

## 644-2005 ADDENDUM 4

### KENASTON UNDERPASS PROJECT KENASTON UNDERPASS PUMPING STATION

#### **URGENT**

**PLEASE FORWARD THIS DOCUMENT TO  
WHOEVER IS IN POSSESSION OF THE BID  
OPPORTUNITY**

ISSUED: January 11, 2006  
BY: Tony Raposo  
TELEPHONE NO. (204) 489-5900

**THIS ADDENDUM SHALL BE INCORPORATED  
INTO THE BID OPPORTUNITY AND SHALL  
FORM A PART OF THE CONTRACT  
DOCUMENTS**

Template Version: A20050506

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**Please note the following and attached changes, corrections, additions, deletions, information and/or instructions in connection with the Bid Opportunity, and be governed accordingly. Failure to acknowledge receipt of this Addendum in Paragraph 10 of Form A: Bid may render your Bid non-responsive.**

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#### **PART A – BID SUBMISSION**

Replace: 644-2005 Bid Submission with 644-2005 Addendum 4 - Bid Submission. The following is a summary of changes incorporated in the replacement Bid Submission:

Replace: Form B(R1)

Replace: Form G(2) (R1)

#### **PART D – SUPPLEMENTAL CONDITIONS**

Revise: D15.4 to read: The City intends to award this Contract by January 31, 2006.

Revise: D18.1 to read: The Contractor shall achieve Substantial Performance by August 11, 2006.

Revise: D19.1 to read: The Contractor shall achieve Total Performance by August 25, 2006.

#### **PART E – SPECIFICATIONS**

Add: E6.2.6 to read:

Contractor shall be responsible for snow clearing and snow removal for all access roads to and from the construction site.

Add: E21.3.16 Protection of Feeder mains

- (a) Contractors carrying out repair work or working in the vicinity of the water feeder mains shall ensure that:
- (i) Equipment shall only be permitted to cross the pipes at designated locations. Crossings shall be made perpendicular to the main wherever possible.
  - (ii) Granular material, construction material, soil or other material shall not be stockpiled on the feeder main or within 5 metres of the feeder main centerline.
  - (iii) Construction practices shall not subject the feeder main to asymmetrical loading at any time. Asymmetrical water pressures shall not be permitted to build up on one side of the feeder main.
  - (iv) Construction practices or procedures at or near the feeder main shall not impart excessive vibration loads on the feeder main and/or cause settlement of the subgrade below the feeder main.

- (v) Jack pipelines and casing pipes directly under feedermain to prevent loss of bedding material under the existing pipe. Pre-coring for installation of the pipelines and casings will not be permitted.
  - (vi) Further to CW 2030-R6, only smooth edged excavation buckets, soft excavation or hand excavation shall be used for excavation adjacent to and over the pipelines.
- (b) It is the Contractors' responsibility to ensure that all work crew members understand and observe the requirements of this Specification. Prior to commencement of on-site work, the Contractor's superintendent, foreman and heavy equipment operators shall attend an orientation meeting that will outline restrictions for working on and around the feedermain. Failure to comply with these restrictions will be grounds for removing the offending personnel from the Site.

Revise: E26.2.4 (c) (ii) table to read:

(c)

Sieve Size	Percent Passing
20000	100%
10000	45% - 75%
5000	0% - 15%
2500	0% - 5%

Delete: E26.2.9 Floor Hardener

- (a) Non-metallic floor hardener: premixed abrasion resistant hardener.
- (b) Products shall be as manufactured by Master Builders Co. Ltd. or approved equivalent.

Revise: E26.2.10 (b)

- (b) On colored floors, wax-free curing and sealing compound "Floor Coat" as manufactured by Master Builders Co. Ltd., CPD Acrylic Cure and Seal – Standard, or approved equivalent alternate.

Delete: E26.2.15 Plain Formliner

- (a) Plain formliner shall be Zemdrain by Dupont, or equal as accepted by the Contract Administrator. This formliner shall be used on all exterior exposed formed surfaces.

Revise: E26.2.16 (a)

- (a) Where non-shrink grout is used, it shall be Sika 212 Non-Shrink Grout, CPD Non Shrink Grout, or equal as accepted by the Contract Administrator. The minimum compressive strength of the grout at 28 days shall be 56 MPa.

Revise: E26.2.17 (a)

- (a) Where epoxy grout is used, it shall be Sika Talygrout 100, CPD Cipadite E-500 Epoxy Grout, or equal as accepted by the Contract Administrator.

Delete: E26.4.2 Formliner

- (b) Plain formliner shall be used on all exposed formed surfaces. The installation of the formliner shall be in strict accordance with the manufacturer's recommendations. The supply and use of the plain formliner finish shall be considered incidental to the works of this Specification and no separate payment will be made.

Delete: E26.11.4 (a)

- (a) The Contractor will retain and pay for the services of an independent testing agency for testing as follows:

Revise: E27.5 (a) (ii)

- (a) (ii) Expandable Waterstop: Volclay RX, Concrete Chemicals CS-231 Waterstop, Concrete Chemicals CS-50 Primer, or approved equal.

Revise: E30.7 to read:

- (a) Burned clay brick to CAS A82.1, Type FBX, Grade SW, Size [90 x 390 x 90 mm]. Acceptable product: IXL. Chateau Grey.
- (b) Standard concrete masonry units: to CSA A165 Series:
  - (i) Classification: H/15/A/M standard weight and H/15/C/M lightweight to CSA A165.1-M. Use lightweight units for fire rated partitions.
  - (ii) Size: giant, as indicated.
  - (iii) Special shapes: provide square units for exposed corners. Provide purpose made shapes for lintels and bond beams. Provide additional special shapes as indicated.

Delete: E30.8 (c)

- (c) Colored mortar: ground colored natural aggregates or metallic oxide pigments. Acceptable products: Northern Pigment Extra Strong Mortar Color. Color selected by Contract Administrator.

Revise: E36.8.2 (a) and (b) to read:

- (a) Zinc coated steel sheet prefinished with factory applied polyvinylidene fluoride. Stelco Stelcolor 10000 Series Coil Coating, 22 gauge. Prefinished metal color: Colorite 'Stone Grey'.
- (b) Zinc coated steel sheet prefinished with factory applied high molecular polyester coating. Colorite HMP, 22 gauge. Prefinished metal color: Colorite 'Stone Grey'.

Revise: E40.3.5 (c) to read:

- (c) Mechanical fasteners:
  - (i) For concrete or masonry backup: hot dipped galvanized concrete/masonry anchors. Gripcon Concrete Masonry Fastening System or equal.

Add: E45.2.1 (b) (xii)

- (xii) Doors 02, 03, and 04 to be 900 x 2100.

Revise: E45.4 5) table to read:

5) Doors					
	Door D01	Hardware group 1	HMI		
	Door D02	Hardware group 2	HMI		
	Door D03	Hardware group 3	HM	45 min. f.r.	
	Door D04	Hardware group 4	HM	45 min. f.r.	

Add: E48.7.1 (d)

- (d) Structural Steel Coatings:
  - (i) Shall include all steel components of the crane/craigne support system, and the pipe support braces in the pump well.
  - (ii) Coating System:
    - ◆ Carboline Carboguard 890 Epoxy-2 coats-4.0 to 6.0 mils DFT/coat.
    - ◆ International Paints Interseal 670HS Epoxy-2 coats – 5.0 to 7.0 mils DFT/coat.
    - ◆ Devoe – Bar-Rust 235 Epoxy – 2 coats – 5.0 to 7.0 mils DFT/coat.

Revise: E50.1.2 (a) (ii)

- (a) (ii) Acceptable products: Prosoco Graffiti Control WB, Prosoco Defacer/Eraser Wipe, Fabrikem Fabrishield Paint Repellent PR-60 for precast concrete and PR-61 for clay brick.

Add: E53.2.2 (b) (vi)

- (b) (vi) Steel pipe for the combination air valve air inlet line shall be epoxy coated exterior, unfinished interior.

Add: E54.2.5 (a); (x), (xi) and (xii)

(a) Water Service

- (x) GA Industries Fig. 942, 150 mm combination air valve is an approved alternative.
- (xi) Provide flushing attachments for the combination air valve.
- (xii) Inlet connection and large orifice outlet connection shall be minimum class 120 flanged connection type.

Revise: E55.3.3 to read:

- (e) The Contractor shall coordinate field-testing of the sluice gate with the Contract Administrator. As a minimum, the Contractor shall allow for one (1) working day for testing.
- (f) The Contractor shall provide proof of long term operational testing for similar sluice gates. This testing shall indicate that gates of the same size and construction meet AWWA C-561-04 for allowable leakage after operation of 25,000 cycles. Copy of such test results shall be provided to the Contract Administrator. Long term testing of the sluice gate supplied will not be required.

Revise: E56.2.1 to read:

- (a) The pump system includes three (3) submersible solids handling pumps complete with the following accessories for each pump:
  - (i) Cast Iron Discharge Elbows
  - (ii) Galvanized discharge elbow support frames to be cast into pump well base slab. Co-ordinate installation between trades.
  - (iii) 75mm dia. galvanized guide rails.
  - (iv) Upper guide bar holders and intermediate guide bar holders to mate to 75 mm dia. guide bars. Guide bar holders shall be galvanized steel.
  - (v) Stainless steel anchor bolts to secure discharge elbows to cast in place of support frames.
  - (vi) Pump chain sling, aircraft cable connected to chain sling, and epoxy coated steel grip eye to connect to chain for lifting of pump.
  - (vii) Chain hooks (galvanized).
  - (viii) Level regulator hanger (galvanized).
  - (ix) Level control sway control ring (stainless steel).
  - (x) Pump power and control cable.
  - (xi) Other accessories as detailed on the design drawings.
- (b) The pump system shall be as manufactured by ITT Flygt Canada or approved alternative.

Revise: E56.2.2

- (a) Submersible solids handling pumps shall meet the following service conditions:

<u>Service Condition</u>	<u>Kenaston Pump Station</u>
No. Pumps Required	3
Minimum Pump Efficiency (%)	75
Minimum Solid Size (mm)	100
Maximum acceptable Minimum Submergence level (mm)	840
Maximum Motorspeed (rpm)	880

Maximum Pump Motor Efficiency (%)  
Acceptable Product or Approved Alternative

90  
Flygt CP 3356/665 (Curve 63-810)  
C/w 475 mm Impeller

(b) Individual Pump Design Point shall meet the following requirements:

- i) 357 L/s @ 16.4 m (during 3 pump operation) and 450 L/s @ 12.5 m (during single pump operation)
- (ii) The pump curve shall permit a duty point of 550 L/s @ > 10 m prior to power limiting.

Revise: E56.2.3 (b) (vi) and (vii) to read:

(b) Pump Accessories

- (vi) Pump lifting /guide rail system shall be designed to allow removal of the pump without disturbing the discharge piping. It shall include galvanized intermediate and upper guide bar holders. It shall also include a mechanism to remove the pump from the pump chamber using the electric crane provided, without entry to the wet well. An acceptable product shall be the Flygt Grip Eye System, including 1 meter of stainless steel chain connected to each pump, a stainless steel aircraft cable extending from the end of the chain to the chain hook on the main floor (approximately 11 meters), and an epoxy coated steel grip eye for connection to the hoist hook and pump chain. The lifting system shall be rated for a minimum loading of 2000 Kgs and be in accordance with applicable ASTM or ISO standards.
- (vii) Guide rails, guide bar hangers, level regulator hangers shall be galvanized. Level regulator sway control rings, chain hook, etc. shall be stainless steel.

Add: E56.6.1 (d) Floor Drains

- (d) MIFAB floor drains c/w 127 mm stainless steel strainer and 3M epoxy coated body is an approved alternative.

Add: E56.6.7 (i) Washdown Hose Assembly

- (i) Provide high grade steel hose reel for perpendicular wall mounting. Provide 1200mm long, 19mm dia. hose bib to hose reel. Hose reel to be manual retracting with handle crank, painted, axle bushings, tension spring brake, and interlocking wall plate. Acceptable product: Rapid Reel Model GH-164 PD.

Revise: E56.6.8 (e) Pump Systems

- (e) The City will provide the required flow meter for the project at no cost. The Contractor will be required to coordinate with the City for pickup of the meter, delivery, installation, and related work.

Revise: E58.7.1 to read:

- (a) Install or mount extinguishers in brackets or cabinets.
- (b) One extinguisher to be located immediately right (south side) of Door 03.
- (c) One extinguisher to be located immediately left (north side) of Door 04.

Revise: E84.1(a) to read:

- (a) Provide a system of conduits, boxes, jacks, etc., for the telephone service in the building. Provide entrance as required by the Telephone Utility. Extend the necessary wiring to the telephone sets, system, telephone dialler, telephone modems, etc. Only one (1) telephone line required for City of Winnipeg RTU Panel Modem. Make all necessary connections and test system.

Revise: E86.20 (f) to read:

- (f) Section #6

- (i) Breakers and contactors for the following:
  - ◆ 1 – 40A Breaker, Panel “A”
  - ◆ 1 – 125A 3P Breaker, Panel “H”
  - ◆ 1 – 60A, 3P Breaker, welding receptacle
  - ◆ 2 – 15A, 3P circuit breakers for electrical hoist panel and sluice gate actuator
- (ii) 2 Spaces

Revise: E86.20 (g) to read:

(g) Section #7

- (i) Control section c/w all items indicated on the drawings including:
- (ii) Terminal strips (identified) for all wiring
- (iii) Identification nameplates on all components, interior and exterior
- (iv) Extra flexible wire to door components
- (v) Control relays, OMRON MK3 PN-5S c/w PF-113A-E bases
- (vi) Time delay relays, OMRON H3CA series c/w bases
- (vii) Push-to-test LED type pilot lights, selector switches, push buttons.
- (viii) Ammeters, Crompton series
- (ix) Elapsed time meters
- (x) Alarm buzzer, Sonalert
- (xi) Transient voltage surge suppressor, Leviton # 51020-BM
- (xii) 2000 VA UPS, Prestige EXT series c/w full battery pack
- (xiii) DC power supply, Lambda 120VAC : 28VDC
- (xiv) LED digital indicators, 4-20mA input. LED displays to be of the signal retransmission type to accommodate analog field signal wiring requirements, Precision Digital # PD765-6R2-1.
- (xv) Three (3) analog signal isolators into MCC control section as manufactured by Pribusin No. ITC 22.
- (xvi) Programmable logic controller as specified in these provisions.
- (xvii) MAS 711 Monitoring System for pumps.

Replace: E86.27 Pump Monitoring System

- (a) Provide a pump monitoring system for each pump. System shall protect pump in case of failure and prevent faults from occurring. Shall provide a minimum of 3 signal outputs signifying the degree of criticality when a pump operates outside normal ranges as specified by the pump manufacturer.
- (b) System to include a Base Unit, Pump Memory and Power Analyzer for each pump, and a central Operator Panel.
- (c) Wire, connect and install in accordance with manufacturer's recommendations.
- (d) Confirm Alarm signal set points with Contract Administrator.
- (e) Acceptable Product: Flygt MAS 711 pump monitoring system or approved alternative.

Replace: E90.3 Pumping Station PLC

- (a) Pumping Station PLC system shall be as shown on the drawings and include:
  - (i) Central processing unit (CPU) including power supply
  - (ii) I/O modules: discrete input, discrete output, analog input and analog output
  - (iii) Remote monitoring hardware
  - (iv) All necessary supporting hardware, e.g. PLC backplane, terminal strips, etc.
  - (v) PLC programming
- (b) Environmental conditions
  - (i) Temperature ratings:

- ◆ Storage temperature: -40 to 85°C
  - ◆ Operating temperature: 0 to 60°C
  - (ii) Humidity: 0 to 93% non-condensing
  - (iii) Altitude: 2000 metres full operation
  - (iv) Vibration and shock:
    - ◆ Shock (half sine wave):  $\nabla$ 15g peak, 11 msec, 3 pulses/axis
    - ◆ Vibration: 10 to 57 Hz @ 0.075 mm d.a 57 to 150 Hz @ 1G
    - ◆ Free fall: 1m
  - (v) RFI and EMF Protection:
    - ◆ RFI/EMF susceptibility: 27 to 500 Mhz: 10 V/m
    - ◆ Electrostatic discharge: 8 kV/ 4 kV contact
    - ◆ Surge withstand: IEC 801-5 2000 V, shield to ground
- (c) Central Processing Unit (CPU):
- (i) General:
    - ◆ The CPU shall consist of rack-mounted sub-assemblies (modules) which solve application logic, store the application program, store numerical values related to the logic, and interface to the I/O modules.
    - ◆ The CPU shall provide local diagnostic information via LED indicators and relay contact outputs. All indicators shall be marked as to its respective function.
    - ◆ A dry contact shall provide for remote PLC failure alarm indication. The CPU shall come complete with all necessary software to provide for this alarm function.
    - ◆ Power back-up for one year via lithium battery.
  - (ii) Communication Networking:
    - ◆ One Modbus interface port for connection via twisted pair. Data transfer communication rate shall be 19200 bits/sec.
    - ◆ One Modbus+ interface port for high performance peer-to-peer communication and high speed data acquisition applications via twisted pair (Belden 9841). Data transfer communication rate shall be 106 bits/sec.
  - (iii) Program Storage:
    - ◆ 8K words of program memory.
    - ◆ PLC program storage medium shall be solid state RAM. RAM memory shall have battery back-up capability of retaining all stored program data through a continuous power outage for 12 months under worst case conditions. Capability shall exist to remove battery from RAM module without interrupting system power.
    - ◆ Removable EEPROM card for non-volatile RAM memory back-up (loads on power-up) and program portability.
    - ◆ Total 256K of memory
    - ◆ 0.3ms/k to 1.4ms/k scan time.
    - ◆ Time-of-day clock.
    - ◆ Watchdog timer.
  - (iv) Programming Technique:
    - ◆ The programming format shall be traditional relay ladder logic/function block.
  - (v) Acceptable manufacturer shall be Modicon TSX Quantum Automation Series Model No. 140 CPU 113 02.
- (d) Input/Output (I/O) Modules:
- (i) General:
    - ◆ All I/O inputs shall be individually fused.

- ◆ All I/O modules shall be of the rack-mounted plug-in type modular design. Each I/O module shall be keyed to prevent module insertion into the wrong rack slot.
  - ◆ LED indicators adjacent to each I/O point, along with identification label.
  - ◆ All user wiring to the I/O modules shall be through a heavy duty terminal strip. Removable, push-in type terminal strip shall allow for module replacement without disturbing field wiring. Pressure type screw terminals shall be used to provide fast, secure wire connections.
  - ◆ Malfunction of an I/O module shall not affect the operation of the remaining I/O modules or the CPU.
  - ◆ CPU shall retain status of all I/O points of a failed I/O module.
  - ◆ Isolation shall be provided between all internal logic and external power circuits. Isolation shall meet minimum specification of 1500V RMS.
- (ii) Discrete Inputs:
- ◆ No. of modules: As required
  - ◆ Description: 115 VAC Isolated Input Module
  - ◆ Number of points: 16
  - ◆ Operating voltage: 79-132VAC @ 60Hz
  - ◆ Points per group: Isolated
  - ◆ Acceptable manufacturer shall be Modicon Model No. 140 DAI 540 00.
- (iii) Discrete Outputs:
- ◆ No. of modules: As required
  - ◆ Description: Relay (NO) Output Module
  - ◆ Number of points: As required
  - ◆ Operating voltage: 115 VAC
  - ◆ Points per group: Isolated
  - ◆ Max. current/pt.: 2 Amp, Resistive
  - ◆ Acceptable manufacturer shall be Modicon Model No. 140 DRA 840 00.
- (iv) Analog Input:
- ◆ No. of modules: As required
  - ◆ Description: Analog Input Module (Uni-Polar)
  - ◆ No. of channels: 8
  - ◆ Operating current: 4 to 20 maDC
  - ◆ Isolation: 1000 VAC Channel to Bus
  - ◆ Accuracy: 0.05% of full scale current
  - ◆ Acceptable manufacturer shall be Modicon Model No. 140 ACI 030 00
- (v) Analog Output:
- ◆ No. of modules: As required
  - ◆ Description: Analog Output Module (Uni-Polar)
  - ◆ No. of channels: 4
  - ◆ Operating current: 4 to 20 maDC
  - ◆ Isolation: 2500 VDC Channel to Bus
  - ◆ Accuracy: 0.2% of full scale current
  - ◆ Acceptable manufacturer shall be Modicon Model No. 140 ACO 020 00.
- (e) Remote Communication Hardware:
- (i) Communication interface module, single cable as manufactured by Modicon Model No. 140 NOE 771 00.
  - (ii) External telephone modem c/w all necessary cables.



- (f) Accessories:
  - (i) One 16 slot mounting backplane shall house the CPU, AC power supply, discrete input, discrete output, analog input, and analog output modules as required. Acceptable manufacturer shall be Modicon Model No. 140 XBP 016 00.
  - (ii) Analog modules require separate terminal strips as manufactured by Modicon Model No. 140 XTS 002 00

Revise: E91.4 (g) to read:

- (g) One level sensing transducer complete with built-in temperature compensation and submersible transducer shield. Remotely mount transducers to underside of slab above respective chambers as indicated on drawings. Supply necessary length of transducer cable between transducer and panel mounted transmitter.

Revise: E92 to read:

## E92. BRIDGE CRANE

### E92.1 Scope of Work

- (a) This section covers the supply, installation and testing of the complete bridge crane system located in the Pump Station in accordance with the Canadian Electrical Code and CSA S-B167 and Z256 "Safety Code for Material Hoists". The supply and installation of the rail beams and support structure as well as supervision of rails' installation shall be included in this section.
- (b) The drawings indicate the general arrangement of the crane and hoists. The Contractor shall provide all necessary appurtenances and incidentals required for operating the crane and hoists in accordance with the specifications and in accordance with national and local governing codes of the safety standards for cranes, as published by ASME.
- (c) This section shall also include for placing the hoists in service and for making all necessary adjustments and corrections required for proper operation to the satisfaction of the Project Administrator.
- (d) The crane and hoist systems shall be the product of a company regularly engaged in the manufacture of this type of equipment and whose equipment is of a design, which has been in satisfactory service under similar conditions for not less than five years.
- (e) Supplementary steel where used to provide support for suspension hardware from building structures other than those shown on the drawings shall conform to the specifications under E35 – Structural Steel.
- (f) The electric power feeder cables and disconnect switches are specified under Division 16 - Electrical, and connections shall be made by the electrical trade, as directed by the manufacturer of the crane and hoisting equipment.
- (g) Conform to Division 1 - General Requirements.

### E92.2 Submittals

- (a) The Contractor shall submit shop drawings and information of the travelling crane system as follows:
  - (i) Assembly drawings and materials list.
  - (ii) Design of structural steel connections submitted under the seal of a structural engineer registered in the province of Manitoba.
  - (iii) Details of all parts and principal dimensions.
  - (iv) Details of the electrical trolleys and hoists, the electrical connections and power requirements.
  - (v) Submit installation manuals before shipment of any equipment.
  - (vi) Submit operation and maintenance manuals 30 days prior to startup.

### E92.3 Electrical Requirements

- (a) All power supply shall be 575 V, 3 phase, 60 Hz alternating current.

(b) Supply and install all necessary wiring to connect all parts of the equipment to the junction boxes installed by the electrical trade. All wiring shall be installed in accordance with the Canadian Electrical Code.

(c) All controls from hoists, trolleys, etc. where electrified shall be of the pendant push-button type and shall operate on 110 V, single phase, 60 Hz power. The pendant shall be suspended from the hoist trolleys.

#### E92.4 Description

- (a) The crane shall be single girder, dual drive, top running, overhead electric travelling crane complete with electric hoist and electric trolley as manufactured by Columbus McKinnon or approved alternate.
- (b) The hoist unit shall be Columbus McKinnon "Lodestar" or approved alternate.
- (c) Crane beams and support structure shall be as specified in section S35 Structural Steel.
- (d) Provide bridge crane as described briefly:

#### Capacities:

Bridge	2 Tonnes
Hoist	2 Tonnes
Span:	9 m (approx)
Runway Length:	11 m (approx)
Maximum Lift:	13 m
Hoisting Speeds: (2-speed)	1.5 m/min and 4.9 m/min
Trolley Speed: (1-speed)	9.1 m/min
Bridge Speed: (1-speed)	15.2 m/min

#### E92.5 Bridge

- (a) The girder shall be as shown on the drawings.
- (b) End trucks shall be of a heavy steel construction, reinforced for axles and welded together with diaphragms and end plates to form a rigid one-piece unit. The end truck and plates shall form rail sweeps and be provided with hard rubber bumpers as required by CMAA Specification No. 74.
- (c) End trucks shall be bolted to girders. High tensile and fitted bolts shall be used to assure permanent alignment. Heavy seat plates and gusset plates shall be welded to the girders to ensure a rigid connection. Each end truck shall be angle braced to girder for additional lateral rigidity.
- (d) The standard truck to meet the CMAA span to wheelbase ratio limit of 8 to 1. Wheels to be 8" diameter of high strength ductile iron, with a hardness of 220 BNH.
- (e) Wheel Bearings to be lifetime lubricated precision ball bearings and shall provide a minimum of 5000 hours performance in accordance with CMAA Specification No. 74.
- (f) Each end truck shall be equipped with its own separate drive unit fixed directly on the side by a flanged mounting. The drive wheels are powered by spur gears on a secondary shaft. All wheels shall be aligned in a uniaxial direction by optical equipment. Each drive unit shall be powered by a dual speed electric motor.
- (g) Four rubber bumpers shall be provided to mate with the runway end stops.

#### E92.6 Load Chain

- (a) Load chain to be thru and case hardened steel.
- (b) Load chain shall be proof tested to twice the working load limit.
- (c) Provide metal chain container to suit.

#### E92.7 Brakes

- (a) The hoist motor shall be provided with an electrically operated and controlled brake so arranged as to become automatically applied in case of power failure. It shall be arranged to release automatically upon the application of power to the motor. The brakes shall be so constructed that the motor must reverse to lower the load.
- (b) The bridge and trolley drive shall be provided with a magnetically operated friction brake. The magnet shall release the brake when the bridge or trolley is in motion. A drifting interval shall be provided between motor and brake operation.
- (c) The friction brakes shall be sufficiently powerful to bring the bridge or trolley and carried load to rest without reversing the motor and shall be adjustable.
- (d) End truck wheels shall be steel castings, turned to equal diameter and contoured to fit the rail track provided under this Section.

#### E92.8 Hoist Trolley

- (a) Provide "Series 635 Lodestar" motor driven trolley or approved equal. The trolley is to be produced and manufactured to ASME B30.11 specification.
- (b) The trolley shall be a four-wheel unit or combinations of two wheel units with load bars or frames from which carrier, and hoist are hung and moved along the tracks. They shall be of a design to suit the type of track furnished and may have flat tread or flanged wheels.
- (c) Load bars or special frames shall be cradled in the trolley yokes on swivel pins with thrust bearings for the maximum load. The load bars and special frames hung from the trolley yokes shall be of all steel or forged steel construction. Other design and construction features of wheels, bearings and their lubrication shall comply with the current Standard Specifications for steel railway bridges, serial designation S1, of the Canadian Standards Association.
- (d) The trolley drive shall be an integral part of the hoist. At least one wheel on each side of the track shall be driven. The drive shall be electric driven.
- (e) Trolleys shall be driven by a reversible single speed motor either through a gearhead on the motor or a separate gear train. Gears shall be of steel and shafts shall be fitted with anti-friction bearings. The drive shall have an integral brake.
- (f) All bearings to be lifetime lubricated.
- (g) Four (4) rubber bumpers shall be provided to mate with the bridge end stops.

#### E92.9 Hoist

- (a) The hoist shall be of the highest standard designed for equipment of this type. The hoist shall be dual speeds, electrically operated and shall be electric motor powered. It shall have a hoisting capacity as specified in this section.
- (b) Hoist shall meet ASME B30.16 and CSA specifications.
- (c) Hoist to have metric rating.
- (d) Hoist to have true vertical lift.
- (e) Provide 4 pocket, heat treated lift wheel.
- (f) The hoist shall have cast aluminum housing and end covers.
- (g) All bearings to be lifetime lubricated.
- (h) Hoist to have an H4 Duty Cycle (30min/hr runtime – 300 start-stop per hour).
- (i) The hoist and trolley shall be integrally constructed and shall be a low-head type of capacity specified to suit the elevations shown on drawings.
- (j) Hoist overload switches shall be provided.
- (k) Each hoist and chain shall be load tested to 125% capacity and test certificates provided to the Contract Administrator.

E92.10 Hook Block

- (a) The hook block shall be of the swivel type carrying a heavy forged steel hook. The hook shall swivel on ball bearings of ample capacity, and include a safety latch.

E92.11 Electrical

E92.11.1 Motors and Brakes

- (e) Drive motor to be ½ horsepower, NEMA design 30 minute rated TENV with Class “F” insulation squirrel cage motor. The motor to be provided with thermal overload protection as standard, C-faced mounted to the gear reducer. 575 volt, 3 phase, 60 Hz motor is to be provided. H4 (30min/hr runtime – 300 start-stop per hour) minimum duty factor.
- (f) All motors shall be supplied with a disc brake to ensure minimal impact to the drive train. Hoist brakes shall be provided a minimum of 250% full-load motor torque braking. The bridge brakes shall be provided a minimum of 150% full-load motor torque braking and on the trolley motor.
- (g) Each motor to have a separate starter mounted in the control panel.

E92.11.2 Controls

- (h) The controls shall consist of all necessary electrical contactors, relay, transformers and fuses in EEMAC 12 electrical enclosure.
- (i) Control circuit shall be 120V.
- (j) The control unit for each crane shall consist of a contactor for each speed variation, a reversing contactor and overload protection. Overload protection shall be of the automatic reset type.
- (k) A main line magnetic contactor shall be included and operated from the push-button station. A main line safety disconnect switch, manually controlled, shall also be included.
- (l) A load switch limiting the capacity of the hoist shall be an integral part of the hoist control system.

E92.11.3 Push-Button Station

- (m) The push-button station shall be festooned across the bridge on an independent trolley track.
- (n) The push-button station shall have an industrial dust tight enclosure CSA Type 12 and have buttons for the following:
  - Stop- reset
  - Bridge, Forward - Reverse
  - Trolley, Forward - Reverse
  - Hoist, Low Speed - High Speed - Up-Down

E92.11.4 Conductors

- (o) Main conductors shall consist of duct-o-bar, Figure 8, 110 amp, galvanized steel conductor, complete with insulated hanger clamps, steel mounting brackets and end caps.
- (p) Cross conductors shall be festooned across the bridge on an independent trolley track.

E92.12 Rails

- (a) The contractor is responsible to provide rails and accessories, in addition to that shown on the drawing, as required for the operation of the crane system.

E92.13 Painting

- (a) The crane assembly shall receive one shop coat of high visibility yellow epoxy paint. Refer to Section E-48 for paint requirements.
- (b) All exposed surfaces of crane to be painted after installation.

E92.14 Installation

- (a) Before leaving the factory the crane and hoist shall be tested under all motions.

- (b) Install the equipment described above in accordance with the drawings and with strict adherence to the manufacturer's instructions.
- (c) Ensure that the crane rails are perfectly horizontal, correctly aligned, and properly fastened to the supporting structures. Install the travel limit stops on each end of rails.
- (d) Lubricate all necessary points on the bridge hoist, draw block and the trolleys using the manufacturer's recommended lubricates.

Add: E94 TRAFFIC BARRIERS AND SECURITY FENCE

E94. TRAFFIC BARRIERS AND SECURITY FENCE

E94.1 General

- (a) This specification covers the supply and installation of traffic barriers, and security fence.

E94.2 Products

- (a) The City of Winnipeg will supply Triton Barriers for use by the Contractor. The Contractor can pick up barriers, load and deliver to the site from the City of Winnipeg Bridge yard. Contractor to contact Mike Terleski at phone no. 794-8510 to obtain location and formal permission to utilize the barriers. Contractor shall be responsible for all operations involved in the installation (as provided by Mike Terleski), maintenance during contract, removals, and delivery to City of Winnipeg Bridge Yard after the work is done.
- (b) Provisional item has been included in Form B: Prices, for the supply and installation of Precast Concrete Barriers. Precast Concrete Barriers may be installed upon the review of pricing by the City of Winnipeg. Upon notification by the Contract Administrator, the Contractor shall supply and install Precast Concrete Barriers, including pins, in accordance with Drawing CW – 315 contained within the Specifications. Contractor shall be responsible for all maintenance during contract, removals, and delivery to the City of Winnipeg Bridge Yard after the work is complete.

E94.3 Execution

- (h) The Contractor shall be responsible for loading (at the City Yard), hauling and unloading, placing, as well as storing of the traffic barriers once they have been received. The Contractor shall supply all necessary equipment for loading, hauling, unloading and storing of the barriers.
- (i) The Contractor shall be responsible for the securing and replacement of the traffic barriers should they be lost, stolen or damaged after they have been received for the duration of the Contract.
- (j) Traffic barriers shall be installed at locations shown on the Drawings. The barriers shall be properly aligned, pinned together and seated firmly to the satisfaction of the Contract Administrator. Granular base course material shall be used as bedding for the barriers in areas designated by the Contract Administrator. Dimensions, material specifications, and thicknesses of granular base course shall be determined by the Contract Administrator.
- (k) Work site security fence shall be placed as indicated on the Drawings. Security fence shall be chainlink or other type as approved by the Contract Administrator. The fence shall have one (1) lockable chainlink gate, which shall serve as the only access point to the site. The Contractor shall be responsible for supplying, installing, maintaining, and removing the worksite construction security fence.

E94.4 Measurement and Payment

- (a) Installation of City supplied Triton Barriers shall be incidental. All costs associated with hauling, delivery to Site, installation, maintenance, and removals shall be included in the unit price bid for Site Works.
- (b) Supply and Installation of Traffic Barriers
  - (i) Supply and installation of New Precast Concrete Barriers will be measured on a length basis and paid for at the Contract Unit Price per metre for the "Item of Work" listed below. The length to be paid for will be the total number of metres of barrier supplied, loaded, hauled and installed in accordance with this specification, accepted and measured by the Contract Administrator.  
Items of Work:
    - ◆ Supply New Precast Concrete Barriers

◆ Install New Precast Concrete Barriers

(c) Supply and Installation of Work Site security fence shall be incidental. All costs associated with the supply and installation of security fence shall be included in the unit price bid for Site Works

**DRAWINGS**

Replace: 644-2005\_Drawing\_P-3258-146\_-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-146-R3  
644-2005\_Drawing\_05699-R1 with 644-2005\_Addendum\_4-Drawing\_05699\_Sht3-R2  
644-2005\_Drawing\_P-3258-148-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-148\_Sht4-R3  
644-2005\_Drawing\_P-3258-151-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-151\_Sht7-R3  
644-2005\_Drawing\_P-3258-152-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-152\_Sht8-R3  
644-2005\_Drawing\_P-3258-153-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-153\_Sht9-R3  
644-2005\_Drawing\_P-3258-164-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-164\_Sht20-R3  
644-2005\_Drawing\_P-3258-166-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-166\_Sht22-R3  
644-2005\_Drawing\_P-3258-167-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-167\_Sht23-R3  
644-2005\_Drawing\_P-3258-168-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-168\_Sht24-R3  
644-2005\_Drawing\_P-3258-169-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-169\_Sht25-R3  
644-2005\_Drawing\_P-3258-170-R2 with 644-2005\_Addendum\_4-Drawing\_P-3258-170\_Sht26-R3