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SECURITY SYSTEM – ISSUED FOR TENDER

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1. PART      GENERAL

1.1.      WORK INCLUDED

- 1.1.1. Comply with Division 1, General Requirements and documents referred to therein.

1.2.      SECTION INCLUDES:

- 1.2.1. Co-ordination Work with other contractors under administration of Construction Manager.
- a. Co-ordination drawings.
  - b. Project meetings.

1.3.      ADMINISTRATION REQUIREMENTS

- 1.3.1. Co-ordination: Perform co-ordination of progress schedules, submittals, use of site, temporary utilities, construction facilities, and construction work, with progress of work under instructions of Construction manager.
- 1.3.2. Sequence required construction operations to obtain best results where installation of one part of work depends on installation of other components, before or after its own installation.
- 1.3.3. Co-ordinate installation of different components to ensure efficiency of work carried out is maximized.

1.4.      QUALIFICATION OF MANUFACTURERS

- 1.4.1. Due to the complexity of the project, only specific security equipment manufacturers will be deemed qualified for this work. Authority to determine these manufacturers, rest solely and completely with the consultant.

1.5.      PREFACE

- 1.5.1. The proceeding is a comprehensive specification for the design and resulting requirements of a fully integrated extension of the existing University of Toronto security system at 27 Kings College Cir.
- 1.5.2. The Security Contractor shall observe, understand and comply with all relevant sections of this, and other divisions referenced in this document. Unless indicated otherwise, the Security Contractor shall include for all requirements stipulated within this section in their scope of work.

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- 1.5.3. For all components provided by others but connected to the security system, the Electrical Contractor shall provide all required conduit c/w pullstring, junction boxes, 120VAC power and back boxes. The Security Contractor shall provide all low voltage wiring, hardware, components and devices as required to connect components provided by others to provide a full operational system.

1.6. REFERENCES

1.6.1. Abbreviations and Acronyms

- a. ACAM Access Control and Alarm Monitoring
- b. CCS Common Cabling System
- c. CCTV Closed Circuit Television System
- d. CNE Common Network Equipment
- e. DGP Data Gathering Panel
- f. DPS Door Position Switch
- g. IP Internet Protocol
- h. GUI Graphical User Interface
- i. LAN Local Area Network
- j. LCD Liquid Crystal Display
- k. LED Light Emitting Diode
- l. NVR Network Video Recorder
- m. PC Personal Computer
- n. PIN Personal Identification Number
- o. PoE Power Over Ethernet
- p. RF Radio Frequency
- q. RFI Request for Information
- r. RFID Radio Frequency Identification
- s. SMS Security Management System
- t. SOC Security Operations Centre
- u. TCP Transmission Control Protocol
- v. UPS Uninterruptable Power Supply
- w. VLAN Virtual Local Area Network

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- x. VOIP Voice over Internet Protocol
- y. WAN Wide Area Network

1.6.2. Reference Documents:

- a. National Fire Protection Association (NFPA)
- b. NFPA 70, Article 517, National Electric Code.
- c. NFPA 101, Life Safety Code.
- d. Electronic Industries Association (EIA)
- e. REC 12749, Power Supplies.

1.6.3. Reference Standards

- a. Canadian Standards Association (CSA International)
  - 1. CSA C22.1-98, Canadian Electrical Code, Part 1 (latest edition) Safety Standard for Electrical Installations.
  - 2. CAN/CSA C22.3 No.1 M87, Overhead Systems.
- b. National Fire Protection Association (NFPA)
  - 1. NFPA 70, National Electric Code.
- c. Underwriters Laboratories of Canada (ULC)
  - 1. S317, Installation and Classification of Closed Circuit Video Equipment (CCVC) Systems for Institutional and Commercial Security Systems.

1.7. SCOPE OF WORK AND SUPPLEMENTARY EXPECTATIONS

1.7.1. Scope of Work

- a. These specifications are to be translated into specific devices, equipment and systems which the Security Contractor proposes to use in order to produce a fully integrated security system as specified.
- b. These tender documents are to be read in conjunction with the Electrical and Door Hardware contract documents. In the event of discrepancies within or between the tender documentation (including drawings, risers, details and specifications), the Security Contractor shall either raise the issue via the RFI process before the project is awarded or include for the most onerous requirement.
- c. The owner reserves the right to modify, adjust and append the scope and extent of work described within this document at any time.

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- d. Security Contractor shall provide (supply, install, configure, test and commission) a network (IP) based, centrally controllable and fully integrated security system consisting of the Access Control system. Except where confirmed otherwise, all materials including, but not limited to, low voltage wiring, patch cabling, control panels, power supplies, battery backup and UPS, cabinetry and enclosures, field devices, hardware and all other materials needed to produce a fully operational security system shall be provided by the Security Contractor.
- e. The Electrical Contractor shall provide all 120VAC power, E.M.T conduit, junction boxes and back boxes, except where indicated otherwise.
- f. All security low voltage wiring shall be enclosed in minimum 21mm conduit unless indicated otherwise.
- g. The Client shall provide all electric strikes, electromagnetic locking devices and wireless electric locks.
- h. The Security Contractor shall coordinate with the Door Hardware Contractor to ensure that the doors and frames are appropriately prepped to support access control devices as specified and shown on the drawings.
- i. The Security Contractor shall be responsible for entering all access monitoring, alarm and map data into the security systems.
- j. The Security contractor shall verify that all IP devices to the nearest network switch locations do not exceed ninety (90) meters. For those runs that do exceed the distance limitations, the Security Contractor shall provide IP PoE extenders as well as all required terminations, cabling, connections, power supplies and hardware for a fully functional security system.
- k. The Security contractor shall apply for all required permits. Permit fees shall be included as part of the RFP sum.

1.7.2. Ancillary Expectation

- a. Waste Management and Disposal
  - 1. Separate and recycle waste materials in accordance with construction/demolition waste management and disposal literature.
  - 2. Remove from site and dispose of all packaging materials at appropriate recycling facilities.
  - 3. Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboards and packaging material in appropriate on-site bins for recycling in accordance with waste management plan.
  - 4. Fold up metal banding, flatten and place in designated area for recycling.
- b. Cleaning, Maintenance, and Extra Materials
  - 1. All equipment and devices shall be provided by the Security Contractor in new, clean and unmarked condition.

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2. Protective coverings shall be removed from all equipment prior to system installation and use.
3. All devices, including Request-to-exit motion sensors shall be properly adjusted for correct purpose and function.
4. Security Contractor to provide necessary security system maintenance materials as well as any unused or auxiliary materials to the owner.
5. All redundant cabling, conduit and devices shall be removed and made safe by the Security Contractor.

1.8. SUBMITTALS AT THE TIME OF BID

- 1.8.1. Security Contractor shall, as a minimum, provide the following at the time of bid.
  - a. A point-by-point compliance checklist indicating whether the proposed solution is compliant with the items included in the drawings and specifications.
  - b. A comprehensive spreadsheet indicating type and quantity of each device included in the bid. The contractor is responsible to include the complete scope of work as depicted in the drawings and specifications. The device types and quantities submitted will not alleviate any responsibilities to provide the complete scope of work.
  - c. All manufacturer produced technical data sheets, specifications, literature and photographs for all proposed equipment and devices.
- 1.8.2. Point-to-point diagrams and riser block diagrams demonstrating the contractors understanding of the overall intention of the works. This shall be provided for the University of Toronto Security System at 27 Kings College Cir and interconnecting components throughout the property.
  - a. Proponent general literature describing the requirements of the project and the plan to complete the work involved, including but not limited to a detailed description of the process and procedures which will be undertaken during the course of this project.
  - b. Information about the proposed project manager for the works.
  - c. Complete information regarding the warranty period for the project (including start date and, length of coverage), and comprehensive maintenance packages (including a sample maintenance contract).
  - d. Manufacturer certifications confirming that the Security Contractor is an authorized provider for all hardware and systems provided.

1.9. SUBMITTALS AFTER AWARD OF CONTRACT

- 1.9.1. Security contractor shall submit shop drawings to indicate:
  - a. Project layout;

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1. Point-to-point diagrams;
2. Cable Schematics;
3. Risers;
4. Mounting Details;
5. Identification labelling scheme including functional description of equipment;
6. Technical data sheets of all devices and equipment;
7. Device location plans and;
8. Cable lists.

1.10. QUALITY OF INSTALLATION

- 1.10.1. The Security Contractor to provide a qualified, thorough and professional installation crew who must be certified installers and re-sellers of all hardware/software products used to fulfil this contract.
- 1.10.2. The Security Contractor must clearly disclose in their proposal any and all instances where a sub-contractor is proposed to be used.
- 1.10.3. During installation, the Security Contractor must observe, understand and obey all site safety rules and regulations. Moreover, parts, equipment, and labour necessary to ensure complete and correct operation of the system.
- 1.10.4. All installed wire, cable, and conduit must be of the correct type, quantity and size as required by the manufacturer.
- 1.10.5. The Security Contractor is to gain consent from the owner or Owner's appointed project manager in order to begin installation.
- 1.10.6. Materials and Product Utilized
  - a. All equipment, devices and subsidiary materials shall be in accordance with applicable CEMA and NEMA specifications, as well as be CSA/ULC approved.

1.11. SOFTWARE UPDATES AND REVISIONS

- 1.11.1. Upon completion and directly preceding the initiation of manufacturer warranties, the Security Contractor is to update all system related software with the most current available edition (which must be confirmed with the consultant) devoid of added expense to the Owner.

1.12. SYSTEM DOCUMENTATION

- 1.12.1. The Security Contractor is required to present adequate documentation covering the entire scope and extent of completed work, including but not limited to:

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- a. Theory of Operation – System outline and overview
- b. Database Setup – Description of details required to prepare the system for implementation, including system planning forms and entry examples such as syntax, etc.
- c. Alarm Processing – Submission of operational manuals explaining the system operator's available functions and capabilities while using the central control unit.
- d. Management Breakdown – Description of administrative functions required to supervise and manage the system.
- e. Product Manuals – Delivery of complete manufacturers manuals for all system software and hardware components
- f. As-Built Drawings – Delivery of complete as-built drawings documenting the complete installed scope of work, all installed field devices for all systems, all head end and back end equipment, conduit routes, point-to-point riser and connection diagrams depicting the complete final architecture of all security sub-systems.

1.13. TESTING AND QUALITY ASSURANCE

- 1.13.1. Testing shall be completed following the mechanical and electrical completion of each major section of the system.
- 1.13.2. The Security Contractor shall provide a complete commissioning testing script (covering all sub-systems including the access control system) to the consultant for review prior to any final system testing or commissioning. Once the commissioning and testing script has been approved, the Security Contractor shall submit them as part of the as-built and close-out documentation.
- 1.13.3. The Security Contractor shall ensure all appropriate software modules are functioning as intended and as designed.
- 1.13.4. At the discretion of the consultant, final acceptance testing shall be carried out at the following defined levels: per point basis; per system basis; per software function basis; per total system basis; and per power load basis.
- 1.13.5. The Security Contractor, is to test and verify the proper installation and functionality of the system per equipment manufacturer requirements.
- 1.13.6. Any and all costs associated with providing on site manufacturer professional services shall be included for.
- 1.13.7. Sufficient manufacturer professional services shall be included to allow for the review and approval of the installation of the access control system by the manufacturers.

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- 1.13.8. Security Contractor shall inspect and test all wires and cables traveling to and from system devices and equipment. Security Contractor to verify that the removal of a device or disconnection of wiring will cause the trouble signal to correctly trigger under open circuit, short circuit, ground fault and removed receptacle conditions.
- 1.13.9. Security Contractor shall inspect all system installed equipment for visible damage or tampering which may interfere with the intended system function.
- 1.13.10. Security Contractor shall test all devices which are field adjustable to ensure the proper settings are realized under ambient conditions at the location of installation.
- 1.13.11. Security Contractor shall operate all initiating devices to verify proper operation.
- 1.13.12. Security Contractor shall inspect system power supplies to ensure all are properly fused, locked away from unauthorized interruption, adequate to meet system requirements and separated from auxiliary device power.
- 1.13.13. Security Contractor shall inspect all battery units for protection from accidental damage and adequate ventilation. All batteries shall be permanently connected to a properly fused charging circuit dedicated for system batteries.
- 1.13.14. Security Contractor shall verify that field wiring is terminated on a single conductor per terminal basis.
- 1.13.15. Security Contractor shall test ancillary equipment connections for proper operation and inspect such equipment to ensure no faults will interfere with security system procedure.
- 1.13.16. On completion of all tests and verification, the Security Contractor shall provide a certificate indicating proof of liability insurance.
- 1.13.17. Any and all deficiencies attributed to the type, quantity, installation, connection, configuration and programming of the systems and components provided shall be rectified by the Security Contractor. The Security Contractor shall be required to provide verification by means that are satisfactory to the Owner and Consultant that all deficiencies have been suitably addressed.

1.14. REQUISITE WARRANTIES

- 1.14.1. All materials provided by the Security Contractor shall have a minimum warranty of twelve (12) months from the certification of Substantial completion.

2. PART PRODUCTS

2.1. SECURITY SYSTEM COMPONENTS AND FEATURES

- 2.1.1. The Security management System (SMS) shall consist, but not be limited to, the following components:
  - a. SALTO POE Above-door Online Data Gathering Panels



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- b. Salto Card Reader
- c. Electric lock complete with integral request-to-exit (By Door Hardware)
- d. Door Position Switches/Door Contacts (By Door Hardware)
- e. Low Voltage Wiring
- f. Software and Licenses
- g. All other hardware and materials required to provide a fully functional and operational security system.

2.2. SYSTEM CABINETRY, ENCLOSURES AND RACKS

2.2.1. Security Enclosure

- a. All cabinets, enclosures, racks and housings having doors or removable covers and containing terminals, P/C hardware or their power supplies, shall be provided with cover operated, corrosion resistant, tamper switch devices. Tamper devices shall be arranged to actuate an alarm signal when the door or covers are moved as little as 1cm (3/8") from its normally closed position.
- b. All controls which affect unit sensitivity shall be located inside the tamper resistant enclosure.
- c. Provide high security key locks or key operated cabinet switches.

2.2.2. Tamper Switching

- a. The tamper switch unit shall remain inaccessible until the switch is activated and shall have concealed mounting hardware so that its location cannot be visually detected from the exterior of the enclosure.
- b. The switches shall remain under supervision at all times, whether or not their circuits are in the authorized access or secure modes.

2.3. ELECTRIC LOCK COMPLETE WITH INTEGRAL REQUEST-TO-EXIT (PROVIDED BY DOOR HARDWARE)

- 2.3.1. The Electric lock complete with integral request-to-exit shall be Sargent Mortise Lockset 56-RX-8204-WTJ-26D. All products shall be part of the UOFT Approved part list and shall be verified and confirmed by UOFT Lockshop. The contractor shall provide automatic latch retraction for doors with automatic door operator.

2.4. CONCEALED DOOR POSITION SWITCHES/DOOR CONTACTS (PROVIDED BY DOOR HARDWARE)

- 2.4.1. The Security Contractor shall be responsible for coordinating with the Door Hardware Contractor for all wiring and configuration requirements.
- 2.4.2. Door position switches shall be of the 1", circular recessed type.

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- 2.4.3. All door position switches that are required to transmit signal to multiple systems shall be Double-Pole Double-Throw (DPDT).
- 2.4.4. All exterior perimeter door position switches shall have a minimum temperature range of -40oC to 65oC and have an IP 66 rating.
- 2.4.5. Security Contractor shall be responsible for the installation, wiring and configuration of the door position contacts.
- 2.4.6. All products shall be part of the UOFT Approved part list and shall be verified and confirmed by UOFT Lockshop.
- 2.5. DATA GATHERING PANELS (DOOR CONTROLLERS)
  - 2.5.1. Data gathering panels shall be SALTO Online POE controllers mounted above the door as indicated by the security drawings.
  - 2.5.2. All Security DGP's shall be installed within lockable enclosures complete with tamper alarms mounted within the wall above the door.
  - 2.5.3. Security contractor shall be responsible for providing all hardware, licenses, wiring, connections, terminations, power supplies, configuration, programming, testing and commissioning for a fully operational extension of the existing University of Toronto security system at 27 Kings College Cir.
- 2.6. CARD READERS
  - 2.6.1. Card readers shall be Salto card readers. All products shall be part of the UOFT Approved part list and shall be verified and confirmed by UOFT Lockshop.
  - 2.6.2. Security contractor shall be responsible for integrating all electronic locking devices and request-to-exit devices such that fully operational electronic access controlled doors are provided.
- 2.7. SECURITY DOOR FUNCTIONALITY AND OPERATION
  - 2.7.1. General
    - a. The following section describes the physical characteristics, operational modes and corresponding implementation methods for the access control and alarm monitoring applications required.
    - b. The Security Contractor shall ensure the desired operations are adhered too, but is not limited to the descriptions provided below.
    - c. The Security Contractor is to work in conjunction with the Owner or Owner appointed project manager in order to make certain all access control applications are properly instituted, programmed and corresponds with the Owners expectations.

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- d. The Security Contractor shall provide all necessary inputs, outputs, devices, software and associated matter to accommodate and deliver all access control applications in proper working order.

2.7.2. Supervised Access

- a. Through the use of door position switches, the access control system shall determine the state of the door in terms of open, closed or forced.

Mode of Operation	Corresponding I/Os
Normal	if DPS = 0 then intrusion = 0
Access	if access = 1 then inhibit alarm reporting
Intrusion	if DPS = 1 then intrusion = 1

- b. Security doors with multiple leaves and therefore multiple door position switches, shall be fused via a junction box to ensure the access control system views them as one (1) door.
- c. The Security Contractor shall provide an end of line resistor allowing the access control and alarm monitoring system to supervise the wiring between the door position switch and data gathering panel.
- d. A controlled access point is typically secured with electromagnetic locks and not equipped with access control card readers or user specific requirements. The access control system is used to energize or de-energize the electromagnetic locks. Furthermore, the access control system shall determine the state of the door in terms of open, closed or forced.

Mode of Operation	Corresponding I/Os
Normal	Owner Defined
Access	if access = 1 then inhibit alarm reporting and de-energize maglock
Intrusion	if DPS = 1 and access = 0 then intrusion = 1
Closed	if DPS = 0 then set closed mode
Open	if DPS = 1 and intrusion = 0 then set open mode
Key Reset	if pushbar keyswitch = 1 then set normal mode
Lockout	if lockout = 1 then cancel and disable access function
Pullstation	if pullstation = 1 then set fire pullstation mode

- e. Security doors with multiple leaves and therefore multiple door position switches, maglocks and bond sensors shall be fused via a junction box to ensure the access control system views them as one (1) door.

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- f. The Security Contractor shall provide an end of line resistor allowing the access control and alarm monitoring system to supervise the wiring between the door position switch and data gathering panel.
- g. The Security Contractor shall integrate the electromagnetic lock with fire alarm system devices in order to ensure that the lock will become de-energized in the event that a fire alarm is realized. The fire alarm contractor shall provide cabling from the fire alarm DGP to the door site.

### 2.7.3. Access Control

- a. Access controlled security doors are typically secured with card readers, electromagnetic or electric strikes, door position switches and a request to exit in the form of either a motion detector, pushbutton or handle/pushbar.
- b. Card reader LED control pattern shall change based on inputs presented to the reader.

Reader State	LED Control Pattern
Normal	Solid Red
Access	Solid Green
Door Forced/Door Held	Alternating Flash Red/Green
Card Rejected	Alternating Flash Red/Green

- c. Access controlled doors may be incorporated into free egress fire exit routes. The Security Contractor shall provide the necessary features and applications associated with free egress fire routes and doors.

Mode of Operation	Corresponding I/Os
Normal	Owner Defined
Access	if access = 1 then inhibit alarm reporting and release maglock and door handle
Intrusion	if DPS = 1 and access = 0 then intrusion = 1 and energize horn/strobe
Closed	if DPS = 0 then set closed mode
Open	if DPS = 1 and intrusion = 0 then set open mode
Secure	if bond sensor = 1 and DPS = 0 then set secure mode
Not Secure	if bond sensor = 0 then set not secure mode
Key Reset	if pushbar keyswitch = 1 then set normal mode
Lockout	if lockout = 1 then cancel and disable access function
Pullstation	if pullstation = 1 then set fire pullstation mode

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- d. Security doors with multiple leaves and therefore multiple door position switches, maglocks shall be fused via a junction box to ensure the access control system views them as one (1) door.
- e. The Security Contractor shall provide an end of line resistor allowing the access control and alarm monitoring system to supervise the wiring between the door position switch and data gathering panel.
- f. The Security Contractor shall provide twelve (12) VDC power from a security DGP location to each device, whether or not the devices were supplied by the Security Contractor.
- g. The Security Contractor shall integrate the electromagnetic lock (if applicable) with fire alarm system devices in order to ensure that the lock will become de-energized in the event that a fire alarm is realized. The fire alarm contractor shall provide cabling from the fire alarm DGP to the door site.

2.7.4. Fire Egress

- a. Doors that provide fire egress are equipped with devices that may include wired hinge, panic bar, and timing device that provides a fire code compliant unlocking delay.
- b. At each electromagnetically locked fire egress door there will also be a fire alarm system pullstation and a fire alarm lock release relay provided by others.
- c. Fire alarm equipment is supplied and installed by others.
- d. The Security Contractor shall provide and connect an access control panel input to the fire alarm pullstations and to the exit delay timer relay output such that each door pullstation/exit delay timer is represented by a unique point in the access control system.
- e. The Security Contractor shall incorporate the fire egress and fire alarm devices into the access control hardware, software, drawings, documents and all other requirements of these specifications.

Mode of Operation	Corresponding I/O's
Normal	Owner Defined
Fire Release	if fire alarm system control relay = 1 and BS = 0 then set fire release mode
Pullstation	if pullstation = 1 or EDT = 1 then set fire pullstation mode

2.7.5. Lockdown Programming

- a. Lockdown programming is based upon the eventinitiated program capability of the access control system servers and data gathering panels.

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- b. When the event initiated program trigger point is in an access control panel and all of the required output control points are in the same panel, the panel shall execute an internal event initiated program to satisfy the requirements of this application.
- c. Lockout, in this application refers to, close, lock, and monitor the door, and disable the card reader.
- d. An authorized access control system operator shall be able to selectively command any door in a lockdown mode to timed access mode.
- e. When an event initiated program contains outputs in multiple data gathering panels, the event initiated program shall use the access control system servers to issue control commands to all other DGPs.
- f. The lockdown programming shall include the following event initiated program sequences:
  - 1. Primary Security Lockdown – Triggered by an access control system command. All primary security lines are locked down.
  - 2. Building Exterior Lockdown – Triggered by an access control system command. All building exterior doors are locked down on the public side.
  - 3. Building Interior Lockdown – Triggered by an access control system command. All interior building doors are locked down and card readers disabled.

2.8. ACCESS CONTROL AND ALARM MONITORING SYSTEM

- 2.8.1. Access control and alarm monitoring system shall be an extension of the existing University of Toronto security system at 27 Kings College Cir.
- 2.8.2. Security Contractor shall be responsible for providing all servers, DGP's, licenses, programming, wiring, terminations, configuration, testing, and verification required to provide for a fully operational extension of the existing University of Toronto security system at 27 Kings College Cir.

3. PART EXECUTION

3.1. INSTALLATION AND MATERIAL STANDARDS

3.1.1. Quality of Installation

- a. The Security Contractor is to provide a qualified, thorough and professional installation crew.
- b. During the installation, the Security Contractor must observe, understand and obey all site safety rules and regulations. Moreover, all pertinent codes as well as proper practice in procedure must be adhered to.

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- c. The security system shall be installed as required in proper conduits. The Security Contractor shall provide all miscellaneous parts, equipment and labour necessary to ensure complete and correct operation of the system.
- d. All installed wire, cable and conduit must be of the correct type, quantity and size as specified or required by the manufacturer and shall consist of continuous runs from device to termination points, without splices.
- e. The Security Contractor is to gain consent from either Owner or Owner appointed project manager

END OF SECTION