

STRUCTURE DESIGN NOTES:

- 1. DESIGN BASED ON AREMA "MANUAL FOR RAILWAY ENGINEERING", 2008 EDITION AND ON CNR "GUIDELINES FOR DESIGN OF RAILWAY STRUCTURES", DATED JANUARY 2006.
- 2. THESE DRAWINGS TO BE READ IN CONJUNCTION WITH THE CONTRACT SPECIFICATIONS.
- 3. EXISTING DIMENSIONS ARE APPROXIMATE ONLY. CONTRACTOR SHALL SITE VERIFY ALL DIMENSIONS.
- 4. ALL STATIONS AND COORDINATES ARE NAD 83 UTM GRID COORDINATES. ALL DIMENSIONS ARE GIVEN IN GROUND COORDINATES. GROUND = GRID/0.9997688

DESIGN LOADS

- 1. COOPER E90 PLUS IMPACT.

FOUNDATIONS

- 1. FOUNDATION DESIGN IS BASED ON THE FOLLOWING REPORTS:
 - "THE CITY OF WINNIPEG BUS RAPID TRANSIT SYSTEM - SOUTHWEST CORRIDOR GEOTECHNICAL INVESTIGATION AND PRELIMINARY RECOMMENDATIONS", PREPARED BY KLOHN CRIPPEN AND DATED MAY 2004.
 - "CITY OF WINNIPEG - BUS RAPID TRANSIT PROJECT SUMMARY OF ADDITIONAL GEOTECHNICAL ASSESSMENT" DATE JULY 03, 2009.
- ENSURE THAT THE REQUIREMENTS OUTLINED IN THESE REPORTS ARE READ AND UNDERSTOOD PRIOR TO COMMENCING WITH FOUNDATION WORK. FOR TEST HOLE LOCATIONS REFER TO THE GEOTECHNICAL REPORT OR BORE HOLE LOG DRAWINGS 9 & 10.
- 2. PROTECT EXCAVATION FOR FOOTINGS FROM RAIN, SNOW, FREEZING TEMPERATURES AND STANDING WATER.
- 3. PLACE A MAT OF LEAN MIX CONCRETE 10 MPa ON THE SPECIFIED WORKING BASE IMMEDIATELY UPON COMPLETION OF AN EXCAVATION TO MINIMIZE LOSS OF MOISTURE OR DEGRADATION OF THE BASE.
- 4. REMOVE GROUND WATER ENTERING EXCAVATION BY AN APPROVED DEWATERING METHOD.
- 5. DO NOT PLACE CONCRETE AGAINST FROZEN GROUND, THAW BY AN APPROVED METHOD, THEN PROTECT EXCAVATION FROM FREEZING PRIOR TO PLACING CONCRETE.

CAST IN PLACE CONCRETE

- 1. CONCRETE MATERIAL, QUALITY, MIXING, PLACING, FORM WORK AND OTHER CONSTRUCTION PRACTICES TO CONFORM TO CSA-A23.1.
- 2. SEE SPECIFICATIONS FOR CONCRETE MIX DESIGN REQUIREMENTS.
- 3. MINIMUM REQUIRED CONCRETE STRENGTH AT 28 DAYS IS 35 MPa.

REINFORCING STEEL

- 1. REINFORCING STEEL SHALL CONFORM TO CSA G30.18 GRADE 400.
- 2. REINFORCEMENT SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH CSA G164 TO A MINIMUM ZINC RETENTION OF 610 g/m².
- 3. CONCRETE CLEAR COVER TO REINFORCEMENT UNLESS NOTED OTHERWISE:

EXPOSED TO EARTH	75 mm TO 90 mm
ALL OTHER LOCATIONS	60 mm TO 80 mm
- NO ADDITIONAL CONSTRUCTION TOLERANCES SHALL BE APPLIED TO THESE VALUES.
- 4. PROVIDE MINIMUM 30 CLEAR BETWEEN REINFORCEMENT AND OTHER EMBEDDED ITEMS SUCH AS SHORING.
- 5. SUPPLY SUPPORT BARS TO SUPPORT MAIN REINFORCING AS REQUIRED.

REINFORCING LAP SPLICES/PROJECTION LENGTH

BAR SIZE	PROJECTION OR LAP
10M	500
15M	800
20M	1000
25M	1600
30M	1900
35M	2200

- 1. LAP SPLICE SCHEDULE IS FOR CLASS B SPLICES OF TOP BARS AND APPLIES TO REINFORCING SPLICES NOT OTHERWISE DETAILED.
- 2. LOCATE REINFORCING SPLICES NOT INDICATED ON THE DRAWINGS AT POINTS OF MINIMUM STRESS. LOCATION OF SPLICES TO BE APPROVED BY THE CONTRACT ADMINISTRATOR.
- 3. BEFORE PLACING REBAR, ENSURE IT IS CLEAN, FREE OF LOOSE SCALE, DIRT, OR OTHER FOREIGN COATING WHICH WOULD REDUCE THE BOND TO CONCRETE.
- 4. ALL LONGITUDINAL BARS IN MAT FOUNDATION, WALLS AND ROOF TO BE SPliced CONTINUOUS FOR THE FULL STRUCTURE LENGTH (EXCEPT AT STAGE 1/2 JOINT WHERE OTHER DETAILS APPLY).
- 5. PROJECTION SHOWN SHALL BE PROVIDED AT CONSTRUCTION JOINTS UNLESS NOTED OTHERWISE.

MISCELLANEOUS METAL/STRUCTURAL STEEL

- 1. STEEL SHALL CONFORM TO CSA G40.21 GRADE 350W.
- 2. STEEL SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH CSA G164 TO A MINIMUM ZINC RETENTION OF 610 g/m².

WELDING

- 1. WELDING SHALL BE UNDERTAKEN BY A COMPANY WITH PROVEN CAPABILITIES IN THIS TYPE OF WORK AND SHALL HAVE APPROVAL FROM THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA W47.1.
- 2. WELDING SHALL CONFORM TO CSA W59.

TEMPORARY DRAINAGE/TEMPORARY SHORING

- 1. SEE SPECIFICATIONS FOR REQUIREMENTS.

WATERPROOFING

- 1. WATERSTOP SHALL BE DURAJOINT BASEAL TYPE 61 OR APPROVED EQUAL ONLY.
- 2. EXPANDING SEALANT SHALL BE VOLCLAY RX101, SIKA SWELL S-2 OR APPROVED EQUAL ONLY.
- 3. WALL DRAIN SHALL BE NILEX NUDRAIN DN50 OR APPROVED EQUAL ONLY.
- 4. SEE SPECIFICATIONS FOR APPROVED WATERPROOFING MEMBRANE TYPES. IF ANY DETAILS SHOWN ARE INCOMPATIBLE WITH THE SELECTED PRODUCT OR DO NOT CONFORM TO THE MEMBRANE MANUFACTURER'S RECOMMENDATIONS, SUBMIT ALTERNATIVE DETAILS TO THE CONTRACT ADMINISTRATOR FOR REVIEW.

PLAN LEGEND

	EXISTING	PROPOSED	TO BE REMOVED/ ABANDONED	TO BE ADJUSTED
COMBINED SEWER				
WASTE WATER SEWER				
STORM RELIEF SEWER				
SUB-DRAIN (150mm U.N.O)				
LAND DRAINAGE SEWER				
FORCEMAIN				
WATERMAIN				
FEEDERMAIN				
WATER SERVICE				
GAS				
HYDRO				
MANITOBA TELEPHONE SYSTEM				
TRAFFIC SIGNALS				
CANADIAN NATIONAL RAILWAY				
STEAM HEAT				
TELEGRAPH				
SPRINKLER				
STREET LIGHTING				
CENTER LINE OF RAILWAY TRACK				
MANHOLE				
HYDRO MANHOLE (BY OTHERS)				
TELEPHONE MANHOLE (BY OTHERS)				
TRAFFIC SIGNAL SPLICE PIT (BY OTHERS)				
CURB INLET				
CATCH BASIN				
CURB & GUTTER INLET C/W CATCH BASIN				
CURB & GUTTER INLET C/W CATCH PIT				
GUTTER INLET C/W CATCH BASIN				
GUTTER INLET C/W CATCH PIT				
WATER VALVE				
HYDRANT				
CURB STOP				
GAS VALVE				
POLE				
HYDRO POLE (BY OTHERS)				
LIGHT STANDARD (STANDARD BY OTHERS)				
TRAFFIC SIGNAL (POLE BY OTHERS)				
SIGNAL CONTROL BOX (CONTROL BOX BY OTHERS)				
PEDESTRIAN CROSSWALK (POLE BY OTHERS)				
ORNAMENTAL LIGHT STANDARD				
SIGN				
OVERHEAD SIGN STRUCTURE				
BORE HOLE				
SLOPE INDICATOR				
TREE C/W DIAMETER				
BUSH/HEDGE				
CULVERT				
COORDINATE CONTROL SURVEY MONUMENT/BENCH MARK				
IRON PROPERTY BAR				
DITCH/SWALE				
FENCE				

ROADWAY ABBREVIATIONS

ABAN	ABANDON (ED)
ABUT	ABUTMENT
ANG	ANGLE
APPROX	APPROXIMATE
AVG	AVERAGE
AZ	AZIMUTH
BG	BEARING
BC	BEGINNING OF CURVE
BVC	BEGINNING OF VERTICAL CURVE
BLVD	BOULEVARD
BLDG	BUILDING
CNR	CANADIAN NATIONAL RAILWAY
CB	CATCH BASIN
CL	CENTRELINE
COSM	COORDINATE CONTROL SURVEY MONUMENT
CTR	CENTER OF RADIUS
CHKD	CHECKED
CS	CIRCULAR CURVE TO SPIRAL
CS	COMBINED SEWER
CONC	CONCRETE
CC	CONCRETE CURB
C&G	CURB & GUTTER
CI	CURB INLET
CGI	CURB & GUTTER INLET
CS	CURB STOP
CSW	CONCRETE SIDEWALK
COORD	COORDINATE
CMP	CORRUGATED METAL PIPE
CRES	CRESCENT
XSEC	CROSS-SECTION
DEG	DEGREE
DET	DETOUR
DIA	DIAMETER
DIST	DISTANCE
DWG	DRAWING
E	EAST
EPAVT	EDGE OF PAVEMENT
ESH	EDGE OF SHOULDER
ELEV	ELEVATION
PT	END OF CURVE
ENT	ENTRANCE
EXC	EXCAVATION
FEM	FEEDERMAIN
F	FENCE
FM	FORCEMAIN
FDN	FOUNDATION
GV	GAS VALVE
GV	GATE VALVE
GRAN	GRANULAR
NSWL	NORMAL SUMMER WATER LEVEL
HORZ	HORIZONTAL
HYD	HYDRANT
H	HYDRO
HC	HYDRO CABLE
HGP	HYDRO GUY WIRE
HPOLE	HYDRO POLE
INV EL	INVERT ELEVATION
IB	PROPERTY IRON BAR
JUNC	JUNCTION
LDS	LAND DRAINAGE SYSTEM
LDMH	LAND DRAINAGE MANHOLE
LS	LENGTH OF SPIRAL
LS	LIGHT STANDARD
LWL	LOW WATER LEVEL
MH	MANHOLE
NIL	NORMAL ICE LEVEL
N	NORTH
OG	ORIGINAL GROUND
OD	OUTSIDE DIAMETER
OHS	OVERHEAD SIGN STRUCTURE
PAVT	PAVEMENT
PCC	POINT OF COMPOUND CURVE
PI	POINT OF INTERSECTION
PC	POINT ON CURVE
PRC	POINT OF REVERSE CURVE
PRVC	POINT OF REVERSE VERTICAL CURVE
PVC	POINT OF VERTICAL CURVE
PVCC	POINT OF VERTICAL COMPOUND CURVE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENT
PROP	PROPOSED
R	RADIUS
RP	RADIUS POINT
RC	REINFORCED CONCRETE
REV	REVISED/REVISION
ROW	RIGHT-OF-WAY
S	SOUTH
SW	SIDEWALK
SP	SPIRAL
SC	SPIRAL TO CURVE
ST	SPIRAL TO TANGENT
STD	STANDARD
STA	STATION
SRS	STORM RELIEF SEWER
STR	STREET
TAN	TANGENT
TST	TANGENT TO SPIRAL
TEL	TELEPHONE
TS	TRAFFIC SIGNAL
TCS	TRAFFIC SIGNAL CONTROLLER
VAL	VALVE
VERT	VERTICAL
VC	VERTICAL CURVE
WWS	WASTE WATER SEWER
WL	WATER LEVEL
WM	WATERMAIN
WV	WATER VALVE
W	WEST
WP	WORKING POINT

STRUCTURE ABBREVIATIONS

ACP	ASPHALT CONCRETE PAVEMENT
A/F	ACROSS FLATS
ALT.	ALTERNATING
APPROX.	APPROXIMATE
B.O.	BY OTHERS
B/O	BOTTOM OF
BOT.	BOTTOM
B/T	BASE OF RAIL
BRG.	BEARING
B.W.	BOTH WAYS
C.I.P.	CAST-IN-PLACE
C.J.	CONSTRUCTION JOINT
CL	CENTER LINE
C/W	COMPLETE WITH
CONC.	CONCRETE
CONT.	CONTINUOUS
CL	CLEAR
CSP	CORRUGATED STEEL PIPE
DBL	DOUBLE
DIA.	DIAMETER
DTL	DETAIL
DWG.	DRAWINGS
DWL	DOWEL
EACH	EACH
E.E.	EACH END
E.F.	EACH FACE
E.S.	EACH SIDE
E.W.	EACH WAY
EQ.	EQUAL
EQ. SP.	EQUAL SPACING
EL	ELEVATION
EXIST.	EXISTING
EXP. JT.	EXPANSION JOINT
F.F.	FAR FACE
GALV.	GALVANIZED
GRAN.	GRANULAR
GRAO.	HORIZONTAL
IB	IRON BAR
IF.	INSIDE FACE
MRK	MARK
MAX	MAXIMUM
m	METRE
MIN	MINIMUM
mm	MILLIMETRE
N.E.	NORTHEAST
N.F.	NEAR FACE
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
No.	NUMBER
N.W.	NORTHWEST
O/C	ON CENTRE
O/H	OVERHEAD
O/O	OUTSIDE TO OUTSIDE
PL	PLATE
PVC	POLYVINYL CHLORIDE
RAD	RADIUS
REINF	REINFORCEMENT
SC	SAWCUT
SHT	SHEET
SPD	STANDARD PROCTOR DENSITY
S.E.	SOUTHEAST
STA.	STATION
S.W.	SOUTHWEST
T	THICK
TYP.	TYPICAL
T.B.D.	TO BE DETERMINED
T/O	TOP OF
UN	UNLESS NOTED
U.N.O.	UNLESS NOTED OTHERWISE
UIS	UNDERSIDE
V	VERTICAL
W.P.	WORKING POINT
W	WITH

	EXISTING	PROPOSED
CONTOURS		
ELEVATIONS		
BUS STOP		
BUILDING		
ALIGNMENT CONTROL LINE		
ROADWAY LANE LINE		
EDGE OF PAVEMENT WITH BARRIER CURB		
EDGE OF PAVEMENT WITHOUT CURB		
PARAPLEGIC CURB		
EDGE OF SIDEWALK		
PROPERTY LINE		

PROFILE LEGEND

	EXISTING	PROPOSED
PROFILE CENTER LINE/CTL		
PROFILE SOUTH/EAST GUTTER/CTL		
PROFILE NORTH/WEST GUTTER/CTL		
PROFILE SOUTH/EAST MEDIAN GUTTER/CTL		
PROFILE NORTH/WEST MEDIAN GUTTER/CTL		
PROFILE SOUTH/EAST DITCH		
PROFILE NORTH/WEST DITCH		
PROFILE SOUTH/EAST BACK OF SIDEWALK		
PROFILE NORTH/WEST BACK OF SIDEWALK		
PROFILE SOUTH/EAST PROPERTY LINE		
PROFILE NORTH/WEST PROPERTY LINE		
PROFILE SOUTH/EAST DOOR SILL		
PROFILE NORTH/WEST DOOR SILL		
PROFILE SOUTH/EAST PRIVATE SIDEWALK		
PROFILE NORTH/WEST PRIVATE SIDEWALK		

HATCH LEGEND

	TO BE REMOVED	PROPOSED
CONCRETE PAVEMENT/CONCRETE PAVEMENT (WITH ASPHALT OVERLAY)		
CONCRETE SIDEWALK 100 mm (MIN)		
CONCRETE MEDIAN 100 mm (MIN)		
CONCRETE PAVEMENT 150 mm, 200 mm, 230 mm		
ASPHALT PAVEMENT		
ASPHALT OVERLAY		
ASPHALT PLANING		
GRAVEL SURFACE		
SODDING		
INSULATION		

SECTIONS AND DETAILS

	A SECTION NUMBER OR DETAIL LETTER
	B DRAWING WHERE SECTION OR DETAILS IS TAKEN
	C DRAWING WHERE SECTION OR DETAIL IS DRAWN



LOCATION UNDERGROUND STRUCTURES 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 EXIST
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