

- NOTES:**
- GENERAL**
1. ALL WORK SHALL MEET OR EXCEED MINIMUM REQUIREMENTS OF THE NATIONAL BUILDING CODE OF CANADA 2020 WITH MANITOBA AMENDMENTS, ASSOCIATED STANDARDS REFERENCED IN THAT CODE, AND LOCAL STANDARDS AND BYLAWS AS APPLICABLE.
 2. READ THE STRUCTURAL DRAWINGS IN CONJUNCTION WITH THE SPECIFICATIONS AND ALL OTHER PERTINENT CONTRACT DOCUMENTS. ENSURE THAT RELEVANT STATUTORY PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCING SITE WORKS.
 3. ALL DIMENSIONS ARE IN METRIC UNITS UNLESS NOTED. VERIFY DIMENSIONS PRIOR TO CONSTRUCTION AND REPORT ANY DISCREPANCIES TO THE CONSULTANT BEFORE PROCEEDING. DO NOT SCALE DRAWINGS.
 4. REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PROCESS DRAWINGS FOR LOCATION OF RECESSES, INSERTS, SLEEVES, ETC. WHICH MUST BE CAST OR FORMED IN THE CAST-IN-PLACE CONCRETE.
 5. REFER TO ALL OTHER RELEVANT DRAWINGS (E.G., ARCHITECTURAL, MECHANICAL AND ELECTRICAL) FOR LOCATIONS AND DIMENSIONS OF EQUIPMENT BASE, PITS, DEPRESSIONS, OPENINGS, SLEEVES AND OTHER BUILDING COMPONENTS NOT SHOWN ON THE STRUCTURAL DRAWINGS. REPORT DISCREPANCIES TO THE CONSULTANT BEFORE PROCEEDING WITH THE WORK.
 6. CONTRACTOR TO CONFIRM DIMENSIONS AND ALL OTHER CRITICAL DETAILS WITH EQUIPMENT SUPPLIERS PRIOR TO CONSTRUCTION. REPORT DISCREPANCIES AND OBTAIN APPROVAL PRIOR TO PROCEEDING WITH CONSTRUCTION.
 7. DO NOT RELY ON ACCURACY OF ANY AS-BUILT RECORDS PROVIDED. SURVEY AND VERIFY ACTUAL DIMENSIONS AND LAYOUT.
 8. NOTIFY THE STRUCTURAL ENGINEER OF RECORD 48 HOURS IN ADVANCE FOR SITE REVIEW OF STRUCTURAL WORK.
 9. THE STRUCTURAL DRAWINGS HEREIN REPRESENT THE FINISHED STRUCTURE. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY GUYING, BRACING, AND SHORING REQUIRED TO ERECT AND HOLD THE STRUCTURE IN PROPER ALIGNMENT UNTIL ALL STRUCTURAL WORK AND CONNECTIONS HAVE BEEN COMPLETED. THE INVESTIGATION, DESIGN, ADEQUACY, AND INSPECTION OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS, ETC. ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA.
 10. DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO THE APPROVAL OF THE CONSULTANT.
 11. ALL STRUCTURAL SYSTEMS WHICH ARE TO BE COMPOSED OF COMPONENTS TO BE FIELD ERECTED SHALL BE SUPERVISED BY THE SUPPLIER DURING MANUFACTURING, DELIVERY, HANDLING, STORAGE, AND ERECTION IN ACCORDANCE WITH THE SUPPLIER'S INSTRUCTIONS AND REQUIREMENTS.
 12. LOADING APPLIED TO THE STRUCTURE DURING THE PROCESS OF CONSTRUCTION SHALL NOT EXCEED THE SAFE LOAD-CARRYING CAPACITY OF THE STRUCTURAL MEMBERS. DESIGN LOADS ARE INDICATED WITHIN THESE NOTES.
 13. SUBMITTALS:

- A. SUBMIT THE FOLLOWING SHOP DRAWINGS, SEALED BY A QUALIFIED PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA, PRIOR TO FABRICATION: SHORING, CONCRETE MIX DESIGNS, PRECAST CONCRETE, CONCRETE REINFORCING.
 - B. FULLY DETAIL SHOP DRAWINGS SHOWING ALL INFORMATION NECESSARY FOR FABRICATION AND INSTALLATION IN ACCORDANCE WITH INDUSTRY STANDARDS. ALL SHOP DRAWING SUBMITTALS TO BE IN METRIC UNITS INCLUDING DIMENSIONS, AND REINFORCING.
 - C. IMPROPERLY PREPARED SHOP DRAWINGS ARE SUBJECT TO REJECTION AND, ON THAT BASIS, ARE TO BE WITHDRAWN AND RESUBMITTED.
 - D. DO NOT COMMENCE FABRICATION UNTIL REVIEWED SUBMITTAL HAS BEEN RETURNED. REVIEW OF SUBMITTALS DOES NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE CONTRACT DOCUMENTS.
14. REPORT TO THE CONSULTANT ALL WORKS THAT DO NOT COMPLY WITH THE PROJECT REQUIREMENTS AND SUBMIT REMEDIAL WORKS PROPOSAL FOR COMMENT / AGREEMENT. DEFECTIVE WORK AND SUBSTANDARD MATERIALS SHALL BE RECTIFIED SATISFACTORILY OR REMOVED FROM SITE.
- SUBMIT METHOD STATEMENTS TO CONSULTANTS WHEN REQUESTED FOR INFORMATION / COMMENT / AGREEMENT:
- CONTRACTOR'S QUALITY / INSPECTION PROCEDURES
 - CONCRETE REPAIR PROCEDURES
 - HOT / COLD WEATHER CONCRETING PROCEDURE

DESIGN CRITERIA

1. DESIGN STANDARDS:
 - GENERAL: NATIONAL BUILDING CODE OF CANADA, 2020 WITH MANITOBA AMENDMENTS
 - CONCRETE: CSA STANDARDS A23.1, A23.2 AND A23.3
 - FOUNDATIONS: GEOTECHNICAL INVESTIGATIONS AND MEMORANDUMS BY: AECOM DATED APRIL 8, 2022 AND JULY 10, 2025.
2. DESIGN LOADS:
 - IMPORTANCE CATEGORY: POST DISASTER
 - DEAD LOADS: SELF WEIGHT
SUPERIMPOSED DEAD LOAD = 0.5 kPa
 - LIVE LOADS: ASHTO H-20 TRUCK TIRES
 - SNOW LOADS: IMPORTANCE FACTORS: $I_s = 1.25$ (ULS), 0.9 (SLS)
 - GROUND SNOW LOAD: $S_s = 1.9$
 - ASSOCIATED RAIN LOAD: $S_r = 0.2$
 - SNOW LOAD FACTORS C_b , C_w , C_s , C_a AND DRIFT LOADS IN ACCORDANCE WITH THE NATIONAL BUILDING CODE OF CANADA 2020.

EXCAVATION AND BACKFILL

1. REFER TO SPECIFICATION SECTION E10 - EXCAVATION AND BACKFILL.
2. ENSURE THAT THE INTEGRITY OF EXISTING UNDERGROUND SERVICES / STRUCTURES ARE MAINTAINED AT ALL TIMES DURING THE WORK. REPAIR / RECTIFY IMMEDIATELY ANY DAMAGE / DISRUPTION TO THE CLIENT'S SATISFACTION AND AT THE CONTRACTOR'S OWN COST.
3. EXCAVATIONS SHALL BE IN ACCORDANCE WITH APPLICABLE OCCUPATIONAL HEALTH AND SAFETY REGULATIONS.
4. THE CONTRACTOR SHALL THAT MAINTAIN A DRY EXCAVATION DURING THE ENTIRE PERIOD OF CONSTRUCTION.
5. TO AVOID DIFFERENTIAL LATERAL PRESSURES, BACKFILL SHALL BE BROUGHT UP EVENLY AROUND THE WALLS. ONLY HAND OPERATED COMPACTION SHOULD BE EMPLOYED WITHIN 600 mm OF THE CONCRETE WALLS.
6. BACKFILLING SHALL NOT BE COMPLETED UNTIL THE CAST-IN-PLACE CONCRETE SLAB HAS ACHIEVED 70% OF THE DESIGN COMPRESSIVE STRENGTH.
7. DO NOT PLACE BACKFILL ON FROZEN GROUND OR WATER LOGGED GROUND. NOR USE FROZEN MATERIAL.
8. MAINTAIN TO WITHIN +/- 1% OPTIMUM MOISTURE CONTENT TO PERMIT COMPACTION TO ATTAIN SPECIFIED DENSITIES. PROTECT BACKFILLED GRADE DURING AND AFTER COMPLETION OF BACKFILL OPERATION FROM SOFTENING DUE TO EXCESS MOISTURE.
9. FENCE OFF OR MAKE INACCESSIBLE ALL EXCAVATIONS IF LEFT UNATTENDED

RAFT FOUNDATIONS

1. RAFT FOUNDATION SLABS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL MEMORANDUMS.
2. THE RAFT FOUNDATION SHALL BE FOUND ON UNDISTURBED SOIL THAT IS ADEQUATELY PROTECTED FROM FREEZING, WETTING, SOFTENING AND DISTURBANCE. THE BEARING SOIL SHOULD BE INSPECTED AND APPROVED BY QUALIFIED GEOTECHNICAL PERSONNEL. NO REINFORCEMENT PLACEMENT SHALL OCCUR UNTIL THE GEOTECHNICAL PERSONNEL APPROVES THE BEARING SURFACE PREPARATION.
3. PROTECT THE PREPARED FOUNDATION SOILS AND MUD SLAB FROM FREEZING PRIOR TO, DURING AND AFTER CONSTRUCTION OF THE RAFT SLABS.
4. RAFT SLABS HAVE BEEN DESIGNED FOR THE FOLLOWING LIMIT STATES DESIGN PARAMETERS, AS NOTED IN THE GEOTECHNICAL MEMORANDUMS:
 - GEOTECHNICAL RESISTANCE FACTOR: 0.5
 - FACTORED BEARING RESISTANCE: 143 kPa
 - SERVICEABILITY LIMIT PRESSURE: 113
 - UPLIFT PRESSURE DUE TO BUOYANCY 62 kPa

CONCRETE REINFORCING

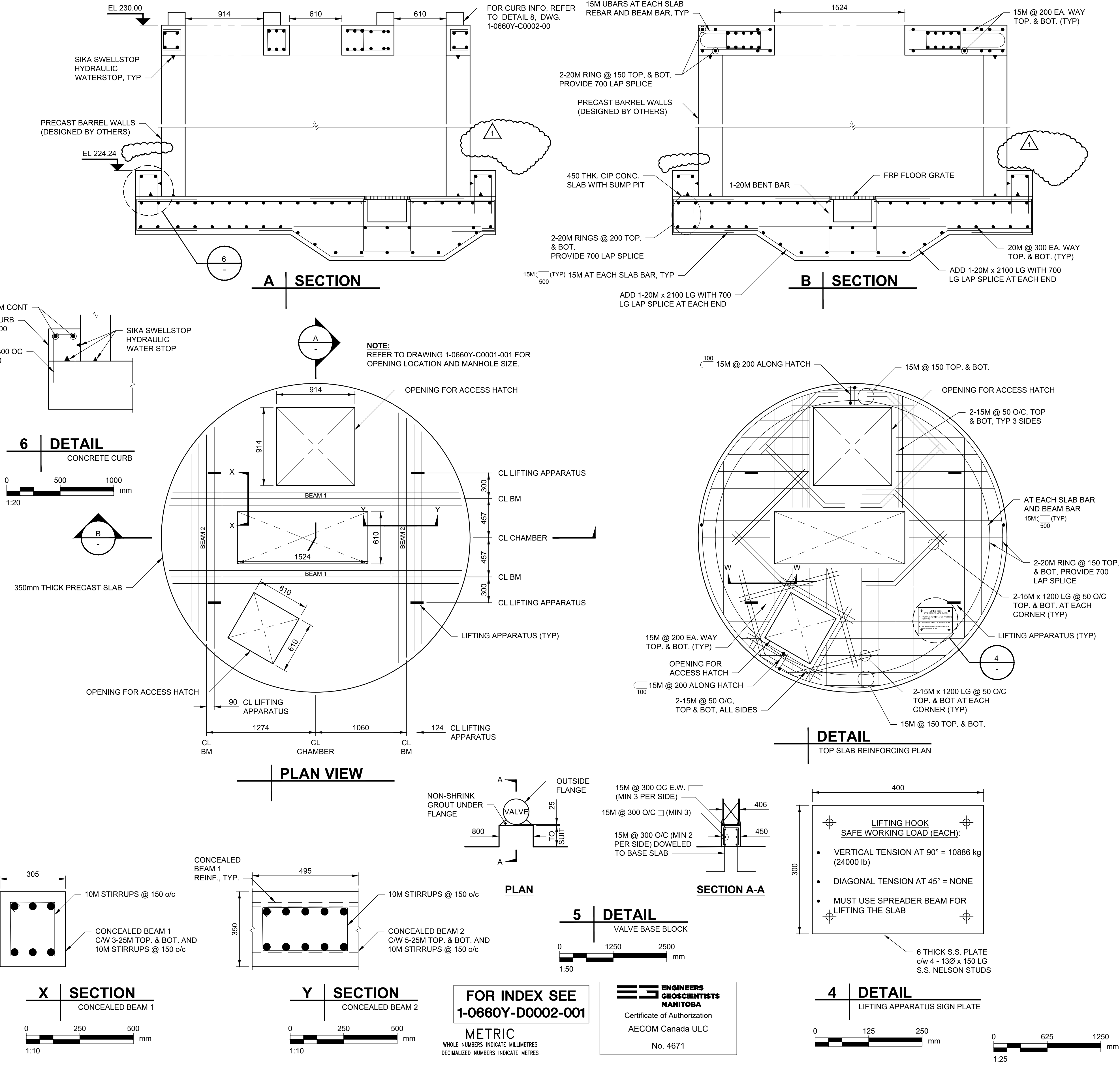
1. REFER TO SPECIFICATION SECTION E15 - REINFORCING STEEL.
2. REINFORCING WORK SHALL BE IN ACCORDANCE WITH CSA A23.1, AND CSA A23.3.
3. ALL REINFORCING TO BE CONTINUOUS. SPLICE ONLY AS DETAILED OR APPROVED BY THE CONSULTANT. UNLESS DETAILED OTHERWISE, ALL LAP SPLICES SHALL BE CLASS B TENSION SPLICES.
4. WHERE NOT SPECIFICALLY DETAILED, REINFORCING STEEL SHALL BE PROTECTED BY CONCRETE COVER AS FOLLOWS:
 - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 75mm OTHERWISE: 60mm
5. MATERIALS SHALL CONFORM TO THE FOLLOWING:
 - REINFORCING STEEL CSA G30.18, GRADE 400, PLAIN FINISH, DEFORMED BARS
 - WELDABLE REINFORCING STEEL CSA G30.18, GRADE 400W, PLAIN FINISH, DEFORMED BARS
6. CHAIR SLAB REINFORCING NOT FURTHER THAN 1000mm IN EITHER DIRECTION. SUPPLY SUPPORT BARS, CHAIRS, AND CARRIERS AS NECESSARY.
7. DOWELS AND ANCHOR BOLTS SHALL BE SECURED IN POSITION BY MEANS OF TEMPLATES BEFORE CONCRETE IS POURED. WHERE DOWELS OR ANCHOR BOLTS ARE TO BE EXPOSED FOR LONGER THAN 1 MONTH AFTER INSTALLATION, PROVIDE WRAPPING AND COVERING AS PROTECTION.
8. HOOKS AND 180° HOOKS WHERE SHOWN SHALL BE DETAILED AS STANDARD HOOKS UNLESS NOTED OTHERWISE.
9. REPLACE BARS THAT DEVELOPED SPLITS OR CRACKS.
10. REINFORCING SHOWN ON STRUCTURAL DETAILS ARE SCHEMATIC ONLY AND MAY NOT SHOW THE ACTUAL NUMBER OF REBARS.

CAST-IN-PLACE CONCRETE

1. REFER TO SPECIFICATION SECTIONS E13 - CAST-IN-PLACE CONCRETE.
2. CAST-IN-PLACE CONCRETE WORK SHALL BE IN ACCORDANCE WITH CSA A23.1.
3. MATERIALS SHALL CONFORM TO THE FOLLOWING:
 - CEMENT: CSA A3001
 - WATER: CSA A23.1/A23.2
 - AGGREGATES: CSA A23.1/A23.2
 - ADMIXTURES: AIR ENTRAINING ADMIXTURE TO ASTM C260 CHEMICAL ADMIXTURES TO ASTM C494
 - WATERPROOFING ADMIXTURE: SPG VAPOR LOCK 20/21
 - GROUT: PREMIXED, NON-SHRINK, NON-METALLIC GROUT WITH MINIMUM STRENGTH AT 4 DAYS OF 20 MPa, AND AT 28 DAYS OF 40 MPa
4. SUPPLEMENTARY CEMENTING MATERIALS WITH A MAXIMUM OF 20 PERCENT TYPE F FLY ASH REPLACEMENT BY MASS OF TOTAL CEMENTITIOUS MATERIALS, IN ACCORDANCE WITH CSA A3001, IS PERMITTED.
5. THE USE OF ACCELERATING OR SET RETARDING ADMIXTURES DURING HOT AND COLD WEATHER SHALL BE APPROVED BY THE CONSULTANT. ADMIXTURES CONTAINING CALCIUM CHLORIDE ARE NOT PERMITTED.
6. CONCRETE MIXES SHALL BE DESIGNED TO MEET THE FOLLOWING PERFORMANCE CRITERIA IN ACCORDANCE WITH CSA A23.1 TABLE 5, ALTERNATIVE 1:

TYPE	CSA EXPOSURE CLASS	CEMENT TYPE	MINIMUM COMPRESSIVE STRENGTH (MPa)	MAX W/C RATIO	MAX AGGREGATE SIZE (mm)	AIR CONTENT RANGE (%)	WATERPROOFING ADMIX
A	S-1	HS/HSb	35 AT 28 DAYS	0.4	20	5-8	NO

7. WATERPROOFING ADMIX SHALL BE ADDED TO CONCRETE MIX TYPE A AT THE TIME OF BATCHING IN ACCORDANCE WITH THE MANUFACTURES INSTRUCTIONS.
 8. SUBMIT CONCRETE MIX DESIGNS TO THE CONSULTANT FOR REVIEW PRIOR TO COMMENCEMENT OF WORK.
 9. ENSURE REINFORCEMENT AND INSERTS ARE NOT DISTURBED DURING CONCRETE PLACEMENT. DO NOT PLACE CONCRETE AGAINST FROZEN GROUND OR IN STANDING WATER.
 10. CONCRETE TO BE BATCHED AND COMPLETELY DISCHARGED IN A PERIOD NOT EXCEEDING NINETY (90) MINUTES FROM THE TIME OF INITIAL ADDITION OF WATER TO THE CEMENT AND AGGREGATE.
 11. USE 25 x 25 FORMED CHAMFERS ON EXPOSED CORNERS OF BEAMS, COLUMNS AND WALLS U.N.O.
 12. MAINTAIN ACCURATE RECORDS OF POURED CONCRETE ITEMS TO INDICATE DATE, LOCATION OF POUR, AIR TEMPERATURE, AND TEST SAMPLES TAKEN. SUBMIT RECORDS TO ENGINEER UPON REQUEST.
 13. PROTECT CONCRETE FROM PREMATURE DRYING. CURE CONCRETE IN ACCORDANCE WITH CSA-A23.1. PROVIDE ADDITIONAL CURING MEASURES OR PROTECTION DURING HOT OR COLD WEATHER IN ACCORDANCE WITH CSA-A23.1.
 14. DO NOT PLACE CONCRETE WHEN WEATHER IS NOT SUITABLE (E.G. DURING RAIN, SNOW) UNLESS ADEQUATE PRECAUTIONARY MEASURES ARE IN PLACE.
 15. FILL THE HOLE IN ACCORDANCE WITH CSA-A23.1.
 16. REPAIR HONEYCOMBED AND DEFECTIVE CONCRETE AT CONTRACTOR'S OWN COST. PROPOSED METHOD STATEMENT AND MATERIAL FOR REPAIR SHALL BE SUBMITTED TO THE CONSULTANT FOR APPROVAL.
- CONCRETE TESTING**
1. INSPECTION AND TESTING OF CONCRETE MATERIALS WILL BE CARRIED OUT BY AN INDEPENDENT TESTING LABORATORY, IN ACCORDANCE WITH CSA-A23.2.
 2. THE TESTING LABORATORY WILL TAKE ADDITIONAL CYLINDERS DURING COLD WEATHER CONCRETING. CURE CYLINDERS ON JOB SITE UNDER SAME CONDITIONS AS CONCRETE WHICH THEY REPRESENT.
 3. CONTRACTOR SHALL PROVIDE ACCESS TO ALL WORK BEING INSPECTED/TESTED.
 4. INSPECTION OR TESTING BY TESTING LABORATORY WILL NOT AUGMENT OR REPLACE CONTRACTOR QUALITY CONTROL NOR RELIEVE HIM OF HIS CONTRACTUAL RESPONSIBILITY.
 5. CONCRETE FAILING TO MEET THE SPECIFIED REQUIREMENTS SHALL BE RETESTED, STRENGTHENED, OR REJECTED IN ACCORDANCE WITH THE CSA-A23.2. ALL ADDITIONAL TESTING, STRENGTHENING, AND/OR REPLACEMENT SHALL BE AT THE CONTRACTOR'S EXPENSE.



LOCATION APPROVED UNDERGROUND STRUCTURES		B.M. ELEV.		CONSTRUCTION COMPLETION DATE: YYYY MM DD	
SUPV. U/G STRUCTURES COMMITTEE	DATE				
NOTE: LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.		1 ISSUED FOR ADDENDUM 2		25/08/13	ADL
		0 ISSUED FOR TENDER		25/07/22	ADL
		NO.		REVISIONS	DATE BY
		DESIGNED BY		AI	CHECKED BY MB
		DRAWN BY		ADL	APPROVED BY KF
		SCALE:		HORIZONTAL AS NOTED VERTICAL N/A	
		DATE		2025 08 13	DATE 2025 07 22
		PLOT DATE:		2025 08 13	
		ENGINEER'S SEAL			
		CONSULTANT DRAWING NUMBER		S-4001	
		Tender No:		639-2025	
		FILE PATH:		C:\Users\leippla\AppData\Local\Temp\AcPublish_29852\60688984-SHT-30-TBPS-S-4001.dwg	
		FILE NAME:		60688984-SHT-30-TBPS-S-4001.dwg	

FOR INDEX SEE 1-0660Y-D0002-001		METRIC WHOLE NUMBERS INDICATE MILLIMETRES DECIMALIZED NUMBERS INDICATE METRES		ENGINEERS GEOSCIENTISTS MANITOBA Certificate of Authorization AECOM Canada ULC No. 4671	
THE CITY OF WINNIPEG WATER AND WASTE DEPARTMENT ENGINEERING SERVICES DIVISION		TACHE BOOSTER PUMPING STATION AQUEDUCT DRAIN CHAMBER STRUCTURAL DETAILS		SHEET 07 OF 07 CITY DRAWING NUMBER 1-0660Y-S0001-001	