

Part 1 General

1.1 PURPOSE OF THE SPECIFICATION

- .1 The purpose of this specification is to identify the functional and technical characteristics of the access control system, including all software and hardware described in this document. This system is primarily intended to control access to the facilities, as well as provide alarm monitoring and processing capabilities.

1.2 WORK INCLUDED

- .1 The work includes furnishing all labor, materials, tools, and equipment, and documentation required for a complete and working Integrated Security Management System as specified in this Section. This scope of work shall cover the requirements for the access control, alarm monitoring.
- .2 The work includes furnishing all labor, materials, tools, and equipment, and documentation required for a complete and working Integrated Security Management System as specified in this Section.

1.3 RELATED WORK

- .1 General Terms and Conditions under Section 1 of the Contract Documents
- .2 Installation practices and procedures as described in the Division 26 Electrical Section.
- .3 Fire Alarm System Section 28 31 01

1.4 REFERENCES

- .1 Design and operation of the system shall conform to the following referenced codes, regulations, and standards as applicable:
 - .1 Canadian Electrical Code (CEC)
 - .2 UL 294 and UL 1076 as required where applicable
 - .3 FCC Rules and Regulations a. Part 15 Class A or B as applicable
 - .4 National Electrical Manufacturers Association (NEMA) a. Section 250 Enclosures for Electrical Equipment
 - .5 Applicable Federal, provincial, and Local laws, regulations and other codes.
 - .6 CE mark, as and where applicable

1.5 INCLUDED WORK

- .1 The contractor shall be responsible for the design, supply, installation, and integration of all components, including all housings, accessories, finishing plates, connectors, cable and wiring, as well as the computer and networking equipment and operating system software.
- .2 The contractor must demonstrate that all components meet the requirements of the specification.

1.6 SCOPE OF WORK

- .1 To provide a completely wired and functional Access Control and Door Alarm Monitoring System including the following components and capabilities:
 - .1 True 32 Bit Access Control Software for "Windows".
 - .2 Multiple operator workstations connected in a LAN configuration.
 - .3 Integrated Photo Badging System (Existing).
 - .4 Dynamic Photo Viewing (on card read).
 - .5 Integrated with CCTV.
 - .6 Reconfiguration of police server to suit clients secure database.
 - .7 ACU's (Access Control Units) with distributed processing capabilities.
 - .8 Auxiliary Alarm Monitoring and Output Control Units where required.
 - .9 HID Compatible proximity card readers and cards.
 - .10 Input and Output devices.
 - .11 Door position switches.
 - .12 Request to exit motion detectors.
 - .13 Electric strikes, latches, and magnetic locks, push button supplied by door hardware section.
 - .14 All wiring, conduit, and cables.
 - .15 Provide a graphic control workstation/display in office G206.
 - .16 This building is an extension of the City's existing card access system "Pegasus" by Johnson Controls. The "Database" for this facility to be configured in the "Police" Server.

1.7 GENERAL PRODUCT DESCRIPTION

- .1 The Security Management System (SMS) shall be capable of integrating multiple building functions including access control, alarm management, intrusion detection, video imaging and badging, database partitioning, and interfacing to closed circuit television monitors (CCTV) matrix switches. It shall also be capable of allowing cardholder information and queries from external system databases (MIS interface).
- .2 The system shall be at the time of bid, if required, listed by Underwriters Laboratories listed for UL 294 Access Control Systems, and UL 1076 Proprietary Burglar Alarm Systems. PC's and all panels furnished on the job shall carry the UL 294 and UL 1076 labels as required. Bidders shall also provide copies of their UL listing cards or other proof of compliance before the award of a contract.
- .3 The system shall be modular in nature, and will permit expansion in both capacity and functionality through the addition of control panels, card readers, workstations, or by increasing the number of cards and sensors.
- .4 The system shall incorporate the necessary hardware, software, and firmware to collect, transmit, and process alarm, tamper and trouble conditions, access requests, and advisories in accordance with the security procedures of the facility. The system shall control the flow of authorized personnel traffic through the secured areas of the facility.

- .5 The user interface at the host computer (server) and at the operator workstation terminal (OWT) shall be a mouse driven graphical user interface (GUI) allowing the user to open and work on multiple windows simultaneously.

1.8 SUBMITTALS

- .1 Contractor shall submit all items in accordance with the requirements of Division 1, Submittals and shall include, but not be limited to, the following:
 - .1 Model numbers from all furnished job components.
 - .2 Manufacturers catalog data sheets for all components.
 - .3 Input power requirements for all SMS components.
 - .4 Complete engineered drawings indicating:
 - .1 Manufacturer model numbers and specifications.
 - .2 Dimensions, layouts and installation details.
 - .3 Point-to-point wiring diagrams for all SMS devices.
 - .4 Termination details for all SMS devices.
 - .5 Single-line system architecture drawings representing the entire SMS.
 - .6 Interfaces with all sub-systems.
 - .5 City Acceptance Form with a check box associated with each card reader and input point. A check mark in the box will indicate that each point has been correctly installed and that communication between the control panel and the host has been established. This form shall be completed prior to City acceptance of the system.
 - .6 Four (4) sets of the Manufacturer's User and Installation Manuals.
 - .7 Course outlines for each of the end user training programs. The course outlines shall include the course duration, and a brief description of the subject matter.

1.9 ABBREVIATIONS

- .1 The following abbreviations are used in this document:
 - ABA American Banking Association
 - ANSI American National Standards Institute
 - ASCII American Standard Code for Information Interchange
 - AWG American Wire Gauge
 - BPS Bits Per Second
 - CPU Central Processing Unit
 - FCC Federal Communications Commission
 - ID Identification
 - IEEE Institute of Electrical and Electronics Engineering
 - I/O Input/Output
 - NEC National Electrical Code
 - NEMA National Electrical Manufacturers Association
 - OWT Operator Workstation Terminal (computer)
 - PIN Personal Identification Number
 - SMS Security Management System
 - UL Underwriters Laboratories

1.10 GLOSSARY OF TERMS

- .1 The following terms are defined for the purposes of this specification:
 - .1 Access Group: A logical group of card readers (terminals) which may be connected to one or more sub-controllers, and which represent a collection of readers for which a particular cardholder may have access privileges.
 - .2 Access Mode: The mode of operation in which the SMS shall only annunciate tamper and trouble conditions at a monitored point. Alarm conditions shall not be annunciated in this mode. This is referred to as "alarm shunting".
 - .3 Acknowledge: The action taken by an SMS operator to indicate that he/she is aware of a specific alarm or tamper state.
 - .4 Advisory: A message provided by the SMS to the operator to inform him/her of a condition as reported by the SMS.
 - .5 Alarm: A change of state as sensed by the SMS indicating that the SMS has detected a condition that its sensors were designed to detect.
 - .6 Badge: The physical card, carried by the cardholder used to gain access through a portal by presentation to a card reader.
 - .7 Cardholder: A person who is a member of the cardholder database who may have been issued a valid badge.
 - .8 Card Reader: A device usually located at access points, designed to decode the information contained on or within a badge for the purposes of making an access decision or for identity verification
 - .9 Clear: The action taken by an SMS operator to remove an alarm from the alarms queue after it has been acknowledged and, if required, responded to.
 - .10 Download: To send computer data from one subsystem to another; for example, to send a cardholder database from the Johnson Controls PEGASYS 2000 server to a sub-controller for the purposes of making access decisions without the intervention of the host.
 - .11 Facility Code: A coded number, in addition to the individual card number stored within each card key, which uniquely identifies the facility at which the card is valid. This feature prevents cards from one facility being used at another facility with a similar access control system.
 - .12 Guard Tour: A sequence of transactions that, when performed within a specified time frame, ensures that your facility is being properly monitored by security personnel. The main purpose of a tour is to confirm and record that an area has been physically visited. It provides real time monitoring of guard activities - reporting if a guard arrives early or late to designated tour stations. Guard Tour stations can either be readers or input points. Tours can be selected randomly or may be specified at regular time intervals.
 - .13 Host Server: The central computer that serves as the communications controller for the field control panels and remote operator workstation terminals. It acts as an alarm monitoring and control workstation, as a point of integration for related sub-systems, and as a central database server.
 - .14 Line Supervision: The monitoring of an electrical circuit via electrical and software systems to verify the electrical integrity of the supervised circuit.
 - .15 Off-line: A condition in which a sub-controller is not in communication with the host server. In the off-line mode, the sub-controller continues to make access

decisions and process alarms according to the information stored at its local database.

- .16 Operator Workstation Terminal (OWT): A personal computer connected to the main Security Management System (SMS) host computer via local area network connections for the purpose of operating the system and responding to alarms.
- .17 Password: A combination of numbers and/or letters unique to each SMS operator.
- .18 Reset: A command or feedback signal that indicates that a monitored point has returned to its normal state having previously been at the alarm or trouble state.
- .19 Secure Mode: The normal state of an alarm input point. A change of state in this mode shall indicate an alarm, or that it has transferred to the trouble or tamper state.
- .20 Secured Area: A physical location within the facility to which one or more card readers control access.
- .21 Tamper: A condition within the circuitry of a monitored point, which indicates that the electrical integrity of that sensing circuit has been compromised.
- .22 Time Zone: A user-defined period made up of days of the week and hours of the day during which events such as Valid Card Grants and Input/Output linking events may occur.
- .23 Trouble: A condition within the circuitry of a monitored point, which indicates that an equipment malfunction, single break, single fault and/or a wire-to-wire short exists.
- .24 User-Definable: An attribute of an SMS function, which may be easily tailored by an operator without extensive computer programming knowledge or experience.
- .25 Workstation: Shortened description for Operator Workstation Terminal (OWT)
- .26 CCTV: Abbreviation to indicate Closed Circuit TV monitoring of particular areas with cameras and monitors.

1.11 OPERATIONAL REQUIREMENTS

- .1 Scope of Work
- .2 System Capabilities
 - .1 General: The SMS shall operate in a client-server architecture. Any SMS software and firmware required for the following system functions shall be fully tested existing SMS application software. Custom software including "ladder logic programming" and other custom application programming intended to provide the following sequences of operation are unacceptable.
 - .2 Database Management: The system shall create and maintain a master database of all cardholder records and system activity for all connected points.
 - .3 Audit Trail: The SMS shall maintain an audit trail file of operator activity, and provide the ability to generate a report by operator, time and date, and type of activity (audit code). The system shall allow the operator to direct the audit trail report to screen, printer, or file. The audit trail feature shall record the following system events:
 - .1 Site parameters modified.

- .2 System login or logout.
- .3 System restart.
- .4 Cardholder added, deleted, or changed.
- .5 Event added, deleted, changed, or executed.
- .6 Alarm message added, deleted, or changed.
- .7 Communications initiated or terminated.
- .8 Field device/points added, deleted, or changed.
- .9 Access privileges added, deleted, or changed.
- .4 Input Point Monitoring: The system shall collect and process status information from all monitored points.
- .5 Alarm Annunciation: The SMS shall audibly and visually annunciate all alarms, advisories, and tamper and trouble conditions.
- .6 Input Point Supervision: The system shall electrically supervise all 2-state and 4-state input point circuits as specified or shown on the drawings.
- .7 Reports: The SMS shall fully integrate with a dynamic report writer module allowing users to create custom reports. The dynamic report writer shall be Seagate Crystal Report Writer 9.0 professional version with the following features:
 - .1 Mouse-driven graphical user interface with the ability to select from a list of SMS database fields.
 - .2 User-definable reports that can be saved and re-run as required, without redefining the report fields and format each time the report is run.
- .8 The SMS shall also ship with the following predefined reports:
 - .1 Cardholder Report - including all fields from the standard and user-defined cardholder record.
 - .2 Input Point Report - listing all connected hardware input points including the point name, terminal name, and controller name to which the points are physically connected.
 - .3 Alarm Response Message Report - listing all user-defined alarm response messages
 - .4 Alarm Instruction Text Report - listing all user-defined alarm instructions.
 - .5 Output Point Report - listing all connected hardware output points including point name, terminal name, and controller name to which the points are physically connected.
 - .6 Time Zone Report - listing all user-defined time zone parameters.
 - .7 Event Trigger Report - listing all user-defined triggers.
 - .8 Event Action Report - listing all user-defined event sequences.
 - .9 Panel Report - listing all control panel configuration settings for each sub-controller.
 - .10 Field Device Report - listing all terminals associated with each sub-controller panel.
 - .11 Card Transaction History Report - listing the transaction history filtered by cardholder name, reader name, transaction type, and start and stop date/time.

- .12 Access Reports - listing all access groups or cardholders with access to a specified door.
- .13 Reader Group Report - listing all readers associated with a given reader group.
- .14 Listing all event names that are linked to a specified event action.
- .15 Alarm History Report - listing the alarm history filtered by alarm input point name, and start and stop date/time.
- .16 Transaction History Report - with the ability to filter by any one or more of the following parameters:
 - .1 Reader name
 - .2 Start date March 19, 2007
 - .3 Start time
 - .4 End date
 - .5 End time
 - .6 Transaction type:
 - .1 Reader up
 - .1 Reader down
 - .2 System restart
 - .3 Facility code error
 - .4 Card event activated at a keypad reader
 - .5 Card event deactivated at a keypad reader
 - .6 Alarm set
 - .7 Alarm reset
 - .8 Alarm acknowledged at a keypad reader
 - .9 Controller tamper alarm set
 - .10 Controller tamper alarm reset
 - .11 Door open alarm
 - .12 Duress alarm
 - .13 PIN code retry alarm
 - .14 Forced door alarm
 - .15 Controller AC power fail
 - .16 Controller battery low
 - .17 Controller tamper
 - .18 Reader AC power fail
 - .19 Reader tamper alarm
 - .20 Alarm open
 - .21 Alarm short
- .9 On-line Help System: The SMS shall provide on-line help, which shall be available at anytime from any active screen by pressing <F1>.
- .10 Operator Menu Access: The SMS shall provide operator password controls accessible to individual users. Additionally, it shall also be possible to restrict operators so that specified menu commands do not appear, or are grayed-out

(disabled). All user passwords are fully encrypted, even while being stored and transmitted across the network.

- .11 Alarm Input Point Reporting Delay: The SMS shall allow the operator to apply an input point reporting delay period from 0-60 seconds for each input point terminal. The default setting for each input point reporting delay shall be zero seconds.
- .12 Alarm Input Point Suppression: The SMS shall provide an alarm input point suppression facility such that the operator may define a time zone suppression period for each individual input point. Alarm conditions for suppressed input points shall not be recorded or archived by the system, however trouble conditions will be recorded.
- .13 Alarm Graphics (Maps): The alarm graphics portion of the system shall provide dynamic color alarm graphic maps with the following functions:
 - .1 User-definable graphic maps to depict input and output point conditions, reader status, and sub-map attachments in the system.
 - .2 The SMS shall support the importing of bitmap files produced with any graphic drawing program in TIF, BMP, or JPEG format. Vector file formats are not acceptable.
 - .3 The SMS map program shall support the importing of most bitmap file format graphics to produce custom icons for all map attachments (input, output, reader, etc.).
 - .4 The map display window shall have Home, Previous and Up level buttons for rapid movement among map levels. It shall also provide map selection and size adjustment lists.
 - .5 The SMS software shall be capable of storing a number of graphic maps. The quantity shall be limited by available hard disk storage space only.
 - .6 The SMS shall provide a palette that includes seven categories of pre-defined alarm map icons:
 - .1 Input - a user-defined alarm input point located anywhere in the system. The input point icon flashes, changes color and the computer's internal sounder beeps when an alarm condition exists. Users can respond by either clicking on the icon or moving directly to the alarm queue window. Each alarm input icon has a pop-up box to indicate its current state (open, short, alarm/active, secure).
 - .2 Output - a user-defined output point located anywhere in the SMS. Clicking on the icon will set or reset the output point. In addition, it can display the set or reset status of point.
 - .3 Map layer - indicates that lower level maps associated with the top layer map exist in the system. Operators will navigate through the map layers by clicking on the up and down icons.
 - .4 Intercom Station - when a call is received from a station, the icon will flash. Clicking on the icon will display the intercom call monitor menu where the user can select available actions.
 - .5 Reader Terminals - will display one of the following icons: held open, forced open, locked, unlocked, unknown, override, up and down.

- .6 Panels - a system panel controlled by the SMS. Panel icons will indicate a status of either up or down.
- .7 I/O Terminals - I/O terminal icons will indicate a status of either up or down.
- .14 Alarm Handling: The alarm handling portion of the system, which consists of the point contacts and the alarm monitoring window, shall provide the following functions:
 - .1 Alarm monitoring window - displays the total number of alarms in the queue and the number of alarms pending, and can be sorted by column. Users can select highlighted alarm inputs to directly access map layer.
 - .2 User-definable alarm message/instructions description - allows the user to assign an alarm message/instruction for each state of an input point ('Open', 'Short', 'Alarm/Active', and 'Secure.')
 - .3 Alarm message "pick list" - all alarm message names and associated descriptions appear in the form of a pick list from which the user may select an appropriate alarm name and message.
 - .4 Alarm input points - the system supports up to 17,000 alarm-input points.
 - .5 Alarm input point maintenance - allows the operator to 'Add', 'Edit', or 'Delete' an alarm input point. The 'Delete' option requires user confirmation. All maintenance functions are logged to the audit trail and archived to the hard disk of the host PC.
 - .6 The system shall support both 2-state and 4-state alarm input point monitoring as called for in this specification or as shown on the drawings.
 - .7 Alarm priority - an alarm priority queue from 0-255. Individual wave sound assignment will be based on alarm priority.
 - .8 Alarm pop-up - alarm inputs that are designated, as "pop-up" by the operator shall take priority over any active non-alarm window. If the operator is viewing a non-alarm window when a pop-up alarm occurs, the alarm queue window shall be automatically placed on top of all other windows to allow the operator to respond to the alarm condition.
 - .9 Alarm instruction display - a window containing up to ten lines of user-defined instructions, which indicate to the operator how to respond to the selected alarm.
 - .10 Alarm condition history display - a window displaying the alarm point history, together with a time and date stamp of each condition.
 - .11 Alarm response entry - a window in which the operator may enter free-form text (up to 255 characters) describing how he/she responded to a given alarm.
 - .12 The operator shall be able to select from a list of predefined response descriptions.
 - .13 The alarm instruction display, alarm condition history display, and the alarm response entry box shall all be part of one summary window. Separate windows or applications to support any of these three functions are unacceptable.
- .15 Security Level Threat Alert Support: The system allows the user to configure badge and terminal security levels by color and range. Security levels will be

mapped to a five-color "Red-Orange-Yellow-Blue-Green" system, each of which can be set a numeric value range. In the event of a security breach, an authorized operator will be able to quickly change access privileges to efficiently set/reset the status of all readers to the required security level.

- .16 Event processing:
 - .1 Panel card events: The SMS shall allow the user to define panel card events, executed by the cardholder at a keypad card reader. The user can define any of the following data for each event:
 - .1 Alphanumeric event name (numeric identifier only is unacceptable)
 - .2 Access code to control the triggering of the event (card activated event)
 - .3 Event trigger type (card only, card + PIN, card + PIN + code, card + code, void card)
 - .4 Event privilege level (0-7)
 - .5 Duration of the event execution (0-1440 minutes)
 - .6 Input point group to be suppressed or not
 - .7 Output point group to be activated or not
 - .8 Door strike operation enabled/disable
 - .9 Reset panel alarm relay
 - .2 Host events: Triggers - the SMS shall provide the operator with a scrolling list of the following event sequence triggers as a minimum, which may be combined with the event sequence logical operators listed below to program a custom sequence of events. The SMS shall be delivered with this functionality, regardless of whether or not these features are implemented by the user upon initial installation.
 - .1 Anti-passback timer on
 - .2 Executive privilege grant of access
 - .3 Host computer grant of access
 - .4 Invalid In-X-It status
 - .5 Invalid badge
 - .6 Invalid badge time zone
 - .7 Invalid keypad event
 - .8 Invalid event privilege level
 - .9 Invalid issue level
 - .10 Invalid PIN code entry
 - .11 Invalid reader
 - .12 Invalid reader time zone
 - .13 Local controller grant of access
 - .14 Soft In-X-It violation
 - .15 Card event activated
 - .16 Card event deactivated
 - .17 Timed override disabled
 - .18 Timed override enabled

- .19 Timed override expired
- .20 Keypad event activated
- .21 Keypad event deactivated
- .22 Alarm point set
- .23 Alarm point reset
- .24 Alarm point short
- .25 Alarm point open
- .26 Reader up
- .27 Reader down
- .28 Facility code error
- .29 Timed override disabled by host
- .30 Timed override enabled by host
- .31 System restart
- .32 Panel online
- .33 Panel offline
- .34 Converter tamper
- .35 Date
- .36 Time
- .37 Start time zone period
- .38 End time zone period
- .39 Event counters
- .40 External input - ASCII file
- .41 External input - Database write
- .42 External input - RS232 serial input
- .43 External input - TCP/IP message
- .3 Host events: Actions - the SMS shall provide a scrolling list of the following event sequence actions as a minimum, and allow the user to attach one or more actions to the event sequence triggers listed above to program a custom sequence of events.
 - .1 Enable anti-passback
 - .2 Disable anti-passback
 - .3 Unlock door control relay
 - .4 Lock door control relay
 - .5 Enable timed override of door control relay
 - .6 Set time zone for PIN code suppression
 - .7 Set time zone for reader
 - .8 Set time zone for reader override
 - .9 Enable reader override
 - .10 Disable reader override
 - .11 Enable soft In-X-It
 - .12 Disable soft In-X-It
 - .13 Enable local timed override

- .14 Disable local timed override
- .15 Lock all doors
- .16 Unlock all doors
- .17 Enable history upload
- .18 Disable history upload
- .19 Include time zone in access decision
- .20 Ignore time zone in access decision
- .21 Set controller relay
- .22 Reset controller relay
- .23 Enable input point group
- .24 Disable input point group
- .25 Set output point group
- .26 Reset output point group
- .27 Display a user-defined message in a pop-up window
- .28 Print user-defined message on any printer
- .29 System database backup
- .30 System panel Download
- .31 Display map
- .32 Event counters
- .33 Acknowledge alarm
- .34 Complete alarm
- .35 Send email
- .36 Connect intercom station
- .37 Disconnect intercom station
- .38 Resynchronize badge entry/exit status
- .4 Logical operators for trigger conditions - the SMS shall provide a scrolling list of the following logical operators for event trigger conditions
 - .1 = (Equal to)
 - .2 ! (Not equal to)
 - .3 > (Greater than)
 - .4 < (Less than)
 - .5 >= (Greater than or equal to)
 - .6 <= (Less than or equal to)
- .5 Logical operators for triggers - the SMS shall the provide the following event trigger logical operators to allow the user to attach one or more of the logical operators with one or more of the event triggers and card actions listed above to program a custom sequence of events.
 - .1 And
 - .2 Or
- .17 Time Zones: The SMS shall provide the capability for the user to define time zones with the following identification and configuration parameters.
 - .1 Alphanumeric name.

- .2 Alphanumeric description.
- .3 Allowance for up to eight periods, four active and four inactive, during each day of the week and each of three different holiday types.
- .4 Any day of the year may be designated as a holiday; each defined as one of three holiday types.
- .18 Communications:
 - .1 Pertaining to network-based communications between the Host and CK720 controllers:
 - .1 Communications between the server (Host) and the CK720 controller panels can optionally support a redundant network path. Thus, the loss of communications on the primary network path automatically causes communications to be established via the other path without operator intervention.
 - .2 Should the sub-controller(s) lose communication with the Host, the sub-controllers shall continue to control access and monitor inputs for all connected points. Local history of all transactions shall be buffered at the sub-controller and automatically uploaded to the Host for alarm reporting and long-term historical storage once communications is re-established.
 - .3 The contractor shall be responsible for the design of a system that will compensate for all signal level losses in the trunk wiring. This shall include any power supplies for the field devices and any signal level converters or repeaters for the proper amplification of electrical signals.
 - .2 Pertaining to serial communications between the Host and D620-type ("Legacy") controllers:
 - .1 Communications between the server (host) and the D620 controller panels can optionally support a redundant communications path via a bi-directional polling methodology. Thus, the loss of communications on the primary ("forward") polling path automatically causes communications to be established via the other ("reverse") path without operator intervention.
 - .2 Should the D620 controller(s) lose communications with the Host, the controllers shall continue to control access and monitor inputs for all connected points. Local history of all transactions shall be buffered at the controller and automatically uploaded to the Host for alarm reporting and long-term historical storage once communications is reestablished.
 - .3 The contractor shall be responsible for the design of a system that will compensate for all signal level losses in the trunk wiring. This shall include any power supplies for the field devices and any signal level converters or repeaters for the proper amplification of electrical signals.
- .19 User-defined Cardholder Database Fields: The system shall support an unlimited number of user-defined data fields, which may be used to store information for each cardholder. Each field may be alphanumeric text, numeric, date, and toggle (Yes/No). The SMS provides standard menu items, which allow the operator to

define these cardholder database fields at anytime. The system remains on-line while user-defined cardholder database fields are added or edited. It shall be possible, using standard SMS system menu commands to report on all user-defined cardholder fields.

- .20 Video Imaging and Badging Integration Option: The system shall include an integrated video imaging/badging system. The captured and stored image can be viewed as part of a cardholder's data record on an OWT. The captured image will also be displayed in the image recall window with a statement indicating whether access was granted or denied.
- .21 Event and Transaction History: The SMS shall maintain a record of all alarms, card transactions, and system exceptions, and provide a means for users to access this information. This log can either be viewed in real-time or by printed report.
- .22 Message Filtering/Forwarding: The SMS shall provide the capacity to control the types of messages transmitted to local workstations and remote servers, thereby reducing the amount of network traffic by only providing filters that only allow a subset of messages to pass a specific criteria. Filtering shall be applied based on the operator logged on to the workstation. Filtering criteria shall include alarm or message type and subtype, partition, item name, query string and priority.
- .23 Anti-Passback Control: The SMS shall provide the capability to prevent more than one person from gaining access to a controlled area by recognizing when a cardholder with access privileges attempts to pass their card back to another person. If so programmed, an alarm may be generated if the cardholder violates the anti-passback rules. It shall be possible to define which readers are subject to anti-passback rules on an individual basis.
- .24 Anti-tailgate Control: The SMS shall provide the capability to prevent more than one person accessing a controlled area because of a single card transaction.
- .25 In-X-It (entry/exit) Control: The SMS shall support the capability to control a card's entry into or exit from an area based on the previous transaction status of the card. An alarm may be generated if the cardholder violates the In-X-It conditions.
- .26 Duress Processing: The SMS shall permit cardholders to force a soft alarm to indicate that they are requesting access to an area under force or duress. In the event of such a situation, the cardholder will be granted access and an alarm will be generated
- .27 Cardholder Definition: The SMS shall allow cardholders to be defined by any of the following identification and operating parameters:
 - .1 Cardholder name (first, middle, last)
 - .2 Cardholder address
 - .3 Cardholder phone number and extension number
 - .4 Validation period using start and void dates
 - .5 Department and Company fields from selection list of user-defined departments and companies
 - .6 Unlimited number of user-defined cardholder fields. The SMS uses these fields in filtering reports
- .28 Badge Definition: The SMS shall allow cardholders to be defined by any of the following badge identification and operating parameters on a per badge basis:
 - .1 Badge number assignment

- .2 Issue level (0-7), only (1) per badge
- .3 Validation period using start and void date and time
- .4 Globally disable badges in all partitions
- .5 Executive privilege enabled or disabled
- .6 Active/Disable badge toggle button
- .7 Trace enabled or disabled
- .8 Override enabled or disabled
- .9 PIN code (4 or 5 digits)
- .10 Badge event privilege level
- .11 Assigned a minimum number of 10 Badges or tokens per Cardholder
- .12 Assign eight Access Groups and Time zones per Badge
- .29 Digitized Photo Image Recall: The SMS shall allow cardholder pictures to be recalled and displayed in real time, together with the following information:
 - .1 Picture (Integrated Video Imaging dependant)
 - .2 First name
 - .3 Last name
 - .4 Date/Time
 - .5 Badge
 - .6 Terminal
 - .7 Action (transaction type)
- .30 Real-time System Activity Window: The SMS shall provide a real time system activity monitor window, which can be displayed on any operator workstation terminal screen whenever the SMS host is on-line. This window shall have the capability to toggle the display on and off, as well as to selectively display the following items at the operator's discretion:
 - .1 Input point alarms.
 - .2 System exception messages.
 - .3 Access grant.
 - .4 Access denied.
 - .5 Access trace.
 - .6 Entry/exit central mode of operation.
 - .7 Audit trail.
- .31 System Status Display: The SMS shall provide a dynamic system summary display that graphically indicates the following status information, filtered by panel or terminal. All status display information shall be summarized in a single window:
 - .1 Terminal up/down.
 - .2 Panel up/down.
 - .3 State of input points (alarm, secure, short, open).
 - .4 Indication of whether each sub-controller, terminal, or reader is disabled or not reporting.
- .32 Alarm Routing: The SMS shall allow each user to define which input points or groups of input points are displayed on each SMS operator workstation terminal

(OWT). The system shall provide a report showing which input points are routed to each OWT.

- .33 Control Points: The SMS shall allow input points to be defined as control points when used in input/output linking and event processing sequences of operation. Control points shall not enter the alarm queue and shall not require that an operator acknowledge them when they change state. The control point activity will, however, be automatically logged to the history file.
- .34 Workstation Control: The SMS shall allow workstations to be assigned a name, and to have the following capabilities:
 - .1 Be identified as either workstation only, or workstation/video badging.
 - .2 Have an enable/disable toggle button to allow or deny operator login at the workstation.
- .35 Real-time Printer: The SMS shall have the ability to print either to a network-accessible printer or to an LPT port. The toggle button may be either enabled or disabled to allow real time printing, and the following print parameters may be independently defined:
 - .1 Input Point Alarms
 - .2 System Exception and Event Messages
 - .3 Access Trace
 - .4 Access Deny
 - .5 Access Grant
 - .6 Entry/Exit Central
 - .7 Audit Trail
- .36 Metasys Integration Option: The Metasys integration option shall allow the PEGASYS 2000 version 2.5 to interface across the BACnet via TCP/IP to the Johnson Controls Metasys Building Management System OPC server supporting either M3 or M5 workstations. It shall further allow the Metasys workstations to view and acknowledge alarms and control output functions from up to five M3 or M5 workstations in real time. This shall allow the user to elect the Johnson Controls Metasys workstation running the M-Alarm graphics to view and interact with alarms generated from the PEGASYS 2000. The Metasys integration shall require no special hardware subset, but rather be a simple upgrade, via software, to allow PEGASYS users to enhance their workstation operations by integrating BACnet communications with the Metasys server.
- .37 Current Loop Configuration: The host server shall allow configuration of Cardkey Legacy D620 and D620-TIU panels. Support of the loop system shall be up to 32 loops with a maximum of sixteen D620 or D620-TIUs per loop.
- .38 Guard tour option: Provides the ability to monitor security personnel by time frame and tour definition. Selected tours may be either randomly selected or fixed. Users shall be able to define up to 256 guard tours with a maximum of three guards per tour.
- .39 Mustering: This feature shall provide the capability of tracking personnel movement in the event of an emergency. During the emergency, all personnel within a risk area are expected to evacuate and are required to badge at a reader outside the risk area. This will allow for real-time monitoring, printed or on-screen, as to who may be still in the hazard area. This information can be used

to direct search and rescue operations. One or more areas within a plant or facility can be designated as Muster Zones.

- .40 Area Control: This feature can be used to control the number of personnel/cardholders that are allowed within a controlled area, thereby allowing large facilities to manage specific areas more easily. For example, a controlled substance room can be monitored, and the system will be able to report and display in real time how many and which cardholders are within the area at any given time.
- .41 MIS Interface Option: This option provides the capability for the SMS to receive cardholder information from an external source (such as a Human Resources database or MIS system). Using the MIS interface and standard ODBC protocols, cardholders and their badges can added, modified or deleted from the P2000 database, cardholder information can be queried using "wildcards", and data imported from ASCII files. Such import/export sessions can occur in either batch or real-time mode.
- .42 Database Partitioning Option: Multi-tenant building control can be supported via database partitioning. Each tenant may be provided with their own user partition capable of controlling and monitoring their own cards, doors, alarms, etc. Building Citys still retain overall control and can override tenant commands if necessary. Building Citys are free to lease workstation "seats" on the security system thereby generating additional revenue while enhancing tenant satisfaction. In a campus environment, each building can be configured as a separate partition with several operations per partition. Each partition appears to the user as a separate security system without incurring an additional cost.
- .43 Support for S320 and D620-AP: (with firmware version PS155B or higher controllers). This feature acts as support for "Threat Levels 0 - 99" and Air Crew PIN numbers for the airport market by allowing the system manager to change access privileges for all cardholders. Threat level takes priority over all other access parameters. Badges with executive privileges are exempt from threat criteria.
- .44 Cotag P900 Mark I and Mark II Controller Support: The features and functionality will be based on the Mark I configuration, meaning that the limits on badges will be limited to the maximum count of the Mark I controller or 30,000 badges with the badge upgrade memory expansion. There are three types of I/O Modules that are applicable: 1) 8 Input and 4 Output; 2) 8 Input and 8 Output; 3) 16 Input.
- .45 Smart Download Feature: This service allows the customer to set the download time for changes that have been made to access and terminal groups. There are three choices:
 - .1 Start download after the system has been idle for "x" minutes after the last change.
 - .2 Download will occur at set time every day.
 - .3 Download to be performed manually.
 - .4 In each case, changes made to the cardholder data are downloaded from the host immediately.
- .46 FDA CFR Part 11: The SMS shall provide functionality to support FDA CDR Part 11 Regulations, concerning electronic records and signatures. The system will have the ability to track database record deletions or record tampering,

record login/logout activities, and monitor password aging and account life-cycle validity.

- .47 Temporary Access feature: This feature only works with Legacy Panels. It allows the customer to define "temporary access" to any valid access group for each individual badge:
 - .1 Start - specifies when, date and time, permission for access is granted. If this is not specified then access is granted immediately.
 - .2 Stop - specifies when, date and time, permission for access expires. If this is not specified then access will not expire.

1.12 SOFTWARE REQUIREMENTS

- .1 The software shall have an installed capacity to accommodate the following at a minimum:
 - .1 A central database on the host server able to support up to 200,000 Badges maximum.
 - .2 Unlimited number of access groups.
 - .3 Unlimited number of passwords groups, each with an unlimited number of operators and their passwords.
 - .4 Up to 17,000 2-state alarm input points, or up to 8,000 4-state alarm input points (or any combination in between).
 - .5 Up to twenty-five (25) operator workstation terminals connected to a host server via an Ethernet TCP/IP network.
 - .6 Central on-line data storage of 500,000 historical transactions, expandable (as system resources allow), with local panel storage capability of up to 200,000 cardholders and 50,000 events.
 - .7 256 levels of alarm priority.
 - .8 A minimum of ten (10) individual badge numbers per cardholder. Each badge shall be tracked separately.
 - .9 Eight (8) issue levels per card, only one of which shall be active at any given time.
 - .10 Unlimited number of user-defined cardholder fields. The system shall be capable of reporting on any or all of the fields. Each field may be defined by the user as either alphanumeric, numeric, date, or logical (yes/no).
- .2 System Software
 - .1 The host server operating system shall be Microsoft Windows 2000 Server. It shall have multi-tasking and multi-user capability, and support workstations with Windows XP Professional or Windows 2000 Professional operating systems.
 - .2 The system database shall be Windows SQL Server 2000 for Windows 2000 Server or SQL Server 7.0 for Windows NT
 - .3 The SMS software features shall be fully documented in the form of a complete User's Manual including operation and installation sections, and a detailed description of the major SMS functions.
 - .4 The SMS shall be capable of partitioning (segmenting) the database which must include, but is not limited to, the following items:
 - .1 Cardholders

- .2 Badges
- .3 Time zones
- .4 Holidays
- .5 Access Groups
- .6 Panels
- .7 Readers/Terminals
- .8 Workstations

1.13 INTEGRATION REQUIREMENTS

- .1 Video imaging system integration. The SMS shall integrate with the Johnson Controls, Inc. P2000 Video Imaging and badging system without the need for custom software development.
 - .1 The integration shall provide for a single database on the SMS host server, which shall store the cardholder data and image fields.
 - .2 The communications between the video capture/badging station and the SMS host shall be via Ethernet TCP/IP only. Serial connections are unacceptable.
 - .3 It shall be possible to operate the Video Badging and Workstation software from the same qualified workstation operating with Microsoft Windows 95 or 98.

Part 2 Product

2.1 GENERAL

- .1 Manufacturers
 - .1 All access control hardware and software shall be of a single manufacturer including host system, controller panels, and input and output terminal modules.
 - .2 Base bid shall be Johnson Controls, Inc. P2000 only. All alternate manufacturers seeking approval shall submit the following documentation to the Division Access Control and Intrusion Detection System Contract Administrator for review ten (10) business days prior to bid.

2.2 HARDWARE REQUIREMENTS

- .1 The minimum system server requirements shall be a standard name brand personal computer with sufficient capacity for the intended purpose. The host computer shall ship factory configured with all software pre-loaded and tested. All computer hardware replacement components shall be available from multiple third party sources. Unless otherwise approved by the manufacturer, the minimum configuration for the host server shall be as defined below for a system capacity of ten workstations, 128 Readers and 15,000 cards:
 - .1 Genuine Intel Pentium IV CPU with a clock speed of 2 GHz or greater
 - .2 512 MB RAM (additional RAM required if P2000 options are included)
 - .3 3.5" floppy disk drive
 - .4 SCSI DAT drive - 4 GB minimum
 - .5 48X speed CD-ROM

- .6 100 GB SCSI hard disk, 7200 RPM
 - .7 1024 x 768 resolution 64K color, video card with 4MB RAM
 - .8 17" SVGA color monitor
 - .9 Standard 101- type keyboard and mouse
 - .10 Two network interface controllers (10/100BaseT Network Controller port) or equivalent.
- .2 System printers shall be provided in the quantities specified or as shown on the drawings. Printers shall be dot matrix, 180 characters per second, bi-directional printers.
- .3 Sub-controllers shall be Johnson Controls, Inc. CK720/CK705 Version 2.0-00 or an approved substitute with the following functionality:
- .1 The sub-controller shall be a fully stand-alone processor capable of making all access control decisions without the involvement of the host computer based on a set of parameters passed to the sub-controller from the host.
 - .2 The sub-controller shall support up to sixteen (16) card readers in addition to either 256 input points or 128 input and 128 output points. It shall further support up to 12 facility codes per reader, 40 unique holidays, 8 access group and time zone pairs.
 - .3 Memory Requirements:
 - .1 Standard number of cards: 600 (supplied in Contract) expandable to 200,000.
 - .2 Minimum number of historical transactions: 5,000 expandable to 50,000 at full card capacity.
 - .4 The controller shall require no firmware changes and shall use flash memory modules to provide non-volatile storage of both data and operational code.
 - .5 The controller shall support the direct connection of a standard dot matrix printer for local transaction and report printing. The printer shall connect to the controller via a built-in serial (RJ45) port.
 - .6 Each controller shall be provided with built-in hardware to support hard-wired communications between the controller(s) and readers of up to 4000 feet per.
 - .7 Communications between the controller(s) and the host server shall be via Ethernet TC/IP at 10Mbps. There shall be an alternate communications path to the host via a secondary IP address such that in the unlikely even the primary IP address / network is down an alternate communications path may be established.
 - .8 An alarm summary relay shall be built-in to the controller motherboard. If so programmed, the alarm relay shall be activated whenever a connected alarm point transfers to the alarm state and whenever soft alarms become active.
 - .9 A SPDT tamper switch shall be attached to the inner surface of the controller enclosure. The tamper switch shall change state whenever the enclosure door is opened to signal the SMS of the condition. The tamper switch input shall be user programmable to be suppressed, to be recognized as an input point to be process by the alarm queue at the host computer, to printout at an optional printer connected directly to the controller, and to activate the alarm summary relay described above.
 - .10 The standard AC linear power supply version of the controller shall include a battery module to back-up the controller's applications programs and database for

30 days after the failure of the primary AC power service. The controller database, the time clock, the transaction history, and all operator entered parameters shall be backed-up by the battery.

- .11 The controller(s) shall be furnished with an UPS battery configuration instead of a standard AC linear power supply configuration. The battery shall power the controller upon failure of the primary AC service for a minimum of three hours.
 - .12 While on UPS service, the controller shall continue to process event activity, card transactions, and record history transactions.
 - .13 The controller shall provide built-in LED to indicate whether the controller is properly communicating with the host computer.
- .4 Alarm monitoring and Output Control terminal boards. Intelligent alarm monitoring and output control terminal boards shall be Johnson Controls, Inc. plug-in modules to the CK720 sub-controller with the following functionality:
- .1 Sixteen two-state alarm input points.
 - .2 Eight four-state supervised alarm input points.
 - .3 Eight two-state alarm input points and eight SPDT output relays.
 - .4 Eight four-state supervised alarm input points and eight SPDT output relays.

2.3 CARDS AND CARD READERS

- .1 General
 - .1 All readers shall be configured with the reader electronics mounted separately, on the "secure" side of the door such that only the reader head and pilot lights are mounted in the reader housing on the "entry" side of the door.
 - .2 Proximity Technology - Furnish and install the reader style as shown on the drawings or as called for in this Specification:
 - .1 Standard range Proximity 4000 reader (contact to 20 in.)
 - .1 The reader shall be integrated and contain all reader electronics inside a single polycarbonate enclosure.
 - .2 The reader shall operate when mounted on a variety of surfaces, including metal. Maximum read range degradation when mounted on a metal surface shall be 50-percent.
 - .3 The reader shall contain an integral color LED and audio tone to indicate if the card has been successfully read.
 - .4 The reader shall be 8" x 8" x 2" maximum.
 - .5 Read range shall be dependent on model selected.
 - .6 The reader shall be rated for normal operation from -5 to 150°F.
 - .7 The proximity card shall be encased in sealed plastic with a surface suitable to receive an adhesive backed photo ID or shall be capable of direct printing.
 - .3 Mullion Style Proximity Readers
 - .1 The reader shall be integrated and contain all reader electronics inside a single polycarbonate enclosure.

- .2 The reader shall operate when mounted on a variety of surfaces including metal. Maximum read range degradation when mounted on a metal surface shall be 50-percent.
 - .3 The reader shall contain an integral color LED and audio tone to indicate if the card has been successfully read.
 - .4 The reader shall be 1.7" x 6" maximum.
 - .5 Read range shall be up to 5".
 - .6 The reader shall be rated for normal operation from -5 to 150°F.
 - .7 The proximity card shall be encased in high impact sealed plastic with a surface suitable to receive an adhesive backed photo ID.
- .4 Extended Range Readers
- .1 To be HID "Maxi-Prox", read up to 8ft. c/w 100 Prox Pass active vehicle tags.

Part 3 Execution

3.1 DELIVERY, STORAGE, AND HANDLING

- .1 SMS components shall be shipped to the job-site in original manufacturer's shipping containers.
- .2 All shipping and handling costs shall be paid for by the Contractor at no additional cost to the City.
- .3 All equipment stored on the job site shall be secured in a locked storage area as designated by the Contractor.
- .4 The contractor may receive a progress payment for the value of the equipment stored on site if adequate storage space is available.

3.2 INSTALLATION REQUIREMENTS

- .1 All consoles, terminals, and controllers shall be factory wired before shipment to the job site.
- .2 Cabinet doors shall open a minimum of 170 degrees to avoid blocking personnel movement. Each door shall be equipped with a cylinder lock, a tamper switch and a piano-type hinge with welded tamperproof pins.
- .3 Provisions shall be made for field wiring to enter the cabinet via standard knockouts at the top, bottom and sides of controller cabinets.
- .4 Each wire shall be identified at both ends with the wire designation corresponding to the wire numbers shown on the wiring diagrams.
- .5 All exposed wiring within the cabinets, consoles, and terminals shall be formed neatly with wires grouped in bundles using non-metallic, flame-resistant wiring cleats or wire ties.
- .6 All ferrous metal work shall be painted, in accordance with the manufacturer's standards.

3.3 TESTING AND COMMISSIONING

- .1 The Contractor shall be responsible for testing and commissioning the installation in accordance with all applicable documents in the Contract set.
- .2 Testing shall be comprehensive and sufficient to demonstrate compliance with each requirement.
- .3 A proposed test plan shall be submitted to the Contract Administrator for approval before commencement of final test.
- .4 Final tests shall be conducted in the presence of the. Contract Administrator.

3.4 TRAINING AND INSTRUCTION

- .1 Operator training shall consist of a two-day course conducted on-site by a factory trained professional instructor. Training conducted by unqualified personnel is unacceptable.
- .2 Training materials shall consist of the following:
 - .1 Formal course outline and agenda
 - .2 Operator training student guide for each student.
 - .3 Hands-on practice with on-line equipment.
 - .4 Written examinations.
- .3 The training course shall be for at least two continuous business days.
- .4 Additional video imaging training sessions shall be made available to the City if necessary, at additional cost.

3.5 WARRANTY

- .1 All equipment furnished under this contract shall be warranted for a period of twelve (12) months from the date of final City acceptance of the system.
 - .1 Respond to service requests on-site, if required.
 - .2 Replace or repair defective components as required.

3.6 SERVICE CONTRACT PROPOSAL

- .1 The bidder shall include an optional service contract proposal at the time of bid. The proposal shall include:
 - .1 Response to emergency service requests on-site, if required.
 - .2 Replace or repair defective components, as required.
 - .3 Manufacturer's recommended preventive maintenance.

- .4 Two-year and five-year maintenance contract, with price, terms, and conditions shown for each year.
- .5 The service contract shall be optional and the City shall have the right to accept or reject the contract, and accept only the warranty service as described above, at no additional cost.

End Of Section

Part 1 General

1.1 GENERAL

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Common Work Results-Electrical Section 26 05 00
- .2 Intercom System Section 27 51 30

Part 2 Products

2.1 GENERAL

- .1 Supply and install a closed circuit TV system with all conduit, wire, outlets, and equipment as shown on the drawings and as herein specified to provide a complete closed circuit TV system in the building.

2.2 SYSTEM OVERVIEW AND FUNCTIONS

- .1 The system shall consist of a series of interior CCTV cameras, protective camera housings, exterior pan-tilt-zoom CCTV cameras, c/w all accessories for a closed circuit TV surveillance system, digital video recorders, 16 cameras each (3 required), 1-Mini UPS APC # RS1500 per DVR, 20" video monitors (flat screen), wiring installed in a dedicated conduit system.
- .2 Room G206 "Shift Supervisor" shall contain 2 video monitors dedicated to the system. Refer to the riser diagram. The system shall be designed to capture and save events when individual cameras are programmed to save their images. Other cameras may only be used to view events (not save events). All individual camera programming will be provided as directed by the Contract Administrator during system set up and training. The DVR shall be connected to the building LAN and it shall be possible that a staff member with a desk top PC connected to the LAN, may view CCTV camera images on this system.
- .3 Four 20" monitors located in Room G208 will be used to monitor the persons in 'roudy' rooms.

2.3 CCTV CAMERAS

- .1 Fixed Type/Dome Cameras
 - .1 Cameras shall be Panasonic #WV-CW244S.
- .2 WV-CW244S
 - .1 The surface mounted vandal resistant digital signal processing (DSP) mini dome color CCD cameras shall be a Panasonic Model WV-CW244S. The WV-

CW244S camera shall incorporate a 1/3" interline transfer CCD, 380,000 [768(H) x 494(V)] pixels effective, with a microlens on each pixel, and high sensitivity of 1.0 lux at f/1.4 (clear dome). The camera shall also achieve a sensitivity of 2.4 lux at f/1.4 (smoked dome). The camera shall display outstanding 480 lines of horizontal resolution and a S/N ratio of 50dB with AGC off.

- .2 The camera's imager and lens assembly shall rotate on a three-axis hinge capable of Pan 320°, Tilt 150° and Azimuth 320° adjustments for optimal camera positioning. The camera shall be able to be semi-flush mounted on a wall or ceiling using a standard double-gang electrical box. The WV-CW244S camera shall feature a rugged weatherproof exterior housing meeting IP66 rating. The WV-CW244S vandal resistant camera shall feature a local monitor output jack for on-site picture and positioning adjustments.
- .3 The camera shall feature intelligent digital back light compensation, digital wide dynamic range circuit and digital noise reduction for surveillance purposes under severe conditions. For better picture quality, the camera shall feature digital 2H enhancer, digital aperture correction, knee circuit and digital white detective ATW.
- .4 The WV-CW244S camera shall incorporate a 1/3", automatic iris, and 2X variable focal lens with a focal length of 3.8-8mm (2.1 X). The lens shall be suitable for use in areas where there is a varying light source. The lens shall have a maximum aperture ratio of 1:1.4 (wide), 1:1.8 (telephoto). The unit shall have an angular field-of-view of 35 degrees telephoto and 73 degrees wide (horizontal), and 26 degrees telephoto and 53 degrees wide (vertical).
- .5 The video and synchronization signal shall be transmitted up to 3000' over coaxial cable (Belden 9259 or equivalent), when used with the Panasonic model WJ-FS616C/WV-PB6164 multiplexer with control kit, matrix system model WJ-SX550C, matrix system WJ-SX850, single camera controller, model WV-CU161 and multiple camera controller Model WJ-MP204C, when used with Model WV-CU360 controllers. Equivalent coaxial cable used shall feature a DC resistance rating of less than 15 ohm/1000', solid copper center conductor and 95% braided, pure copper shield. VD2 shall provide roll free picture switching regardless of power supply phase. The power source for the WV-CW244S shall be 24VAC, 60Hz. All units must be UL listed.

2.4 WEATHERPROOF AND VANDAL RESISTANT COLOUR DOME CAMERA

- .1 To be Panasonic #WV-CW964.
- .2 Weatherproof housing, 360° high speed PTZ, 30X optical zoom, auto image stabilizer, scene change detection, auto tracking, built-in sun shield, heater, auto B&W mode at night, .04 FC colour, .004 FC B&W mode, auto focus.
- .3 64 presets.

2.5 CCTV MONITORS (17")

- .1 CCTV monitors shall be Panasonic #WV-LD2000.
 - .1 640 x 480 VGA.
 - .2 3 channel video inputs (composite A/B or S-video).

- .3 Built-in Panasonic security data link connector.
- .4 1.5W speaker output.
- .5 Rack mount adapter, 19" rack.
- .6 120V, 73W.
- .7 NTSC, PAL

2.6 CCTV MONITOR MOUNTS

- .1 CCTV monitor mounts to be Pelco #MR4050 c/w all options and accessories as required.
 - .1 Steel, black powder coat finish.
 - .2 150 lbs capacity.
 - .3 19" to 31" adjustable width.
 - .4 Mounting adapter.

2.7 DIGITAL DISK RECORDER (DVR)

- .1 DVR's to be Panasonic #WJ-HD316A.
 - .1 General
 - .1 Power Source: 120V AC, 60 Hz.
 - .2 Power Consumption (approx.): 85W
 - .3 Ambient Operating Temperature: -10°C - +45°C (14°F - 113°F)
 - .4 Ambient Operating Humidity: Less than 90%
 - .5 Standard Hard Disk Drive Unit: 1 bay (1 TB)
 - .6 Drive Bay for additional HDD Unit: 7 required (2 TB each)
 - .7 Dimensions (W x H x D): 420 x 88 x 350mm (16-9/16" x 3-7/16" x 13-3/4")
 - .8 Weight (approx.): 9.5 kg (20.9 lbs)
 - .2 Input/Output
 - .1 Video
 - .1 Video Input:
 - .1 1Vp-p/75 ohm, NTSC composite video signal with automatic termination/looping through, multiplexed control data, 8-input (1-8ch)*1 (BNC)
 - .2 1Vp-p/75 ohm, NTSC composite video signal with automatic termination/looping through, 8-input (9-16ch)*2 (BNC)
 - .2 Cascade Input: 1Vp-p/75 ohm (BNC)
 - .3 Video Output:
 - .1 1Vp-p/75 ohm, NTSC composite video signal/ active looping through, 8-input (1-8ch)*1 (BNC)
 - .2 1Vp-p/75 ohm, NTSC composite video signal with automatic termination/looping through, 8-input (9-16ch)*2 (BNC)
 - .4 Monitor Output: 1Vp-p/75 ohm, 2 terminals (BNC)
 - .5 Monitor Terminal (VGA): RGB output, 1 terminal (D-sub 15-pin)

- .6 S Video Output: $Y=1V_{p-p}/75$ ohm, $C=0.286V_{p-p}$, 1 terminal (S terminal)
- .7 Video Output (front panel): $1V_{p-p}/75$ ohm, 1 terminal (Pin jack)
- .2 Audio
 - .1 Audio Input: -10dB, 10K ohm, 4 terminals (Pin jack)
 - .2 Audio Output: -10dB, 600 ohm, unbalanced, 2 terminals (Pin jack)
- .3 Others
 - .1 External Storage Terminal: High speed serial interface (approx. 480 Mbps), 1 terminal
 - .2 Copy Terminal: High speed serial interface (approx. 480 Mbps), 2 terminals
 - .3 Control Terminal: Emergency recording input, Disk end status output, HDD emergency output, camera emergency output, emergency output, power off output, time adjustment input/output, sequence select input/output, power inspection input, external storage unit recording mode select (D-sub, 25-pin)
 - .4 Alarm Connector: 1-8ch*3 alarm input, 9-16ch*4 alarm input 1-16ch*5 alarm output, alarm recover input, alarm suspend input, (D-sub, 25-pin)
 - .5 RS485 Port: RS485 (4line/2line), 2 terminals (RJ-11)
 - .6 Data: RS485, 2 terminals (RJ-11)
 - .7 Serial Port: RS232C, 1 terminal (D-sub, 9-pin)
 - .8 Network Interface Port: 10 Base-T/100Base-TX (RJ-45)

2.8 SYSTEM CONTROLLERS

- .1 The system controller shall be Panasonic #WV-CU650.
 - .1 The system controller enables the following functions:
 - .1 Camera selection
 - .2 Alarm (LED/Suspend/Recall/Reset)
 - .3 Setup menu

2.9 CCTV MATRIX

- .1 The Matrix System shall be a Panasonic WJ-SX650 Main Card Cage, WJ-SX650U Expansion Card Cage and WV-CU650 System Controller.
- .2 This CCTV switching and control system is engineered to integrate CCD cameras, time-lapse VCRs, monitors and peripheral products into a comprehensive CCTV system. All control, video and timing signals (VD2) shall be multiplexed over a single coaxial cable allowing synchronization of all CCD cameras used on this project. The system shall fully control integrated camera device Series WV-CS954 and all the onboard electronic functions of Panasonic's intelligent CCD cameras such as the WV-CW474AS Series. Built-in cable compensation circuit on every input channel shall provide high quality picture, control and synchronization of up to 3000' of RG-59/U cable (Belden 9259 or equivalent). The system's extensive program capability shall include versatile camera sequences, alarm mode, time/date event scheduling, password protection, operator's access level, priority and system partitioning, providing outstanding flexibility. 1000 camera presets shall be able to be directly accessed via the System Controller, WV-

CU650. The controller WV-CU650 shall be used for setup, camera control and video routing. The controller unit's multi line character LCD display and function keys shall provide direct menu access to Panasonic Unitized Surveillance Device Series WV-CS954. Rack-mount brackets shall be included. Modular construction shall enable up to 256 camera inputs and 32 monitor outputs. The system shall have 32 inputs and 16 outputs as standard configuration; by adding 32-channel video input board (WJ-PB65C32) and 16-channel output board (WJ-PB65M16), the system can be expanded to meet future surveillance needs. Up to 4 WV-CU650 controllers can be connected to the system. The WJ-SX650 System shall provide multiple, isolated looping outputs that may be used for alternate monitoring locations.

- .3 Alarm modes shall be automatically enabled or disabled by time of day and day of the week. Page ID display on System Controller shall indicate menu page selection for simplified programming and menu navigation. Digital Video Recorder Control with Model WJ-HD316A shall include Real-time Multiscreen Display control (each image at 60 ips refresh rate), Recorder Playback control and search functions. Real-time multiscreen display shall be available on any monitor connected to the WJ-SX650 system when Model WJ-HD316A Recorders are used.
- .4 The built-in RS-232C port shall permit up and downloading of the system data for back-up and restore purposes with a PC. The system can be controlled and programmed through the RS-232C port with the administration software. The power source shall be 120VAC, 60Hz. The system shall be UL listed.

2.10 POWER SUPPLY

- .1 Power supply to be sized 150% on each branch to accommodate future expansion.

2.11 EQUIPMENT RACK

- .1 Standard 19" rack c/w wire management on both sides. Refer to Detail.

2.12 WIRING

- .1 All wiring shall be copper/coaxial type supplied by system vendor. The electrical contractor shall install all CCTV wiring as per system vendors requirement.
- .2 Final termination and testing of cables to be by system vendor.

Part 3 Execution

3.1 GENERAL

- .1 Locate, install, wire and connect all components and devices in accordance with the requirements of the manufacturer.

3.2 MOUNTING OF EQUIPMENT

- .1 Mount equipment at heights as described in Section 26 05 00.

- .2 Mount equipment square and plumb with building lines. Install devices flush and square with finished surfaces.

3.3 TERMINATION OF CONDUCTORS

- .1 Terminate conductors directly to the terminals of each device.

3.4 IDENTIFICATION

- .1 Identify equipment as per Section 26 05 00.
- .2 Clearly identify zones on control panels, devices, etc.
- .3 Identify wires and cables with wire markers to indicate zone numbers. Identify wiring in each box, panel, cabinet etc. Coding of identification to meet with the approval of the Contract Administrator.

3.5 WIRING AND CONDUIT

- .1 Install wiring in an independent conduit system.
- .2 Install device backboxes to form part of the conduit system. Conduit to be sized to accommodate the wiring being installed.

3.6 TESTING

- .1 The complete system shall be tested in the presence of the Contract Administrator and the City of Winnipeg's representative on completion of the Work. Tests shall demonstrate that the CCTV System will function in an acceptable manner.

3.7 INSTALLATION

- .1 Install equipment in accordance with manufacturer's instructions.

3.8 TESTS

- .1 Perform tests in accordance with Section 26 05 00.

End Of Section

Part 1 General

1.1 GENERAL

- .1 All drawings and all sections of the specifications shall apply to and form an integral part of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Common Work Results-Electrical Section 26 05 00
- .2 Video Surveillance System Section 28 23 00

Part 2 Products

2.1 GENERAL

- .1 Provide a digital audio/video PC-software based recording system to be used in police interview rooms. The system shall provide a digital method of capturing, storing, accessing, copying and transcribing digitally-recorded audio/video.
- .2 General Requirements:
 - .1 The system shall be a software-based product running on a PC in the Microsoft Windows operating system environment.
 - .2 The system must not require any vendor proprietary hardware components including sound and video cards.
 - .3 The system shall be user-friendly and designed for inexperienced computer users.
 - .4 The system shall perform up to 4-channel audio and single channel video recording on a single desktop or notebook PC for each interview room. The system must provide an appropriate level of redundancy and fault tolerance.
 - .5 The system will record audio/video to the local PC hard disk and simultaneously to an external hard disk connected to the local PC or a disk or disk array connected to the Local Area Interview Room Network (LAN).
 - .6 The system will have the capability to archive to a Local Area Network (LAN) or a CDR/DVD disk on the local PC. The system will provide automatically, spanning over multiple DVD's or CDR's for recordings that exceed the available space on a CDR or DVD. The PC shall be capable of recording 4 disks (CD/DVD) simultaneously.
 - .7 The system will also allow for the movement of recorded audio and video via removable media such as, but not limited to CD-R, flash memory drive, DVD or file transfer/access across a LAN.
 - .8 The system shall produce an audio/video recording that can be played using a no cost player application available through the Internet. The player shall be able to isolate up to four channels of audio individually or a mixed combination of four channels. The player must have a transcription capability for use with a foot control and allow a minimized view with video showing in a small window off

the Windows toolbar. The system shall NOT require a database to store and retrieve audio/video files and shall NOT use database software architecture.

.3 Specific Requirements:

- .1 The software must offer separate software modules allowing optional functionality such as annotating, access to or copying of audio/video. This modular functionality must allow the user to annotate and link audio/video recordings after they have occurred and on a separate PC from the recording PC.
- .2 The recording software shall allow the user to confidence monitor the audio/video recording with the audio/video playing back on the recording PC display within three seconds of the recording. This ongoing playback must be a true playback from the local hard disk and not a buffer or display of the audio/video input.
- .3 Audio/video files must be created and named in such a way that the user can select specific audio/video using location, date and time as the identifiers.
- .4 Audio/video must be recorded in five minute segments. These segments must not be seen by the user when audio/video is recorded, archived or played back. The user must see the completed recording as one file.
- .5 The recording software shall run on a PC and allow for other software applications to run on that PC at the same time as recording is taking place. In addition, the software shall allow the user to minimize the recording application while providing a visual indication on the PC display that recording is functioning.
- .6 The recording software shall allow the user to access recorded files from another time, another interview room, or earlier in the recording session and save all or portions of the audio/video to other locations such as a Local Area Network (LAN) or removable media.
- .7 The software shall allow the user to access audio/video recorded earlier in the current recording session or from a prior session. The software shall have the ability to play audio/video from any point in time while the software continues to record.
- .8 The recording software must allow options for file size. The maximum file size for full screen video must not exceed 400MB of space per hour with one channel of audio and 450MB per hour with 4 channels of audio.
- .9 The playback software shall be available as a separate module that must be provided at no cost to all potential users of the audio/video. This software must be available through a website on the Internet. The playback software must operate in Windows XP and Windows Vista operating system environment.
- .10 The playback software must allow full screen video playback.
- .11 The playback software must link to Microsoft Word and allow Microsoft word documents to scroll with the audio/video as playback occurs.
- .12 The playback software must allow keyboard hotkey control of all playback and audio volume control functions.
- .13 The playback software must allow the user to turn video on and off without closing the playback application and allow audio playback without video showing even if video is available in the recording.
- .14 The playback software shall allow users to access audio/video from anywhere on a Local Area Network (LAN) or digital media such as, but not limited to, DVD,

CDR or flash memory. This software shall provide the ability to isolate audio channels during playback. The software shall provide the ability to change the volume of playback on individual audio channels. The playback software shall allow the use of an optional foot control to stop, start, rewind and fast-forward the audio/video. In this transcription mode the software must allow an adjustable auto-backspace when the play is released on the foot control.

- .15 A software module shall be provided to allow the reformatting of digital audio/video to Windows Media Format.
 - .16 The recording software shall allow the user to choose its own method of creating annotations or notes. User options for annotated notes must include handwritten notes.
 - .17 This annotation application must be usable by police, clerks and lawyers who are not connected to the recording system. The annotations must be stored in XML format. The software must allow the user to create custom keyboard shortcuts to facilitate rapid text entry. The annotation application shall allow rapid search and retrieval of any entry including a note taken, name of proceeding, location of proceeding, date of proceeding, or any combination thereof.
 - .18 The annotation application shall provide links on each note entry directly back to the audio/video recording. This linking must be portable to allow audio/video links in htm, pdf and Microsoft Word documents.
- .4 Turnkey application PC hardware requirements:
- .1 The PC supplied as part of the solution must be able to run the proposed application with the addition of the following requirements.
 - .1 The PC must be running the Microsoft Windows XP Pro operating system.
 - .2 The PC must provide 4 - internal dual layer DVD/CD burners.
 - .3 The solution must provide an external USB hard disk as a backup drive for the audio/video recordings.
 - .4 The solution must allow a composite video and line level audio input.
 - .5 The solution must provide a 17" flat panel display.

2.2 EQUIPMENT

- .1 Server: (1 per interview room plus 1 spare)
 - .1 P4 3.4GHz processor (800Hz 2x2MB Cache)
 - .2 512MB memory (2x 256MB DDR2-533 Non-ECC Dimm)
 - .3 Liteon 18x DVDRW Burners
 - .4 Nero Suite 2 Dolby 2 Channel decoding/Royalty/MPEG2 Patent
 - .5 Integrated Video Component
 - .6 Integrated Sound for Parnerlink
 - .7 Microsoft Windows XP Pro
 - .8 Rackmount Case
 - .9 Antec LX-44 PCI Audio Capture Card
 - .10 Hauppauge Impact VCB PCI Full Height #558 GC0172
 - .11 Integrated LAN

- .12 300Watt Power Supply with Rifle Fan 12cm
- .13 Three year Parts Warranty
- .2 Desktop PC: (9 required plus 1 spare)
 - .1 Intel BLKDG965RYCK 1066/800 ATX/DDR2/SATA/PCIE/X/3000/GBLAN
 - .2 Windows XP Pro (Vista Capable)
 - .3 Intel P4 3.4GHz processor (800MHz 2X2MB L2 Cache)
 - .4 512MB memory (2x 256MB DDR2-533 Non-ECC Dimm)
 - .5 2 – Seagate ST325082AS 500GB SATA 7200RPM Drive (one is a mirror)
 - .6 4 – Liteon 18x DVDRW Burners
 - .7 Nero Suite 2 Dolby 2 Channel Decoding/Royalty/MPEG2 Patent
 - .8 Integrated Video Component
 - .9 Integrated sound for Partnerlink
 - .10 Noblecasa TS082-B ATX Mid Tower Black/Silver
 - .11 Microsoft Q95-00087Basic PS/2 Black Keyboard
 - .12 Microsoft Black Optical Mouse USB/PS2 MS9010
 - .13 Three year Parts Warranty
- .3 Monitor: (for Desktop PC)
 - .1 BenQ FP202W 20” LCD Monitor w/integrated speakers
 - .2 Screen Size 20"
 - .3 Resolution 1680 x 1050 (WSXGA+)
 - .4 Pixel Pitch 0.258 mm
 - .5 Brightness 300 cd/m2
 - .6 Contrast Ratio 600:1
 - .7 Response Time 8ms (5 + 3)
 - .8 Display Area 433.4 × 270.9 (mm)
 - .9 Display Color 16.7 million
 - .10 Viewing Angle 140/130 (CR>=10)
 - .11 Input Signals D-Sub/DVI-D
 - .12 Horizontal Frequency (KHz) 31 - 81
 - .13 Vertical Frequency (Hz) 56 - 76
 - .14 Video Bandwidth (MHZ) 25 - 165
 - .15 Color Temperature Reddish/Normal/Bluish + user mode
 - .16 Power Consumption 60W (max)
 - .17 Power Supply Built-in
 - .18 Product Color No
 - .19 Features Vesa Wall Mounting (100 x 100 mm)
 - .20 i-Key
 - .21 Kensington Lock
 - .22 Adjustments (UP/DOWN) Tilt -2/20
 - .23 Dimensions (WxHxD) 396.7 x 479.6 x 169.9mm

- .24 Weight 5.7 kg
- .25 Accessories (Standard) Black
- .26 Accessories (Standard) VGA and DVI cable (it will depend on the area)
- .27 Emission Standard TCO99
- 4 KVM SWITCH
 - .1 16 port KVM switch: Belkin F1DA116T-B Pro 2 16 Port KVM Switch
- 5 LAPTOP
 - .1 Acer Aspire # AS9300
 - .2 AMD Turion 64 1.6GHz
 - .3 1GB DDR2 RAM
 - .4 160GB HDD
 - .5 DVD-RW Drive
 - .6 17" WXGA Display
 - .7 802.11b/g wireless
 - .8 MS Windows XPMCE
- .6 Interview Room CCTV Cameras
 - .1 Panasonic # WV-CW474AS
 - .2 The surface-mounted vandal resistant digital signal processing (DSP) Super Dynamic II mini dome color CCD cameras shall be a Panasonic Model WV-CW474AS. The WV-CW474AS camera shall incorporate a 1/3" interline transfer Super Dynamic II CCD, 380,000 [768(H) x 494(V)] pixels effective, with a microlens on each pixel, and high sensitivity of 0.8 lux at f/1.4 (Color Mode, clear dome) and 0.1 lux at f/1.4 in (Black & White Mode, clear dome). The camera shall also achieve a sensitivity of 1.6 lux at f/1.4 (Color Mode, smoked dome) and 0.2 lux at f/1.4 in (Black & White Mode, smoked dome). The camera shall display outstanding 510 lines of horizontal resolution in Color Mode, 570 lines of horizontal resolution in Black & White Mode and a S/N ratio of 50dB with AGC off.
 - .3 The camera's imager and lens assembly shall rotate on a three-axis hinge for optimal camera positioning. The camera shall be able to be mounted on a wall surface or hard ceiling surface using a flush-mounted, double-gang electrical box. The WV-CW474AS camera shall feature a rugged weatherproof exterior housing meeting IP66 rating. The WV-CW474AS vandal resistant camera shall feature a local monitor output jack for on-site picture and positioning adjustments.
 - .4 The WV-CW474AS camera's Super Dynamic II CCD shall be charged with long and short charges, creating both standard shutter speeds and fast shutter speeds simultaneously, on a single image field. The Super Dynamic II CCD shall automatically apply each exposure pattern to bright and normal areas. The Super Dynamic II CCD shall feature images with a dynamic range of up to 64 times. The WV-CW474AS camera shall feature a built-in digital motion detector with a 48-section mask and level adjustment capability within the compact body. The camera shall also feature intelligent digital back light compensation, digital wide dynamic range circuit, digital noise reduction and electronic sensitivity-up for real surveillance purposes under severe conditions. For better picture quality, the

camera shall feature digital 2H enhancer, digital aperture correction, knee circuit and digital white detective ATW. The camera shall also offer a user-configurable AWC setting for white balance at a manual setting.

- .5 The WV-CW474AS camera shall feature a Black & White mode that may be automatically engaged on low light level, permit the use of an external infrared illuminator or manually selected. The camera shall incorporate independent automatic Color-to-Black & White switching modes for switchover on light threshold and sensitivity to IR illumination in the 800 nm wavelength (Auto1 and Auto2). Each Color-to-Black & White switching mode shall incorporate two switching threshold light levels, high and low. Each Color-to-Black & White switching mode shall incorporate three duration settings for automated switchover. The camera's video image may be manually changed to upside-down mode to facilitate certain mounting and other applications.
 - .6 The WV-CW474AS camera shall incorporate a CS-mount, 1/3", automatic iris, 2X variable focal lens with a focal length of 3.8-8mm (2.1X). The lens shall be suitable for use in areas where there is a varying light source. The lens shall have a maximum aperture ratio of 1:1.4 (wide), 1:1.8 (telephoto). The unit shall have an angular field-of-view of 35 degrees telephoto and 73 degrees wide (horizontal), and 26 degrees telephoto and 53 degrees wide (vertical).
 - .7 The WV-CW474AS camera imager shall also feature 2X digital zoom for a total magnification of 4.2X. The camera imager shall incorporate a remotely accessible on-screen menu to adjust pan and tilt of the imager to achieve accurate post-installation adjustment.
 - .8 The WV-CW474AS shall offer a user-friendly on-screen setup and adjustment of ALC/ELC, electronic shutter speed, Auto Gain Control (AGC) plus many other features. The camera's built-in shutter shall feature setting of off, 1/100, 1/250, 1/500, 1/1000, 1/2000, 1/4000 and 1/10000 sec. A special menu shall allow fine adjustment of chrominance, pedestal and aperture level. The WV-CW474AS shall provide a variety of synchronization modes. They shall provide color genlock to help ensure optimum performance with image processors and screen splitters.
 - .9 The video, on-screen camera menu and synchronization signal shall be transmitted up to 3000' over coaxial cable (Belden 9259 or equivalent), when used with the Panasonic model WJ-FS616C/WV-PB6164 multiplexer with control kit, matrix system model WJ-SX550C, matrix system WJ-SX850, single camera controller, model WV-CU161 and multiple camera controller Model WJ-MP204C, when used with Model WV-CU360 controllers. Equivalent coaxial cable used shall feature a DC resistance rating of less than 15 ohm/1000', solid copper center conductor and 95% braided, pure copper shield. The camera shall adjust automatically to temperature fluctuations when used with Panasonic Heater unit WV-CW3H.VD2 shall provide roll free picture switching regardless of power supply phase. The power source for the WV-CW474AS shall be 24VAC, 60Hz or 12V DC. All units must be UL listed.3
 - .10 Corner mount adapters shall be Panasonic # PCMA474F
- .7 Interview Room Microphones - Desktop
- .1 To be by : Louroe Electronics, # Verifact L-DT , desktop microphone
 - .1 2 opposing built-in microphones
 - .2 Low impedance omni-directional pattern

- .3 ABS housing
- .4 Weighted non-slip bottom
- .5 Pre-amp for line level input
- .6 Provide 10 ft cord, plug-in jack on wall @ desk location
- .8 Interview Room Microphones – Ceiling
 - .1 To be by : Louroe Electronics, # Model B microphone
 - .1 single built-in microphone, c/w extension cable (3-10 inches)
 - .2 Low impedance omni-directional pattern
 - .3 ABS housing
 - .4 Pre-amp for line level input c/w sensitivity switch to lower gain
 - .5 This Mic to be installed concealed in light fixtures within the interview room. Coordinate with fixture supplier as required.
- .9 Time Date Generator
 - .1 To be by : Pelco # TDG200DT, Time Date Generator, or approved equal
 - .1 Display is positionable within 100% of active screen
 - .2 Front panel controls
 - .3 99 Year calendar
 - .4 Battery backup
 - .5 Rack Mount
 - .6 Jitter free display
- .10 Picture In Picture
 - .1 To be by : Kramer # PIP200x1
 - .1 Controls are front mounted
 - .2 Built in Proc Amp – allows control of each input for brightness / contrast / saturation.
 - .3 2 Memory locations for presets
 - .4 2 input, 1 output
 - .5 10 bit resolution
- .11 System Software
 - .1 Software for the Interview room systems (9 plus Spare) shall be as provided by “For The Record” (FTR “Interrogator PLUS” ver. 4.1 or latest version)
 - .2 The software will allow users to :
 - .1 Integrate CCTV cameras & Microphones in an interview room
 - .2 Create linked notes while viewing live interviews, or previously recorded interviews.
 - .3 Isolate / duplicate / playback specific segments of interviews.
 - .4 Instant access to recorded segments
 - .5 Simplifies transcript translation using integrated software record player
 - .6 Time / Date watermark on each recorded frame
 - .7 Compatible with Microsoft “Wordlink”

- .12 Wiring
 - .1 Camera wiring to be copper/coaxial type Provo #5909ASV as supplied by system vendor.
 - .2 Wiring to be installed by the electrical contractor as per system vendors requirements.
 - .3 Final terminations and testing of CCTV cables to be by system vendor.

Part 3 Execution

3.1 GENERAL

- .1 Locate, install, wire and connect all components and devices in accordance with the requirements of the manufacturer.

3.2 MOUNTING OF EQUIPMENT

- .1 Mount equipment at heights as described in Section 26 05 00.
- .2 Mount equipment square and plumb with building lines. Install devices flush and square with finished surfaces.

3.3 TERMINATION OF CONDUCTORS

- .1 Terminate conductors directly to the terminals of each device.

3.4 IDENTIFICATION

- .1 Identify equipment as per Section 26 05 00.
- .2 Clearly identify zones on control panels, devices, etc.
- .3 Identify wires and cables with wire markers to indicate zone numbers. Identify wiring in each box, panel, cabinet etc. Coding of identification to meet with the approval of the Contract Administrator.

3.5 WIRING AND CONDUIT

- .1 Install wiring in an independent conduit system.
- .2 Install device backboxes to form part of the conduit system. Conduit to be sized to accommodate the wiring being installed.

3.6 TESTING

- .1 The complete system shall be tested in the presence of the Contract Administrator and the City of Winnipeg's representative on completion of the Work. Tests shall demonstrate that the CCTV System will function in an acceptable manner.

3.7 INSTALLATION

- .1 Install equipment in accordance with manufacturer's instructions.

3.8 TESTS

- .1 Perform tests in accordance with Section 26 05 00.

End Of Section

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate:
 - .1 Mounting method and dimensions.
 - .2 Layout of identified internal and front panel components.
 - .3 Enclosure types.
 - .4 Wiring diagrams.
 - .5 Interconnection diagrams.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for motor starters for incorporation into manual specified in Section 01 78 10 - Closeout Submittals.

1.4 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 10 - Closeout Submittals.

Part 2 Products

- .1 The perimeter fence vibration sensor system shall consist of a piezoelectric type coaxial electric sensor cable and a two dual-zone signal processors (East/West/North/South).
 - .1 The sensor cable shall be attached to the fence with ultraviolet resistant cable ties at twelve-inch intervals (cable ties to be furnished by the manufacturer).
 - .2 The fence movement and the fence cut detection portion of the sensor system will be a piezoelectric coaxial cable sensitized to become a vibration detector. The sensor cable shall have equal sensitivity throughout its entire length; have only one variable sensitivity adjustment throughout its entire length, and be capable of having a maximum length of 500 meters per zone. The jacket covering of the sensor shall have maximum ultraviolet resistance protection.
 - .3 Each zone of the system shall be capable of accepting up to 500 meters of insensitive coaxial cable in addition to the 500 meters of sensitive piezoelectric coaxial cable. The system shall also accept installation of the coaxial cable at random intervals and random lengths up to a total of 500 meters at any point or points within the detection zone. Detection sensitivity in the sensitive region shall not be compromised by the presence of insensitive cable in the zone.
 - .4 Both sensitive and insensitive cable types shall be supplied in 50m, 100m and 200m pre-connectorized lengths using standard TNC connectors. The cable may

be easily cut to fit and reconnectorized in the field using standard TNC connectors.

- .5 The electronic signal processor shall be housed in a polycarbonate NEMA-4 enclosure with total dimensions (height plus width plus depth) less than 22 inches and total volume not to exceed 0.2 cubic feet. All openings must be gasketed and sealed.
- .6 Each electronic signal processor shall connect two piezoelectric cables (2 zones). The processor boards shall be 100 percent solid state, conformal coated and solder masked. The relays provided shall be a normally open, normally closed Form C contact closure pair for output of alarm, tamper and fault signals.
- .7 Sensor cable signals shall be digitized and processed using digital signal processor (DSP) circuitry and evaluated simultaneously against both fence “cut” intrusion and fence “climb” intrusion profiles for optimal intrusion detection and minimum false alarm rates.
- .8 The capability to reject false alarms due to wind conditions shall be provided as a standard feature of the system. Wind rejection shall consist of a built-in software algorithm that automatically and dynamically adjusts system alarm parameters based on measurement of relative wind speed at the fence. No anemometers or other external wind speed measuring instruments shall be required.
- .9 Each electronic zone processor shall operate + 10 to 26 volts DC with a power requirement of 1.5 Watts.
- .10 The electronic circuitry shall provide sensitivity adjustment via a single 360 degree potentiometer adjusted with a simple screwdriver. No special tools, handheld calibrators, computers, field test sets or other equipment shall be required for system calibration and adjustment.
- .11 The entire sensor system shall be capable of detecting tampering within any portion of the system by either enclosure cover switch or sensor cable fault. In the single zone or dual zone processor the zone in fault shall be indicated with the lighting of a red LED on the appropriate processor board. The tamper alarm contact outputs shall provide isolated and/or supervised outputs, normally open or normally closed. Tamper alarm will continue until tamper is corrected.
- .12 The signal processor shall have a built-in test mode that provides both visual and audio confirmation of a simulated alarm event.
- .13 The electronic circuitry portion of the sensor system shall provide an output useable by an external amplifier that will allow an operator to actually hear an audio signal representing movement of the fence, regardless of whether the system is in a normal or alarm status.
- .14 All sensor cable and insensitve cable shall be supplied by the manufacturer to ensure compatibility.
- .15 The system shall be:
 - .1 Copperhead Series 400 by Servo Electronics.

Part 3 Execution

- .1 Install sensitive & insensitive cabling as per manufacturers requirements.
- .2 The system shall be configured as ‘4’ zones, (North-South-East-West).

- .3 Locate cable processed in Room G155.
- .4 To remotely annunciate the alarms (4) connect each output to individual inputs of the panic alarm/interview in progress in Room G123.
- .5 Provide test report to Contract Administrator.
- .6 Provide City training of all operable components and any components requiring maintenance. Provide video tape of the above (4) copies.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1	Electrical General Requirements	Section 26 05 00
.2	Conduits, Conduit Fastenings and Conduit Fittings	Section 26 05 34
.3	Wires and Cable	Section 26 05 21
.4	Outlet Boxes, Conduit Boxes and Fittings	Section 26 05 32
.5	Card Access	Section 28 13 19
.6	Motor Starters	Section 26 29 10

1.2 REFERENCES

.1	CAN/ULC-S524 Installation of Fire Alarm Systems
.2	ULC-S525 Audible Signal Appliances, Fire Alarm
.3	CAN/ULC-S526 Visual Signal Appliances for Fire Alarm Systems
.4	CAN/ULC-S527 Control Units, Fire Alarm
.5	ULC-S528 Manually Actuated Signalling Boxes, Fire Alarm
.6	CAN/ULC-S529 Smoke Detectors, Fire Alarm
.7	ULC-S530 Heat Actuated Fire Detectors, Fire Alarm
.8	CAN/ULC-S536 Inspection and Testing of Fire Alarm Systems
.9	CAN/ULC-S537 Verification of Fire Alarm Systems
.10	DFC No. 310(M) Computer Systems
.11	Manitoba Building Code

1.3 DESCRIPTION OF SYSTEM

- .1 This specification provides the requirements for the supply and installation, programming, testing, commissioning and verification of a complete Addressable Analog Fire Detection System. The system shall include, but not be limited to: control panels, remote annunciator, input and control modules, alarm initiating and indicating peripheral devices, conduit, wire and accessories, etc. required to furnish a complete operational system. Provide 120V circuits for equipment as required.
- .2 System Includes:
 - .1 Microprocessor based addressable control panel to carry out fire alarm and protection functions including receiving alarm signals, initiating first stage and general alarm, supervising system continuously, actuating zone annunciators, initiating trouble signals, performing fire control functions, etc.
 - .2 Trouble signal devices.
 - .3 Power supply facilities.
 - .4 Manual alarm stations.
 - .5 Automatic alarm initiating devices.
 - .6 Audible signal devices.
 - .7 Visual alarm signal devices.

- .8 End-of-line devices.
 - .9 Annunciators.
 - .10 Ancillary devices.
 - .11 Standby batteries.
 - .12 Auxiliary control.
 - .13 Intelligent environmental compensation.
 - .14 System degrade operation.
 - .15 Other features, components, etc. as required.
- .3 The loading of device loops shall be based on approximately 80% load. Provide additional loops to comply with this loading where required or directed.
 - .4 The loading of horn circuits, strobe circuits shall not exceed 75% circuit capacity. Provide additional circuits to comply with this loading where required or directed.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- .1 The equipment and installation shall comply with the current ULC and Building Code requirements.
- .2 Manitoba Building Code.
- .3 Local and Municipal By-Laws.
- .4 Authorities having jurisdiction.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 26 05 00 for the complete Fire Alarm system including:
 - .1 All devices.
 - .2 Control panels, printer, accessories, etc.
 - .3 Zoning System, including isolator locations.
 - .4 Programming of the Fire Alarm System.
 - .5 Connection to fire suppression system.
 - .6 All other components of the fire alarm system.
 - .7 Description of the operational sequences of the system.
 - .8 Complete set of drawings, indicating location of all devices, including analogue and signalling devices, control and annunciator panels, all interconnections to mechanical equipment, to fire suppression systems and to existing computer room system, all conduit routing and sizes, all wire sizes, types, number and a riser for each control panel indicating all of the above.
 - .9 Pictorial drawings of control equipment indicating the location of the components and parts and their respective catalogue number and electrical characteristics.
 - .10 Interconnecting diagrams and cable manual.
 - .11 System descriptions of the actual installation.
 - .12 Maintenance instructions.
 - .13 Recommended spare parts list.
 - .14 Provide name, address and telephone number of the manufacturer's service representative to be contacted during the warranty period.
- .2 This information is to be revised to "as-built" after construction is completed. Insert as part of the Operating and Maintenance Manuals.

1.6 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for Fire Alarm System for incorporation into manual specified in Section 26 05 00.
- .2 Include:
 - .1 Operation and maintenance instructions for complete fire alarm system to permit effective operation and maintenance.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.
 - .3 Copy of as-built shop drawings.

1.7 WARRANTY

- .1 Warranty all Equipment, Sensors, materials, peripherals, installation, workmanship, etc. for one (1) year from the date of final acceptance of the system.
- .2 Provide a complete inspection and testing of the fire alarm system 1 year after final acceptance. Inspection tests to conform to be ULC-S536. Submit inspection report to Contract Administrator.
- .3 Provide all programming of system as directed during the warranty period at no cost to The City.

1.8 MAINTENANCE

- .1 Provide one year's free maintenance with two inspections by manufacturer during year. The second inspection can be done at the same time as the ULC-S536 inspection and testing specified in 1.7 Warranty.

1.9 TRAINING

- .1 Arrange and pay for on-site lectures and demonstrations by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.
- .2 Provide video tape (4 copies) of all training provided.
 - .1 Provide training sessions which will explain general system operation to staff.
 - .2 Provide training sessions for staff to explain detailed operating and maintenance procedures.

1.10 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with Section 26 05 00.
- .2 Provide a lockable metal cabinet to be installed as directed by the Contract Administrator.
 - .1 Provide 6 spare devices of each type used in unopened cartons and clearly labelled as to type of device (smoke detectors/heat detectors/dual strobes/bell strobes/addressable relays/detector bases/pull stations, etc.

1.11 SERVICE

- .1 The supplier of the system must employ factory trained technicians and maintain a service organization within driving distance of the job site.

1.12 MATERIALS

- .1 The system and components must be supplied by one manufacturer of established reputation and experience who must have produced similar apparatus for a period of at least five (5) years and who must be able to refer to similar installation rendering

satisfactory service. All references to model numbers and other pertinent information herein is intended to establish minimum standards of performance, quality and construction.

- .2 Any equipment proposed as equal to that specified herein must conform to the standards herein. All equipment must be of one manufacturer. In addition, the contractor must obtain the Contract Administrator's approval in writing five (5) working days prior to bidding other than as specified. The manufacturer's name, model numbers, and three copies of working drawings and engineering data sheets shall be submitted for approval along with a point by point comply/non-comply cross reference listing, item by item, of the specification for compliance. Approval of other manufacturers does not relieve the contractor from meeting the specification requirements.
- .3 **Manufacturers**
 - .1 **Approved manufacturers:**
 - .1 Edwards
 - .2 Simplex
 - .3 Cerberus
 - .4 Notifier
 - .2 Approved manufacturers must use factory trained personnel for all sales, installation, programming, testing, verification, inspection, service, etc.

Part 2 Products

2.1 MATERIALS

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .2 Power supply: to CAN/ULC-S524.
- .3 Audible signal devices: to ULC-S525.
- .4 Control unit: to CAN/ULC-S527.
- .5 Manual fire alarm stations: to ULC-S528.
- .6 Thermal detectors: to ULC-S530.
- .7 Smoke detectors: to CAN/ULC-S529.
- .8 Smoke alarms: to CAN/ULC-S531.
- .9 Visual alarms: to CAN/ULC-S526.

2.2 FIRE ALARM DESIGN FEATURES

- .1 The Fire Alarm System shall be a zoned, two stage, non-coded, electronically supervised, addressable, microprocessor based, networked system. Supply complete with all hardware and software necessary for this installation.
- .2 Manual override switches, Actions, Sequences, and Time Controls shall have the ability to be software disabled to prevent unauthorized operation during non alarm condition. Switches shall be automatically enabled during alarm condition to allow manual control by authorized personnel.
- .3 When all active events that initiated the SET or RESET of an output have returned to normal, only then shall the output be allowed to restore.

- .4 Visually indicate at the control panel LCD, the addressable device or the circuit of alarm initiation. When the control panel goes into the alarm condition the green NORMAL LED shall extinguish, the red ALARM LED shall light and the BUZZER shall pulsate. The first line of the 80 character LCD shall indicate the REAL TIME, the number of MESSAGES WAITING, the TYPE of ALARM, the ALARM ZONE NUMBER, and the TIME THAT THE ALARM OCCURRED. The second line shall display the user specified message.
- .5 The system shall be capable of setting the sensitivity of all analog sensors by point and be capable of displaying the analog value of the sensor by device and/or traditional input and vectoring the value to the printer. The system shall automatically identify any analog sensor which becomes dirty (maintenance alert) prior to false alarming.
- .6 The operator shall acknowledge the alarm by pressing the NEXT/ACK button, and the buzzer will silence providing there is not an additional alarm pending. If there are additional alarms waiting, the operator shall acknowledge all pending alarms before the buzzer will silence. To silence audible devices, the operator shall press the ALARM SILENCE button. A new alarm shall cause the audibles to respond. To reset the system the operator shall press the RESET button.
- .7 Print a record of alarm on the system printer by Time, Alarm zone or device number, alarm type, and the user specified message. All restorations shall likewise be recorded, except the user specified message shall not be repeated.
- .8 Activation of a sprinkler supervisory condition shall automatically:
 - .1 Display on the control panel LCD the zone or the addressable device. During the SUPERVISORY condition the amber SUPERVISORY LED shall light, the NORMAL LED shall go out, and the BUZZER shall pulsate. The LCD shall indicate SUPERV. SHORT and the zone/device number. The operator shall silence the BUZZER by acknowledging all messages and pressing the TROUBLE SILENCE button.

2.3 SEQUENCE OF OPERATION

- .1 On activation of any alarm initiating device on the fire alarm system, the system goes into alarm as follows:
 - .1 Signal all horns and activate strobes throughout the building to sound at stage one alarm rate.
 - .2 Annunciate the location of the alarm initiating device on all annunciators and control panel. All annunciators and control panel shall display identical zone descriptions.
 - .3 Shut down all fans, etc. in the building as indicated.
 - .4 Unlock electrically locked doors.
 - .5 Activate preaction sprinkler system from devices in the preaction sprinkler zone.
 - .6 The alarm signal continues to sound throughout the facility until:
 - .1 Tones are manually silenced; horns remain silenced until a subsequent zone is activated.
 - .2 Alarm initiating device / devices are reset / cleared and the system is reset.
 - .7 Transmit a signal to the Fire Department.
 - .8 Other auxiliary functions as specified.
 - .9 Stage two alarm activation via pullstation key switch activation or 5 minute stage one alarm time out will cause all audible and visual alarms to go into general evacuation rate.

- .2 If the system is being tested by staff, all annunciators and control panel shall display "TEST IN PROGRESS" in addition to the initiating devices being tested.

2.4 CONTROL PANEL

- .1 The control panel shall be modular in construction with multi tasking microprocessor-based technology, distributed processing, and include a watchdog circuit per individual module processor to monitor the proper operation of every system processor. Systems with one watchdog circuit for all the modules are not considered equal. All components must be housed in an approved enclosure, behind a cylinder locked, removable hinge door with a viewing window. Opening of the panel door must not expose live components or wiring. The door must be easily removable without tools to prevent any obstruction to the operator during fire alarm management procedures or during system maintenance procedures.
- .2 The base system board must provide the number of addressable loops as shown on the drawings plus 25% spare, signal circuits of 1.5 A each as shown on the drawings plus 25% spare, alarm relays, trouble relays, programmable relays, communication network port, alphanumeric LCD annunciator driver port, auxiliary power limited 24 VDC supply, communication active LED, programming port, digitally controlled battery supervision circuit and charger, etc.
- .3 The system must be fully field programmable. Perform any required logical sequence for fan and damper control. Provide 99 software timers accurate to one second for any required timing functions. The timers may be individually programmed from one second to four hours.
- .4 The system software must fully integrate all of the system functions including annunciation, alarm management sequence, fan and damper control.
- .5 The system must be capable of providing alarm indication in degrade mode by activating the addressable loop alarm led.
- .6 The total system one way response to an alarm shall be no more than 2.5 seconds on a system configured to the maximum capacity.
- .7 System communication between transponders if supplied must be in DCLB via copper wires.
- .8 The system addressable loops must be DCLB with loop isolation between alarm zones. The addressable loop must not be loaded more than 80% of full system capacity.
- .9 The control panel shall have a two line by forty character backlit supertwist (for any required viewing angle) alphanumeric LCD display.
- .10 The operator control panel must be intuitive in design. It must be fully bi-lingual in English and French and must have all the following standard indications and control buttons clearly labelled in English and French. A programmable key may be used to toggle the system prompts and printouts between the English and French languages.
- .11 Detection line circuit monitoring shall be provided by a Conventional Zone Module. This module shall be system interconnected by a card edge connector and shall be operated by the control panel. Each circuit shall be capable of Class "A" or Class "B" wiring. Each zone shall accommodate up to thirty (30) ionization or photoelectric detectors, flame and beam detectors, as well as any quantity of shorting type contact devices.

- .12 An output circuit for operation of DC audible devices, or city tie, shall be provided by Controllable Signal Module. This module shall be system interconnected by a card edge connector, capable of operating with either Class "A" or Class "B" wiring, and shall be operable by the control panel. The module shall be supervised by the control unit for open and shorted circuits. Open and short circuits shall report trouble only and respond with circuit identification. The module shall contain two (2) programmable open collector outputs capable of sourcing 250 ma at 40 VDC for relay or LED activation.
- .13 The system shall require no manual input to initialize in the event of a complete power down condition. It shall return to an on line state as an operating system performing all programmed functions upon power restoration. Systems requiring battery backed-up memory devices shall not be acceptable.
- .14 Selectable history event logging shall be stored in flash memory and displayed, printed or downloaded by classification for selective event reports.
 - .1 Shall allow selection of events to be logged, including; inputs, as alarms, troubles, supervisory, securities, status changes and device alarm verification; outputs, as audible control and output activation; actions, as reset, set sensitivity, arm/disarm, override, password, set time and acknowledge.
 - .2 Data format for downloading shall be compatible with the data base handling program, allowing custom report generation to track alarms, troubles and maintenance.
 - .3 Audible and visual indications shall be generated when memory is 80% and 90% full to allow downloading of data. The system shall be programmable circular logging, assuring that at least the last 800 events will always be stored in non-volatile memory.
- .15 The system shall support intelligent analog smoke detection, conventional smoke detection, manual station, water flow, supervisory and status monitoring devices. The system shall also be capable of supporting future amplifiers, future voice/visual circuits and a firefighter's telephone system.
- .16 The panel must be capable of measuring the sensitivity of connected intelligent analog ionization and photoelectric smoke detectors.
 - .1 The measurements shall be discrete voltage readings, accurate to .01 VDC. The readings shall be dynamic, providing a constant display of voltage shifts when in the sensitivity voltage list mode.
 - .2 The control panel shall provide a display and a printed list of these sensitivity measurements as a permanent record of the required sensitivity testing.
 - .3 When programmed, any system connected, ionization or light refraction style smoke detector shall be capable of automatic sensitivity drift compensation up or down. This adjustment shall keep the relationship between the sensing chamber voltage and the programmed alarm threshold voltage constant throughout the life of the detector to prevent false indications or failure to alarm in the presence of smoke.
 - .4 The control panel shall place each detector in the system in an alarm condition, transparent to the system user, every twenty four hours as a dynamic check of the accuracy of the alarm threshold setting. Upon reception of the alarm report, the system detector shall be restored to it's pretest state.
 - .5 The system shall be capable of monitoring the state of detectors and display a message when a detector is approaching the limits of adjustment as a result of contaminants. A second message shall be displayed when the detector reaches the limits of adjustment due to these contaminants.

- .6 The system shall be capable of recognizing that a detector has been cleaned, initiating a series of tests to determine if the cleaning was successful and display a detector cleaned message, readjusting that detectors normal sensitivity setting reference.
- .17 The system shall recognize initiating of an alarm and indicate the alarm condition in a degrade mode of operation, in the event of processor failure or the loss of system communications to the circuit interface panels.
 - .1 Each circuit interface panel shall be capable of operation in its own degrade mode. In this mode, the system shall receive an alarm from any intelligent analog or conventional initiating device. It shall activate local indicating appliances and remote or auxiliary connect circuits.
 - .2 The system shall indicate a trouble condition during degrade mode operation and shall give a visual indication of an alarm condition.
 - .3 Detector operation in the degrade mode shall continue at the alarm threshold previously programmed. Systems returning detectors to a common default value in degrade mode shall not be acceptable.
- .18 The system shall be capable of reporting alarms from devices whether programmed or not. Alarm reports from these devices shall activate indicating appliance circuits.
- .19 The system shall perform time based control functions including automatic changes of specified smoke detector sensitivity settings.
 - .1 Time based functions shall be controlled by specifying time periods or actual dates. It also shall provide the ability to control these functions on an exception basis using a holiday schedule.
- .20 The system shall provide a one person field test of either the complete system or a specified area, maintaining full function of areas not under test.
 - .1 Field test shall be usable in a silent or audible mode. When in the audible mode, the signals shall audibly annunciate alarms, troubles and device types.
 - .2 All field test activity shall be logged to the system printer and historical memory.
- .21 The system shall be provided with eight levels of password protection with up to forty passwords.
- .22 Provide a cost savings software verification Compare program. The program shall instruct the technician as to what software changes have been made from one software revision to another and what points require verification.
- .23 The system must be capable of reading and displaying at the control panel the sensitivity of remote intelligent/analog ionization and photoelectric detection devices. Individual intelligent/analog detection device alarm threshold must be adjustable form the control panel.
- .24 The detection system must remain 100% operational and capable of responding to an alarm condition while in either routine operator maintenance mode or during programming by the manufacturer.
- .25 Dynamic supervision of system electronics, wiring, detection devices and software must be provided by the control system. Failure of system hardware or wiring must be indicated by type and location on the alphanumeric display.
- .26 The control mode must permit the arming and disarming of individual detection or output devices. Status of these devices must be displayed upon command from the control panel.

- .27 The address, type of device and sensitivity setting of each addressable device must be field settable by a simple programming device and stored in the addressable device in non-volatile memory. Loss of both A/C power and batteries in the control panel will not affect the system device programming.
- .28 The system must be programmed in the field only via laptop computer. Burning of EPROMs is not acceptable. System programming must be password protected. The final system program must be available on hardcopy and included in the City's manuals.
- .29 The printer or alphanumeric display must be capable of listing upon request:
 - .1 Alarms and troubles with time, date and location.
 - .2 Status of output functions.
 - .3 Sensitivity of intelligent /analog smoke detectors.
 - .4 Detection device number, type and location.
 - .5 Status of remote relays.
 - .6 Acknowledgement time and date.
 - .7 Signal silence time and date.
 - .8 Reset time and date.
 - .9 Battery voltage, A/C voltage and battery charge current.
- .30 The system must be capable of:
 - .1 Counting the number of intelligent/analog devices within a "zone" which are in alarm.
 - .2 Counting "zones" which are in alarm.
 - .3 Counting the number of intelligent/analog detectors which are in alarm on the system.
 - .4 Differentiating among types of intelligent/analog detectors such as smoke detectors, manual stations, water-flow switches, thermal detectors, cross zoning, etc.
- .31 Provide a suitable dot matrix printer (located at reception counter near main fire alarm panel) to log all system activity, print reports, etc.

2.5 POWER SUPPLY

- .1 120 VAC, 60 Hz input, 24 VDC output standby power from gel cell batteries sized as per NBC-90 requirements.
- .2 System to include system power supplies, including necessary transformers, rectifiers, regulators, filters and surge protection required for system operation. The system devices shall display normal and alarm conditions consistently whether operating from normal power or reserve (standby) power.
- .3 The Power Supply/Chargers, shall provide 24 Vdc operating and emergency power to the system. The power supply shall be of switch mode design with a minimum efficiency of 80% with transient protection (up to 6 KV) including the EMI filter, spark gaps, transzorbs, and varistors. The power supply shall provide required current outputs of fully regulated, power limited 24 Vdc. The power supply shall provide diagnostic LEDs to notify the operator upon AC power and/or the control unit CPU failure. The power supply shall have brown out, low battery, and system ground fault features. It shall be capable of charging from 5 AH to 60 AH batteries of either gel electrolyte or nickel cadmium types. Upon AC power failure, the power supply shall transfer the system to battery back-up and power the system for 24 hours and then drive all bells, horns and strobes for a minimum of 30 minutes (or as required to meet code for the particular building occupancy).

- .4 The system shall have the capability of polling any system power supply to determine battery voltages and current accurate to within .01VDC.

2.6 ALARM SIGNALLING

- .1 Provide standard 'horn/strobe' signals thru-out the facility. db rating of horn to suit area and number of horns provided.
- .2 Wire horns and strobe as class B circuits.

2.7 REMOTE ANNUNCIATOR

- .1 Remote recess mounted alpha-numeric annunciators shall be located as indicated on the plans. Each annunciator shall contain a supervised, back-lit, liquid crystal display with a minimum of four lines with twenty characters per line. Where required the annunciator shall contain a key-switch enabled reset, alarm silence, trouble silence and drill/all call switches. It must be possible through programming to determine which common control functions are active with the key-switch in the enable or disable position. Equipment shall be ULC listed.
- .2 It must be possible to have up to 32 annunciators on a single annunciator network. It must provide regenerative functions in the event of communication failure.
- .3 Each annunciator must be capable of supporting custom messages as well as system event annunciation. It must be possible to filter unwanted annunciation of trouble, alarm or supervisory functions. The annunciator must incorporate a power saving feature. The front panel back lighting must turn off after a minimum of four minutes if there is no switch activity and no unacknowledged messages waiting.
- .4 Where required it must be possible to connect a printer directly to the annunciator through a dedicated RS-232 port. The printer to facilitate generation of hard copy records of system activity.
- .5 The annunciators shall be mounted in stand-alone flush-mounted enclosures c/w brushed stainless steel custom faceplate.
- .6 The annunciator must be able to automatically seek specific messages from other parts of the network if no message resides in its database.

2.8 DETECTORS

- .1 General
 - .1 Detectors shall be capable of full digital communications using both broadcast and polling protocol. Each detector shall be capable of performing independent fire detection algorithms. The fire detection algorithm shall measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted deceptive nuisance alarms. Signal patterns that are not typical of fires shall be eliminated by digital filters. Devices not capable of combining different fire parameters or employing digital filters shall not be acceptable.
 - .1 Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detector head. Distributed intelligence shall improve response time by decreasing the data flow between detector and analog loop controller.

- .2 Detectors not capable of making independent alarm decisions shall not be acceptable. Maximum total analog loop response time for detectors shall be 0.5 seconds.
- .3 Each detector shall have a separate means of displaying communication and alarm status. A green LED shall flash to confirm communication with the analog loop controller. A red LED shall flash to display alarm status. Both LEDs on steady shall indicate alarm-standalone mode status.
- .4 Both LEDs shall be visible through a full 360 degree viewing angle.
- .5 The detector shall be capable of identifying up to 32 diagnostic codes. This information shall be available for system maintenance. The diagnostic code shall be stored at the detector.
- .6 Each detector shall be capable of transmitting pre-alarm and alarm signals in addition to the normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level.
- .7 Each detector microprocessor shall contain an Environmental Compensation algorithm which identifies and sets ambient "Environmental Thresholds" approximately six times an hour. The microprocessor shall continually monitor the environmental impact of temperature, humidity, other contaminants as well as detector aging. The process shall employ digital compensation to adapt the detector to long term environmental changes. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 50% and 100% of the allowable environmental compensation value.
- .8 Differential sensing algorithms shall maintain a constant differential between selected detector sensitivity and the "learned base line sensitivity". The base line sensitivity information shall be permanently stored at the detector approximately once every hour.
- .9 Each detector may be individually programmed to operate at any one of five sensitivity settings.
- .10 The intelligent analog device and the analog loop controller shall provide increased reliability and inherent survivability through intelligent analog conventional operation. The device shall automatically change to stand alone, conventional device operation in the event of a loop controller polling communications failure. In the analog conventional detector mode, the analog detector shall continue to operate using sensitivity and environmental compensation information, stored in its microprocessor at the time of communications failure. The analog loop controller shall monitor the loop and activate a loop alarm if a detector reaches its alarm sensitivity threshold.
- .11 Each device shall be capable of automatic electronic addressing and/or custom addressing without the use of DIP or rotary switches. Devices using DIP or rotary switches for addressing, either in the base or on the detector shall not be acceptable.
- .12 It shall be possible to program the analog devices into a minimum of 16 groups with a minimum of 32 devices per group. It shall also be possible to link groups to program activities.
- .13 The intelligent analog detectors shall be suitable for mounting on any detector mounting base.

2.9 HEAT DETECTORS

- .1 Fixed Temperature Heat Detectors
 - .1 The intelligent heat detector shall have a thermistor heat sensor and operate at a fixed temperature. It shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm.
 - .2 The integral micro-processor shall determine if an alarm condition exists and initiate an alarm based on the analysis of the data. Systems using central intelligence for alarm decisions shall not be acceptable.
 - .3 The heat detector shall have a nominal rating of 135F (57C). 190 detectors to be provided in the Boiler Room or where indicated on plans.
 - .4 The heat detector shall have a minimum linear spacing rating of 60 foot (21.3m) centers and be suitable for wall mount applications.
 - .5 Heat detectors noted or specified as "WP" or moisture proof shall be an epoxy sealed moisture proof type detector c/w dedicated addressable monitor module SiGA-CT1/CT2.

2.10 IONIZATION SMOKE DETECTORS

- .1 The intelligent analog ion detector shall utilize a unipolar ionization smoke sensor to sense changes in air samples from its surroundings. The integral microprocessor shall dynamically examine values from the sensor and initiate an alarm based on the analysis of data. Systems using central intelligence for alarm decisions shall not be acceptable.
- .2 The detector shall continually monitor any changes in sensitivity due to the environmental affects of dirt, smoke, temperature, aging and humidity. The information shall be stored in the integral processor and transferred to the analog loop controller for retrieval using a Laptop Computer.
- .3 The ion smoke detector shall operate in constant air velocities from 0 to 75 ft./min. (0-0.38 m/sec.) and with intermittent air gusts up to 300 ft./min (1.52m/sec) for up to 1 hour and meet the following standards:
 - .1 ULC Smoke Sensitivity Range 0.61 - 1.83 % Obscuration/ft (305mm).
- .4 The ion detector shall be suitable for operation in the following environment:
Temperature: 32F to 120F (0C to 49C) Humidity: 0-93% RH, non-condensing Elevation: Up to 5000 ft. (1,524 m)
- .5 The ion detector shall be rated for ceiling installation at a minimum of 30 foot (9.1m) centers and be suitable for wall mount applications.
- .6 Each detector shall be capable of Intelligent Analog-Conventional operation to provide inherent survivability in the event of a communication failure with the Analog Loop Controller.

2.11 PHOTOELECTRIC DETECTOR

- .1 The intelligent analog photoelectric detector shall use a light scattering type photo sensor to sense changes in air samples from its surroundings. The integral microprocessor shall dynamically examine values from the sensor and initiate an alarm based on the analysis of data. Systems using central intelligence for alarm decisions shall not be acceptable.
- .2 The photo detector shall continually monitor any changes in sensitivity due to the environmental affects of dirt, smoke, temperature and humidity. The information shall be stored in the integral processor and transferred to the analog loop controller for retrieval using a Laptop Computer.

- .3 The photoelectric smoke detector shall be suitable for area protection and direct insertion into air ducts up to 3 feet (0.91m) high and 3 feet (0.91m) wide with air velocities up to 5000 ft./min. (0-25.39 m/sec.) without requiring specific duct detector housings or supply tubes and meet the following standards:
 - .1 ULI Smoke Sensitivity Range 0.67 - 3.77 % Obscuration/ft (305mm).
 - .2 ULC Smoke Sensitivity Range 0.67 - 3.77 % Obscuration/ft (305mm).
 - .3 Provide a lamacoid nameplate which describes the new fan system for all duct smoke detectors.
 - .4 The photo detector shall be suitable for operation in the following environment:
Temperature: 32 deg F to 120 deg F (0 deg C to 49 deg C) Humidity: 0-93% RH, non-condensing Elevation : no limit
 - .5 The photo detector shall be rated for ceiling installation at a minimum of 30 foot (9.1m) centers and be suitable for wall mount applications.
 - .6 Each detector shall be capable of Intelligent Analog-Conventional operation providing inherent survivability in the event of a communication failure with the Analog Loop Controller.

2.12 DETECTOR BASES

- .1 General
 - .1 Bases shall be suitable for mounting on North American 1 gang, 3-1/2" or 4" octagon box, 4" square box.
- .2 Standard Base
 - .1 The base shall contain no electronics and shall support all detector types.
 - .2 Removal of the respective detector shall not affect communications with other detectors.
 - .3 Terminal connections shall be made on the room side of the base. Bases which must be removed to gain access to the terminals shall not be acceptable.
 - .4 The standard detector base shall be capable of supporting one Red Remote Alarm Indicator.
- .3 Relay Base
 - .1 The relay base shall support all detector types and have the following minimum requirements:
 - .1 The relay shall be a bi-stable type and selectable for normally open or normally closed operation.
 - .2 The position of the contact shall be supervised.
 - .3 The relay operation shall be exercised by the detector processor on power up.
 - .4 The relay shall automatically de-energize when a detector is removed.
 - .5 The operation of the relay base shall be controlled by its respective detector processor.
 - .6 Form "C" Relay contacts shall have a minimum rating of 1 amp. @ 24 vdc and be listed for "pilot duty".
 - .2 Each detector shall be capable of Intelligent Analog Conventional operation providing inherent survivability in the event of a communication failure with the Analog Loop Controller. This operation shall ensure the operation of the relay. Relay bases not controlled by the detector micro-processor shall not be acceptable.
 - .3 Removal of the respective detector shall not affect communications with other detectors.

- .4 Terminal connections shall be made on the room side of the base. Bases which must be removed to gain access to the terminals shall not be acceptable.
- .4 Isolator Base
 - .1 The isolator base shall support all detector types and have the following minimum requirements:
 - .1 The operation of the isolator base shall be controlled by its respective detector processor. Isolators which are not controlled by a detector processor shall not be accepted.
 - .2 The isolator shall operate within a minimum of 23 msec. of a short circuit condition on the communication line.
 - .3 Following a short circuit condition, each isolator/detector shall be capable of performing an internal self-test procedure to re-establish normal operation. Isolator/detectors not capable of performing independent self tests shall not be acceptable.
 - .2 When connected in Class A configuration the Loop Controller shall identify an isolated circuit condition and provide communications to all non isolated analog devices. Loop wiring shall be Class 'A', T-tapping is allowed between isolator bases / modules only. Isolator bases to be provided when a loop is used between floors, between areas which have fire separations. Do not exceed 12 devices on a branch without an isolator.
 - .3 Terminal connections shall be made on the room side of the base. Bases which must be removed to gain access to the terminals shall not be acceptable.
 - .4 Show isolator base locations on a floor plan as part of shop drawings. Fire separations are to be shown on these floor plans as well.
 - .5 The Loop Controller shall support up to 96 isolator bases.

2.13 MODULES

- .1 Single Input Module
 - .1 The intelligent Single Input Module shall be capable of a minimum of 4 personalities, each with a distinct operation.
 - .2 The personality of the module shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Single function modules or modules requiring Eprom, ROM or PROM changes or DIP switch/jumper changes shall not be acceptable.
 - .3 The single input module shall support the following circuit types:
 - .1 Alarm Latching, Manual Station, Conventional Heat, Waterflow
 - .2 Delayed Waterflow
 - .3 Non-Latching Monitor
 - .4 Supervisory
 - .4 Input circuit wiring shall be supervised for open and ground faults.
 - .5 The input module shall have a minimum of 2 diagnostic LEDs mounted behind finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes.
 - .6 Terminal connections shall be accessible from the room side of the assembly. Devices which must be removed to gain access to the wiring terminals shall not be acceptable.
 - .7 The single input module shall be suitable for mounting on North American 2 1/2" (64mm) deep 1 gang, 1 1/2" (38mm) deep 4" square box with 1 gang cover.
 - .8 The input module shall be suitable for operation in the following environment:

- .1 Temperature: 32F to 120F (0C to 49C)
 - .2 Humidity: 0-93% RH, non-condensing
 - .9 It shall be possible to address each module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable.
- .2 Dual Input Module
- .1 The intelligent Dual Input Module shall provide two (2) supervised input circuits capable of a minimum of 4 personalities, each with a distinct operation.
 - .2 The personality of the module shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Single function modules or modules requiring Eprom, ROM or PROM changes or DIP switch/jumper changes shall not be acceptable.
 - .3 The dual input module shall support the following circuit types:
 - .1 Alarm Latching, Manual Station, Conventional Heat, Waterflow
 - .2 Delayed Waterflow
 - .3 Non-Latching Monitor
 - .4 Supervisory
 - .4 Input circuit wiring shall be supervised for open and ground faults.
 - .5 The dual input module shall have a minimum of 2 diagnostic LEDs mounted behind finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes.
 - .6 The dual input module shall be suitable for mounting on North American, 2 1/2" (64mm) deep 1 gang, 1 1/2" (38mm) deep 4" square box with 1 gang cover.
 - .7 Terminal connections shall be accessible from the room side of the assembly. Devices which must be removed to gain access to the wiring terminals shall not be acceptable.
 - .8 The input module shall be suitable for operation in the following environment:
 - .1 Temperature: 32F to 120F (0C to 49C)
 - .2 Humidity: 0-93% RH, non-condensing
 - .9 It shall be possible to address each module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable.
- .3 Single Input Signal Module
- .1 The intelligent Single Input Riser/Signal Module shall provide one supervised output circuit. The output circuit shall be suitable for any of the following operations:
 - .1 24 vdc, polarized audible and visible signal appliances
 - .2 The personality of the module shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. Single function modules or modules requiring Eprom, ROM or PROM changes or DIP switch/jumper changes shall not be acceptable.
 - .3 Circuit wiring shall be supervised for open and ground faults.
 - .4 The signal module shall have a minimum of 2 diagnostic LEDs mounted behind finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes.
 - .5 The signal module shall be suitable for mounting on North American 2 1/2" (64mm) deep, 2 gang or 1 1/2" (38mm) deep, 4" square boxes.

- .6 Terminal connections shall be accessible from the room side of the assembly. Devices which must be removed to gain access to the wiring terminals shall not be acceptable.
 - .7 The signal module shall be suitable for operation in the following environment:
 - .1 Temperature: 32F to 120F (0C to 49C)
 - .2 Humidity: 0-93% RH, non-condensing
 - .8 It shall be possible to address each module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable.
- .4 Control Relay Module
- .1 The intelligent micro-processor based Control Relay Module shall provide one form "C" dry relay contact rated at 2 amps. @ 24 Vdc. to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems. Provide auxiliary relays (wired for fail safe operation) where amp rating of Control Relay Module is exceeded.
 - .2 The position of the relay contact shall be confirmed by the system firmware.
 - .3 The control relay module shall have a minimum of 2 diagnostic LEDs mounted behind finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes.
 - .4 The control relay module shall be suitable for mounting on North American; 2 1/2" (64mm) deep, 1 gang, 1 1/2" (38mm) deep, 4" square box with 1 gang cover.
 - .5 The module shall be suitable for operation in the following environment:
 - .1 Temperature: 32F to 120F (0C to 49C)
 - .2 Humidity: 0-93% RH, non-condensing
 - .6 Terminal connections shall be accessible from the room side of the assembly. Devices which must be removed to gain access to the wiring terminals shall not be acceptable.
 - .7 It shall be possible to address each module without the use of DIP switches. Devices using DIP switches for addressing shall not be acceptable.
- .5 Universal Class A/B Module
- .1 The intelligent Universal Class A/B Module shall be capable of a minimum of 15 distinct operations.
 - .2 The personality of the module shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the ZAS-2, Analog Loop Controller. Single function modules or modules requiring Eprom, ROM or PROM changes or DIP switch/jumper changes shall not be acceptable.
 - .3 The Universal Class A/B module shall support the following circuit types:
 - .1 Two Class B or one Class A Initiating Device Circuits (IDC) capable of delayed waterflow alarm operation.
 - .2 One Class A or B Indicating Device (Signal) Appliance Circuit (IAC)
 - .3 One Class A or B Circuit for 2 wire Smoke Detectors (Verified or non-verified).
 - .4 One Form "C" (NO/NC) Dry Output Contact Relay
 - .4 Input/Output circuit wiring shall be supervised for open and ground faults.
 - .5 The universal Class A/B module shall have a minimum of 2 diagnostic LEDs mounted behind finished cover plate. A green LED shall flash to confirm

communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes.

- .6 The module shall be suitable for mounting on North American 2 1/2" (64mm) deep, 2 gang or 1 1/2" (38mm) deep, 4" square boxes.
- .7 Terminal connections shall be accessible from the room side of the assembly. Devices which must be removed to gain access to the wiring terminals shall not be acceptable.
- .8 The universal Class A/B module shall be suitable for operation in the following environment:
 - .1 Temperature: 32F to 120F (0C to 49C)
 - .2 Humidity: 0-93% RH, non-condensing
- .9 It shall be possible to address each module without the use of DIP or rotary switches. Devices using DIP switches for addressing shall not be acceptable.

2.14 SIGNAL PAGING DEVICES

- .1 Use 8 inch eight ohm cone type loudspeakers with matching transformers parallel connected to supervised 70 volt signal/page circuits. Provide input power taps 1/4, 1/2, 1, 2 and factory set to 1 watt. Provide axial sensitivity of 85 db at 10 feet for a 2 watt input over a frequency range of 50 to 13000 Hz. Provide a flat white baked enamel finish. Coat the speaker backboxes with a resonance damping material. Flush mounted speakers to be Type 1, surface mounted speakers to be Type 2.
- .2 Use eight ohm re-entrant horn speakers with matching transformers parallel connected to supervised 70 volt signal/page circuits. Provide input power taps at 1, 2, 4, 7.5 Watts. Provide axial sensitivity of 88 db at 10 feet for a 2 Watt input over a frequency range of 400 to 4000 Hz. Mount flush or surface as shown on the plans.
- .3 Strobes: shall be ULC listed and operate on supervised alarm circuits at 20 to 24V DC. Strobe shall have a red filter.
- .4 End of Line Devices
 - .1 Provide high impact plastic red end of line plates with screw terminations as required for all conventional circuits & bell circuits.

2.15 AS-BUILT RISER DIAGRAM

- .1 Remote alarm system riser diagram: Refer to Section 26 05 00 - Electrical General Requirements.

Part 3 Execution

3.1 INSTALLATION

- .1 Install systems in accordance with CAN/ULC-S524, manufacturer's requirements, authorities having jurisdiction, etc.
- .2 Install main control panel, annunciators, etc. and connect to AC power supply as indicated on drawings.
- .3 Locate and install manual alarm stations and connect to alarm circuit wiring.
- .4 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts (co-ordinate with Division 15).

- .5 Connect alarm circuits to main control panel or DGP's.
- .6 Connect signalling circuits to main control panel.
- .7 Install end-of-line devices where required.
- .8 Install remote annunciator panels and connect to annunciator circuit wiring.
- .9 Locate and install door releasing devices.
- .10 Locate and install relay units to control fan shut down, etc.
- .11 Locate and install intelligent modules as required.
- .12 Fire Suppression System: wire alarm switches, supervisory switches, solenoids, etc. and connect to control panel.
- .13 Connect sprinkler switches.

3.2 VERIFICATION, DATA AND TESTING

- .1 System Verification
 - .1 Upon completion of all wiring and installation of all equipment, devices, etc., do complete verification of the fire alarm system. Verification shall be in accordance with current edition of Standard CAN/ULC-S537 "The Verification of Fire Alarm Systems" and following requirements. Even if permitted by Code and recognized standards and regulations, grade of work shall in no case be lower than specified in the project specifications. Verify all new initiating and signal/solenoid zones and circuits, etc. Verify that every component installed, is working and functions as intended.
 - .2 Manufacturer with assistance of electrical contractor shall do a complete verification of system to ULC S-537 to ensure:
 - .1 That system is installed as per plans and specifications and is operative and acceptable to all authorities having jurisdiction.
 - .2 That system is installed as per recommendations of manufacturer.
 - .3 That system is electrically supervised, including all zone lamps. To accomplish this, manufacturer with assistance of electrical contractor shall:
 - .1 remove each and every device from its applicable circuit by disconnecting circuit wiring
 - .2 verify presence of the applicable trouble signal and indications at control panel and remote annunciators.
 - .4 That all devices are operative. Check each switch, device, etc. for proper operation.
 - .5 That all system functions are operating as intended, including:
 - .1 all main control circuits,
 - .2 all remote annunciator circuits,
 - .3 all manual and automatic initiating devices,
 - .4 all audible and visual alarm signals,
 - .5 all ancillary controls, including fan shutdown, door release, etc.
 - .6 All existing systems functions (such as alarm signals, ancillary controls, etc.) that are not modified, but are required to operate from any new zones added, shall be verified for correct operation.
 - .7 When fire alarm system is verified, Contractor shall measure and record all loop or circuit resistance values at the fire alarm panel

- when end-of-line resistor is shorted. Contractor shall highlight all values which exceed the manufacturer's recommendations and report them to the Contract Administrator for action to correct this deficiency.
- .3 Any necessary changes required to conform to the above shall be completed by the electrical contractor with technical assistance provided by the system manufacturer.
 - .4 During the period of this inspection, the electrical contractor shall assist the manufacturer with the services of electricians.
 - .5 To assist the electrical contractor in preparing his bid, the manufacturer shall indicate in his tender the number of hours required to complete this inspection.
 - .6 Upon completion of the above inspection, including any changes required, the manufacturer shall submit the following documentation to the Contract Administrator.
 - .1 Certification of Verification
 - .2 A complete report of all equipment verified, including:
 - .1 sprinkler system switches
 - .2 automatic detectors
 - .3 alarm signals
 - .4 annunciators
 - .5 door hold open devices
 - .6 fan shutdown
 - .7 the number and type of devices connected to each circuit
 - .7 For each piece of equipment verified, the following information shall be included in the report:
 - .1 Catalogue number and type of device
 - .2 Location of device
 - .3 Zoning or circuit devices including ancillary devices
 - .4 Supervision test results
 - .5 Operation of device
 - .6 Inspection date
 - .7 Serial number of every smoke detector
 - .8 Sensitivity reading of every smoke detector, including duct detectors
 - .9 Record the time delay of all sprinkler flow switches
 - .10 Zone circuit loop resistance
 - .11 Fire alarm system supplier shall verify that alarm descriptions match and are consistent at each of following reporting locations:
 - .1 Fire alarm control panel
 - .2 Fire alarm remote annunciators
 - .8 Report shall also indicate operation of ancillary functions such as remote alarm indicators, door release, fan shutdown, etc. which are required to be activated. Operation shall be verified by actual observation of the entire function (e.g. bells ringing, checking to ensure proper fans shut down, etc.). Observing a change of state in the fire alarm control panel (e.g. observing relay function) is not considered complete verification of the entire function. Verification shall include actual field checking of proper operation of ancillary devices and equipment. Complete fire alarm system verification report shall be submitted to Contract Administrator and authorities having jurisdiction minimum of one week before City of Winnipeg Acceptance Inspections.
 - .9 All costs necessary for this verification shall be included in electrical trade's tender price.

- .10 Upon completion of this inspection, manufacturer shall demonstrate the operation of system to The City.
 - .11 Verify identification of all terminals (markers, directories and diagrams) in interconnecting wires and cables, certifying their correctness. Upon completion of verification, submit all documentation to Contract Administrator, including mylar sepia of as-built system riser block diagram and all tub or cabinet directories. Indicate on all documentation submitted that in fact it has been verified.
 - .12 Any errors in verification report shall be just cause for complete reverification of all verification work performed by Contractor, at discretion of Contract Administrator. Contractor shall be responsible for all costs associated with system reverification.
 - .13 Verify number of detectors on each zone and include verification report quantity of detectors on each zone.
 - .14 Sprinkler Flow Switches: Check and calibrate time delay of all sprinkler flow switches such that time delay is between 25 and 30 seconds. Record 'final setting' time delay of every flow switch in verification report.
- .2 Fire Alarm System Equipment Data
- .1 Supply complete manufacturer's data, information and instructions to aid the City to troubleshoot, repair, maintain and service the equipment and system. Include all of the following in each of the Maintenance/Operating Manuals:
 - .1 engineering specifications data
 - .2 user manual complete with explanation of equipment capabilities
 - .3 specific sequence of operation and events
 - .4 control schematics
 - .5 schematics of electronic operation
 - .6 theory of electronic modules
 - .7 electrical values of all electronic components
 - .8 assembly drawings and parts list, stating part number and manufacturer
 - .9 as-built system wiring diagrams showing location of all panels
 - .10 test procedure for systems, panels and individual modules
 - .11 colour code of wire
 - .12 Floor plan drawings (as-builts) indicating:
 - .1 Locations of all fire alarm devices, panels, etc.
 - .2 Location of all magnetic holders and ancillary devices connected to fire alarm control panel.
 - .3 All conduit runs, junction boxes.
 - .4 Quantity of wires in each conduit run.
 - .5 Zone wiring identification at each junction box and fire alarm device.

END OF SECTION