

GENERAL

1.

THIS IS AN IMPERIAL PROJECT, UNLESS OTHERWISE NOTED. ALL DIMENSIONS ARE IN FEET AND INCHES. ALL FORCES ARE IN kips, UNLESS OTHERWISE NOTED.
2.

"WSP-S" REFERS TO WSP-CANADA STRUCTURAL CONSULTANT.
3.

PRIOR TO CONSTRUCTION, REVIEW STRUCTURAL DRAWINGS IN CONJUNCTION WITH DRAWINGS PROVIDED BY ALL OTHER CONSULTANTS, CONFIRM ALL DIMENSIONS, ELEVATIONS AND HEADROOM CLEARANCES, AND COORDINATE ALL OPENINGS, SLEEVES AND EMBEDDED ITEMS.
4.

REPORT ANY DISCREPANCIES OR CONFLICTS BEFORE PROCEEDING WITH THE WORK.
5.

DO NOT CUT OR DRILL ANY OPENINGS IN STRUCTURAL MEMBERS WITHOUT WRITTEN PERMISSION FROM WSP-S.
6.

VERIFY EXISTING DIMENSIONS AND CONDITIONS ON SITE PRIOR TO CONSTRUCTION.
7.

USE THESE DRAWINGS ONLY FOR THE PURPOSE IDENTIFIED IN THE REVISIONS COLUMN. DO NOT CONSTRUCT FROM THESE DRAWINGS UNLESS MARKED "ISSUED FOR CONSTRUCTION".
8.

DO NOT USE INFORMATION ON THESE DRAWINGS FOR ANY OTHER PROJECT OR WORKS.
9.

DO NOT SCALE THESE DRAWINGS.
10.

UNLESS OTHERWISE NOTED ON DRAWINGS, FOLLOW TYPICAL DETAILS SHOWN ON DRAWINGS. TYPICAL DETAILS SHOW STRUCTURAL INTENT RATHER THAN ACTUAL CONDITIONS FOR THIS PROJECT. IF A TYPICAL DETAIL INCLUDES A CROSS REFERENCE TO ANOTHER TYPICAL DETAIL WHICH IS NOT INCLUDED IN THE DRAWING SET, THE CROSS REFERENCED DETAIL IS NOT APPLICABLE ON THIS PROJECTS.
11.

ALL SECTIONS, DETAILS AND STATEMENTS NOTED AS "TYPICAL" APPLY TO LIKE / SIMILAR CONDITIONS IN THE STRUCTURE.
12.

REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR REQUIRED FIRE RATING, SPRAYED FIREPROOFING, INTUMESCENT PAINTING AND ALL OTHER MEASURES REQUIRED TO ACHIEVE IT.
13.

REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR WATERPROOFING, SEALERS, ETC.
14.

REFER TO GEOTECHNICAL REPORT AND ARCHITECTURAL / CIVIL DRAWINGS AND SPECIFICATIONS FOR ALL SOIL WORKS.
15.

DRAWINGS SHOW COMPLETED STRUCTURE ONLY. THEY DO NOT SHOW TEMPORARY WORKS FOR WHICH THE CONTRACTOR IS RESPONSIBLE AND WHICH MAY BE REQUIRED FOR EXECUTION OF THE PROJECT, INCLUDING TEMPORARY SHORING, BRACING, GUYS AND THE TOWNS. THE CONTRACTOR TO ESTABLISH CONSTRUCTION PROCEDURE AND SEQUENCE TO ENSURE SAFETY OF THE WHOLE STRUCTURE AND ALL ITS COMPONENTS DURING ERECTION.
16.

EXTENT OF ALL TEMPORARY SHORING FOR EXCAVATION WHICH MAY BE REQUIRED IS NOT NECESSARILY SHOWN ON STRUCTURAL DRAWINGS, CONTRACTOR TO DETERMINE. REFER TO SPECIFICATIONS FOR TEMPORARY SHORING REQUIREMENTS.
17.

DESIGN OF ALL TEMPORARY WORKS TO BE CARRIED OUT BY A PROFESSIONAL ENGINEER RETAINED BY THE CONTRACTOR, LICENSED IN THE PLACE WHERE THE PROJECT IS LOCATED.
18.

ANCHOR BOLTS AND OTHER EMBEDDED ITEMS ARE DESIGNED FOR LOADS ACTING ON THE COMPLETED STRUCTURE ONLY AND ARE NOT TO BE USED OR RELIED UPON FOR TEMPORARY SUPPORT OR BRACING DURING ERECTION UNLESS REVIEWED AND APPROVED BY THE CONTRACTOR'S ENGINEER RESPONSIBLE FOR THE ERECTION PROCEDURES.
19.

CONSTRUCTION LOADS ON COMPLETED STRUCTURE NOT TO EXCEED DESIGN LOADS INDICATED ON DRAWINGS. FULL DESIGN LOADS MAY ONLY BE APPLIED AFTER THE CONCRETE REACHES ITS DESIGN STRENGTH.
20.

UNLESS SHOWN ON STRUCTURAL DRAWINGS, DESIGN OF NON STRUCTURAL AND SECONDARY STRUCTURAL ELEMENTS AND THEIR CONNECTIONS TO THE PRIMARY BUILDING STRUCTURE ARE NOT WITHIN THE SCOPE OF SERVICES PROVIDED BY WSP-S. SUCH ELEMENTS INCLUDE (BUT ARE NOT LIMITED TO) THE FOLLOWING:

1.

MISCELLANEOUS STEEL ELEMENTS' STAIRS, RAILINGS, GUARDRAILS.

2.

PARTITIONS: MASONRY, GLASS, WOOD AND STEEL STUDS, PREFABRICATED PANELS

3.

BULKHEADS, SUSPENDED CEILING, INTERIOR AND EXTERIOR SIGNAGE.

4.

ARCHITECTURAL PRECAST, PRECAST STAIRS.

5.

EXTERIOR CLADDING: PRECAST PANELS, METAL WALL SYSTEMS, CURTAIN WALLS AND WINDOWS.

6.

MASONRY, STONE OR PRECAST VENEER CONNECTIONS TO BACKUP STRUCTURE.

7.

MODULAR ASSEMBLIES FOR THERMALLY BROKEN BALCONIES.

8.

SKYLIGHTS, SNOW FENCES, GUTTERS, ROOF ANCHORS, WINDOW WASHING SYSTEMS, CHIMNEYS AND STACKS.

9.

SUPPORTS FOR MECHANICAL AND ELECTRICAL EQUIPMENT: HANGERS, BRACES, POSTS, RACKS, SLEEPERS, SEISMIC RESTRAINTS, SUPPORT PLATFORMS AND PADS, SERVICE PLATFORMS.

10.

SUPPORTS AND SEISMIC RESTRAINTS FOR OTHER EQUIPMENT, SUCH AS MEDICAL AND SPORTS EQUIPMENT.

11.

STORAGE RACKS.

12.

LANDSCAPING ELEMENTS: WALLS, CURBS, BENCHES, PLANTERS, WATER FEATURES.

13.

LIGHT POLES, FLAG POLES, SIGNS AND THEIR FOUNDATIONS.
21.

WSP-S WILL NOT REVIEW DESIGN, DETAILING AND INSTALLATION OF THESE ELEMENTS, FOR WHICH SUPPLIERS AND / OR SPECIALTY PROFESSIONAL ENGINEERS ARE RESPONSIBLE. THE ONLY REVIEW PROVIDED (WHERE APPLICABLE) WILL BE FOR IMPACT ON THE BASE BUILDING STRUCTURE.
22.

MAINTAIN A QUALITY CONTROL PLAN FOR STRUCTURAL WORK, AND MAKE IT AVAILABLE TO THE CONSULTANT UPON REQUEST. AT A MINIMUM, THE PLAN TO INCLUDE:

1.

NAMES OF PERSONNEL RESPONSIBLE FOR EXECUTION OF THE PLAN.

2.

MEANS AND METHODS FOR CONFIRMING MATERIAL COMPLIANCE WITH SPECIFICATIONS AND ASSOCIATED DOCUMENTATION PROCEDURES.

3.

PROGRAM FOR CONFIRMING AND DOCUMENTING COMPLIANCE WITH REQUIRED SUB-TRADE QUALIFICATIONS AND QUALIFICATIONS OF THEIR INDIVIDUAL EMPLOYEES AND SUB-CONTRACTORS.

4.

PROCEDURES FOR REVIEWING FIELD COMPLIANCE WITH CONSTRUCTION DOCUMENTS, INCLUDING DOCUMENTATION OF LOCATIONS REVIEWED, PHOTOGRAPHS TAKEN AND TIMING OF REVIEW. THE CONTRACTOR'S REVIEW TO BE COMPLETED PRIOR TO REVIEW BY THE CONSULTANT.

5.

PROCEDURES FOR RECTIFYING DEFICIENCIES NOTED BY THE CONTRACTOR, SUB-CONTRACTORS, CONSULTANTS AND INDEPENDENT INSPECTION AGENCIES.
23.

FOR INSPECTION AND TESTING REQUIREMENTS, REFER TO SPECIFICATIONS.
24.

IN CASE OF DISCREPANCY BETWEEN GENERAL NOTES, DRAWINGS AND SPECIFICATIONS, COMPLY WITH THE MOST STRINGENT REQUIREMENTS.

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28.

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DESIGN DATA

1.

STRUCTURAL DESIGN IS IN ACCORDANCE WITH THE 2012 ONTARIO BUILDING CODE COMPENDIUM, NBC 2015 STRUCTURAL COMMENTARIES.
2.

CONCRETE ELEMENTS ARE DESIGNED PER CSA A23.3-14: DESIGN OF CONCRETE STRUCTURES.
3.

STEEL ELEMENTS ARE DESIGNED PER CSA S16-14 - LIMIT STATE DESIGN OF STEEL STRUCTURES.
4.

COLD FORMED STEEL STRUCTURAL ELEMENTS ARE DESIGNED PER CSA S136-12: NORTH AMERICAN SPECIFICATION FOR DESIGN OF COLD FORMED STEEL STRUCTURAL MEMBERS.
5.

MASONRY STRUCTURAL ELEMENTS ARE DESIGNED PER CSA S304-14 - DESIGN OF MASONRY STRUCTURES.
6.

THE VALUES FOR CLIMATIC DATA USED IN THE DETERMINATION OF DESIGN LOADS HAVE BEEN OBTAINED FROM THE 2012 OBC FOR THE SPECIFIC LOCATION OF OTTAWA, ON.
7.

BASED ON THE USE AND OCCUPANCY, THE BUILDING IS DESIGNED TO THE REQUIREMENTS OF A NORMAL IMPORTANCE CATEGORY.
8.

SUPERIMPOSED DEAD LOADS (SD) ARE NON-STRUCTURAL, DEAD LOADS DUE TO NON-STRUCTURAL TOPPINGS, FINISHES, PARTITIONS, ROOFING MATERIALS, SUSPENDED EQUIPMENT, PAVERS, SOIL, ETC.
9.

DEAD LOAD (DL) IS THE SELF WEIGHT OF THE STRUCTURE PLUS THE SUPERIMPOSED DEAD LOAD.
10.

NET FACTORED UPLIFT LOADS ON ROOFS ARE SHOWN ON PLANS.
11.

UNLESS OTHERWISE NOTED, DESIGN LOADS SHOWN ON DRAWINGS ARE SPECIFIED (UNFACTORED) LOADS, TO BE USED FOR ULS DESIGN. FOR SLS DESIGN, THESE LOADS CAN BE REDUCED, BY MULTIPLYING WITH THE RATIO OF APPROPRIATE IMPORTANCE FACTORS $k_s(S)$ AND $k_d(S)$ GIVEN BELOW.
IF ONLY ONE VALUE IS GIVEN FOR A POINT LOAD, CONSIDER IT LIVE LOAD.
12.

FOR CONNECTION LOADS, "+" SIGN INDICATES TENSION AND "-" SIGN INDICATES COMPRESSION, EXCEPT FOR COLUMN LOADS WHERE "+" SIGN INDICATES COMPRESSION AND "-" SIGN INDICATES TENSION.
13.

SNOW:
 $S_s = 2.4 \text{ kPa}$
 $S_r = 0.4 \text{ kPa}$
 $I_s \text{ (ULS)} = 1.0$
 $I_s \text{ (SLS)} = 0.9$
14.

RAIN:
ONE DAY RAINFALL: 1/50 = 86 mm
15.

WIND:
 $q = 0.41 \text{ kPa}$ (1 IN 50)
 $I_w \text{ (ULS)} = 1.0$
 $I_w \text{ (SLS)} = 0.75$
16.

BUILDING IS: LOW RISE
TERRAIN TYPE: OPEN
17.

SEISMIC:
 $S_{SI}(0.2) = 0.439$
 $P_{GA} = 0.281$
 $I_{ef}P_{SI}(0.2) = 0.500$
 $S_{SI}(0.5) = 0.237$
 $P_{GV} = 0.196$
 $R_d = 1.16$
 $R_o = 1.3$
 $S_{SI}(2.0) = 0.056$
 $I_e = 1.0$
 $S_{SI}(5.0) = 0.015$
 $S_{SI}(10.0) = 0.0055$
SITE CLASSIFICATION = D

EXCAVATION, BACKFILL AND COMPACTION

1.

REFER TO GEOTECHNICAL REPORT FOR ALL EXCAVATION, BACKFILL AND COMPACTION REQUIREMENTS.
2.

VERIFY GEOTECHNICAL INFORMATION ON SITE AND OBTAIN ADDITIONAL DATA IF REQUIRED.

3.

PRIOR TO COMMENCING EXCAVATION, LOCATE AND IDENTIFY ALL EXISTING UNDERGROUND STRUCTURES AND SERVICES.
4.

MAINTAIN STRUCTURES AND SERVICES WHICH ARE TO REMAIN OPERATIONAL OR WHICH WILL BE RE-USED. DESIGN AND PROVIDE PROTECTION AND SUPPORT WHERE REQUIRED. OBTAIN APPROVAL FROM THE AUTHORITIES HAVING JURISDICTION AND DIVERT OR RELOCATE EXISTING SERVICES. REMOVE ALL OTHER STRUCTURES AND SERVICES.
5.

ESTABLISH LINES OF EXCAVATION AS REQUIRED NOT TO EXCEED MAXIMUM SLOPE OF EXCAVATION GIVEN IN THE GEOTECHNICAL REPORT, REFER TO TYPICAL DETAIL TC-FDN-41. ANY DEVIATIONS FROM THIS DETAIL, TO BE APPROVED BY THE GEOTECHNICAL CONSULTANT AND WSP-S.
6.

DESIGN AND PROVIDE SHORING AND BRACING FOR EXCAVATION WHERE NECESSARY.
7.

EXCAVATE TO EXPOSE NATIVE UNDISTURBED SOIL, AND TO ALLOW FOR MINIMUM COMPACTED BACKFILL AND CONSTRUCTION CLEARANCES AS REQUIRED. REMOVE ALL TOPSOIL, LOOSE FILL, DEBRIS, SOFT SPOTS AND ORGANIC MATERIALS.
8.

DIG TRENCHES FOR MECHANICAL AND ELECTRICAL SERVICES TO PROVIDE UNIFORM CONTINUOUS BEARING AND SUPPORT BEDDING MATERIAL ON UNDISTURBED SOIL. REFER TO MECHANICAL, ELECTRICAL AND CIVIL DRAWINGS FOR TRENCH CONSTRUCTION DETAILS. AT A MINIMUM, FILL TRENCHES WITH SAND TO 300 (12") ABOVE PIPES OR CONDUITS.
9.

LEGALLY DISPOSE OF ALL EXCAVATED MATERIALS, OR STORE ON SITE FOR BACKFILLING OPERATIONS IN ACCORDANCE WITH GEOTECHNICAL RECOMMENDATIONS AND PROJECT SPECIFICATIONS.
10.

PROTECT BOTTOM OF EXCAVATION FROM EXCESSIVE MOISTURE. USE GRANULAR FILL OR LEAN CONCRETE (MUD SLAB) AS RECOMMENDED IN THE GEOTECHNICAL REPORT. SLOPE FOR DRAINAGE. PROVIDE DRAINAGE TRENCHES AND PITS AND PUMP OUT WATER AS REQUIRED.
11.

GEOTECHNICAL ENGINEER TO REVIEW AND APPROVE ALL EXCAVATIONS BEFORE BACKFILLING OR PLACING CONCRETE.
12.

UNLESS NOTED OTHERWISE IN THE GEOTECHNICAL REPORT, BACKFILLING MATERIALS TO BE AS FOLLOWS:

-

TYPE 1 (CLASS A) BACKFILLS: CRUSHED STONE WITH PARTICLE SIZE RANGING FROM 0 TO 20 (0" TO 3/4").

-

TYPE 2 (CLASS B) BACKFILLS: CRUSHED STONE OR NATURAL SANDS WITH PARTICLE SIZE RANGING FROM 0 TO 5 (0" TO 3/16").

-

TYPE 3 BACKFILLS: MATERIALS CHOSEN FROM RECYCLED EXCAVATED MATERIALS OR IMPORTED SOILS APPROVED BY THE GEOTECHNICAL CONSULTANT WITH NO PARTICLES LARGER THAN 75 (3").
13.

ALL BACKFILLING MATERIALS TO BE SOUND AND CLEAN, FREE FROM DEBRIS, ORGANIC AND FROZEN MATTER, WITH NO REACTIVE MINERALS NOR FRABLE MATERIALS WITH SWELLING POTENTIAL.
14.

UNLESS NOTED OTHERWISE IN THE GEOTECHNICAL REPORT, PLACE BACKFILLING MATERIALS AS FOLLOWS:

-

INFRASTRUCTURE (GRANULAR BASE): TYPE 1 (CLASS A) BACKFILL; MINIMUM THICKNESS UNDER INTERIOR SLAB ON GRADE - 200 (8"); UNDER EXTERIOR SLAB ON GRADE - 300 (12").

-

INTERIOR SLAB ON GRADE: TYPE 2 (CLASS B) BACKFILL TO U/S OF INFRASTRUCTURE (GRANULAR BASE).

-

SIDEWALKS: NON FROST SUSCEPTIBLE TYPE 1 (CLASS A) OR TYPE 2 (CLASS B) BACKFILL TO U/S OF INFRASTRUCTURE (GRANULAR BASE); SEE ALSO CIVIL AND LANDSCAPING DRAWINGS.

-

EXTERIOR LANDSCAPED AREAS: TYPE 3 BACKFILL TO U/S OF TOPSOIL; SEE ALSO ARCHITECTURAL AND LANDSCAPING DRAWINGS.
15.

GEOTECHNICAL ENGINEER TO REVIEW AND APPROVE ALL BACKFILLING MATERIALS.
16.

UNLESS NOTED OTHERWISE IN THE GEOTECHNICAL REPORT, BACKFILL TO GRADES INDICATED IN LIFTS NOT EXCEEDING 300(12"), EXCEPT THAT LIFTS FOR INFRASTRUCTURE (GRANULAR BASE) SHOULD NOT EXCEED 150(6"); USE MECHANICAL COMPACTION EQUIPMENT; DO NOT PLACE BACKFILL OVER FROZEN SOIL.
17.

USE ONLY LIGHT, HAND-OPERATED EQUIPMENT FOR COMPACTION ADJACENT TO BASEMENT WALLS AND RETAINING WALLS. DO NOT BACKFILL UNTIL ELEMENTS PROVIDING LATERAL SUPPORT, INCLUDING SLABS ON GRADE AND ALL SUSPENDED LEVELS, ARE COMPLETED AND CONCRETE HAS REACHED 75% OF ITS DESIGN STRENGTH. FOR ELEMENTS THAT ARE TO BE BACKFILLED ON BOTH SIDES, PLACE BACKFILL SIMULTANEOUSLY ON BOTH SIDES SUCH THAT HEIGHTS DO NOT VARY BY MORE THAN 500 (1'-8") FROM ONE SIDE TO THE OTHER.
18.

MAINTAIN MOISTURE CONTENT IN BACKFILLING MATERIAL AS REQUIRED TO ACHIEVE THE SPECIFIED COMPACTION. PROTECT FROM EXCESSIVE MOISTURE DURING AND AFTER THE BACKFILLING OPERATION.
19.

UNLESS NOTED OTHERWISE IN THE GEOTECHNICAL REPORT, COMPACT BACKFILL TO ACHIEVE THE FOLLOWING STANDARD PROCTOR MAXIMUM DRY DENSITIES:

-

BELOW SLAB ON GRADE: 98%

-

BELOW PAVEMENT AND SIDEWALKS: 95%

-

BELOW LANDSCAPED AREAS: 90%
20.

AN INDEPENDENT INSPECTION AND TESTING AGENCY TO MONITOR COMPACTION AND CONDUCT DENSITY TESTING DURING INSTALLATION OF ALL GRANULAR MATERIALS.

CAST-IN-PLACE CONCRETE

1.

CONCRETE IS SPECIFIED PER ALTERNATIVE 1 - PERFORMANCE SPECIFICATION, AS OUTLINED IN CSA A23.1. THE CONTRACTOR AND THE CONCRETE SUPPLIER TO MEET ALL CERTIFICATION, DOCUMENTATION AND QUALITY CONTROL REQUIREMENTS.
2.

CONTRACTOR AND CONCRETE SUPPLIER TO ENSURE THAT PLASTIC AND HARDENED MIX PROPERTIES MEET SITE REQUIREMENTS FOR PLACING, FINISHING AND THE SPECIFIED PERFORMANCE REQUIREMENTS.
3.

CONCRETE SUPPLIER TO BE CERTIFIED BY THE READY MIXED CONCRETE ASSOCIATION OF ONTARIO.
4.

CEMENT TO BE PORTLAND CEMENT TYPE GU UNLESS NOTED OTHERWISE OR REQUIRED BY EXPOSURE CLASS.
5.

CONCRETE TO BE NORMAL DENSITY (MIN. 2300 kg/m³) UNLESS NOTED OTHERWISE.
6.

NOMINAL MAXIMUM SIZE OF COARSE AGGREGATE TO BE 20 (3/4") UNLESS NOTED OTHERWISE.
7.

UNLESS NOTED OTHERWISE, CONCRETE TO BE IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

ELEMENT	COMPRESSIVE STRENGTH (MPa) AT 28 DAYS (SEE NOTE #3 BELOW)	EXPOSURE CLASS	SPECIAL REQUIREMENTS & REMARKS
CAISSON	25	N	
PIERS & PILASTERS	25	F2	
EXTERIOR GRADE BEAMS	25	F2	
INTERIOR GRADE BEAMS	25	N	
SLAB-ON-GRADE, TRENCHES (INTERIOR)	25	N	FOR SLABS 125 (5") AND THICKER, NOMINAL MAXIMUM SIZE OF COARSE AGGREGATE 40 (1-1/2"). CONCRETE COVER NOT TO BE LESS THAN 40 (1-1/2") AT RESILIENT FINISHES. USE WCM-04-45
SLAB-ON-GRADE, TRENCHES (UNHEATED VEHICLE ACCESSIBLE AREAS), SIDEWALKS, FROST SLABS	32	C2	FOR SLABS 125 (5") AND THICKER, NOMINAL MAXIMUM SIZE OF COARSE AGGREGATE 40 (1-1/2"). CONCRETE COVER NOT TO BE LESS THAN 60 (2-3/8")
LEAN CONCRETE, MUDSLABS	10	N	

- NOTES:

1.

WHERE EXPOSURE CLASS IS NOTED "N / F2" USE "F-2" EXPOSURE CLASS FOR PERIMETER AND EXTERIOR NON-INSULATED ELEMENTS ABOVE THE FROST LINE, AND FOR ELEMENTS IN INTERIOR UNHEATED SPACES, WHICH ARE SUSCEPTIBLE TO FREEZING. USE "N" EXPOSURE CLASS FOR ELEMENTS PROTECTED FROM FREEZING.

2.

LIMIT NOMINAL MAXIMUM AGGREGATE SIZE TO 10 (3/8") FOR COLUMNS WITH SMALLEST DIMENSION LESS THAN 300 (12") AND FOR WALLS LESS THAN 200 (8") THICK

3.

WHERE HVSCM (AS DEFINED IN CSA A23.1) OR ANY CLASS "S" EXPOSURE CONCRETE IS USED, SPECIFIED CONCRETE STRENGTH TO BE ATTAINED AT 56, RATHER THAN AT 28 DAY.

4.

MINIMUM DOSAGE OF CORROSION INHIBITOR IS 10LBS OF 30% SOLUTION OF CALCIUM NITRITE, AS PER CSA-S143.

5.

REFER TO CSA A23.1 FOR THE MAXIMUM WATER/CEMENT RATIO, MINIMUM COMPRESSIVE STRENGTH, AIR CONTENT, CURING REQUIREMENTS, CHLORIDE ION PENETRABILITY AND ALTERNATE CEMENT TYPES TO MEET THE REQUIREMENTS FOR THE NOTED EXPOSURE CLASS.

6.

WHERE REQUIRED BY SPECIFICATIONS, PROVIDE MINIMUM AMOUNT OF SUPPLEMENTAL CEMENTING MATERIALS SPECIFIED FOR THE OVERALL PROJECT.

7.

CONVEY CONCRETE FROM TRUCK TO FINAL LOCATION BY METHODS WHICH WILL PREVENT SEPARATION OR LOSS OF MATERIAL. MAXIMUM FREE FALL NOT TO EXCEED 1.5m (5'-0"). CONSOLIDATE CONCRETE USING MECHANICAL VIBRATORS.

8.

PLACE CONCRETE AS CLOSE AS POSSIBLE TO FINAL LOCATION TO AVOID SEGREGATION. VIBRATE ALL CONCRETE.

9.

PROTECT CONCRETE FROM FREEZING. DO NOT PLACE CONCRETE AGAINST FROZEN GROUND. USE COLD WEATHER CONCRETING METHODS IN ACCORDANCE WITH CSA-A23.1.

10.

PROTECT CONCRETE FROM EXCESSIVE HEAT AND DRYING. USE HOT WEATHER CONCRETING METHODS IN ACCORDANCE WITH CSA-A23.1.

11.

PROVIDE PENETRATING SEALER AT COLUMNS AND WALLS IN VEHICLE ACCESSIBLE AREAS IN ACCORDANCE WITH TYPICAL DETAILS.

12.

SLABS AND BEAMS

1.

SURVEY TOP OF FORMWORK / SLAB ELEVATIONS AT SUPPORTS, AT MIDSPAN BETWEEN SUPPORTS, AT CENTERS OF BAYS, AND AT CANTILEVERED ENDS AT THE FOLLOWING TIMES:

-

BEFORE CONCRETE PLACEMENT

-

AFTER CONCRETE PLACEMENT BUT PRIOR TO REMOVAL OF SUPPORTING FALSEWORK

-

AFTER REMOVAL OF SUPPORTING FALSEWORK.

2.

SUBMIT SURVEY DATA FOR ENGINEER'S RECORD.
1.

DO NOT USE STEEL TROWEL TO FINISH AIR-ENTRAINED CONCRETE.

2.

PROVIDE MINIMUM 150 (6") BEARING ON MASONRY WALLS.

3.

FOR SLABS-ON-GRADE OR UNBONDED CONCRETE TOPPINGS, LOCATE ALL CONDUITS, PIPES, OR HEATING CABLES EMBEDDED IN CONCRETE CLEAR OF THE TOP ONE THIRD OF THE SLAB THICKNESS TO AVOID DAMAGE DURING SAWCUTTING.

4.

CONSTRUCTION & CONTROL JOINTS

1.

PROVIDE JOINTS WHERE SPECIFIED OR SHOWN ON DRAWINGS. LOCATE SO AS NOT TO IMPAIR THE REQUIRED STRENGTH OF THE STRUCTURE. SUBMIT JOINT LAYOUT FOR WSP-S REVIEW AND APPROVAL. A MINIMUM OF 2 WEEKS PRIOR TO POURING CONCRETE. REFER TO TYPICAL DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

2.

UNLESS OTHERWISE NOTED, PROVIDE STANDARD CONTINUOUS 38 x 89 (2-1/2") FORMED KEYS AT ALL CONSTRUCTION JOINTS. CENTER AT JOINTS AND CHAMFER SIDES.

3.

IF A SPECIFIC CONSTRUCTION JOINT DETAIL IS SHOWN ON DRAWINGS, IT CAN NOT BE SUBSTITUTED BY ANY ALTERNATIVE CONSTRUCTION JOINT DETAIL.

4.

HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE WALLS (OTHER THAN AT UNDERSIDE OF SLABS) ARE NOT PERMITTED, EXCEPT WHERE SHOWN ON THESE DRAWINGS.

5.

NON-STRUCTURAL SLABS ON GRADE AND UNBONDED TOPPINGS: UNLESS NOTED OTHERWISE, PROVIDE CONSTRUCTION JOINTS AT 30m (100ft) MAXIMUM IN BOTH DIRECTIONS, WITH CONTROL JOINTS (SAWOUT JOINTS) IN BETWEEN AT 25 TIMES THE SLAB THICKNESS, BUT NOT MORE THAN 5m (15ft). LONGER DIMENSION OF ANY SOG SEGMENT CREATED BY CONSTRUCTION AND CONTROL JOINTS NOT TO EXCEED 1.25 TIMES THE SHORTER DIMENSION OF THE SEGMENT. CONSIDER SLAB DEPRESSIONS AND PITS WHEN PROPOSING LAYOUT, AND SHOW ON LAYOUT DRAWINGS. COMPLETE SAWCUTTING WITHIN 6 TO 18 HOURS OF PLACING CONCRETE. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

6.

DO NOT SAWCUT STRUCTURAL SLAB ON GRADE; PROVIDE CONSTRUCTION JOINTS AS DESCRIBED FOR FORMED SLABS.

7.

BONDED TOPPING: JOINTS TO MATCH LOCATIONS OF THOSE IN BASE SLAB.

8.

EXTERIOR RETAINING WALLS: PROVIDE VERTICAL CONTROL JOINTS AT 5m (16ft) MAXIMUM, WITH KEYS AND EXPANSION JOINTS AT 15m (50ft) MAXIMUM.

9.

THREE BACKFILLS: MATERIALS CHOSEN FROM RECYCLED EXCAVATED MATERIALS OR IMPORTED SOILS APPROVED BY THE GEOTECHNICAL CONSULTANT WITH NO PARTICLES LARGER THAN 75 (3"). MAXIMUM, AND CONTROL JOINTS AT 5m (16ft) MAXIMUM. LOCATE CONTROL JOINTS NOT MORE THAN 2.5m (8ft) FROM EACH SIDE OF CONSTRUCTION JOINTS AND ANY WALL CORNER.

CONCRETE REINFORCEMENT

1.

REINFORCEMENT TO CONFORM TO THE FOLLOWING STANDARDS:

DEFORMED BARS - CSA G30.18, GRADE 400R OR 400W

2.

WELDED WIRE FABRIC - ASTM A1064/A1064M, YIELD STRENGTH 450 MPa, SUPPLIED IN FLAT SHEETS ONLY.

3.

ALL REINFORCING BAR SIZES ARE METRIC, "M" IS NOT NECESSARILY MARKED AFTER A BAR SIZE. FOR EXAMPLE, 10-15B NOTED ON PLAN INDICATES 10 BARS OF 15M DIAMETER, PLACED AT BOTTOM.

4.

ALL REBAR HOOKS TO BE STANDARD LENGTH 90° OR 180° HOOKS. REBAR LENGTHS LISTED ON DRAWINGS DO NOT INCLUDE THE HOOK LENGTH.

5.

UNLESS A SPECIFIC STIRRUP SHAPE IS INDICATED ON PLANS OR SCHEDULES, ALL STIRRUPS TO BE CLOSED HOOPS.

6.

WHERE TWO BARS OF DIFFERENT SIZE ARE LAPPED IN TENSION, SPLICE LENGTH TO BE EQUAL TO THE SMALLER BAR'S TENSION LAP SPLICE, OR TO THE LARGER BAR'S TENSION DEVELOPMENT LENGTH, WHICHEVER IS LONGER.

7.

FOR BUNDLED BARS, FULLY STAGGER SPICES OF EACH INDIVIDUAL BAR IN THE BUNDLE.

8.

LAP WELDED WIRE FABRIC SHEETS BY ONE SPACING OF CROSS WIRES + 50 (2"), MEASURED BETWEEN THE OUTERMOST CROSS WIRES IN EACH SHEET.

9.

PROVIDE ADDITIONAL SUPPORT BARS AS REQUIRED TO ADEQUATELY SUPPORT AND SECURE ALL REINFORCEMENT AND PREVENT MOVEMENT WHEN PLACING CONCRETE.

10.

PROVIDE SUFFICIENT CHAIRS TO REINFORCING TO MAINTAIN SPECIFIED CONCRETE COVER.

11.

PLACE WELDED WIRE FABRIC IN SLABS ON GRADE AT 1/3 SLAB THICKNESS BELOW TOP OF SLAB. PROVIDE ADEQUATE CHAIRS TO KEEP IN SPECIFIED POSITION. LIFTING WWF AFTER CONCRETE IS POURED TO BRING IT IN POSITION IS NOT ACCEPTABLE.

12.

ALL REINFORCING TO BE CLEAN, FREE OF LOOSE SCALE, OIL, DIRT, RUST, AND ANY OTHER FOREIGN COATING THAT AFFECT BONDING CAPACITY.

13.

MINIMUM CLEAR SPACING BETWEEN ADJACENT BARS TO BE AT LEAST 1.4 TIMES THE BAR DIAMETER OR 1.4 TIMES THE NOMINAL MAXIMUM SIZE OF THE COARSE AGGREGATE, WHICHEVER IS MORE.

14.

WHERE PARALLEL REINFORCEMENT IS PLACED IN TWO OR MORE LAYERS, POSITION BARS IN UPPER LAYER DIRECTLY ABOVE THE BARS IN LOWER LAYER, MAINTAINING THE MINIMUM CLEAR SPACING BETWEEN LAYERS AS SPECIFIED ABOVE.

15.

UNLESS NOTED OTHERWISE ON DRAWINGS MINIMUM CONCRETE COVER TO PRINCIPAL REINFORCEMENT TO BE AS FOLLOWS (ALSO REFER TO TYPICAL DETAIL TC-RENF-21):

	NOT EXPOSED TO VEHICLE TRAFFIC		EXPOSED TO VEHICLE TRAFFIC
ELEMENT	PROTECTED	EXPOSED	
		TOP BARS: $\leq 25\text{M}: 40 \text{ (1-5/8")}$ $30\text{M}: 45 \text{ (1-3/4")}$ $35\text{M}: 55 \text{ (2-1/8")}$	TOP BARS: 60 (2-3/8")
FOOTINGS, RAFT FOUNDATIONS, PILES, PILE CAPS REINFORCED AS FOOTINGS	--	BARS AT SURFACES CAST AGAINST FORMWORK/MUD SLAB: SAME AS TOP BARS	BARS AT SURFACES CAST AGAINST FORMWORK/MUD SLAB: SAME AS TOP BARS
		BARS AT SURFACES CAST AGAINST EARTH: 75 (3")	BARS AT SURFACES CAST AGAINST EARTH: 75 (3")
PIERS, PILE CAPS REINFORCED AS COLUMNS	--	$\leq 25\text{M}: 55 \text{ (2-1/8")}$ $30\text{M}: 60 \text{ (2-3/8")}$ $35\text{M}: 70 \text{ (2-3/4")}$ IF EXPOSED TO CHLORIDES: $\leq 35\text{M}: 75 \text{ (3")}$	$\leq 25\text{M}: 55 \text{ (2-1/8")}$ $30\text{M}: 60 \text{ (2-3/8")}$ $35\text{M}: 70 \text{ (2-3/4")}$
		BARS AT SURFACES CAST AGAINST EARTH: NOT LESS THAN 90 (3-1/2")	BARS AT SURFACES CAST AGAINST EARTH: NOT LESS THAN 90 (3-1/2")
		$\leq 25\text{M}: 55 \text{ (2-1/8")}$ $30\text{M}: 60 \text{ (2-3/8")}$ $35\text{M}: 70 \text{ (2-3/4")}$	75 (3")
GRADE BEAMS	-	IF EXPOSED TO CHLORIDES: $\leq 35\text{M}: 75 \text{ (3")}$	BARS AT SURFACES CAST AGAINST EARTH: NOT LESS THAN 90 (3-1/2")
		BARS AT SURFACES CAST AGAINST EARTH: NOT LESS THAN 90 (3-1/2")	
REBAR REINFORCED NON STRUCTURAL SLABS ON GRADE CAST OVER VAPOUR BARRIER OR RIGID INSULATION	TOP BARS: $\leq 25\text{M}: 25 \text{ (1")}$ BOT BARS: $\leq 35\text{M}: 40 \text{ (1-5/8")}$	TOP & BOT BARS: $\leq 25\text{M}: 40 \text{ (1-5/8")}$	TOP & BOT BARS: $\leq 25\text{M}: 40 \text{ (1-5/8")}$
REBAR REINFORCED NON STRUCTURAL SLABS ON GRADE WITHOUT VAPOUR BARRIER OR RIGID INSULATION	TOP BARS: $\leq 25\text{M}: 25 \text{ (1")}$ BOT BARS: 75 (3")	TOP BARS: $\leq 25\text{M}: 40 \text{ (1-5/8")}$ BOT BARS: 75 (3")	TOP BARS: $\leq 25\text{M}: 40 \text{ (1-5/8")}$ BOT BARS: 75 (3")
		ALL BARS $\leq 25\text{M}: 40 \text{ (1-5/8")}$ $30\text{M}: 45 \text{ (1-3/4")}$ $35\text{M}: 55 \text{ (2-1/8")}$	BARS AT VISIBLE FACE OF EXTERIOR RETAINING WALLS: 40 (1-5/8") FOR PROTECTION SEE NOTE #6 BELOW
BASEMENT WALL AND RETAINING WALLS	BARS AT VISIBLE FACE: $\leq 25\text{M}: 25 \text{ (1")}$ $30\text{M}: 30 \text{ (1-1/4")}$ $35\text{M}: 35 \text{ (1-3/8")}$		BARS AT VISIBLE FACE OF EXTERIOR RETAINING WALLS: $\leq 30\text{M}: 60 \text{ (2-3/8")}$ $35\text{M}: 70 \text{ (2-3/4")}$
			BARS AT FACE AGAINST EARTH: $\leq 25\text{M}: 40 \text{ (1-5/8")}$ $30\text{M}: 45 \text{ (1-3/4")}$ $35\text{M}: 55 \text{ (2-1/8")}$

NOTES:

1.

"PROTECTED" MEANS IN INTERIOR, CONDITIONED SPACE.

2.

"EXPOSED" MEANS IN UNHEATED SPACE AND/OR EXPOSED TO WATER, WEATHER OR SULPHATES (BUT NOT VEHICLE TRAFFIC).

3.

COVERS SHOWN ABOVE ASSUME 20 (3/4") MAXIMUM NOMINAL SIZE OF CONCRETE AGGREGATE. REFER TO CONCRETE MIX DESIGN TABLE IN CAST-IN-PLACE CONCRETE NOTES FOR CONCRETE WITH LARGER AGGREGATE SIZE, AND INCREASE COVER TO REINFORCING CLOSEST TO THE SURFACE AS INDICATED.

4.

UNLESS OTHERWISE NOTED, FOR BARS WITH 90° HOOKS, PROVIDE 50 (2") COVER ON THE BAR EXTENSION BEYOND THE HOOK (FROM THE HOOKED PORTION TO FACE OF CONCRETE).

16.

WALLS

1.

UNLESS OTHERWISE NOTED ON DRAWINGS, SCHEDULES OR NOTES, MINIMUM REINFORCEMENT FOR CONCRETE WALLS TO BE AS FOLLOWS:
 $150 \text{ (6") MAXIMUM WALL: } 10 @ 330 \text{ (13") H} + 10 @ 450 \text{ (18") V IN CENTRE}$
 $200 \text{ (8") MAXIMUM WALL: } 10 @ 250 \text{ (10") H} + 10 @$