FLUTE) TRANSVERSE TO SPAN OF DECK AND AROUND PERIMETER
- LONGITUDINAL WELDS @ 600 C/C
- SIDE LAP BUTT CLINCH @ 300 C/C
8. FIELD CUTTING OF DECK UNITS SHALL BE DONE IN WORKMANLIKE MANNER. CUT OPENINGS AND REINFORCE EDGES AS REQUIRED FOR PIPES, DUCTS, ETC. THE MAXIMUM SIZE OF AN UNREINFORCED OPENING IS 150 mm SQUARE OR IN DIAMETER. ROOF OPENINGS LARGER THAN 450 mm WIDE AND FLOOR OPENINGS LARGER THAN 300 mm WIDE SHALL BE SUPPORTED BY STEEL FRAMING.
9. DESIGN METAL ROOF DECK FOR MAXIMUM LIVE, SNOW AND RAIN LOAD DEFLECTIONS OF L/360.

**MASONRY:**

- 1. THE DESIGN AND CONSTRUCTION OF ALL WORK ON THIS PROJECT IS TO CONFORM TO APPLICABLE EDITION OF CSA STANDARDS CSA-S304.1, CSA-A370, CSA-A371, CSA-A179 AND CAN/CSA-G30.18. PROVIDE TYPE S MORTAR IN ACCORDANCE WITH APPLICABLE EDITION OF CSA STANDARD CSA-A179.
2. PROVIDE STANDARD, HOLLOW 15 MPa CONCRETE BLOCK UNITS UNLESS NOTED OTHERWISE. AT LOCATIONS WHERE VERTICALLY-REINFORCED MASONRY IS SPECIFIED, PROVIDE ONE ADDITIONAL VERTICAL BAR OF SIZE EQUAL TO DISTRIBUTED VERTICAL REINFORCING, FULL HEIGHT AT EACH SIDE OF CONTROL JOINTS, AND AT CORNERS, INTERSECTIONS, ENDS OF WALLS AND TO EACH SIDE OF ALL OPENINGS, UNLESS NOTED OTHERWISE. PROVIDE 2 ADDITIONAL BARS WHERE OPENING WIDTH IS GREATER THAN 1200 mm. PROVIDE MATCHING DOWELS TO FOOTING, SLAB THICKENING, SLAB ON DECK OR OTHER SUPPORTING STRUCTURE, FOR ALL VERTICAL WALL REINF. (TYP. UIN).
3. FOR HIGH-LIFT GROUTING, PROVIDE CLEAN-OUT HOLES IN BOTTOM COURSE AND MINIMUM SLUMP OF 200 mm.
4. MASONRY GROUT SHALL BE FINE GROUT, AND SHALL BE PROPORTIONED ACCORDING TO, AND MEET ALL REQUIREMENTS OF APPLICABLE EDITION OF CSA-A179.
5. PROVIDE CONTINUOUS, HORIZONTAL, STANDARD LADDER-TYPE HORIZONTAL JOINT REINFORCEMENT @ 400 mm C/C, IN BOTTOM TWO BED JOINTS, TOP TWO BED JOINTS AND FIRST BED JOINT, ABOVE AND BELOW ALL WALL OPENINGS. ALL SUCH REINF. SHALL BE SPLICED USING CLASS B TENSION LAP SPLICES (AS DEFINED IN APPLICABLE EDITION OF CSA-S304.1). PREFABRICATED CORNER AND INTERSECTION JOINT REINFORCING PIECES SHALL BE USED. MINIMUM WIRE DIAMETER TO BE 3.65 mm.
6. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATION OF ALL MASONRY WALLS.
7. PROVIDE VERTICAL REINFORCING IN ALL MASONRY WALLS AS PER TABLE ON SPECIFIC BLD. DRAWING ALL REINFORCED CORES SHALL BE GROUTED SOLID FOR FULL HEIGHT OF WALLS. VERTICALLY-CANTILEVERED WALLS SHALL BE CONSTRUCTED OF SOLID-GROUTED MASONRY.
8. PROVIDE VERTICAL REINFORCING AT EACH LATERAL SUPPORT LOCATION (SEE BLD. SPECIFIC DRW.)
9. LAP ALL 15M BARS 675 mm MINIMUM. LAP ALL 20M BARS 850 mm MINIMUM.
10. UNLESS NOTED OTHERWISE, MINIMUM CLEARANCE OF XX mm SHALL BE PROVIDED BETWEEN MASONRY WALLS AND STEEL COLUMNS, BEAMS, GIRDERS, JOIST AND GIRTS. THIS REQUIREMENT DOES NOT APPLY WHERE MASONRY IS INTENDED (BY DESIGN) TO BEAR ON STEEL MEMBER.
11. WHERE POST-INSTALLED ANCHORS ARE INSTALLED IN MASONRY ELEMENTS/MEMBERS, EXISTING REINFORCING STEEL (INCLUDING HORIZONTAL BED JOINT REINFORCING), CAST-INS AND EMBEDDED ITEMS SHALL BE ACCURATELY LOCATED, AND EDGE OF ANCHOR HOLES SHALL BE LOCATED A DISTANCE AWAY FROM EXISTING REINFORCING STEEL (INCLUDING HORIZONTAL BED JOINT REINFORCING), CAST-INS END EMBEDDED ITEM SUCH THAT AT LEAST MINIMUM CONCRETE COVER REQUIREMENTS (SEE MASONRY NOTE #1) ARE MET. EXISTING REINFORCING STEEL (INCLUDING HORIZONTAL BED JOINT REINFORCING), CAST-INS AND EMBEDDED ITEMS SHALL NOT BE DAMAGED ANCHORING ACTIVITIES, INCLUDING DRILLING.

**STRUCTURAL STEEL:**

- 1. THE DESIGN AND CONSTRUCTION OF ALL WORK IN THIS PROJECT SHALL CONFORM TO THE APPLICABLE EDITION OF CAN/CSA-S16.
2. ALL SHOP CONNECTIONS SHALL BE WELDED. ALL FIELD CONNECTIONS SHALL BE WELDED OR BOLTED USING HIGH TENSILE-STRENGTH BOLTS, BEARING TYPE, WHERE APPLICABLE, AND UNLESS NOTED OTHERWISE, CONNECTIONS SHALL BE CISC DOUBLE ANGLE BEAM CONNECTIONS FOR A325 BOLTS AND E49XX FILLET WELDS. MINIMUM SIZE OF BOLTS - M20 DIAMETER.
3. ALL WELDING SHALL BE CARRIED OUT IN ACCORDANCE WITH APPLICABLE EDITION OF FOLLOWING CSA STANDARDS:
- W47.1 FOR QUALIFICATIONS OF WELDERS
- W48.1 TO W48.7 FOR ELECTRODES
- W59 FOR DESIGN AND WORKMANSHIP
4. ALL COLUMN ENDS SHALL BE SAWCUT AND WELDED TO BASE/CAP PLATES.
5. ALL COLUMNS TO HAVE ANGLES AT TOP TO SUPPORT STEEL DECK WHERE REQUIRED.
6. BRACING MEMBERS SHALL BE CONNECTED FOR THE FOLLOWING (WHICHEVER IS LARGER):
- 50% OF THE NOMINAL TENSION CAPACITY OF THE MEMBER BASED ON GROSS AREA
- FORCES AS SHOWN ON THE DRAWINGS
- A MINIMUM OF TWO BOLTS
7. FOR DOUBLE-ANGLE BRACING (E.G. CROSS-BRACING), ANGLES SHALL HAVE INTERCONNECTING BATTENS AND/OR SPACERS SUCH THAT SLENDERNESS RATIO OF INDIVIDUAL ANGLES (BASED ON LEAST RADIUS OF GYRATION OF INDIVIDUAL ANGLES) DOES NOT EXCEED SLENDERNESS RATIO OF BUILT-UP (DOUBLE-ANGLE) MEMBER.
8. THE CONTRACTOR SHALL SUPPLY, INSTALL, MAINTAIN AND REMOVE ANY TEMPORARY BRACING REQUIRED DURING CONSTRUCTION.
9. FORCES ARE DESIGNATED BY (+) FOR TENSION AND (-) FOR COMPRESSION.
10. CONNECTIONS FOR BEAMS, GIRDERS AND JOISTS SUBJECT TO AXIAL FORCES SHALL BE DESIGNED FOR THE AXIAL FORCES IN ADDITION TO THE SHEAR FORCES, MOMENT FORCES/EFFECTS AND TORSION FORCES/EFFECTS. FORCES INDICATED ARE FACTORED AND IN KN. MOMENTS AND TORSIONS INDICATED ARE FACTORED AND IN KN-m.
11. ALL EXTERIOR STEEL, AND STEEL THAT IS NOT IN A TEMPERATURE AND HUMIDITY CONTROLLED ENVIRONMENT, SHALL BE HOT-DIPPED GALVANIZED (BOTH STRUCTURAL STEEL AND MISCELLANEOUS STEEL). THIS SHALL INCLUDE NUTS, BOLTS, WASHERS, BASE PLATES, LEVELING PLATES, ANCHOR BOLTS AND ANCHORS.
12. FILLER BEAMS AND JOISTS SHALL BE PLACED EQUALLY BETWEEN ESTABLISHED DIMENSIONS, UNLESS NOTED OTHERWISE.
13. PROVIDE WELDED STIFFENER PLATES ON BOTH SIDES OF THE WEB OF BEAMS AND GIRDERS AT POINTS OF CONCENTRATED LOAD, INCLUDING BEAMS AND GIRDERS SUPPORTING COLUMNS OR RUNNING OVER TOPS OF COLUMNS. MINIMUM STIFFENER PLATE THICKNESS SHALL BE 10 mm OR FLANGE THICKNESS OF COLUMNS ABOVE OR BELOW, WHICHEVER IS GREATER. MINIMUM SIZE OF WELD SHALL BE 5 mm DOUBLE FILLET WELD, OR SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE STIFFENER, WHICHEVER IS GREATER.
14. FOR LOCATIONS OF DOOR FRAMES, WALL OPENINGS, ROOF AND FLOOR OPENINGS, ETC., AND RELATED DETAILS, SEE ARCHITECTURAL, MECHANICAL, ELECTRICAL, PROCESS & CIVIL DRAWINGS.
15. SHOWN ON PLANS DENOTES AXIAL LOADS ALONG BEAMS AND GIRDERS DUE TO WIND OR EARTHQUAKE LOADS. DESIGN BEAM-TO-BEAM, BEAM-TO-GIRDER AND GIRDER-TO-GIRDER CONNECTIONS, AS WELL AS BEAM-TO-COLUMN AND GIRDER-TO-COLUMN CONNECTIONS FOR THESE LOADS IN COMBINATION WITH APPLICABLE GRAVITY LOADS.
16. PERIMETER ROOF ANGLE SHALL BE CONTINUOUS AND BUTT WELDED TOGETHER AT JOINTS. ENSURE CONNECTION OF PERIMETER ANGLE TO SUPPORTING STRUCTURE IS SUFFICIENT TO RESIST MAXIMUM UNIT SHEAR FROM DECK DIAPHRAGM. REFER TO ROOF-DIAPHRAGM SHEAR DIAGRAM ON DRAWINGS
17. ALL WELDABLE REINFORCING STEEL ANCHORS SHALL BE WELDED TO BASE PLATES/BEARING PLATES TO FULLY DEVELOP BARS IN TENSION.
18. REFER TO SPECIFICATIONS FOR BEAM AND GIRDER CAMBER REQUIREMENTS.

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ISSUES: Table with columns No., DESCRIPTION, DATE. Rows A-D.
CONSULTANTS:
SEAL:
PRIME CONSULTANT: IBI GROUP
PROJECT TITLE: CITY OF TORONTO ACCESSIBILITY UPGRADES
PROJECT ADDRESS:
PROJECT NO: 9119- 19- 0162 / IBI 122260
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SHEET TITLE: STRUCTURAL - GENERAL NOTES
SHEET NUMBER: G28-GAL-G2000 ISSUE: D

**REINFORCING STEEL**

- ALL REINFORCING STEEL SHALL CONFORM TO CAN/CSA-G30.18-M-2009 (R2014), GRADE 400W.
- MINIMUM CLEAR SPACING BETWEEN PARALLEL REINFORCING BARS SHALL BE 1.4 TIMES THE BAR DIAMETER, 1.4 TIMES THE MAX. AGGREGATE SIZE OR 30mm WHICHEVER IS GREATER. PROVIDE 75mm MINIMUM LAPPED REBAR CLEARANCE FOR CONCRETE VIBRATOR ACCESS.
- DEVELOPMENT LENGTHS AND LAP SPLICES SHALL BE IN ACCORDANCE WITH THE REINFORCING STEEL INSTITUTE OF CANADA, MANUAL OF STANDARD PRACTICE UNLESS INDICATED OTHERWISE. ALL LAP SPLICES SHALL BE CLASS 'B' TENSION LAP SPLICES AND CLASS 'B' TENSION LAP SPLICES SHALL BE PROVIDED FOR ALL SHRINKAGE AND TEMPERATURE BARS, WHERE TWO BARS OF DIFFERENT DIAMETERS ARE LAPPED; PROVIDE CLASS 'B' TENSION LAP LENGTH CORRESPONDING TO THE SMALLER BAR BUT NO LESS THAN FULL TENSION DEVELOPMENT LENGTH OF THE LARGER BAR.
- PROVIDE EMBEDMENT LENGTH FOR FULL TENSION DEVELOPMENT IN ACCORDANCE WITH CSA A23.3
- DEVELOPMENT LENGTH AND SPLICE LENGTH FOR  $f_y = 400MPa$  AND  $f'_c = 35MPa$  TO BE AS PER TABLE BELOW, UNLESS OTHERWISE SHOWN ON DRAWINGS.

BAR SIZE	$f'_c = 35MPa$				$f_y = 400MPa$	
	TENSION STEEL		TENSION STEEL		COMPRESSION STEEL	
	HORIZONTAL TOP BARS*	ALL OTHER BARS**	DEVELOPMENT	SPLICES	DEVELOPMENT	LAP SPLICES
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
10	360	470	280	370	200	330
15	510	670	390	510	290	470
20	620	810	480	630	350	560
25	1000	1300	770	1010	450	740
30	1190	1550	910	1190	530	880
35	1420	1850	1090	1420	630	1050
45	-	-	-	-	800	-

REFERENCE: CAN/CSA A23.3-14

db= MAX. OF NORMAL AND ACTUAL BAR DIAMETER

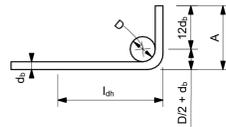
\* HORIZONTAL TOP BARS WITH MORE THAN 300mm OF FRESH CONCRETE POURED BELOW THE BARS, AND WALL HORIZONTAL REINFORCEMENT.

\*\* HORIZONTAL BARS WITH NOT MORE THAN 300mm OF FRESH CONCRETE POURED BELOW THE BARS, VERTICAL BARS.

- STANDARD 90° HOOK TO CONFORM TO A23.3 AND THE FOLLOWING TABLE, WHICHEVER IS MORE STRINGENT, UNLESS OTHERWISE SHOWN ON DRAWINGS.

STANDARD 90° HOOK DIMENSION

BAR SIZE	$f'_c = 35MPa$		$f_y = 400MPa$	
	D***	A	$l_{db}$ ****	
$d_b$ (mm)	(mm)	(mm)	(mm)	(mm)
10M	70	190	150	
15M	100	260	190	
20M	120	320	240	
25M	150	410	300	
30M	250	520	360	
35M	300	620	430	



90° HOOK SEE A23.3

\*\*\* SEE A23.1, TABLE 16

\*\*\*\* SEE A23.3, §12.5.1, §12.5.3 (b) =  $0.7 \times 100d_b / f'_c^{0.5} > 150$  OR 8  $d_b$ .

**ABBREVIATIONS:**

2L	two angles	HP	high point
AB	anchor bolt	HS	high strength
ADD	addendum	ID	inside diameter
ADJ	adjacent	IE	invert elevation
AF	above finished floor	IF	inside face
AHU	air handling unit	IN	inches
ALT	alternate	INCL	include
ANC	anchor	INFO	information
APPROX	approximate	JT	joint
ARCH	architectural	KN	kiloneutron
ASTM	American Society for Testing and Materials	kNm	kilonewton meter
B/B	back to back	kPa	kilopascal
BC	bottom chord	L	length
BET	between	LB	pound
BLDG	building	LG	long
BLK	block	LL	live load
BM	beam	LLBB	long legs back-to-back
BOF	bottom of footing	LLH	long leg horizontal
BOS	bottom of steel	LLV	long leg vertical
BOT	bottom	LO	louver opening
BRG	bracing	LP	low point
BRG	bearing	LS	louver sill
BRKT	bracket	m	metre
BSMT	basement	MACH	machine
CA	column above	MAX	maximum
CB	column below	MECH	mechanical
C/C	center to center	MEZZ	mezzanine
CERT	certified	MFR	manufacturer
CHKD PL	checkered plate	MIN	minimum
CIP	cast in place	MISC	miscellaneous
CJ	construction joint	mm	millimetre
CL	centerline	MT	metric ton
CLJ	control joint	NIC	not in contract
CLR	clear	NO	number
COL	column	NTS	not to scale
CONC	concrete	O/O	out to out
CONN	connection	OPNG	opening
CONSTR	construction	OPP	opposite
CONT	continuation (continuous)	PC	piece
CONTR	contractor	PEN	penetration
CSA	Canadian Standards Association	PL	plate
CT	cooling tower	PROJ	projection
CTR	center	PSF	pounds per square foot
C/W	complete with	PSI	pounds per square inch
DET	detail	R	radius
DIA	diameter	RCB	reinforced concrete beam
DIAG	diagonal	REF	reference
DIM	dimension	REINF	reinforcement
DL	dead load	REMOV	removable
DO	door opening	REQD	required
DWG	drawing	RR	railroad
DWL	dowel	R/W	reinforced with
EA	each	SCH	schedule
EF	each face	SECT	section
EL	elevation	SIM	similar
ELEC	electrical	SOG	slab on grade
EMB	embedment	SP	space
EQ	equal	SPEC	specifications
EQPT	equipment	SQ	square
EW	each way	SSC	structural steel contract
EXP	expansion	STAGG	staggered
EX	existing	STD	standard
EXT	exterior	STIFF	stiffener
FDN	foundation	STL	steel
FDNC	foundation contract	STRU	structural
FIN	finish	SYM	symmetrical
FL	floor	t	thickness
FLG	flange	T	tread
FT	feet	T&B	top and bottom
FTG	footing	TC	top chord
FUT	future	TEMP	temperature
GA	gauge	THK	thick
GC	general contract	TL	total load
GALV	galvanized	TOF	top of footing
GENL	general	TOS	top of steel
GOL	gauge outstanding leg	TYP	typical
GR	grade	UON	unless otherwise noted
GRT	grating	VERT	vertical
H	high	VIF	vertical inside face
HEF	horizontal each face	VOF	vertical outside face
HGR	hanger	W	width (wide)
HGT	height	W/O	without
HH	hooked-hooked	WP	working point
HIF	horizontal inside face	WPL	wall plate
HOF	horizontal outside face	WS	water stop
HORIZ	horizontal	WT	weight
		WWF	welded wire fabric

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PROJECT TITLE  
**CITY OF TORONTO**  
**ACCESSIBILITY UPGRADES**

PROJECT ADDRESS

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SHEET TITLE  
**STRUCTURAL - GENERAL**  
**NOTES, SYMBOLS &**  
**ABBREVIATIONS**

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