

A. GENERAL

- ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED PRIOR TO COMMENCING CONSTRUCTION.
- VERIFY WEIGHT AND LOCATION OF ALL EQUIPMENT ON STRUCTURE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.
- CONSTRUCTION JOINT LOCATIONS ARE TO BE APPROVED BY THE CONTRACT ADMINISTRATOR.
- THE STRUCTURE SHALL BE BRACED IN ALL DIRECTIONS TO SAFELY WITHSTAND ALL LATERAL FORCES WHICH MAY BE ENCOUNTERED DURING ERECTION. THE BRACING SHALL REMAIN IN PLACE UNTIL ALL WALLS AND STRUCTURAL MEMBERS WITH ROOF DECK ARE IN PLACE.
- LOCATE UNDERGROUND SERVICES AND PROTECT THEM AT ALL TIMES DURING CONSTRUCTION.
- THE STRUCTURE IS DESIGNED IN ACCORDANCE WITH THE APPLICABLE BUILDING CODES. DESIGN LIVE LOADS ARE AS SHOWN ON THE DRAWINGS.
- FLOOR LIVE LOADS:

MAIN FLOOR	12.0 kPa
MECHANICAL FLOOR LOADS	12.0 kPa
ROOF LOADS:	
LIVE LOAD	1.56 kPa
DEAD LOAD	1.0 kPa
- ADDITIONAL LOADS AS NOTED ON PLAN
WIND LOAD $q(1/100)$ 0.49 kPa

FOUNDATIONS

- FOUNDATION ELEMENTS ARE DESIGNED AND SHALL BE INSTALLED IN ACCORDANCE WITH RECOMMENDATIONS MADE BY UMA ENGINEERING LTD. IN THEIR REPORT DATED MARCH 7, 2005.
- PLACE PUMP STATION FOUNDATION ON UNDISTURBED SUBGRADE CAPABLE OF SUSTAINING 400 KPA (8300 PSF) BEARING PRESSURE AT DEPTHS SHOWN ON THE DRAWINGS UNO.
- SUBGRADE TO BE CONFIRMED ON SITE BY GEOTECHNICAL ENGINEER AT TIME OF CONSTRUCTION (PRIOR TO CASTING ANY BASE SLABS).
- WHERE BEARING MATERIAL IS DISTURBED OR SOFT, REMOVE UNSUITABLE MATERIAL AND BACKFILL WITH LOW STRENGTH CONCRETE FILL TO THE APPROVAL OF THE CONTRACT ADMINISTRATOR.
- PROTECT BEARING SURFACES FROM EXPOSURE TO FREEZING OR FREE WATER.
- CONTRACTOR TO PROVIDE SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA FOR SHORING. DETAIL DRAWINGS FOR SHORING SHALL BE SUBMITTED FOR REVIEW TO THE CONTRACT ADMINISTRATOR PRIOR TO COMMENCING THE WORK.
- SHORING TO BE DESIGNED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT AND PROJECT SPECIFICATIONS.

FORMWORK

- USE 150mm (6") CARDBOARD VOID FORM WRAPPED IN POLYETHYLENE SHEETS AS BOTTOM FORM FOR STRUCTURAL SLABS AND GRADE BEAMS AT GRADE. ACCESSORIES SUCH AS HI-CHAIRS, SPACERS, ETC. SHALL BE SUPPORTED USING PADS OF PLYWOOD OR TEMPERED FIBREBOARD TO PREVENT PUNCTURING FORM.
- ALL CONSTRUCTION JOINTS TO HAVE KEY MINIMUM 40 mm (1 1/2") DEEP.
- ALL STRUCTURAL SLABS FRAMING INTO WALL TO HAVE KEY MINIMUM 50mm (2") DEEP.
- ALL CONCRETE BEAMS FRAMING INTO WALLS TO HAVE KEY MINIMUM 100mm (4") DEEP BY HEIGHT AND WIDTH OF BEAM. WHEN CONCRETE BEAMS ARE CAST INTO WALL KEY, PROVIDE DOWELS EQUAL IN SIZE AND NUMBER TO THAT OF HORIZONTAL BEAM REINFORCING FROM WALL AND LAP WITH BEAM STEEL.

B. REINFORCING

- ALL REINFORCING BARS SHALL BE DEFORMED BARS WITH A MINIMUM SPECIFIED YIELD STRENGTH OF 400MPa OR EQUAL IN ACCORDANCE WITH CAN G30.18, EXCEPT STIRRUPS AND TIES WHICH SHALL HAVE MINIMUM SPECIFIED YIELD STRENGTH OF 300 MPa.
- CLEAR CONCRETE COVER TO REINFORCING AS FOLLOWS U/N:

BASE SLAB:	75mm BOTTOM, 50mm TOP
FLOOR SLABS:	25mm TOP & BOTTOM
EXTERIOR WALLS:	50mm INTERIOR, 100mm EXTERIOR
INTERIOR WALLS:	50mm EACH FACE
GRADE BEAMS:	40mm TOP, BOTTOM, AND SIDES
SLABS-ON-GRADE:	50mm
- LOCATE REINFORCING SPLICES NOT INDICATED ON DRAWINGS AT POINTS OF MINIMUM STRESS. LOCATIONS OF SPLICES TO BE APPROVED BY CONTRACT ADMINISTRATOR.
- BEFORE PLACING ENSURE REINFORCING IS CLEAN, FREE OF LOOSE SCALE, DIRT, OR OTHER FOREIGN COATING WHICH WOULD REDUCE THE BOND TO CONCRETE.
- UNLESS OTHERWISE NOTED HOOK ALL REINFORCING AT CORNERS OF BEAMS AND WALL INTERSECTION OR USE 90x90 CORNER BARS.
- CONTRACTOR TO SUBMIT SHOP DRAWINGS TO THE CONTRACT ADMINISTRATOR FOR REVIEW PRIOR TO COMMENCING THE WORK.

C. CONCRETE

- ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE LATEST CAN3-A23.1 - CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION.
 - PROPORTION NORMAL DENSITY CONCRETE IN ACCORDANCE WITH CAN-A23.1 TO GIVE THE FOLLOWING PROPERTIES:
 - FOUNDATION SLAB, EXTERIOR WALLS, AND BEAMS
 - CEMENT: TYPE 50 SULPHATE RESISTANT
 - MAX. COARSE AGGREGATE: 20mm
 - MIN. COMPRESSIVE STRENGTH AT 28 DAYS: 35MPa
 - MAX. WATER/CEMENT RATIO: 0.45
 - CLASS OF EXPOSURE: S-1
 - MAX. SLUMP: 80mm ±30mm
 - AIR CONTENT: 4-7%
 - INTERIOR FLOOR SLABS, BEAMS, EQUIPMENT PADS AND BENCHING
 - CEMENT: TYPE 10
 - MAX. COARSE AGGREGATE: 20mm
 - MIN. COMPRESSIVE STRENGTH AT 28 DAYS: 30MPa
 - MAX. WATER/CEMENT RATIO: 0.55
 - CLASS OF EXPOSURE: N
 - MAX. SLUMP: 80mm ±30mm
 - AIR CONTENT: 1-3%
 - MASONRY CORE FILL
 - CEMENT: TYPE 10
 - MAX. COARSE AGGREGATE: 10mm
 - MIN. COMPRESSIVE STRENGTH AT 28 DAYS: 20MPa
 - MAX. SLUMP: 150mm ±20mm
 - AIR CONTENT: 5-8%
 - VEHICULAR TRAFFIC CONCRETE & EXTERIOR SLABS
 - CEMENT: TYPE 10
 - MAX. COARSE AGGREGATE: 20mm
 - MIN. COMPRESSIVE STRENGTH AT 28 DAYS: 32MPa
 - CLASS OF EXPOSURE: C-2
 - MAX. SLUMP: 80mm
 - AIR CONTENT: 5-8%
- NOTE: CLASS C FLYASH MAY REPLACE PORTLAND CEMENT BY NO MORE THAN 15% BY MASS OF TOTAL CEMENTITIOUS CONTENT IN THE MIX.
- CONSTRUCT FORMWORK, SHORING AND BRACING TO MEET DESIGN, PROJECT SPECIFICATION AND CAN3-A23.1-M90 REQUIREMENTS. CONSTRUCT ACCURATELY, SO THAT RESULTANT FINISHED CONCRETE CONFORMS TO SHAPES, LINES AND DIMENSIONS INDICATED ON THE DRAWINGS.
 - VOID FORMS UNDER FLOOR SLABS, & BEAMS SHALL BE HONEYCOMB TYPE BIODEGRADABLE CARDBOARD, 150mm THICK TREATED TO PROVIDE SUFFICIENT STRUCTURAL SUPPORT FOR CONCRETE UNTIL CONCRETE IS CURED.
 - CONSTRUCTION JOINTS, POUR SCHEDULING AND WORK PROCEDURES SHALL BE DISCUSSED WITH THE CONTRACT ADMINISTRATOR PRIOR TO COMMENCING CONSTRUCTION.
 - NOTIFY THE CONTRACT ADMINISTRATOR 48 HOURS PRIOR TO PLACING CONCRETE.
 - USE WATERSTOPS AT ALL CONSTRUCTION JOINTS.

METAL FABRICATIONS

- PROVIDE SHOP DRAWINGS FOR REVIEW PRIOR TO CONSTRUCTION.
- MATERIAL: EPOXY COATED STEEL AND HOT DIPPED GALVANIZED STEEL.
- WELDING: STEEL TO CSA W59-M1989, ALUMINUM TO CSA W59.2-M1991
- STEEL SECTIONS AND PLATES: TO CAN3 G40.21.
- ALL ALUMINUM TO BE IN ACCORDANCE WITH CSA H44-GS11N, 6061-T6 (OR 6351-T6) ALLOY UNLESS NOTED OTHERWISE.
- BOLTED STEEL CONNECTIONS: BOLTS TO ASTM A325.
- BOLTED ALUMINUM CONNECTIONS: BOLTS TO BE STAINLESS STEEL TYPE 315 ELC ASTM-A167.
- ALL ANCHOR BOLTS TO CONFORM TO ASTM A307 GALVANIZED.
- APPLY ISOLATION COATING TO ALUMINUM SURFACES EMBEDDED OR IN CONTACT WITH CONCRETE OR MASONRY.
- STEEL GRATING: FISHER AND LUDLOW OR APPROVED EQUAL.

STEEL STAIRS

- SHOP DRAWINGS: PROVIDE ENGINEERING DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA FOR APPROVAL PRIOR TO CONSTRUCTION.

ROUGH CARPENTRY

- STRUCTURAL WOOD FRAMING TO BE SPF #2 OR BETTER. ALL WOOD TO BE KILN DRIED.
- ALL WALLS TO BE ADEQUATELY BRACED UNTIL ROOF STRUCTURE IS INSTALLED.
- NAILING PATTERNS AND LENGTHS TO CONFORM TO REQUIREMENTS OF PART 9 OF NATIONAL BUILDING CODE OF CANADA.
- PLYWOOD SHALL BE EXTERIOR GRADE DOUGLAS FIR PLYWOOD CONFORMING TO CAN3-0121-M1978 "DOUGLAS FIR PLYWOOD", ALL WOOD TRUSSES TO BE DESIGNED IN ACCORDANCE WITH:
 - CAN3-086-M84 "ENGINEERING DESIGN IN WOOD (WORKING STRESS DESIGN)"
 - THE NATIONAL BUILDING CODE OF CANADA
 - THE MANITOBA BUILDING CODE
 - ANY ANTICIPATED SNOW BUILD UP LOADS.
- TRUSSES FRAMING INTO BEAMS OR OTHER TRUSSES SHALL BE CONNECTED WITH PROPER METAL FRAMING ACCESSORIES OR EQUAL APPROVED BY ENGINEER.
- SUBMIT DRAWINGS BEARING SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA FOR REVIEW PRIOR TO FABRICATION.
- ENGINEERING SHOP DRAWINGS SHALL INCLUDE A LAYOUT PLAN.
- TRUSS SUPPLIER TO PROVIDE ALL BRACING AND BLOCKING AS RECOMMENDED BY TRUSS PLATE INSTITUTE (COMMENTARY) H1B-91.
- PROVIDE 2 TYPE H1 METAL HURRICANE TIES, MANUFACTURED BY SIMPSON STRONG TIE (OR APPROVED ALTERNATE) AT EACH ROOF TRUSS BEARING LOCATION.

G. STRUCTURAL STEEL

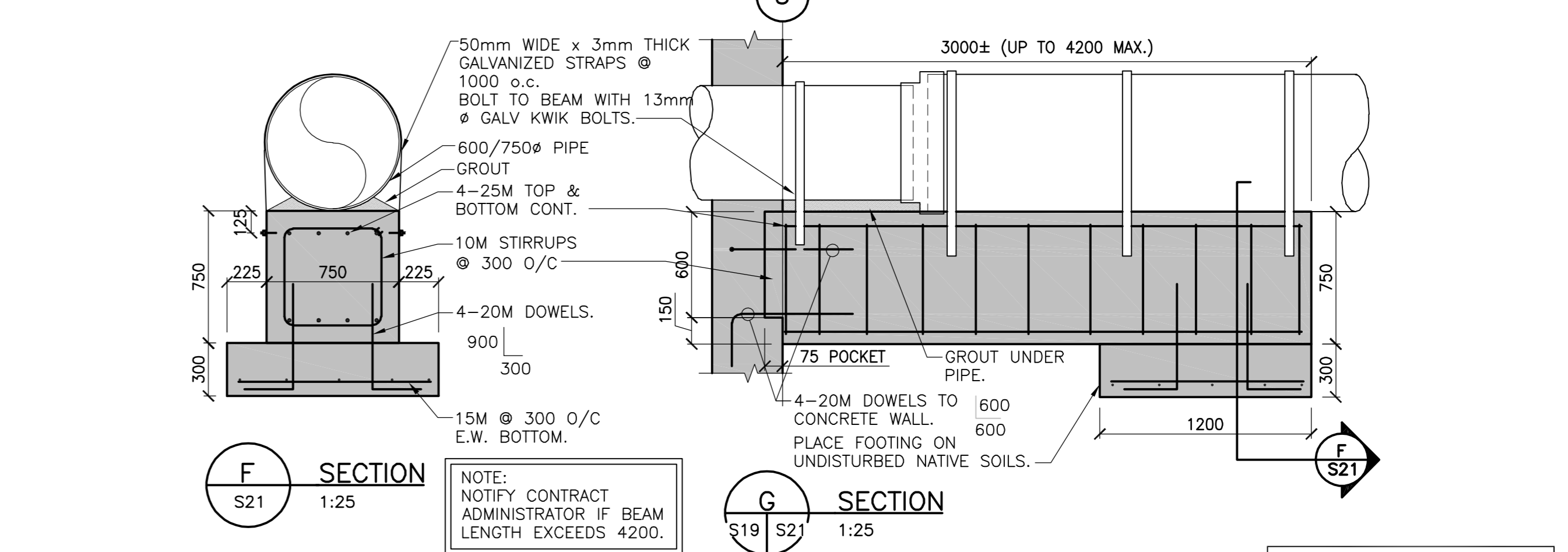
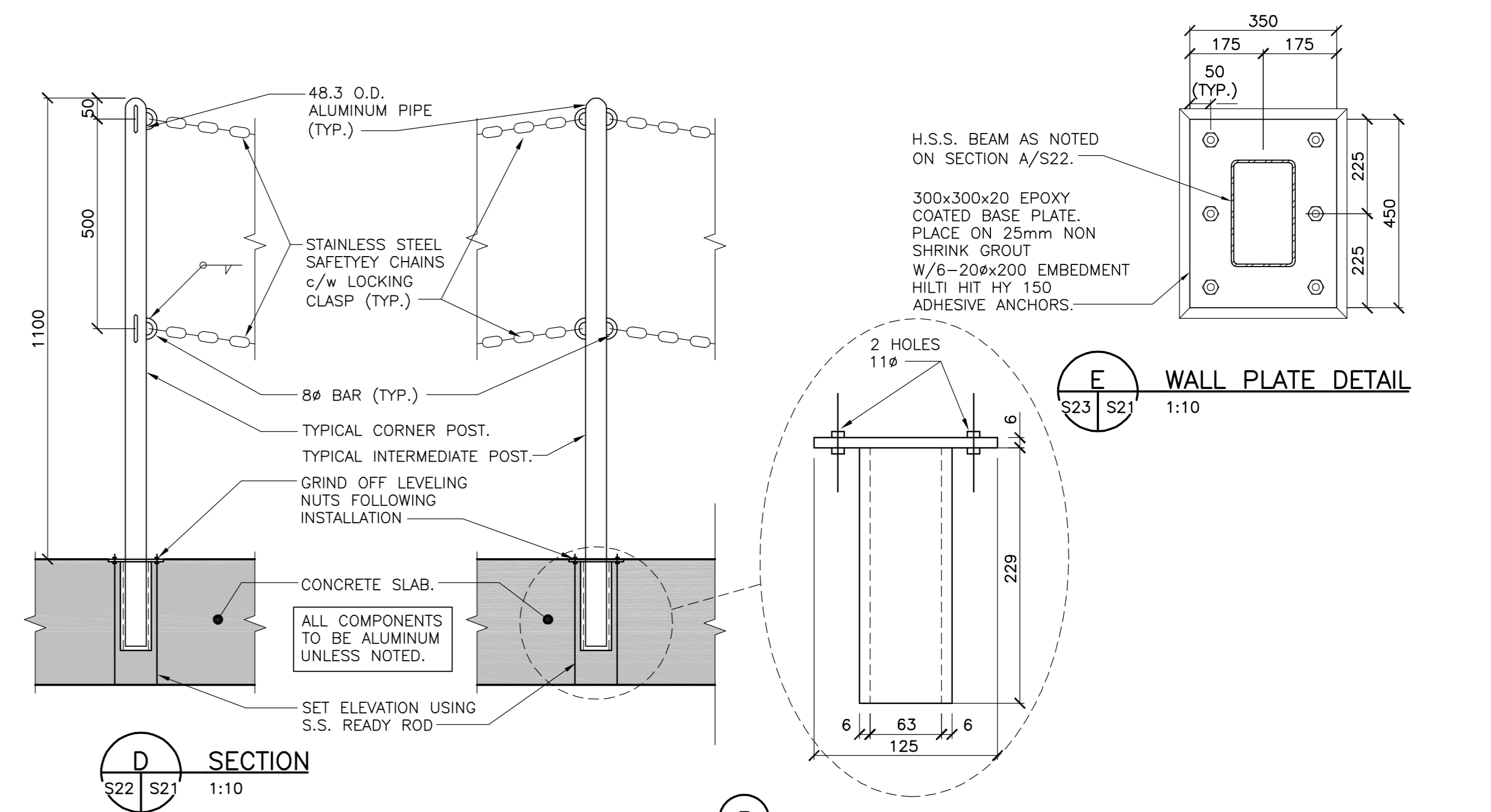
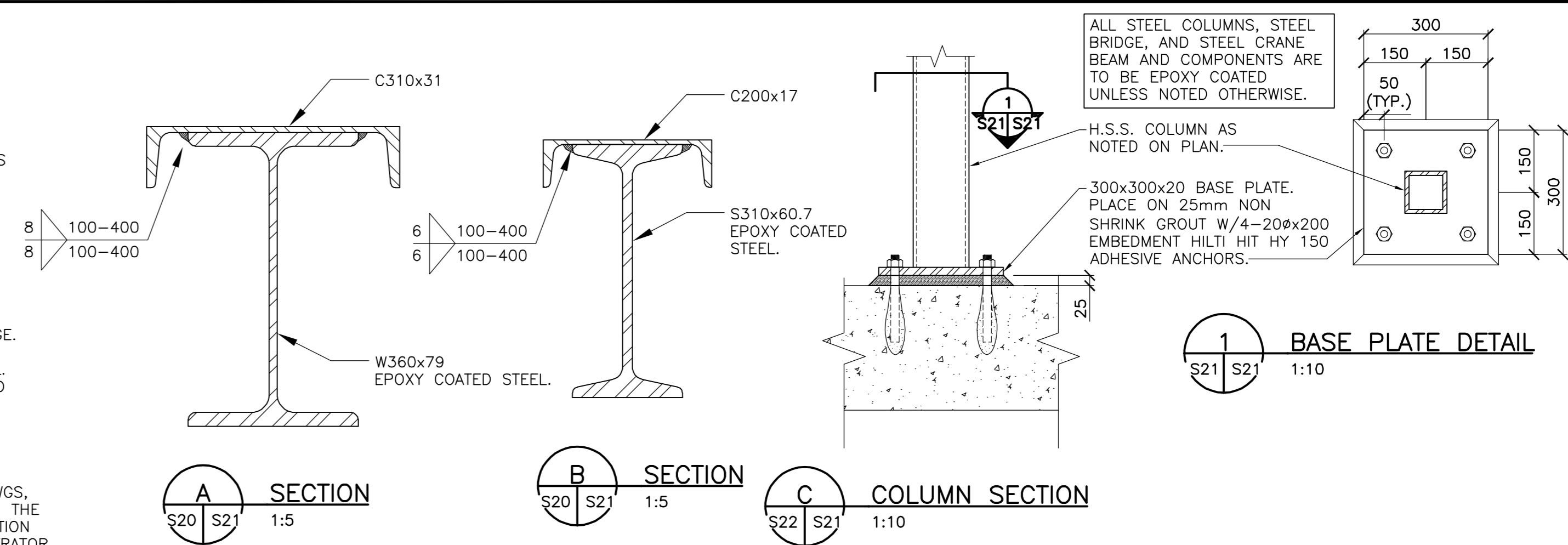
- STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD G40.21
- WIDE FLANGE SECTIONS TO BE G40.21 350MPa
- HOLLOW STRUCTURAL SECTIONS TO BE G40.21 350MPa CLASS C
- ALL OTHER ROLLED OR WELDED STRUCTURAL SECTIONS AND PLATES TO BE G40.21 300MPa GRADE STEEL.
- FABRICATION AND ERECTION SHALL CONFORM TO CSA STANDARD S16 (LATEST)
- ALL WELDING SHALL BE PERFORMED BY QUALIFIED WELDERS FULLY APPROVED FOR STRUCTURAL WELDING BY THE CANADIAN WELDING BUREAU IN ACCORDANCE WITH CSA SPECIFICATIONS W47 AND W59.
- SPLICING OF MEMBERS NOT PERMITTED UNLESS OTHERWISE NOTED, WHERE BEAMS ARE CONTINUOUS OVER SUPPORTS, NO HOLES PERMITTED IN TOP FLANGE.
- PROVIDE 2-10mm WELDED WEB STIFFENER PLATES EACH SIDE OF BEAM, ALIGNED WITH COLUMN OR WALL.
- COLUMN BASE AND CAP PLATES SHALL BE WELDED TO COLUMNS. PROVIDE 20mm CAP PLATE C/W 4-20mm DIA. ASTM A325 BOLTS FOR ALL COLUMNS UNLESS NOTED OTHERWISE.
- FABRICATE ALL BEAMS WITH CAMBER TO OFFSET THE DEFLECTIONS DUE TO DEAD LOAD.
- STRUCTURAL STEEL SUPPLIER SHALL SUBMIT SHOP DWGS, SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MB. SHOWING ALL DESIGN AND FABRICATION DETAILS OF CONNECTIONS TO THE CONTRACT ADMINISTRATOR FOR REVIEW PRIOR TO START OF FABRICATION.

E. MASONRY

- MASONRY MORTAR FOR CONCRETE BLOCKS WALLS SHALL BE TYPE S WITH A 28 DAY STRENGTH OF 8.5 MPa.
- PROVIDE CONTINUOUS BOND BEAMS WITH 2-15M BARS IN 20 MPa CONCRETE FILL AT THE TOP OF ALL MASONRY WALLS AND AS INDICATED ON THE DRAWINGS.
- PROVIDE MASONRY LINTELS AS PER LINTEL SCHEDULE.
- AT LINTEL LOCATIONS FILL BLOCK TWO COURSES DEEP WITH 20 MPa CONCRETE AT BEARING EACH END UNLESS OTHERWISE INDICATED.
- CONCRETE FILL ALL CORES CONTAINING REINFORCEMENT.
- PLACEMENT OF CONCRETE FILL SHALL BE IN LIFTS NOT EXCEEDING 2400mm.
- LAP VERTICAL WALL REINFORCING MINIMUM 600mm.
- UNLESS NOTED OTHERWISE PROVIDE CONCRETE FILLED CORE EACH SIDE OF WALL OPENING REINFORCED WITH 1-15M VERTICAL FULL HEIGHT.
- CONTROL JOINT SPACING TO BE 7000mm MAXIMUM ALONG EXTERIOR WALLS AND 9000mm MAXIMUM ALONG INTERIOR WALLS.
- PROVIDE TEMPORARY BRACING OF MASONRY WALLS UNTIL ALL STRUCTURAL ELEMENTS INCLUDING ROOF DECK ARE IN PLACE. BRACING DETAILS TO BE SUBMITTED FOR REVIEW UNDER THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA.
- MORTAR TESTS SHALL BE TAKEN IN ACCORDANCE WITH CSA STANDARD A304.
- SEE SPECIFICATIONS FOR MASONRY TIE REQUIREMENTS.
- PROVIDE L150x100x8 HOT DIPPED GALVANIZED STEEL LOOSE ANGLE LINTELS FOR BRICK VENEER SUPPORT WITH MINIMUM 200mm MINIMUM BEARING EACH END.

CONCRETE SLAB-ON-GRADE

- SUB-BASE PREPARATION**
PREPARE SUB-BASE IN STRICT ACCORDANCE WITH THE SOILS REPORT.
- GRANULAR BASE**
INSTALL A BASE OF CLEAN WELL GRADED GRANULAR FILL COMPACTED TO MINIMUM 95% MODIFIED PROCTOR DENSITY. INSTALL AND COMPACT IN 150mm HIGHLIGHTS TO THE THICKNESS SPECIFIED ON THE STRUCTURE PLANS.
- FOR WINTER OR EARLY SPRING STARTS, THAW ALL FROZEN AREAS PRIOR TO INSTALLING GRANULAR MATERIAL.
- THE CONTRACTOR SHALL ENSURE THAT COMPACTION TESTS BE PERFORMED BY AN INDEPENDENT TESTING COMPANY DURING THE INSTALLATION OF ALL GRANULAR MATERIAL. THE RESULTS SHALL BE FORWARDED TO THE CONTRACT ADMINISTRATOR.
- PROVIDE 10 MIL POLY MOISTURE BARRIER (WELL LAPPED) BETWEEN COMPACTED GRANULAR BASE AND CONCRETE SLAB.
- REFER TO STRUCTURAL DRAWINGS FOR PLACEMENT OF DOWELS EXTENDING INTO OR FROM THE SLAB.
- REFER TO "CONCRETE" AND "REINFORCING STEEL" NOTES FOR MATERIAL SPECIFICATIONS AND REQUIREMENTS.



APEGM
Certificate of Authorization
Stantec Consulting Ltd.
No. 1301 Expiry: April 30, 2006

THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

Winnipeg

KENASTON UNDERPASS
KENASTON UNDERPASS PUMPING STATION

STRUCTURAL - DETAILS, SECTIONS AND GENERAL NOTES

SHEET 6 OF 25
CAD FILE DRAWING NUMBER 113703042-S19.dwg
CITY DRAWING NUMBER P-3258-150

LOCATION APPROVED UNDERGROUND STRUCTURES		B.M. ELEV.	Stantec Consulting Ltd.		ENGINEER'S SEAL
SUPV. U/G STRUCTURES COMMITTEE	DATE		905 Waverley Street, Winnipeg, Manitoba Tel 204-489-5900 Fax 204-453-9012		ORIGINAL SEALED BY K.W. CHARLESON P. ENG. 05.12.09
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.			DESIGNED BY P.W.	CHECKED BY K.W.C.	CONSULTANT DRAWING NO. 113703042-S21
			DRAWN BY V.J.F.	APPROVED BY W.S.	
2 ISSUED FOR TENDER	05.12.09	K.W.C.	HOUR SCALE: AS SHOWN		DATE 05.12.09
1 ISSUED FOR CLIENT REVIEW	05.11.24	K.W.C.	VERTICAL: R. FINGAS 05.12.09		
0 ISSUED FOR CLIENT REVIEW	05.10.14	K.W.C.	R. FINGAS, P. ENG. BRIDGE PROJECTS ENGINEER		
NO. REVISIONS	DATE	BY	DATE	05.09.13	