GENERAL

THE NOTES ON THIS SHEET REFER SPECIFICALLY TO DRAWINGS C004 THROUGH C007.

1. THESE NOTES ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.
2. STRUCTURAL DIMENSIONS, ELEVATIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE COORDINATED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. BOLT SIZES, TYPES, AND PATTERNS SHALL BE VERIFIED WITH THE MANUFACTURER. ALL BOLT PATTERNS SHALL BE TEMPLATED TO INSURE ACCURACY OF PLACEMENT.
3. MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT PLANS, SHALL BE PROVIDED FOR PRIOR TO PLACING CONCRETE.
4. STRUCTURAL DRAWINGS SHALL BE USED IN COORDINATION WITH MECHANICAL, ELECTRICAL, AND CIVIL DRAWINGS, AND WITH SHOP DRAWINGS PROVIDED BY MANUFACTURERS OF EQUIPMENT.
5. STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL, HYDROSTATIC, AND BACKFILL LOADS ON THE COMPLETED STRUCTURES. THE STRUCTURES HAVE NOT BEEN DESIGNED TO RESIST THESE LOADS WHILE ONLY PARTIALLY CONSTRUCTED. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED FROM ALL CONSTRUCTION LOADS BY BRACING AND BALANCING UNTIL ALL STRUCTURAL ELEMENTS ARE IN PLACE, AND ALL CONCRETE HAS REACHED THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH UNLESS SPECIFIED DIFFERENTLY IN THE SPECIFICATION. OVERLOADING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.
6. UNLESS OTHERWISE SHOWN, ON ALL STRUCTURAL DRAWINGS THE FINISHED GRADE AROUND STRUCTURES IS SHOWN THUS , INDICATING EITHER GROUND SURFACE, OR OTHER SYMBOLS INDICATING TOP OF CONCRETE SLAB, OR AC PAVEMENT.

CONCRETE

1. ALL ELEVATIONS SHOWN ARE IN METERS AND DIMENSIONS SHOWN ARE IN MILLIMETERS.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS OR AS SHOWN ON DRAWINGS.
3. CONCRETE SURFACES EXPOSED TO THE FLOW OF WATER MUST BE SMOOTH AND FREE FROM SPALLS, HONEY COMBS AND/OR POCKETS.
4. ROUGHEN SURFACES OF POURS AT CONSTRUCTION JOINTS, UNLESS OTHERWISE NOTED.
5. ALL WATERSTOP SHALL BE TYPE A AND CONTINUOUS UNLESS OTHERWISE NOTED ON THE DRAWINGS. JOINTS AT SPLICES AND CORNERS SHALL BE BONDED.
6. PROVIDE V-GROOVE JOINTS AS DETAILED ON THIS DRAWING AT CONTRACTION JOINTS AND CONSTRUCTION JOINTS WHERE SHOWN ON DRAWINGS AND AS OTHERWISE NOTED.
7. PROVIDE CONSTRUCTION JOINT TREATMENT TO ALL CONCRETE SURFACES RECEIVING A BONDED CONCRETE FINISH.
8. UNLESS OTHERWISE SHOWN ON THE PLANS, CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:
   CONCRETE SURFACES IN CONTACT WITH MOVING WATER OR SUBMERGED IN WATER 100mm
   BOTTOM OF FOUNDATION AND FOOTINGS 150mm
   FOR SURFACES IN CONTACT WITH WEATHER AND FORMED SURFACES IN CONTACT WITH EARTH 50mm
9. ALL GROUT SHALL BE CEMENTITIOUS NON-SHRINK GROUT. UNLESS INDICATE OTHERWISE.
10. UNLESS OTHERWISE NOTED OR SPECIFIED, ALL STRUCTURAL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 30MPa IN 28 DAYS.
11. LOCATION OF ALL CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE PLANS OR APPROVED BY THE ENGINEER. ALL CONSTRUCTION JOINTS LOCATED ON THE PLANS OR REQUIRED FOR CONSTRUCTION, BUT NOT SHOWN ON THE PLANS, SHALL HAVE A 150mm WATERSTOP, IF IN MEMBERS IN CONTACT WITH WATER.
12. DOWELS, PIPE, WATERSTOPS AND OTHER INSTALLED MATERIALS AND ACCESSORIES SHALL BE HELD SECURELY IN POSITION. WHILE CONCRETE IS BEING PLACED.
13. ALL EXPOSED EDGES AND CORNERS OF CONCRETE SHALL HAVE A 20mm X 20mm CHAMFER, UNLESS NOTED OTHERWISE.
14. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, LAPS OF REINFORCEMENT SHALL BE AS SHOWN ON TABLE 1.2 ON DRAWING C007.

CONCRETE REINFORCEMENT

1. CONCRETE REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF CAN/CSA-A23.1, CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION.
2 STEEL REINFORCEMENT SHALL BE DEFORMED BARS OF GRADE 400 (FY=400 MPa) CONFORMING TO CSA G30.18.
3 MINIMUM TENSION EMBEDMENT AND HOOK DEVELOPMENT LENGTH SHALL BE AS GIVEN IN TABLE 1.1 AND TABLE 1.2.
4 MINIMUM LAP SPLICE LENGTH SHALL BE CLASSIFIED AS "CLASS B" SPLICE. "CLASS B" SPLICE LAP LENGTHS SHALL BE EQUAL TO THE LENGTHS GIVEN IN TABLE 1.1 AND TABLE 1.2 AND INCREASED BY 30%.
5 STAGGER SPLICES WHEREVER POSSIBLE. IF SPLICES ARE STAGGERED, MINIMUM LAP SPLICE LENGTH SHALL BE CLASSIFIED AS "CLASS A" SPLICE. "CLASS A" SPLICE LAP LENGTHS SHALL BE EQUAL TO THE LENGTHS GIVEN IN TABLE 1.2.
6 "TOP BARS*" ARE HORIZONTAL WALL AND SLAB BARS WITH MORE THAN 300mm OF FRESH CONCRETE CAST-IN UNDERNEATH. "OTHER BARS" ARE ALL REINFORCING BARS NOT CLASSIFIED AS "TOP BARS*".
7. INDICATES A BARS WITH A BEND TURNED TOWARDS THE OBSERVER.

   INDICATES A BARS WITH A BEND TURNED AWAY FROM THE OBSERVER.

   INDICATES A LAPPED SPLICE IN THE SAME PLANE, NOT A BEND IN THE BAR.
8. DIMENSIONS ARE TO THE CENTERLINES OF BARS UNLESS OTHERWISE SHOWN.
9. REINFORCEMENT PARALLEL TO EMBEDDED ITEMS SHALL MAINTAIN A MINIMUM CLEAR DISTANCE EQUAL TO 1-1/2 TIMES THE MAXIMUM SIZE AGGREGATE.
10. THE FIRST AND LAST BARS IN THE WALLS AND SLABS SHALL BEGIN AND END A DISTANCE EQUAL TO THE CLEAR COVER FROM EACH END OF THE MEMBER.
11. MECHANICAL COUPLERS MAY BE USED UPON APPROVAL OF THE ENGINEER. SEE SPECIFICATION SECTION XX XX XX.
12. CONCRETE REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF CAN/CSA-A23-1, CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION.
13. REINFORCEMENT STEEL SHALL BE DEFORMED BARS CONFORMING IN QUALITY TO THE REQUIREMENTS OF CAN/CSA - G30.18, "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", GRADE 400W. ALL REINFORCING STEEL WELDING SHALL BE APPROVED BY THE ENGINEER IN ADVANCE OF WELDING AND IS TO BE IN ACCORDANCE WITH CSA STANDARD W186.
14. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS, UNLESS OTHERWISE INDICATED, SHALL BE IN ACCORDANCE WITH RSIC (REINFORCING STEEL INSTITUTE OF CANADA), "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", LATEST EDITION.

STRUCTURAL STEEL FOR MISCELLANEOUS METAL WORKS

UNLESS NOTED OTHERWISE ON THE DRAWINGS, THE FOLLOWING GENERAL NOTES SHALL APPLY.

CODES AND STANDARDS

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF THE FOLLOWING CODES AND STANDARDS:
   - CSA STANDARD S16.1 "LIMIT STATES DESIGN OF STEEL STRUCTURES".
   - CANADIAN INSTITUTE OF STEEL CONSTRUCTION CODE OF STANDARD PRACTICE FOR STRUCTURAL STEEL.
   - CSA STANDARD W59, WELDED STEEL CONSTRUCTION (METAL ARC WELDING).
2. IN ADDITION TO THE GENERAL REQUIREMENTS ABOVE, THE LATEST EDITION OF THE FOLLOWING DOCUMENTS ARE REFERED TO IN, OR PROVIDE SOURCES OF DATA FOR THIS SPECIFICATION.
   - ASTM A325, SPECIFICATION FOR HIGH-STRENGTH BOLTS FOR STRUCTURAL STEEL JOINTS.
   - HANDBOOK OF STEEL CONSTRUCTION, CANADIAN INSTITUTE OF STEEL CONSTRUCTION, 11TH EDITION.
   - CSA STANDARD W48.1, CARBON STEEL COVERED ELECTRODES FOR SHIELDED METAL ARC WELDING.
   - CSA STANDARD W47.1, CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES.
3. STEEL CONSTRUCTION SHALL CONFORM TO THE SPECIFICATIONS AND STANDARDS AS CONTAINED IN THE LATEST EDITION OF THE HANDBOOK OF STEEL CONSTRUCTION (LIMIT STATES DESIGN OF STEEL STRUCTURES).

MATERIALS

1. ALL STRUCTURAL STEEL PLATE SHALL BE CSA G40.21 50W (GRADE 350), UNLESS NOTED OTHERWISE. ALL STRUCTURAL "W" SHAPES SHALL BE CSA G40.21 GRADE 50W OR CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATIONS A992. ALL PLATES 50MM OR MORE IN THICKNESS SHALL BE TESTED BY ULTRASONIC INSPECTION ACCORDING TO ASTM A435. OTHER SHAPES SHALL BE G40.21 M350 W OR G40.21 50W OR ASTM A572 GRADE 50. HSS SHAPE SHALL BE ASTM A500 GRADE C.
2. ALL STAINLESS STEEL (SS) MATERIAL SHALL CONFORM O ASTM 240, TYPE 304 OR 316, UNLESS NOTED OR SPECIFIED.
3. MILL TEST CERTIFICATES FOR STEEL SHALL BE FURNISHED BEFORE FABRICATION BEGINS.
4. FOR STEEL MATERIALS REFER TO SPECIFICATIONS.
5. THE USE OF ROLLED STEEL SECTIONS AND/OR BOLTS MANUFACTURED OUTSIDE CANADA WILL REQUIRE VERIFICATION THAT THE PRODUCTS COMPLY WITH APPLICABLE ASTM STANDARDS. MILL CERTIFICATES WILL BE REQUIRED FOR ALL STEEL. STEEL GRADES OTHER THAN ASTM-A36 WILL REQUIRE TESTING BY AN APPROVED LABORATORY. ALL FOREIGN BOLTS MUST BE APPROVED BY DEPARTMENT REPRESENTATIVE PRIOR TO THEIR USE.

BOLTS

1. BOLT ASSEMBLIES INCLUDING ONE HARDENED WASHER SHALL CONFORM TO ASTM A325 UNLESS NOTED OTHERWISE ON THE DRAWINGS.

RODS

1. ALL RODS SHALL CONFORM TO ASTM F1554 UNLESS NOTED OTHERWISE ON THE DRAWINGS.

WELD ELECTRODES

1. ELECTRODES SHALL BE E480XX AND SHALL CONFORM TO W48.1 SPECIFICATIONS.
2. ALL WELDING SHALL BE BY SHIELDED METAL ARC WELDING AND/OR FLUX-CORED ARC WELDING METHODS AND SHALL CONFORM TO CANADIAN WELDING BUREAU FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION CSA STANDARD W59 AND W55.3. QUALIFICATIONS OF WELDERS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR STANDARD QUALIFICATION PROCEDURE OF THE CSA STANDARD W47.1.

EXCAVATION

1. REFER TO GEOTECHNICAL REPORT .
2. EXCAVATE TO BEDROCK. CUT TO THE REQUIRED FOUNDATION BEARING SURFACE.
3. DO NOT CONSTRUCT ON FROZEN GROUND.

BASE SLAB

1. SUB-BASE PREPARATION - PREPARE SUB-BASE IN STRICT ACCORDANCE WITH THE GEOTECHNICAL REPORT.
   - - REMOVE ALL TOPSOIL, SILT, LOOSE FILL, DEBRIS, ORGANIC MATERIAL (INCLUDING TREE ROOTS), EXISTING FOUNDATION ELEMENTS, TANKS, ETC.
   - - FILL ALL VOIDS AND LOW AREAS WITH CLEAN WELL GRADED GRANULAR FILL COMPACTED TO A MINIMUM 100% STANDARD PROCTOR DENSITY. INSTALL AND COMPACT IN 150mm (6") HIGH LIFTS.
2. GRANULAR BASE - INSTALL A BASE OF CLEAN WELL GRADED GRANULAR FILL COMPACTED TO MINIMUM 100% STANDARD PROCTOR DENSITY. INSTALL AND COMPACT IN 150mm (6") HIGH LIFTS TO THE THICKNESS SPECIFIED ON THE DRAWINGS.
3. IF REQUESTED BY THE ENGINEER, SAMPLES OF PROPOSED GRANULAR BASE AND SUB-BASE MATERIAL SHALL BE SUBMITTED TO GEOTECHNICAL CONSULTANT FOR REVIEW AND APPROVAL.
4. THAW ALL FROZEN AREAS PRIOR TO INSTALLING GRANULAR MATERIAL.
5. COMPACTION TESTS SHALL BE PERFORMED BY AN INDEPENDENT TESTING COMPANY DURING THE INSTALLATION OF ALL GRANULAR MATERIAL. THE RESULTS SHALL BE FORWARDED TO THE ENGINEER.
6. PROVIDE 15 MIL POLY MOISTURE BARRIER (WELL LAPPED AND SEALED) BETWEEN COMPACTED GRANULAR BASE AND CONCRETE SLAB UNLESS NOTED OTHERWISE.
7. PROVIDE A FULL AND CONTINUOUS 12mm (1/2") WIDE FLEXCELL JOINT BETWEEN THE EDGE OF SLAB AND ALL OTHER STRUCTURAL ELEMENTS (I.E., GRADE BEAMS, FOUNDATIONS, RETAINING WALLS, COLUMNS, ETC.) UNLESS NOTED OTHERWISE.
8. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR SERVICES INSTALLED BELOW THE SLAB AND FOR SERVICES PENETRATING THE SLAB REQUIRING SLEEVING.
9. INSTALL SAWCUTS AS INDICATED ON STRUCTURAL PLANS. SAWCUTS TO BE 1/4 OF THE SLAB THICKNESS IN DEPTH AND 3mm (1/8") WIDE. DO NOT CUT THROUGH REINFORCING IN THE SLAB. CUT NO SOONER THAN 24 HOURS BUT NOT LATER THAN 48 HOURS AFTER SLAB IS POURED. FILL SAWCUTS WITH APPROVED BITUMINOUS COMPOUND OR CAULKING.
10. PROVIDE CONSTRUCTION JOINTS C/W 12mm (1/2") ASPHALT IMPREGNATED FIBREBOARD AND GREASED DOWELS TO MATCH SLAB REINFORCING.

TABLE 1.1

READ IN CONJUCTION WITH DESIGN NOTES SECTION CAST-IN-PLACE CONCRETE

EMBEDMENT OF DOWELS

BAR SIZE	REINFORCEMENT GRADE (MPa)	COMPRESSION EMBEDMENT (BASED ON CONCRETE STRENGTH MPa)			REGULAR TENSION EMBEDMENT (BASED ON CONCRETE STRENGTH MPa)				
		20 MPa	25 MPa	30 MPa AND OVER	20 MPa	25 MPa	30 MPa	35 MPa	40 MPa
10M	400	250mm (10")	225mm (9")	200mm (8")	325 (13")	300mm (12")	300mm (12")	300mm (12")	300mm (12")
15M	400	350mm (14")	300mm (12")	275mm (11")	490 (19")	440mm (18")	400mm (16")	380mm (15")	380mm (15")
20M	400	430mm (17")	385mm (16")	350mm (14")	650 (26")	580mm (23")	530mm (21")	490mm (20")	450mm (18")
25M	400	540mm (22")	480mm (19")	440mm (18")	1010 (40")	900mm (36")	825mm (33")	760mm (30")	710mm (28")
30M	400	645mm (26")	580mm (23")	530mm (21")	1210 (48")	1080mm (43")	990mm (39")	910mm (36")	840mm (34")
35M	400	760mm (30")	680mm (27")	620mm (25")	1690 (67")	1520mm (60")	1400mm (56")	1270mm (51")	1200mm (48")

NOTE:	DESCRIPTION:
NOTE 1	TOP EMBEDMENT VALUES ARE 1.3 TIMES REGULAR EMBEDMENT VALUES. TOP EMBEDMENT APPLIES TO HORIZONTAL REINFORCEMENT CAST WITHIN 300 mm (12") OR MORE OF CONCRETE BELOW THE BAR.
NOTE 2	FOR EPOXY REINFORCEMENT INCREASE THESE LENGTHS BY 1.5. INCREASE THESE LENGTHS BY 1.7 FOR EPOXY COATED TOP REINFORCEMENT.

TABLE 1.2

READ IN CONJUCTION WITH DESIGN NOTES SECTION CAST-IN-PLACE CONCRETE

REINFORCEMENT SPLICES

(UNLESS NOTED OTHERWISE)

BAR SIZE	FULL TENSION SPLICE	FULL TENSION SPLICE FOR TOP BARS *
10M	400mm (16")	500mm (20")
15M	550mm (22")	750mm (30")
20M	700mm (28")	900mm (36")
25M	1100mm (44")	1400mm (56")
30M	1300mm (52")	1700mm (67")
35M	1550mm (62")	2000mm (79")

NOTE:	DESCRIPTION:
NOTE 1	TOP BARS ARE DEFINED AS HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 300mm (12") OF CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.
NOTE 2	APPLIES TO REINFORCEMENT SPLICES NOT OTHERWISE DETAILED.
NOTE 3	LAP SPLICE SCHEDULE IS FOR CALL B SPLICE UNO.
NOTE 4	FOR STANDARD EMBEDMENT DEPTH INTO CONCRETE DIVIDE TENSION LAP SPLICE NUMBERS BY 1.3.
NOTE 5	FOR EPOXY REINFORCEMENT INCREASE THESE LENGTHS BY 1.5. INCREASE THESE LENGTHS BY 1.7 FOR EPOXY COATED TOP REINFORCEMENT.

TABLE C.1

READ IN CONJUCTION WITH DESIGN NOTES SECTION C. CAST-IN-PLACE CONCRETE

CONTROLLED CONCRETE

CONCRETE LOCATION	MAX. AGG. SIZE	28 DAY STRENGTH	EXPOSURE CLASS	AIR CONTENT	CEMENT TYPE
FOOTINGS	20 mm (3/4")	35 MPa	S-1	4-7 %	HS
FOUNDATIONS / PILASTERS / RETAINING WALLS	20 mm (3/4")	35 MPa	S-1	4-7 %	HS
GRADE BEAMS / WALLS (BELOW GRADE)	20 mm (3/4")	35 MPa	S-1	4-7 %	HS
STRUCTURAL SLABS - EXTERIOR	20 mm (3/4")	35 MPa	C-1	5-8 %	GU
STRUCTURAL SLABS - INTERIOR	20 mm (3/4")	35 MPa	N	- %	GU
STRUCTURAL SLABS ON GRADE	20 mm (3/4")	35 MPa	C-1	5-8 %	GU
WALLS - EXTERIOR (ABOVE GRADE)	20 mm (3/4")	35 MPa	F-2	4-7 %	GU

Consultant

Notes

Revision	By	Appd	YYYY.MM.DD
0 ISSUED FOR PERMITTING	CJU	BF	2018.03.16

Issued

File Name: N/A	Author	Designer	Checker	2018.02.06
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit/Seal

PRELIMINARY NOT FOR CONSTRUCTION

LICENSED PROFESSIONAL ENGINEER
2018-03-15
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PROVINCE OF ONTARIO

Client/Project Logo

Mississippi Valley Conservation Authority

Client/Project

SHABOMEKA LAKE DAM RECONSTRUCTION

NORTH FRONTENAC, ONTARIO

Title

GENERAL NOTES

Project No. 159100390

Scale 1 : 1

Revision 0

Sheet 4 of 9

Drawing No. **C004**

<Pck location in Project Information>
3/15/2018 11:18:21 AM

ORIGINAL SHEET - ISO B2