Part 1 General

1.1 DEFINITIONS

.1 Emergency Repairs: Any activity required to bring the temporary traffic signal system to full functionality in accordance with the specifications other than Routine Maintenance activities.

.2 Equipment: All electrical or mechanical devices and vehicles used or reasonably required for use in emergency repairs or routine maintenance and operation of the temporary traffic signal system.

.3 Routine Maintenance: Ongoing preventive maintenance activities in accordance with the manufacturer's recommendations and in accordance with the Ministry of Transportation Ontario, Electrical Engineering Manual, Volume 2, Electrical Maintenance, and includes the periodic adjustment of the temporary traffic signal system components to correct deviations from the system specifications resulting from normal operation of the system.

.4 Non-Routine Maintenance: Any activity required to repair unexpected failure of system components. It requires immediate action and takes precedence over routine maintenance activities for the duration of the emergency. Non-Routine maintenance includes all emergency maintenance activities.

.5 System Components: All hardware and software components, devices, parts and materials included in the temporary traffic signal system supplied and installed by the Contractor.

1.2 OPERATIONAL CONSTRAINTS (TRAFFIC CONTROL)

.1 Follow all operational constraints established by the Ministry of Transportation Ontario for traffic control when operating the temporary traffic signal system, and/or when performing routine maintenance and emergency repairs.

.2 Should lane closures be required during emergency repairs, they are to be carried out in accordance with the Ontario Traffic Manual (OTM), Book 7 - Temporary Conditions, and appropriate police authority.

1.3 QUALITY CONTROL

.1 Each time emergency repair work is performed, test and inspect the temporary traffic signal system and ensure that it has been restored to full functionality in accordance with the requirements of the contract.

1.4 QUALITY ASSURANCE

.1 The Departmental Representative may make random inspection of the work.

Part 2 Products

2.1 USED MATERIALS

.1 Used materials, except cables and lamps, may be used in the maintenance and operation of temporary installations provided that:

.1 All material components or completed assemblies of components have CSA or UL approval;

.2 The material is approved for use in the Province of Ontario Construction Projects.

.3 It complies with the applicable requirements for Special Approval by the Electrical Safety Authority;

.4 It complies with the requirements of the contract;

.5 and it is in good condition.

2.2 STOCKING OF COMPONENTS

.1 Stock spare components suitable for the emergency and routine maintenance of the installation. These spare components are to be kept on hand for the repair of traffic signal equipment. As a minimum, stocking of traffic signal components to be in accordance with the MTO Electrical Engineering Manual, Volume 2, Electrical Maintenance.

Part 3 Execution

3.1 MAINTENANCE AND OPERATION

.1 Take responsibility for contacting, negotiating, obtaining permits, and taking all other actions required to ensure the connection of the temporary traffic signal system to the Power Authority supply lines.

.2 Take responsibility for supplying, or ensuring the supply of, all the necessary labour, materials and services to effect the connection of the temporary traffic signal system to the Power Authority supply lines.

.3 Without limiting the foregoing, take responsibility for effecting, and paying for all of the following: (a) connection of the temporary traffic signal system to the Power Authority supply lines and energy cost; (b) permits and all permit and service fees; (c) materials and labour.

.4 Take responsibility for installing the revised traffic signal interval timing into the traffic signal controller upon direction from the Departmental Representative up to a maximum of four (4) times. Set up the traffic signal controller by performing all programming, setting all timing controls and switch settings, and setting any other controller operational parameters obtained from the Departmental Representative. Take responsibility for verifying to his own satisfaction, that the revised signal timing is consistent and complete.

.5 At any time during the contract, the Departmental Representative reserves the right to review the timing and operations of the temporary traffic signal system and the

Contractor is to implement any changes to the operation settings and timings requested by the Departmental Representative. Do not make any changes to the timing controls, switch settings, or change any operational parameters with respect to the traffic signal unless instructed to do so by the Departmental Representative.

.6 Maintain all temporary traffic signal system components in good working condition in accordance with the contract specifications and provide all Routine Maintenance and Emergency Repairs required to fulfill this obligation. In particular, and without limiting the foregoing, provide routine and non-routine maintenance service during winter shut down and provide such according to the Ministry of Transportation of Ontario Electrical Engineering Manual, Volume 2, Electrical Maintenance.

.7 Provide on-call local emergency repair service and such service is to be available 24 hours a day 7 days a week for the duration of the contract. Emergency Repairs will be required whenever there is a failure or cessation of the operation of any component or components of the temporary traffic signal system.

.8 Routine Maintenance is to include adjustments of the temporary traffic signal system equipment as detailed in the Ministry of Transportation Ontario Electrical Engineering Manual, Volume 2, Electrical Maintenance.

3.2 RESPONSE, NOTIFICATION AND RESTORATION

.1 Clearly identify in writing the designated contact person and alternate for liaison with the Departmental Representative who will also designate representatives and alternates as contact persons for Canada.

.2 Respond to any Emergency Repair calls in accordance with the Ministry of Transportation, Ontario Electrical Engineering Manual, Volume 2, Electrical Maintenance. Maintain a log book, to be kept in the Traffic Signal Field Cabinet. The log book is to record any field work performed on the temporary traffic signal system including the replacement of any hardware, any changes to the software, or any changes to the configuration, phasing or timing parameters. The time and date of each entry in the log book is to be recorded and the entry signed by the individual making the entry. The time taken to reach the site of the malfunction and commence repairs following notification of a need for emergency repairs is to be in accordance with the MTO, Electrical Engineering Manual, Volume 2, Electrical Maintenance.

3.3 TRAFFIC SIGNAL CONTROL PROGRAMMING AND TIMING

.1 Take responsibility for ensuring that all controller and conflict monitor programming is installed, and responsibility for the setting of all timing controls, switches and programming controls. Take responsibility for installing the traffic signal timing into the traffic signal controller as indicated in the timing sheet. Take responsibility for verifying that the signal timing is consistent and complete. The inspection, testing and test results are to be witnessed and certified by the Quality Verification Engineer. The Contractor's Quality Verification Engineer to witness and certify that the work has been inspected and tested, and that the material and installation comply with the requirements of the contract.

.2 The traffic controller assembly to provide a minimum of four (4) Phases, complete with the respective backboard and to be wired to support the phase assignment as shown on the timing sheet.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 34 71 16 Impact Attenuating Devices

1.2 REFERENCES

.1 Ministère des Transports du Québec

.1 Tome VII, Matériaux, Collection des Normes et ouvrages routiers du ministère des Transports du Québec, Québec, MTQ.

.2 Cahier des charges et devis généraux, Infrastructures routières-construction et reparation, Edition 2013, Québec, MTQ

.3 Ontario Provincial Standard Specification (OPSS)

.1 Volume 2, Material Specifications

.4 Ontario Provincial Standard Detail (OPSD)

.1 OPSD 911.140 Precast I-Lock Connection, Installation Temporary.

.5 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.2-98, Boiled Linseed Oil.

.2 CAN/CGSB-3.3-2007, Kerosene.

.6 Canadian Standards Association:

.1 CSA G164-M1981 - Hot Dip Galvanizing of Irregularly Shaped Articles

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for physical size, finish and limitations of the product to be installed.

.3 Samples:

.1 Notify Departmental Representative at least 4 weeks prior to commencing Work of proposed sources of materials.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store and protect concrete barriers from damage.

.2 Store precast concrete units in single layer.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Material and equipment is to meet or exceed provincial standards using materials that are approved for use in Ministry of Transportation Ontario (MTO) or Ministère des Transports du Québec (MTQ) construction projects. Demonstrate in writing that each product meets or exceeds provincial requirements.

.2 External connectors:

.1 Steel: as indicated in OPSD 911.140.

.2 Galvanizing: to CSA G-164, minimum zinc coating 0.61 kg^2

.3 The concrete mix design for all concrete barriers to be the responsibility of the Contractor. The following specific requirements to apply:

.1 Class of Concrete to be 30 MPa at 28 days

.2 Coarse Aggregate to be 19.0mm nominal maximum size

.3 Maximum Slump to be 60mm

.4 Air Content to be 6% ± 1.5%

Part 3 Execution

3.1 CONSTRUCTION

.1 All new temporary vehicle concrete barriers supplied and installed to remain in place until completion of the contract.

.2 Precast concrete barriers to be constructed as per OPSD 911.140 I-Lock Connection Temporary Barrier and placed as indicated.

.3 Precast I-Lock Connection Temporary Barrier units:

.1 Cast lifting devices into units.

.2 Provide minimum 50 mm cover over reinforcement.

.3 Use only inverted steel forms.

.4 Concrete to be without surface defects to approval of Departmental Representative.

.1 Re-finishing is not permitted.

.5 Place concrete barrier units and make connections as indicated. Ensure alignment is smooth with no visible deviations.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 00.06 Special Procedures for Traffic Control

.2 Section 10 14 53 Temporary Traffic Signage

.3 Section 32 12 16 Asphalt Paving

.4 Section 32 11 23 Aggregate Base Courses

1.2 REFERENCES

.1 Ontario Provincial Standard specification, Ontario Ministry of Transportation

- .1 OPSS 1001, November 2005, Material Specification for Aggregates - General
- .2 OPSS 723, November 2011, Construction Specification for Energy Attenuators

.2 Ontario Provincial Standard Detail (OPSD)

- .1 OPSD 923.180 November 2011, Energy Attenuator, Crash Cushion Quad-guard System Installation - Temporary Unidirectional

.3 Ministère des Transports du Québec

- .1 Cahier des charges et devis généraux, Infrastructures routières-Construction et réparation, Édition 2012, Québec, MTQ.
- .2 Tome V, Signalisation Routière, Collection des Normes et ouvrages routiers du ministère des Transports du Québec, Québec, MTQ.
- .3 Tome VII, Materiaux, Collection des Normes et ouvrages routiers du ministère des Transports du Québec, Québec, MTQ.

.4 Ministry of Transportation, Ontario (MTO)

- .1 Ontario Traffic Manual, Book 6: Warning Devices
- .2 Ontario Traffic Manual, Book 7: Temporary Conditions .

.5 Canadian Standards Association (CSA International)

- .1 CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CAN/CSA A23.5 Supplementary Cementing Materials
- .3 CSA A5 Portland Cement

.6 American Society for Testing and Materials International (ASTM)

- .1 ASTM A123/A 123M-09 Zinc (Hot Dip Galvanized) Coatings or Iron and Steel Products
- .2 ASTM A325-10 Structural Bolts, Steel Heat Treated, 120/105 ksi Minimum Tensile Strength
- .3 ASTM A780-09 Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings.
- .4 ASTM D4956-11a Retroreflective Sheeting for Traffic Control

.5 ASTM C494 Chemical Admixture For Concrete

.6 ASTM C309 Liquid Membrane Forming Compounds for Curing

1.3 ACTION CAN/CGSB AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for Impact Attenuating Devices and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer licensed in the Provinces of Ontario and Quebec, Canada.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground and in accordance with manufacturer's recommendations in clean area.

.2 Store and protect materials from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Material and equipment is to meet or exceed provincial standards using materials that are approved for use in Ministry of Transportation Ontario (MTO) or Ministere des Transports du Quebec (MTQ) construction projects. Demonstrate in writing that each product meets or exceeds provincial requirements.

.2 Asphalt:

.1 Asphalt to Section 32 12 16 - Asphalt Paving.

.3 Granular:

.1 Granular to Section 32 17 23- Aggregate Base Courses.

.4 Anchor Bolts:

.1 Anchor bolts supplied and installed to recommendations of energy attenuator manufacturer.

.5 Bolts for Connection of Attenuator system to concrete Barrier:

.1 Bolts to connect the attenuator system to the concrete barrier to be to ASTM A 325 and hot dip galvanized to ASTM A 123.

.6 Flexible Delineator Posts:

.1 Orange flexible delineator post to OPSS 2012 with a length of 915mm measured above the fixed base.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections are acceptable for installation of attenuator are in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Temporary energy attenuators to be installed to manufacturer’s written instructions. Existing or new 150 mm minimum thick asphalt over 150 mm minimum thick compacted granular base may be used to support the energy attenuator. The asphalt to extend a minimum of 500 mm beyond the anchor bolts.

.2 Place Asphalt in accordance with section 32 12 16 - Asphalt Paving.

.3 Granular base below asphalt pad to be a minimum depth of 150mm of new or existing Granular A.

.4 Energy attenuators not to be installed on surfaces with crossfall greater than 6%.

.5 Touch up damage to galvanized finish by wire brushing loose and cracked finish.

.1 Apply 2 coats of organic zinc-rich coating to damaged areas.

.2 Pre-treat damaged surfaces according to manufacturer's instructions for zinc-rich coating.

.6 Clean shop primed steel surfaces scratched during installation and touch up with primer.

.7 Apply paint when relative humidity is less than 85% and when ambient temperature is above 5 degrees C.

3.3 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by attenuator installation.

END OF SECTION