

**PART E**  
**SPECIFICATIONS**

## PART E - SPECIFICATIONS

### GENERAL

#### E1. GENERAL

- E1.1 These Specifications shall apply to the Work.
- E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing</u>
ST-150	Mounting Plate for Audible Signals Controller

#### E2. GOODS

- E2.1 The Contractor shall supply and deliver a audible pedestrian signal in accordance with the requirements hereinafter specified.
- E2.2 This specification is based and expands upon the standards prescribed by the Manual on Uniform Traffic Control Devices for Canada [Chapter A6.10 dated September, 1998]. It is not intended to impose restrictions upon design or materials, which conform to the AASHTO, ASTM, ITE, or IMSA Standards. All AASHTO, ASTM, ITE or IMSA standards not mentioned in this specification shall still apply.
- E2.3 The Audible Pedestrian Signal device shall be an "**Internal**" style device, (i.e. bare board or module intended for mounting onto a City of Winnipeg standard mounting plate - Drawing No. ST-150), within a controller cabinet, a 300mm (12-inch) square pedestrian signal head or similar enclosure and shall be designed to drive two or more series-connected, externally-mounted "standard" City speakers described in clause E3.9. Each audible pedestrian signal device shall be supplied complete with a microphone and associated wiring to provide for ambient noise compensated sound output levels as detailed per clause E3.8. Physical dimensions and characteristics of the device are contained in clause E4.2
- E2.4 The City of Winnipeg shall install audible pedestrian signal devices and the (vendor-supplied) ambient noise compensation microphone. The City shall install the audible pedestrian signal module using a standard mounting plate (Drawing ST-150). The City shall furnish, install and connect to each audible pedestrian signal device the appropriate associated push-button(s) inputs, the standard output speakers to generate all specified output sounds clause E3.9 and the "Walk" and "Don't Walk" pedestrian signal field wiring connections.
- E2.5 The audible pedestrian signal device(s) either automatically or (as a selectable option) via push-button command, shall issue one of two selectable "Bird Call" sounds during the "Walk" interval or a portion thereof, to indicate the appropriate interval for people to begin to cross a street. Preferably the same device can be programmed to issue one of two "Auxiliary" sounds during "Walk" to handle more complex intersection designs and/or signal phasing.
- E2.6 The volume of the "Bird Call" (or "Auxiliary") sounds shall be variable, adjustable and ambient-noise compensated for minimal neighbourhood disturbance clause E3.8.
- E2.7 The device(s), when controlled by push-buttons, shall issue a very low-volume "Locator Sound" to alert pedestrians of the presence of audible pedestrian signal devices, and to help visually-impaired people locate the appropriate push-button. The device(s) shall provide audible feedback "Confirmation Clicks" - one "button click" issued immediately upon every activation of a push-button, and also a second "extended call confirmation click" shall be issued only after a

continuous push-button press has been sustained for a specified minimum interval of several seconds, sufficient to register demand for the appropriate "Bird Call" sound clause E3.9.

- E2.8 The device(s) shall become silent and all sounds deactivated when the associated visual pedestrian signals are dark, such as during flashing operation of the traffic control signal.
- E2.9 The City of Winnipeg standard speaker for the audible pedestrian signal devices is the Atlas Soundolier Model VT-158U. This speaker has 8-ohm coil resistance, sensitivity of 96.9 dB for an input of 1 watt input power at a distance of 1 foot and 15-watt power rating. Either two (2) or four (4) such speakers shall be connected in series to the output circuit of each audible pedestrian signal device.
- E2.10 All sounds ("Bird Calls", "Auxiliary Sounds", "Locator Sounds" and "Push-button/Call Confirmation Clicks") produced by the audible pedestrian signal unit shall be generated by the above noted speakers.

**E3. PERFORMANCE REQUIREMENTS**

- E3.1 Each audible pedestrian signal device shall be capable of emitting at least the following 4 (four) different sounds [i.e. 2 "Bird Call" Sounds, a "Locator Sound" and "Push-button/Call Confirmation Clicks"].
- E3.2 Bird Call Sounds: Each audible pedestrian signal device shall be able to emit two (2) audible "Bird Call" sounds as described within the Manual of Uniform Traffic Control Devices for Canada (Chapter A6.10, dated September, 1998) and specified in Table 1 below. Each device shall be capable of being programmed by the City to provide at any one time, either one of two specified "Bird Call" sounds. The selected "Bird Call" shall be output during all or a portion of the appropriate associated "Walk" pedestrian signal interval (its function being to give a "Proceed" notification to pedestrians). Additional "Bird Call" sound characteristics are detailed in clause E4.9(a).

**Table 1** Audible "Bird Call" Signal Output Parameters.

PARAMETER	SOUND #1	SOUND #2
Sound Type	Bird Call "Peep" or "Chirp"	Bird Call "Cuckoo"
Walk Direction	East-West	North-South
Sound Pattern	Short Duration Tone of "Ramped" Rapidly Descending Frequency	2-Tone Pattern of Alternating High then Low Frequency Tones
Pattern Sequence Period	1.0 second (± 20%)	1.5 second (± 20%)
Sound Duration	170 milliseconds (± 20%)	500 milliseconds (± 20%)
Initial Frequency	2,800 Hz (± 20%)	1,250 Hz (± 20%)
Frequency Deviation	-1,000 Hz (± 20%)	-120 Hz (± 20%)

- E3.3 Locator Sound: each device shall also be capable of generating a "Locator Sound". The purpose of the "locator sound" is in part to alert pedestrians that audible signals are present, also to assist visually-impaired pedestrians more readily to locate the appropriate pedestrian push-button which governs the corresponding pedestrian signal and to provide some directional guidance to those still crossing when the "Bird Call" terminates. The "locator sound" should be a constant pattern of repetitive short duration pulses, and shall be dissimilar from the 2 specified "Bird Call" sounds or the 2 "Auxiliary" sounds as defined below. Additional "locator sound" characteristics are detailed in clause E3.9(b)

- E3.4 Push-button Click/Call Confirmation Clicks: each device shall be capable of generating:
- (a) a “push-button click” immediately in response to each push-button press; and
  - (b) an “extended call confirmation click” immediately after a continuous push-button press has been sustained for a sufficient period to initiate a call for the “Bird Call” sound.
- E3.5 The purpose of “push-button click” is to provide audible feedback that the push-button has been pressed, and the “extended call confirmation click” is to inform pedestrians that a valid “extended” push-button call for audible pedestrian service has been registered and is being acknowledged by the Audible Pedestrian Signal unit. The “push-button click” and the “extended call confirmation click” each shall be a single short duration sound, similar to the metallic click of a conventional light switch, and shall be dissimilar from any of the other sounds specified herein. The push-button interface is described in clause E3.13(c). The “extended, or delayed call” via “push-button delay timer” is detailed in clause E3.13. Additional “push-button click/extended call confirmation click” characteristics are detailed in clause E3.10.
- E3.6 Optional and Future Sound Outputs: each device preferably should be designed so as to have the capability of emitting the following optional “Proceed” sounds and possible future “Pedestrian Clearance” sounds;
- (a) Auxiliary Sounds: (optional) in addition to the above noted mandatory required sounds, the bidder shall indicate whether the equipment offered is also capable of generating the following described 2 (two) additional “Auxiliary” sounds, without substantial additional costs nor extensive modification of hardware. Similar in purpose to the “Bird Call” sounds, only 1 of these Auxiliary sounds would be used per crosswalk by a specific device, but each device should be capable of being programmed by the City to provide either one of the two specified Auxiliary sounds. The purpose of the Auxiliary sounds is for application where complex signal phasing, unusual geometry or other circumstance requires more than the 2 audible “Bird Call” sounds at an intersection.

**Table 2** Auxiliary Audible “Proceed” Sounds for Special Complex Phasing Conditions

PARAMETER	SOUND #3	SOUND #4
Sound Type	High Frequency “Beep-Beep-Beep”	Low Frequency “Beeeeeep”
Walk Direction	First complex phasing anomaly	Second complex phasing anomaly
Sound Pattern	Continuous Equal “On-Off” Pulses of A Single Frequency	Constant Low Frequency Tone
On Periods	100 milliseconds ( $\pm 20\%$ )	Constant “On”
Sequence Rate	5 Pulses per second	Not Applicable
Frequency Base	2,800 Hz ( $\pm 20\%$ )	>700 Hz ( $\pm 20\%$ )

- E3.7 Provision for “Pedestrian Clearance” Sounds for the “Flashing Don’t Walk” Interval: (future option) in addition to the four (4) above noted Bird Call and Auxiliary “Proceed” sounds, it is possible that two (2) and potentially four (4) additional sounds may be defined in future, intended to sound concurrently with the “Pedestrian Clearance” signal interval, which is signified by the visual “flashing Don’t Walk.” A specific “Pedestrian Clearance” sound would be defined for each of the two “Bird Call” sounds, and potentially two more also, one for each of the two “Auxiliary” sounds:
- (a) although the characteristics of any future “Pedestrian Clearance” sounds are currently undefined, the equipment offered should preferably be designed so as to provide the option to incorporate future “Clearance” sounds within the audible pedestrian signal device offered, with minimal hardware alterations being required for the upgrade (e.g. device upgradeable via replacement only of socket-mounted memory device(s) or programmable-logic integrated circuit(s) and setting of pin(s) or jumper(s), for example); and

- (b) The future "Pedestrian Clearance" sound would emit from the same speaker(s) as the corresponding "Bird Call" sound, should be ambient-noise compensated, and should have the same sound pressure level (\*) characteristics as the "Bird Call" sounds. The future "Pedestrian Clearance" sound would be generated only when it would follow its companion "Bird Call" sound, that is, it would be provided only after the corresponding "Bird Call" (or corresponding "Auxiliary" sound) had been issued during all or a portion of the immediately preceding "Walk" interval. If initiated, the future "Pedestrian Clearance" sound would be emitted during the entire portion of the flashing "Don't Walk" interval, and would cease to sound within 1.0 second after the flashing "Don't Walk" signal becomes non-flashing (or dark).

E3.8 Ambient-Noise Compensated Sound Output Levels: the volume of the Audible "Bird Call" sounds and the "Auxiliary" sounds (if provided) and the "Locator Sound" shall be continuously adjustable to provide a "quiet" sound pressure level (\*) range from absolute silence to a volume of approximately 2 dB to 5 dB at 1m above ambient during minimal (silent) street activity. During periods of greater ambient street noise, the sound volume shall be ambient noise level compensated, the volume automatically increasing in proportion to ambient noise, up to a maximum sound pressure level (\*) of approximately 90 dB at 1m. The output volume shall vary proportionately to the relative level of ambient noise measured during the appropriate "Walk" indication. The response time of the automatic volume control circuitry (i.e. the time between measured increase in ambient noise and the corresponding change of the output sound volume) shall be between 150 to 200 milliseconds. Each device shall provide means to permit the City to field-adjust the minimum volume level above or below the above noted "quiet" sound pressure level(\*) of 2 to 5 dB level (i.e. to set the "minimum volume" level during minimal street activity).

- (a) sound Pressure Level Test Conditions: (\*) note: respecting all specified "sound pressure levels" for audible pedestrian signal devices, assume for test conditions a series connection of two (2) output speakers, each speaker having 8-ohm coil resistance, sensitivity (i.e. efficiency) of 96.9 dB for an input of 1 watt input power at a distance of 1 foot and 15-watt power rating. The City of Winnipeg standard audible pedestrian signal speaker is an Atlas Soundolier Model VT-158U.

E3.9 Additional Sound Characteristics:

- (a) The "Bird Call" sound shall be programmable to issue concurrently with the associated "Walk" circuit, as long as that circuit is active. However, the following circumstances may modify the operation of the "Bird Call" output:
  - (i) the sound shall be inhibited when the (optional) "device inhibit" function clause E3.12 is active;
  - (ii) the sound shall be deactivated whenever there is no voltage on either the "Walk" or "Don't Walk" circuit for a period greater than 1.5 seconds ("visual pedestrian signals dark" condition). Preferably the sound should be inhibited when there is energy concurrently on both the "Walk" and "Don't Walk" circuits which power the device (a fault condition);
  - (iii) there shall be means to program the device to limit the "Bird Call" sound duration to a maximum interval. This "Bird Call limit" shall be adjustable over a range of 6 seconds or less to at least 18 seconds;
  - (iv) the "Bird Call" sound shall normally be initiated at the beginning of the associated "Walk" interval by default if the "no push-button control" option is selected, or when a valid push-button call has been registered prior to the beginning of the "Walk" interval;
  - (v) the "Bird Call" sound shall be capable of being initiated (or re-initiated) at "**any point**" during the associated "Walk" interval should a valid push-button call be received during "Walk" whenever the "Bird Call" is silent; and

- (vi) the maximum interval shall not override audible signal termination control by the associated "Walk" circuit (i.e. whenever the associated "Walk" signal terminates, then shall the "Bird Call" sound also immediately terminate, regardless whether the maximum interval has expired).
- (b) "Locator Sound" Characteristics: the "locator sound" when selected shall be generated at all times, subject to the following exceptions:
- (i) it shall be inhibited when the (optional) "device inhibit" function is active;
  - (ii) it shall be inhibited during the "push-button click" to the "extended call confirmation click" call interval;
  - (iii) it shall be deactivated whenever there is no voltage on either the "Walk" nor "Don't Walk" circuit for a period greater than 1.5 seconds ("visual pedestrian signals dark" condition). Preferably the sound should be inhibited when there is energy concurrently on both the "Walk" and "Don't Walk" circuits which power the device (a fault condition);
  - (iv) optionally, it may be inhibited when the "Bird Call" (or "Auxiliary") sound is active;
  - (v) optionally, the "locator sound" may markedly increase in volume for a brief period immediately following termination of the "Bird Call" sound. This brief period of greater volume of the "locator tone" may serve as a "homing beacon" navigation aid to assist visually-impaired pedestrians to maintain their bearing and stay within the crosswalk; and
  - (vi) the "locator sound" minimum volume level shall be silent. It shall be ambient-noise compensated in similar manner as the "Bird Call" sounds. Its output volume should be continuously adjustable by means of a control separate from that for the "Bird Call" sounds. (The "locator sound" volume is field-adjusted not more than 2 to 5 dB louder than ambient, so as to be audible in the range of 2 to 4 metres from the appropriate push-button).
- E3.10 "Push-button Click/Extended Call Confirmation Click" Characteristics: the "push-button click" shall be generated immediately upon each press of the push-button. The "extended call confirmation click" shall be generated each and every time there is an "extended push-button activation" sufficiently long to exceed the "push-button call delay interval" and initiate demand for a "Bird Call" sound. The two "click" sounds may be identical. The "click" sounds shall be functional at all times, excepting:
- (a) they shall be inhibited when the (optional) "device inhibit" function is active;
  - (b) they shall be inhibited when the "Bird Call" or "Auxiliary" sound is active; and
  - (c) they shall be deactivated whenever there is no voltage on either the "Walk" or "Don't Walk" circuit for a period greater than 1.5 seconds ("visual pedestrian signals dark" condition). Preferably the "click" sounds should be inhibited when there is energy concurrently on both the "Walk" and "Don't Walk" circuits which power the device (a fault condition).
- E3.11 The "push-button click/extended call confirmation click" minimum volume level shall be silent. The maximum volume shall be at least 60 dB at 1 metre. Preferably, the "click" should be ambient-noise compensated in similar manner as the "Bird Call" sounds. The "click" output volume shall be continuously adjustable by means of a control separate from that for the "Locator Sound." The "click" volume control may be independent, or set by means of the same volume control as the "Bird Call" sounds.
- E3.12 Device Inhibit: (optional) the device should have a sound inhibit input. Application of 115 ( $\pm$  20) VAC at this input shall disable all sound outputs of the device ("Bird Call" sounds, "Auxiliary" sounds, the "locator sound" and the "push-button click/extended call confirmation click"). Alternatively, in the event of non-conformance to this option, the bidder may submit with the bid a detailed description of the "inhibit input" characteristics of the equipment offered (including electrical interface details, performance details of the "inhibit" mode, etc).

### E3.13 Push-button Delay Timer:

- (a) the audible pedestrian signal device shall have the capability to provide a City-selectable "Bird Call sound only on "delayed-call demand" control option. When thus programmed, the audible pedestrian signal device shall then respond only to the application of an extended depression of the local pedestrian push-button equal to or longer than a specific call-delay interval, and ignore any push-button call of lesser duration. This option preferably should provide a City-selectable call-delay interval of a minimum range of 0 (zero) to 4 (four) seconds extended button press (or alternatively a fixed non-variable call-delay parameter providing for a 3 to 6 second "call-delay interval" of push-button extended depression time), as well as means to disable this call-delay feature;
- (b) upon time-out of an extended depression of the push-button, the unit shall output the abovementioned "push-button extended call confirmation click". The "push-button click /extended call confirmation click" volume shall be adjustable, either by means of an independent volume control or via the "Bird Call" volume control, and its minimum volume level shall be silent. Any extended pedestrian button depression less than the call-delay interval shall not result in a confirmation click being issued nor cause the "Bird Call" signal to sound during the next following appropriate "Walk" indication. Any extended pedestrian button depression longer than the "call-delay interval" shall cause an "extended call confirmation click" to be issued and the "Bird Call" sound to initiate immediately if the associated "Walk" signal is on, or at the beginning of the next following appropriate "Walk" signal indication. If a valid extended pedestrian button call is received during the associated "Walk" signal, the "extended call confirmation click" may or may not be issued, but the "Bird Call" sound, if silent, shall immediately be provided, and the "Bird Call" sound shall then persist until either its "maximum" interval expires or the appropriate associated "Walk" indication terminates, whichever event occurs first;
- (c) Pedestrian Push-button Interface: The audible pedestrian signal device shall be capable of connection to a pedestrian push-button control circuit for "demand-only" operation. The two (2) distinct pedestrian push-button electrical interfaces with which the device shall be compatible are specified as follows:
  - (i) the electrical interface shall accept all input voltages from 12 to 24 volts (plus or minus 2 volts) alternating or direct current. It shall recognize a short circuit as a true input. This short circuit will be any voltage from zero to three volts; and
  - (ii) the audible pedestrian signal device shall also be capable of supplying electrical energy into the push-button circuit through the push-button connection terminals. When programmed to supply power to the push-button circuit, the unit shall provide either DC or AC consistent with the above-described push-button interfaces.
- (d) Constant Push-button Call "Fault" Response: if the audible pedestrian signal device is programmed for push-button activated operation (with or without "call-delay"), and there is an indefinitely long period during which no energy is presented at the push-button interface (a common "stuck button" fault condition) the device shall default to the following operation:
  - (i) at the onset of a "constant call" condition, after any programmed "call-delay" interval elapses, a single "extended call confirmation click" shall sound during "Don't Walk" (as usual) or the "Bird Call" sound shall issue during the "Walk" (as usual). No additional "call confirmation click" shall thereafter be issued until the following sequence of events shall occur;
  - (ii) at this point, if the "Walk" circuit is active, the "Bird Call" sound shall be issued. If the "Bird Call" sound exceeds its maximum interval (if programmed), it shall then become silent, and shall not be issued again until the next recurrence of the "Walk";
  - (iii) if the "Don't Walk" is active, no further "call confirmation click" shall be issued until the start of the next recurrence of the "Don't Walk" following the next successive "Walk"; and
  - (iv) following restoration of normal push-button operation, the audible pedestrian signal device shall automatically resume its normal mode of operation.

- E3.14 Sound Selection: the selection of the appropriate "Bird Call" sound shall be by such means as to permit the appropriate sound to be selected by the City by straightforward manual means, (i.e. by means of a long-life, moisture-proof switch or hermetically sealed switch, pin selected jumper, etc.). If more than one of the "Bird Call" sounds is selected (either in error or due to failure of the selector mechanism), the unit shall default to a silent "fail-safe" mode which permits neither "Bird Call" sound to be emitted. Preferably, the "locator sound" and the "call confirmation click" would also be inhibited by this fault condition.
- E3.15 Electrical Requirements: audible signals may be CSA or UL approved and if so, shall bear a label on the housing.
- (a) power: the device shall be powered from 115 VAC ( $\pm 20$  VAC), 60 Hz, which shall be derived from both the "Walk" and the "Don't Walk" signal circuits. The device shall be capable of reliable uninterrupted operation when powered from a flashing "Don't Walk" signal circuit, which input flashes at 1 Hz. with a 50% on-time duty cycle. There shall be no power feedback or transfer between the "Walk" and "Don't Walk" AC circuits resulting from the operation or presence of the audible signal device. Loss of power from both these circuits for 1.5 seconds or greater shall initiate a "device inhibit" state whereby the audible beginning of walk indication (Bird Call) is disabled, until power has been restored. Occurrence of voltage simultaneously on both the appropriate "Walk" and "Don't Walk" circuits is a fault condition and should immediately establish a "device inhibit" state such that the audible beginning of walk indication (Bird Call) is inhibited unless and until the voltage on either circuit should terminate;
  - (b) electrical Protection and Isolation: the device shall have a replaceable fuse. The printed circuit board(s) shall be protected with an acrylic conformal coating that conforms to MIL-I-46058. The coating thickness shall be 0.003 +0.002/-0.001 inch and shall be applied to both sides of the cleaned printed-wiring assembly. Movisters shall be used to protect the device from high voltage transients. Movisters shall be installed between AC+ and neutral, AC+ and ground; and neutral and ground. Electrical isolation between the (push-button) input pins and all AC input and common circuits shall be 1,000 Megohms and 2,500 volts DC;
  - (c) 2 kV High Energy Electrical Transient Tests: the audible pedestrian signal shall withstand without damage the discharge of a 25 microfarad capacitor charged to 2,000 volts applied while the unit is energized and operational, across.
    - (i) each field input (push-button);
    - (ii) AC+ to Protective Ground;
    - (iii) AC- (Neutral) to Protective Ground; and
    - (iv) AC+ to AC- (Neutral).
  - (d) 1 kV Low Energy No-Load Input Test: the device shall be designed to withstand without failure the discharge of a 10 microfarad capacitor, charged to  $\pm 1,000$  volts, directly across the (push-button) input pins with no load present; and
  - (e) 2 kV Low Energy Dummy-Load Input Test: the device shall be designed to withstand without failure the discharge of a 10 microfarad capacitor, charged to  $\pm 2,000$  volts, directly across the (push-button) input pins and across either of the input pins and the Protective ground. For the duration of this test, a dummy resistive load of 5 ohms shall be placed across the input terminals.
- E3.16 Electrical Connections and Wiring: Each device shall be supplied with a minimum of 600mm (24-inch) long shield cable with the ambient-noise compensating microphone. The microphone wires shall be terminated on the audible pedestrian signal device via screw-type terminals. All electrical interface terminals and connectors shall be clearly labelled or marked as to function. Screw-type terminals made of non-ferrous metal shall be used for all wiring connections.

#### **E4. PHYSICAL AND ENVIRONMENTAL REQUIREMENTS**

- E4.1 Device Operating Conditions and Physical Size: Audible pedestrian signal devices will be mounted within an ITE standard twelve inch square pedestrian head, within the Traffic Signal Controller Cabinet or other suitable enclosure. The devices shall operate in a high relative humidity environment in temperatures from -37 °C to +74 °C (-35°F to +165 °F).
- E4.2 The dimensions of the audible pedestrian signal device (excluding microphone) may not exceed the following:
- (a) length of module, including all connectors - 10-1/4 inches maximum;
  - (b) width of module, including all connectors - 4-5/8 inches maximum; and;
  - (c) depth of module (underside of PC board to topmost component) - 1-3/4 inches maximum.
- E4.3 The device shall have a minimum of two (2) mounting holes, for mounting the audible pedestrian signal device to a City of Winnipeg standard mounting plate (Drawing ST-150) by means of conventional 1/4-inch diameter fasteners.
- E4.4 Electrical termination of all input and output circuits required by the audible pedestrian signal device shall be done by means of standard electrical barrier terminals. All electrical interface terminals and connectors shall be clearly labelled or marked as to function. Screw-type terminals made of non-ferrous metal shall be used for all wiring connections.

#### **E5. INSPECTION AND SAMPLE ITEM REQUIREMENT**

- E5.1 The City shall require the successful bidder to supply the City not more than two (2) "sample units" of the item(s) bid, complete with documentation package, for detailed inspection, testing and approval by the City of Winnipeg. Acceptance will be based on meeting the essential requirements of this specification, product versatility and price. The successful bidder shall within ten (10) Business Days of a request by the Contract Administrator, provide a representative sample of the goods offered. Failure to supply the sample units within the prescribed time interval may result in cancellation of the order.
- E5.2 Bidders shall specify with their bid what specific elements of the abovementioned service documentation package will not be supplied to the City for reasons of proprietary design, patent protection, etc. Such restriction of product information will not necessarily disqualify the unit bid from consideration.

#### **E6. DELIVERY**

- E6.1 Goods shall be delivered on an "as required" basis during the term of the Contract, f.o.b. destination, freight prepaid, to:

Public Works  
Equipment and Material Stores  
1277 Pacific Ave.  
Winnipeg, MB

- E6.1.1 Goods shall be delivered within thirty (30) Business Days of the placing of an order, except where otherwise agreed at the time of ordering.
- E6.1.2 The Contractor shall confirm each scheduled delivery with the User at least two (2) Business Days before delivery.

- E6.2 All delivered units are subject to inspection by the City and must meet the approval of the Contract Administrator.
- E6.3 Goods shall be delivered between 8:30 a.m. and 3:30 p.m. on Business Days.
- E6.4 The Contractor shall off-load goods as directed at the delivery location.
- E6.5 Every device shall be accompanied by a complete documentation package for the audible pedestrian signal, each package to include: make and model reference; installation, programming and adjustment procedures; test and check list procedures; electrical characteristics and specifications; basic theory of operation; complete and fully-dimensioned wiring drawings, assembly drawings and hardware layout sketches; printed circuit board layout drawings and complete circuit schematics (including part numbers and circuit board reference numbers).
- E6.6 The Manufacturer's trademark, product identification, date of manufacture and serial number shall be labelled on each device, in an easily identifiable location.