Peel Region

Tuesday, January 13, 2026

DOCUMENT - 2025-620T
INTERIOR RENOVATIONS AT PEEL REGIONAL POLICE 21 DIVISION, 10 PEEL CENTRE DRIVE, BRAMPTON

ADDENDUM NO. 1

Number of Pages: 138

Referring to the above Document 2025-620T - INTERIOR RENOVATIONS AT PEEL REGIONAL POLICE 21 DIVISION, 10 PEEL CENTRE DRIVE, BRAMPTON, please note the following:

1. **Bid Closing Date**

The closing date has been changed to:

12:00PM noon local time

THURSDAY, JANUARY 22ND, 2026

2. **Instruction To Bidders – Section 13 Time of Completion**

DELETE Item #13.1 in its entirety.
REPLACE with "The Contractor agrees to attain **Substantial Performance of the Work**, by the day of November 6 in the year 2026, and **Ready-for-Takeover**, by the day of November 27 in the year 2026.

Contractor to account for an estimated 38-48 weeks of construction".

3. **Online Bid Form – Hourly Rates**

DELETE Item #17 Audio Visual Site Foreman and Item #18 Audio Visual Site Journeyman.

4. **Clarifications**

1) All STC rated walls to be continued to the structural slab. If there is any conflict between mechanical/electrical components and new STC rated wall, GC is responsible to either relocate the mechanical/electrical component or supply and install the required bulkhead around the component to maintain the integrity of the STC rated wall.
2) AV equipment procurement and installation by owner.
3) All CAT 6 cabling by contractor.
4) Security devices and access control cabling by owner, rough-in by contractor.
5) Request for acceptance of Substitutions will not be considered during the bidding period. Bidders to submit the bid based on the specified manufacturers listed within the specifications.
6) For framing details to support STC rated doors and frames, refer to the attached structural drawing S1 & S2 issued for tender addendum dated January 7, 2026. (2 pages)
7) Refer to attached Electrical Addendum #01 (119 pages) and Mechanical Addendum #01 (3 pages) issued by EXP dated January 9th, 2026.
8) Location for all mechanical and electrical components to be coordinated with architectural reflected ceiling plan. Report any discrepancy to the architect before taking any action.
9) Room finish schedule, Room # 2-01 & 2-02 north wall material to be revised to CBW, paint finish.
10) For the location of glass wall tile for washrooms/showers, refer to interior elevations.
11) Frame type for door D-2-09 & D-2-09a to be revised to type 1.
12) Contractor parking and Loading Dock location Map (1 page) is attached with this Addendum.

5. **Questions and Answers:**

Question 1:

Are there any mandatory base building contractors for the BAS controls and balancing on this project?

Answer 1:

Existing base building BAS vendor:
Trane Building Automation Systems
Contact: Justin (416)450-9556

Existing base building fire alarm contractor:
Viking Fire Protection
Contact: Mauricio (416)561-1018

Question 2:

Some scope of work clarifications are required for this tender:
1. There are references on drawings to both Cat6 and Cat6A cabling. Div27 spec states Cat6A. Drawing notes request re-termination of existing Cat6 at consolidation points and drawing details indicate Cat6A cabling back to the telecom rack assumed to be in the computer rooms.
2. Only 7x existing Cat6 cable drops are shown on Demolition drawings (no total count) but, there are 5 consolidation points shown on new Power and Systems drawings.
3. New Cat6A to Consolidation Points and existing Cat6 from the CP to the Computer room makes no sense. Is this a complete Cat6A solution implementing CPs for cabling?
4. Seeing as there is no Riser drawing, it is assumed that any copper or fibre connections, shown in the Network Standards doc, between the computer rooms are existing.
5. Why and how are the RG6 coax and 2 conductor analogue cables terminating in the ceil space and not simply run to the wall outlet locations?

Answer 2:

1. Please note the following:
    - All existing CAT6 cables, that are in good condition and not damaged, shall be re-terminated on new Belden CAT6 RJ-45 jacks and patch panels in consolidation points. Re-testing of existing cables are required to ensure cable standards are maintained.

- New cabling from consolidation points to remote locations shall be a Panduit CAT6A solution.
- For areas where additional cables are required to remote locations, Panduit CAT6A cabling solution shall be installed on a new patch panel from the rack in the Computer Room to the new Belden CAT6 RJ-45 jacks and patch panels in consolidation points.

2. Contractor shall conduct an initial site review to quantify all existing CAT6 cables to be re-terminated. Re-testing of existing cables are required to ensure cable standards are maintained.
3. Refer to Answer 3.1 for clarity. Any new cabling and infrastructure shall be Panduit CAT6A solution to adhere to client standards. Any existing cabling to be re-terminated shall remain as Belden CAT6 cabling.
4. Confirmed, all backbone copper and fibre cabling are existing.
5. RG6 Coaxial and 2-Conductor Analogue cables shall run from Rack 3 in Computer Room to be terminated in ceiling outside of the Interview Room for connectivity to owner provided and installed equipment.

Question 3:

Is panel RP-2RCC new, or existing? The drawing shows that is existing, but the panel schedule does not show it to be existing as it does for all the other panels. The schedule also has all of the breakers shown in bold, typically meaning that they are new. There is also no SLD to show where it is to be fed from.

Answer 3:

EXP-E: As per detail 2/E202, RP-2RCC is a new panel. It’s fed from existing panel RP-2RC (refer to panel schedule on E401).

Question 4:

On Drawing A100, there are notes indicating some walls to be demolished as block walls. Is it correct to assume that all other walls to be demolished (which are not specifically noted as block walls) are drywall? If not, please clarify whether all partitions to be demolished are block walls.

Answer 4:

All existing walls that are shown to be demolished, are concrete block walls.

Question 5:

On drawing A100 - Note # 8 under floor demolition notes calls for allowing up to 2 inches of floor leveling under new flooring. This could present a significant cost if required throughout all new flooring areas. Would you consider carrying this item as a cash allowance, as the extend of required floor leveling cannot be accurately quantified until the existing floor is removed?

Answer 5:

Allowing up to 1 inch of floor leveling to be the base for bid submission, anything beyond this amount will be existing condition.

Question 7:

For the List of Proposed Major Subcontractors, please confirm whether Performance and Labour & Material Payment Bonds are required from the listed subcontractors, and whether these bonds must be submitted with the bid or only after award.

Answer 7:

The Region does not require Performance Bond and Labour & Material Payment Bond from Subcontractors.

Question 8:

There is a Security Film listed under the cash allowance; however, Drawing A201 notes that the GC is to supply and install frosted film to existing full-height windows.
Please clarify whether the frosted film noted on Drawing A201 is to be included under the cash allowance or if it is to be in the base scope.

Answer 8:

Frosted film is to be included in base scope. Security film refers to the lobby vestibule entrance, which will be included in the cash allowance.

Question 9:

On drawing A200, wall type P15 is noted on the wall to the left of line 17 around line B1. What is the extend of P15 on the existing wall? is it 5760mm? Please confirm.

Answer 9:

The dimension behind the gun lockers is +/- 5760 mm.

Question 10:

1.Please provide names and contact of fire alarm, HVAC controls, security, and sprinkler contractors servicing the building and the manufacturers of the systems.
2. Please provide the start and finish times for regular daytime work and after-hours work.
3.Please provide the height from the floor to the underside of the ceiling structure on ground floor and second floor.
4.Please confirm whether the ceiling structure on both the ground floor and second floor is a 230 mm thick concrete suspended slab, as indicated in Detail 2/S1. We raise this question because Drawing A202 shows a concrete topping on corrugated metal deck.
5.Drawing A100 (General Demolition Legend) notes a 1-hour fire-rated hoarding; however, we are unable to locate this hoarding on the floor plans in A100. Please assist by identifying its location. In addition, please confirm whether any 1-hour fire-rated hoarding is required beyond what is noted on Drawing A700.
6.Drawing A700 shows 1-hour fire-rated hoarding in limited locations, but not in all corridor areas where work is indicated. For example, Drawing A100 shows work in the corridor adjacent to rooms A-25 and A-26 on the second floor. Please advise whether poly hoarding is acceptable for this area and for other areas not shown on A700. If poly hoarding is not acceptable, please specify the required type of hoarding.
7.Detail 3/A300 indicates a vertical rectangular trim approximately 34 mm high (50 mm including 16 mm gypsum board) concealing a light fixture within a light cove. Please provide the material specification and the method of attachment to the ceiling for this trim.
8.Please assist in identifying the locations on the drawings where glass specified in Section 08 80 00 – Glass and Glazing is to be used.

9.Section 09 80 00, Item 2.2.1.4, specifies a 2-inch thick panel; however, the product No. 2604 is listed as a 7/8-inch thick panel. Please clarify this discrepancy.
10.We are unable to identify the application of Section 09 80 00 on the drawings. Please assist by indicating the relevant locations.
11.Please confirm that Tectum panels specified in Section 09 84 00 are to be used in Partitions P3 and P10.
12.Please provide material for a transom panel for door frame type 2.

Answer 10:

1. The information of Existing base building BAS and Fire Alarm contractors is provided in Q/A #1 above. Security Contractor is part of cash allowance and will be completed by Clockworks Systems Inc. Manufacturers of the existing security system include Honeywell (NetAXS) and Avigilon. Any additional information can be provided to the successful bidder by Owner.
2. Regular Daytime work 7:30am -4:00pm. After-hours work is anything outside of regular daytime work ours. **Bidders to include for all afterhours work required as part of their bid.**
3. Ground floor slab to slab height: +/- 4800mm
   Second floor slab to slab height: +/- 3900mm
4. Second floor from grid 11B to grid 21Y and third floor from grid 12 to 21Y are constructed with 230mm thick reinforced concrete two-way slab supported on concrete columns.
   Details on A202 are typical details. For structural information refer to structural drawings.

5&6. A700 drawing is for reference only. The actual location and number of hording to be confirmed with client and should be under GC scope.
7. Detail to be provided by drywall contractor for approval during shop drawing phase.
8. Section 08 80 00 glass and glazing to be deleted from specifications.
9. GC to match the thickness to existing walls. GC to verify on site and install the required number of layers accordingly.
10. For all partition types that indicates “Acoustic Panels to match existing”.
11. Tectum panels are specified for P3 & P2.
12. Transom panel to be metal panel, pain finish. Paint color to match the door and frame color.

Question 11:

Please confirm that Sections 28 20 00, 28 16 00, 28 10 00, 28 05 00 will be paid from $700,000.00 Security Cash Allowance.

Answer 11:

Security devices and access control cabling shall be part of the Cash Allowances. Infrastructure including conduits category cabling to be provided by contractor.

Question 12:

1.Please confirm whether shop welding of lintels L1 and L2 noted on Drawing S2 is acceptable, including any shop welding inspection requirements.
2.We also request clarification on how structural members C1 and B1 shown on Detail 3/S1 interface with the STC door frame and the existing partition, as this information is not shown on Drawing A600. Please provide the applicable details for each wall type.

Answer 12:

1. Shop weld of lintels is acceptable. GC to retain a third party welding inspection company to review all the shop and site weld connections and submit related reports.
2. For framing details to support STC rated doors and frames, refer to the attached structural drawing S1 & S2 issued for tender addendum dated January 7, 2026. GC is responsible to demolish, patch, repair existing concrete block/drywall partition as required for the framing.

Question 13:

Please be advised that Bobrick and ASI do not manufacture tilted 24 × 48 mirrors. Kindly select a tilted mirror from the standard sizes available on the manufacturers' websites.

Answer 13:

Price to include manufacturer standard tilt mirror size, to be confirmed during the shop drawing submission stage.

Question 14:

The drawings indicates that there is an existing access control system.
Is the current system Avigilon? Is there a local server onsite? If so, what type of server is it? Pro, Enterprise, and available licenses?
Do we need to provide access cards? If so, how many are required?
How many existing doors and readers are currently at this location?
Is the current camera system Avigilon? Can the existing server accommodate the additional cameras?
Do you have a model # for Type 1 & type 2 cameras?

The drawings indicate numerous Duress Buttons to be implemented. To which system are these buttons connected to? Does it require a local siren?

1.4.1.1 Indicates all CAT6A cabling to provided & installed by Structured Cable contractor.
Will they also be providing all POE switches, UPS backup and patch cables as needed?
2.1.1.5 Does the security contractor need include the cost for the Specialty Engineer to be present when testing & commissioning all security related devices? If so, how much do we need to budget?

Answer 14:

Regarding security work, Infrastructure including conduits to be completed by contractor. All Security cameras, card readers and required security equipment to be supplied and installed by PRP security contractor under cash allowance as noted. Testing and commissioning to be performed by security vendor under cash allowance.

Question 15:

Can you please confirm with Peel that Belden is an acceptable manufacturer? The specs say it is, but the drawings say only Panduit.

Answer 15:

As per Peel Police Network Standards, all new cabling to be Panduit spec.

Question 16:

Due to our current workload, we kindly request an extension to the tender closing if possible.

Answer 16:

Bid Closing extended to **THURSDAY, JANUARY 22ND, 2026**

Question 17:

Washroom accessories
Interior elevation 3A/A500 for typical shower / washroom shows a grab bar behind toilet.
Please confirm this is incorrect as rooms are not barrier free.
Specified folding grab bars are not located on plans.

Lockers
Please confirm new lockers are required at rooms 2-02 and 2-27 only
Rooms 2-08 and 2-14 have existing lockers.

Answer 17:

Washroom Accessories: Please price as outlined in the drawings.
Lockers:
New Lockers Required: 2-02, 2-27
Existing Lockers: 2-08, 2-14

Question 18:

Detail 7/A500 includes a note referring to 75×75×4.5 steel L-stiffeners at 100 mm o.c. between the basin. We do not understand this note, as it is unclear how stiffeners can be installed between a single basin. Could you please clarify this requirement and provide a detailed vanity support detail showing all supporting elements?

Answer 18:

Stiffeners are not required between the basin.

Question 19:

The bid form requests the provision of labor rates for the audio-visual trade. However, the audio-visual scope of work is covered under a cash allowance. As the specific scope for audio-visual work has not been defined, bidders are unable to coordinate with audio-visual subcontractors and, consequently, cannot provide accurate unit labor rates. We kindly request that this requirement be removed from the bid form.

Answer 19:

The Hourly rates for audio-visual work have been removed from the online Bid form.

Question 20:

1. Is this project to be completed during regular hours or after hours?
2. Could you please provide a Specification for the Floor Boxes?
3. Could you please provide a One-Line diagram for Panel RP-2RCC?

Answer 20:

1. Both Regular hours and after hours work will be required on this project. Contractor bid to account for all after hours work required.
2. Specification to be the Connectrac Flex Raceway System.
3. As per detail 2/E202, RP-2RCC is a new panel. It's fed from existing panel RP-2RC (refer to panel schedule on E401).

Question 21:

1) Will it be possible to relocate these lockers elsewhere within the building. If so, where?

2) If the lockers need to be relocated offsite, will it be on or near Divion 21? Alternatively, somewhere else arranged by the supplier of lockers.

3) Will the vehicle dock be available?

4) Is there a goods elevator that will be available?

5) Gun Lockers Of which there are 23. Not listed on the tender. Are these existing or will new ones be required?

Answer 21:

1) GC is responsible to remove, relocate, store and reinstall existing lockers. Relocation will be within the building, exact location to be determined.
2) Not required to be relocated off site.
3) Yes.
4) Yes.
5) Gun lockers indicated on drawings will be part of the security cash allowance.

Question 22:

On drawing E302 Second floor lighting all the lights in the change rooms labelled L5 look like they are mislabelled. An L5 is a 2 x 4 light should these lights be L7?

Answer 22:

Second floor change room lighting shall be type L7.

Question 23:

What is the start date for this project? The tender documents indicate that the work must be substantially completed by Sept 18 2026 and ready for

take over by Sept 30 2026. In order to determine the overall duration, please provide a guaranteed start date. Alternatively please provide the project duration in weeks.

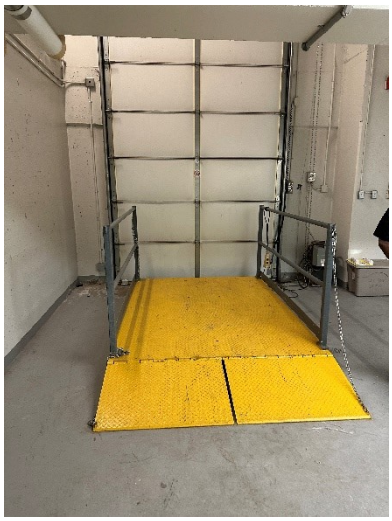
Answer 23:

Construction is estimated to start in March of 2026. Substantial completion date has been revised to November 6th, 2026. Contractor to account for an estimated 38-48 weeks of construction in their bid.

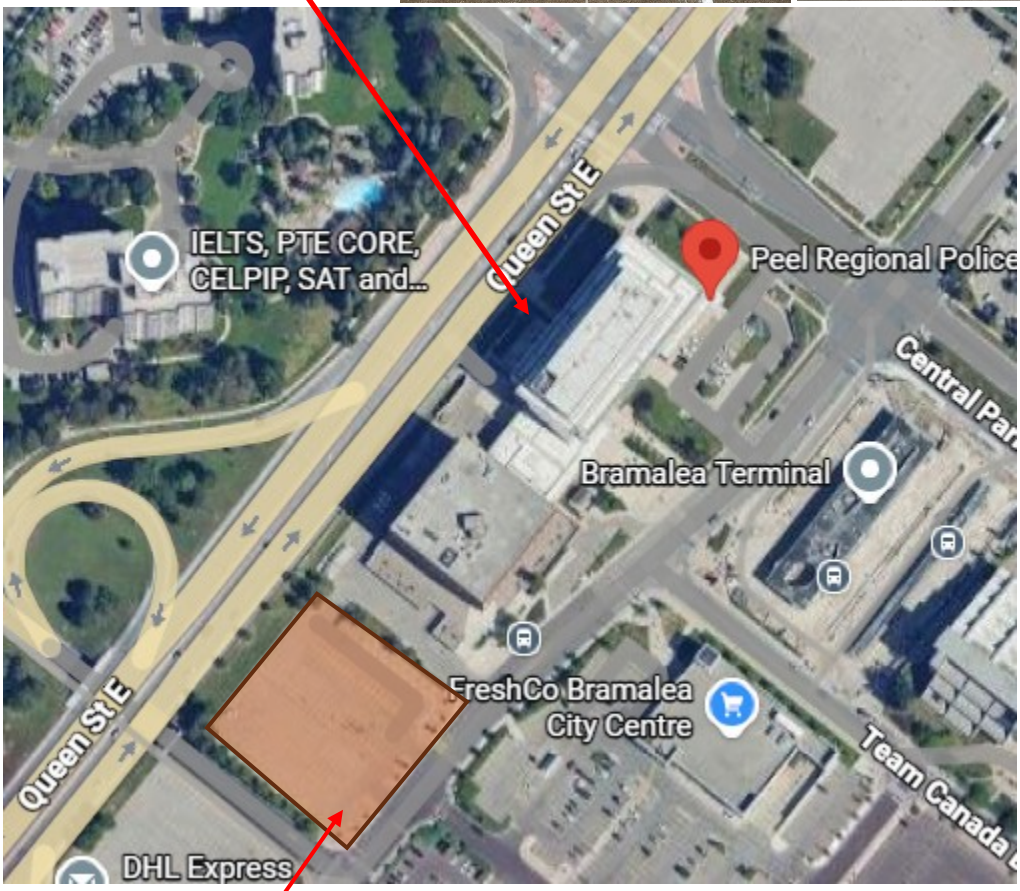
Colin Zeng

Senior Procurement Analyst

21 Division – Back Entrance and Material Drop Off



Contractor Material Delivery and Trade Access – Basement Level Elevator



Contractor Parking.

EXP Services Inc.
220 Commerce Valley Drive West, Suite 110
Markham, Ontario
L3T 0A8

Telephone: 905.695.3217
Facsimile: 905.695.0167

Electrical and Technology
Addendum No. 01

Reference: In response to Tender RFI Issue Date: January 9, 2026

Project: 21 Division, Peel Regional Police – Facility Interior Renovations
(EXP Project Number MRK-25008049-A0)

This addendum shall form an integral part of the Bid Documents for the above project and shall be read in conjunction therewith. This addendum shall, however, take precedence over all requirements of the previously issued Drawings and Specifications with which it may prove to be at variance, unless otherwise clarified by the Consultant.

This addendum must be signed by the Bidder in the appropriate space and must be attached to the back of the Bid Form for submission at the time of bidding. Bids not including this addendum signed as requested may be rejected as informal.

Revisions / Clarifications

The following changes and clarifications shall be considered when submitting your bid.

1.1. ELECTRICAL & TECHNOLOGY SPECIFICATIONS

1.1.1. Section 27 05 00 Common Work Results for Communications (included herein)

.1 Part – 1 General, 1.3 Work Included in the Low Voltage Communications Contract
- .1.1. Add description for design intent of existing and new cables.

.2 Part – 1 General, 1.9 Record As-Built Drawings
- .2.1. Delete description for underground and utility work.

.3 Part – 1 General, 1.17.2 Submittal Procedures and Format
- .3.1. Delete description for fibre.

.4 Part – 2 Products, 2.3 Basket Cable Tray (For Telecommunications Applications)
- .4.1. Delete description for basket cable tray.

.5 Part – 3 Execution, 3.2 Installation of Cable Tray
- .5.1. Delete description for cable tray installation.

1.1.2. Section 27 10 00 Structured Cabling (included herein)

.1 Part 1 – General, 1.4.1 Manufacturers Qualifications
- .1.1. Revise description from “single manufacturer” to “acceptable manufacturers” to match Owner standards.
- .1.2. Delete description for optical fibre.

.2 Part 2 – Products, 2.2 Cables, 2.3 Patch Panels, 2.4 Connectors, 2.5 Faceplates, 2.6 Patch Cords, 2.7 Equipment Enclosures
- .2.1. Add description for acceptable part numbers.
- .2.2. Add description for CAT6 components, where applicable.
- .2.3. Delete description for optical fibre components.

.3 Part 2 – Products, 2.8 Pathways
- .3.1. Delete description for cable trays.

.4 Part 3 – Execution, 3.1 Installation
- .4.1. Delete description for copper and fibre backbone cables.
- .4.2. Delete description for equipment racks.
- .4.3. Add description for consolidation points.
- .4.4. Delete description for pathways.

1.1.3. Section 28 05 00 Common Work Results for Electronic Safety and Security (included herein)

.1 Part 1 – General, 1.4 Requirements
- .1.1. Revise description to clarify existing equipment.
- .1.2. Delete description for security systems headend equipment.
- .1.3. Add description for tie-in/integration with existing systems headend equipment.

1.1.4. Section 28 10 00 Access Control System (included herein)

.1 Part 1 – General, 1.1 Section Includes
- .1.1. Revise description to clarify tie into existing equipment.

.2 Part 2 – Products, 2.1.1 General Scope
- .2.1. Revise description to clarify tie into existing equipment.

.3 Part 2 – Products, 2.1.2 System Description
- .3.1. Delete description for access control system headend equipment.
- .3.2. Delete description for magnetic locks.
- .3.3. Delete description for intercom.
- .3.4. Delete description for fire alarm release operation.
- .3.5. Delete description for photo badge and verification.

.4 Part 2 – Products, 2.3 Field Devices, 2.4 Display and Control Equipment, 2.5 Software
- .4.1. Delete description for references to existing equipment and components.

1.1.5. Section 28 16 00 Intrusion Detection System (included herein)

.1 Part 1 – General, 1.1 Section Includes, 1.5 System Requirements
- .1.1. Revise description to clarify tie into existing equipment.

.2 Part 2 – Products, 2.5 Peripheral Devices and Sensors
- .2.1. Delete description for overhead door.

1.1.6. Section 28 20 00 Video Surveillance System (included herein)

.1 Part 1 – General, 1.1 Section Includes
- .1.1. Revise description to clarify tie into existing equipment.

.2 Part 2 – Products, 2.3 Design and Performance Requirement, 2.5 Display and Control Equipment, 2.6 Technical Requirements - Software
- .2.1. Revise description to clarify tie into existing equipment.
- .2.2. Delete description for references to existing equipment and components.

1.1.7. Section 28 26 00 Duress Panic Alarm System (included herein)

.1 Add specification section 28 26 00 Duress Panic Alarm System.

1.2. ELECTRICAL AND TECHNOLOGY DRAWINGS

1.2.1. E411 – TECHNOLOGY DETAILS (included herein)

.1 Detail 1: revise Communications Riser Diagram and add stub from corridor into interview room, as bubbled.

.2 Detail 3: revise Detail Notes of the wireless access point, as bubbled.

.3 Detail 4: revise Detail Notes and device depiction of the standard wall mount outlet, as bubbled.

.4 Detail 5: revise Detail Notes and device depiction of the standard furniture mount outlet, as bubbled.

.5 Detail 7: revise Detail Notes of the ceiling mounted fixed camera, as bubbled.

.6 Detail 8: revise Detail Notes of the wall mounted camera, as bubbled.

.7 Detail 9: revise Detail Notes of the single access control door, as bubbled.

.8 Detail 10: revise Detail Notes of the single access control door with electrified lock, as bubbled.

.9 Detail 11: revise Detail Notes of the single door with door contact and alarm, as bubbled.

---------- END OF ELECTRICAL AND TECHNOLOGY ADDENDUM No. 01 ----------

PART 1 – GENERAL

1.1 References

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

.2 Division 25 Specification Sections apply to this Section.

.3 Division 26 Specification Sections apply to this Section.

.4 Division 27 Specification Sections apply to this Section.

.5 Division 28 Specification Sections apply to this Section.

.6 This section specifies products, criteria and characteristics, and methods and execution that are common to one of more Mechanical and Electrical Sections. It is intended to supplement to each Electrical and Communications Section and is to be read accordingly.

1.2 Submittals

.1 Submit shop drawings for products specified in this Section.

1.3 Work Included in the Low Voltage Communications Contract

.1 The mention of an Article, operation or method requires that the extra-low voltage communications systems Contractor (Contractor) shall provide same and perform each operation in accordance with the conditions stated. The Contractor shall provide material, labour, equipment, and transportation to complete the project in compliance with the Contract Documents to provide a complete and fully functional installed system.

.2 Work shall be installed in accordance with Provincial and Local Inspection Authorities having jurisdiction together with the recommendations of the manufacturer whose equipment is to be supplied and installed under this Contract.

.3 Drawings and Specifications form complementary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices, and materials obviously necessary for a sound, secure and complete installation.

.4 Provide all services and coordination representing the Owner for all incoming services voice and data and TV.

.5 It is the intent that these Specifications and Drawings are to establish minimum requirements for methods, products, and equipment and to provide electrical service, distribution and systems finished, tested and ready for operation. Incidental detail not usually shown or specified, but necessary for proper installation and operation shall be included in the work and the Contractor's estimate, the same as if specified.

.6 Locations of all equipment and material shall be adjusted at no extra cost to the Owner, to accommodate the work interferences anticipated and/or encountered.

.7 Prior to installation, determine the exact route and location of each raceway and piece of equipment to minimize conflicts with other trades.

.8 The Contractor, in conjunction with the Consultant and Owner's representative, shall establish exact locations of materials and equipment to be installed. Consideration shall be given to construction features, equipment of other trades and requirements of the equipment proper.

~~.8~~.9 Within the scope of work, all existing CAT6 cables, that are in good condition and not damaged, shall be re-terminated on new Belden CAT6 RJ-45 jacks and patch panels in consolidation points. Re-testing of existing cables is required to ensure cable standards are maintained. Where existing CAT6 cable quantities are insufficient, new Panduit CAT6A cabling shall be installed from Rack 1 in the Computer Room to be terminated on new Panduit CAT6A jacks and patch panels in the consolidation points. New cabling from consolidation points to remote locations shall be a Panduit CAT6A solution.

~~.9~~.10 Give notices, file plans, obtain permits and licenses, pay fees and back charges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of Contract Documents.

~~.10~~.11 Before submitting a bid, each bidder shall examine the drawings relating to their work and shall become informed as to the extent and character of the work required and its relation to other work in the building.

~~.11~~.12 This project may be phased, as defined by the Owner and Architect. This may necessitate the provision of temporary cabling and connectivity to maintain newly constructed and existing areas of the project that may be affected by the phasing of construction. Contractor shall be responsible for providing, installing, and removing all temporary cabling and connectivity as required in their original bid. All associated appurtenances with the utilities shall be provided as part of this project.

~~.12~~.13 Materials shall be suitably stored and protected prior to installation and work shall be protected after installation, during construction and prior to acceptance.

~~.13~~.14 The Contractor shall furnish scaffolding, rigging, hoisting and services necessary for delivery, erection and installation of equipment and apparatus required to be installed by the Contractor. This equipment shall be removed by the Contractor upon completion of the project.

1.4 Permits and Licenses

.1 The Contractor shall prepare and submit applications and working drawings to authorities having jurisdiction over the project. Licenses and permits required shall be secured and paid for by the Contractor.

1.5 Standards and Codes

.1 Work shall be installed in accordance with National, Provincial, and Local codes, ordinances, laws, and regulations. Comply with applicable OSHA regulations.

.2 Work shall be installed in accordance with BICSI, IEEE, ANSI, and TIA/EIA standards latest versions.

.3 Materials shall have a UL or ETL label where a UL or ETL Standard or test exists.

.4 International, national, and local codes and standards:

.1 National Building Code (NBC)

.2 National Fire Code (NFC)

.3 National Energy Code of Canada for Buildings (NECB)

.4 CSA C22.1 Canadian Electric Code, Part 1

.5 CSA C22.2 No. 214 Communications Cables CSA C22.2 No. 232-M Fibre Optic Cables FCC Rules 47 CFR 0-19 Telecommunications

.6 ASTM E2085-00a Standard Guide on Security Framework for Healthcare Information

.7 ASTM E1869-04 Standard Guide for Confidentiality, Privacy, Access, and Data Security Principles for Health Information Including Electronic Health Records

.8 Electrical Safety Authority

.9 CENELEC EN 50173 Information Technology: Generic Cabling Systems

.10 FIPS PUB 174 Commercial Building Telecommunications Wiring Standard

.11 IEC 603-7, PART 7 Detail Specification for Connectors, 8-Way, Including Fixed and Free Connectors with Common Mating Features

.12 IEC 807-8 Rectangular Connectors for Frequencies Below 3 MHz, Part 8: Detailed Specification for Connectors, Four-Signal Contacts and Earthing Contacts for Cable Screens, First Edition

.13 ISO/IEC IS 11801A Generic Cabling for Customer Premises

.14 NEMA WC 63 Performance Standard for Field Testing of Unshielded Twisted-Pair Cabling System

.15 ULC-S317-1996, Installation and Classification of Closed-Circuit Video Equipment (CCVC) Systems for Institutional and Commercial Integrated Security Management Systems.

.16 UL 444 and 13 Adopted Test and Follow-Up Service Requirements for the Optional Qualification of 100ohm; Twisted-Pair

.17 UL 60950 Standard for Safety of Information Technology Equipment

.18 UL 969, Standard for Marking and Labelling Systems

.19 CIP-002-3 through CIP-009-3 – Critical Infrastructure Protection

.20 Public Hospitals Act

.21 Personal Health Information Protection Act

.22 Personal Information Protection and Electronic Documents Act

.23 CSA standard Z318.0, Commissioning of Health Care Facilities

.24 Local Building Department

.25 Local Fire Department

.26 Other Municipality Bylaws

.5 American Society for Industrial Security (ASIS)

.1 ASIS/SHRM WVP.1-2011 Workplace Violence Prevention and Intervention ANSI Standard

.2 ANSI/ASIS/RIMS RA.1-2015 Risk Assessment

.3 ANSI/ASIS PAP.1-2012 Security Management Standard: Physical Asset Protection

.4 ANSI/ASIS CSO.1-2013 Chief Security Officer (CSO) Organizational Model

.5 ASIS FPSM GDL (2009) Facilities Physical Security Measures Guideline

.6 Telecommunication Industry Association (TIA)

.1 ANSI/EIA/TIA 568.0-E Generic Telecommunications Cabling for Customer Premises

.2 ANSI/EIA/TIA 568.1-E Commercial Building Telecommunications Infrastructure Standard

.3 ANSI/EIA/TIA 568.2-E Balanced Twisted-pair Telecommunications Cabling and Components Standards

.4 ANSI/EIA/TIA 568.3-E Optical Fiber Cabling Components Standard

.5 ANSI/EIA/TIA 568.4-D Broadband Coaxial Cabling and Components Standard

.6 ANSI/TIA-569-E Telecommunications Pathways and Spaces

.7 ANSI/TIA-606-D Administration Standard for Telecommunications Infrastructure

.8 ANSI/TIA-607-E Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises

.9 ANSI/TIA-758-C Customer-Owned Outside Plant Telecommunications Infrastructure Standard

.10 ANSI/TIA-862-B Building Automation Systems Cabling Standard

.11 ANSI/TIA-1152-A Requirements for Field Test Instruments and Measurement for Balanced Twisted-pair Cabling

.12 ANSI/TIA-1179-A Healthcare Facility Telecommunications Infrastructure Standard

.13 TIA TSB-162-B Telecommunications Cabling Guidelines for Wireless Access Points

.14 TIA TSB-184-A Guidelines for Supporting Power Delivery over Balanced Twisted-pair Cabling

.7 Building Industry Consulting Service International (BICSI)

.1 BICSI Telecommunications Distribution Methods Manual (TDMM), 15th Edition or latest

.2 Information Transport Systems Installation Manual (ITSIM), 8th Edition or latest

.3 Outside Plant Design Reference Manual (OSPDRM), 6th Edition or latest

.4 ANSI/BICSI 005-2016 Electronic Safety and Security (ESS) System Design and Implementation Best Practice

1.6 Dimensions and Definite Locations

.1 Drawings are performance drawings, diagrammatic, and show approximate locations of equipment and devices. Any information regarding accurate measurement of building is to be taken on site. Do not scale Drawings, and do not use Drawings for prefabrication work.

.2 Locations of equipment and materials shown may be altered, when reviewed by Consultant, to meet requirements of equipment and/or materials, other equipment or systems being installed, and of building, all at no additional cost to Contract.

1.7 Coordination

.1 The Contractor shall refer to shop drawings and submittal drawings for equipment requiring communications connections to verify rough-in and connection locations.

.2 Based on the systems concept, the main components, and the approximate geometrical relationships, the Contractor shall provide all other components and materials necessary to make the systems fully complete and operational.

.3 Coordinate arrangement, mounting, and support of communications equipment:

.1 To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

.2 To provide for ease of installation and removal of the equipment with minimum interference to other installations or equipment.

1.8 Contract Documents

.1 Listing of Drawings does not limit responsibility of determining full extent of work required by these Contract Documents. Refer to Architectural, HVAC, Plumbing, Fire Protection, Electrical, Structural, Site Utility and all other Drawings and other Sections that indicate types of construction in which work shall be installed and work of other trades with which work of Division 27 must be coordinated.

.2 Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

.3 Items referred to in singular number in Contract Documents shall be provided in quantities necessary to complete work.

.4 Information and components shown on riser diagrams but not shown on plans, and vice versa, shall apply or be provided as if expressly required on both.

.5 Data that may be furnished electronically by the Architect is diagrammatic. Such electronically furnished information is subject to the same limitation of precision as heretofore described. If furnished, such data is for convenience and generalized reference and shall not substitute for Architect's sealed or stamped construction documents.

1.9 Record As-Built Drawings

.1 The Contractor shall keep a detailed up-to-date record, of the manner and location in which installations are actually made, indexing each drop, backbone, pull box and equipment / racks.

.2 Record documents are to reflect all changes in work including change orders, field directives, addenda from bid set of Contract Documents, request for information responses, etc. Upon completion of the project, the Contractor shall modify the project electronic drawing and specification files to incorporate this information. Modified documents shall be turned over to the Owner and Consultant in electronic formats. Record drawings shall also include:

.1 Locations of buried conduit or similar items. Include buried depth.

.2 Field changes of dimension or detail.

.3 Changes made by field order or change order.

.4 Details not on original contract drawings.

.3 Take photographs of all concealed equipment in gypsum board ceilings, shafts, underground (buried) piping routes and supports and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation for each photo. These shall become part of Record Documents.

~~.4 Underground and utility work shall be located by distances to landmarks, such as building foundations. Give actual dimensions of everything installed including elevations and elevations at each change in direction.~~

~~.5~~.4 Drawings shall also show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall incorporate actual manufacturer and make and model numbers of final equipment installation.

~~.6~~.5 THE CONSULTANT/ARCHITECT WILL NOT CERTIFY THE ACCURACY OF THE RECORD DRAWINGS - THIS IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

~~.7~~.6 When required by the jurisdiction, each trade shall submit the record set for approval by the building department in a form acceptable to the department. Any document format size changes, and supplemental information required for the submittal are the responsibility of the Contractor.

~~.8~~.7 Quality of Record Documents shall equal or exceed that of original Contract Documents.

~~.9~~.8 The record documents shall be submitted in electronic media format to the Architect/Consultant for review and approval, prior to Application for Final Payment.

1.10 Discrepancies in Documents

.1 Where drawings or specifications conflict or are ambiguous, advise the Consultant in writing before Award of Contract. Otherwise, the Consultant's interpretation of contract documents shall be final, and no additional compensation shall be permitted due to discrepancies or ambiguities thus resolved.

.2 Where drawings or specifications do not coincide with manufacturers' recommendations, or with applicable codes and standards, alert the Consultant in writing before installation. Otherwise, make changes in installed work as the Consultant requires within Contract Price.

.3 If the required material, installation, or work can be interpreted differently from drawing to drawing, or between drawings and specifications, this Contractor shall provide that material, installation, or work which is of the higher, more stringent standard.

.4 It is the requirement of these contract documents to have the Contractor provide systems and components that are fully complete, operational, and suitable for the intended use. There may be situations in the documents where insufficient information exists to precisely describe a certain component or subsystem, or the routing of a component or its coordination with other building elements. In cases such as this, where the Contractor has failed to notify the Consultant of the situation, the Contractor shall provide the specific component or subsystem with all parts necessary for the intended use, fully complete and operational, and installed in workmanlike manner either concealed or exposed per the design intent.

1.11 Requests For Information (RFI's)

.1 If the RFI is a request to resolve a conflict or an ambiguity, or a request for additional detail, the Contractor's RFI shall include a sketch or equivalent description of Contractor's proposed solution.

1.12 Site Visit

.1 Before submitting bid, visit and carefully examine site to identify existing conditions and difficulties that will affect work. No extra payment will be allowed for additional work caused by unfamiliarity with site conditions that are visible or readily construed by an experienced observer.

.2 The Contractor shall visit job site to familiarize himself with the specific location of the new equipment installations in existing areas, to ensure there is adequate access for the installation of equipment. All entries, pathways, corridors, stairwells, etc., that may be used to install equipment shall be investigated. All existing conditions and potential obstructions that may impede access and installation shall be addressed prior to equipment purchasing/ordering.

1.13 Existing Conditions and Preparatory Work

.1 Before starting work in a particular area of the project, visit site and examine conditions under which work must be performed including preparatory work done under other Divisions/ Sections or other Contracts or by the Owner. Report conditions that might affect work adversely, in writing, through the General Contractor to the Architect via RFI. Do not proceed with work until defects have been corrected and conditions are satisfactory. Commencement of work shall be construed as complete acceptance of existing conditions and preparatory work.

.2 The documentation of existing conditions was derived from As-Built documents and is in part unverified. Actual existing conditions shall be verified prior to commencement of work.

1.14 Utility Charges

.1 Include utility fees and charges for any temporary voice, data and TV services.

.2 Include utility fees and charges for any required work by the voice, data and TV service providers for the completion of the project.

.3 Utility costs for permanent service shall be paid by the Owner.

1.15 Temporary/ Continuity of Utility Services

.1 Refer to Division 1 - General Requirements, regarding specific requirements.

.2 Provide temporary services where project construction schedule requires extended shut downs of existing equipment and/or systems. Temporary services include the necessary equipment and/or systems to maintain continuity of services. Extended shutdowns are interruptions of existing services for a period of time longer than that acceptable to the Owner.

.3 Do not interrupt existing utility services without written Owner's approval.

.4 Schedule interruptions in advance, according to Owner's instructions. Submit, in writing, with request for interruption, methods proposed to minimize length of interruption.

.5 Interruptions shall be scheduled at such times of day and work so that they have minimal impact on Owner's operations.

.6 Contractor shall coordinate any shutdowns of existing systems as follows:

.1 Give proper notice to Owner when making shutdowns; a minimum of fourteen full days is required.

.2 Minimize timeline of shutdowns of any system.

.3 Provide temporary services where required and perform shutdowns and tie-ins at a time convenient to Owner.

.4 Contractor shall be responsible for completing and filing the Owner's shutdown notice questionnaire.

.5 Perform required survey and inspection work required by the notice for shutdown.

.7 Provide all necessary material, tools, and labour as required for the provisions of temporary services.

.8 Include premium time work associated with interruptions of services and/or shutdowns as necessary to avoid disruption to Owner's operations.

.9 For communications work associated with any service provider, coordinate with the appropriate service provider.

.10 Complete a document by trade Contractor as indicating what is being included as part of this bid, and this project.

.11 For work involving an independent utility company (i.e., non-owner provided utility), Contractor shall coordinate directly with the utility provider all aspects of related work, including shutdowns, tie-ins, capacity impacts, etc.

1.16 Substitutions

.1 Where the Contractor wishes to use equipment or methods other than those listed by name, that equipment must be approved by the Consultant. To gain approval for equipment not listed, the Contractor shall submit the following to the Consultant for his review:

.1 Documentation from the equipment manufacturer indicating where this equipment meets and does not meet the specifications or drawings as written. This documentation shall state exceptions taken to the specification and the reasons for exceptions. Documentation relative to the request shall be submitted on the manufacturer's letterhead and signed by a representative of the manufacturer.

.2 Manufacturer's Cut Sheets: Cut sheets shall be originals as are contained in the manufacturer's catalogue.

.3 The Contractor shall provide samples of the proposed equipment for the Consultant’s review, if requested by the Consultant.

.4 The Contractor shall furnish other information or materials as requested by the Consultant to establish equality.

.5 The Contractor shall acknowledge that they have reviewed the submission criteria for the request by stamping the submission with a review stamp or acknowledgement by an accompanying letter.

.6 Equipment and materials submitted for review without proper documentation shall be rejected without review.

.2 Materials, equipment, or methods of installation other than those named, shall be in accordance with the general requirements and similar in composition, dimension, construction, capacity, finish and performance.

.3 Contractors submitting equipment for approval shall include in their bids incidental costs that may result from the use of equipment. Costs shall include, but not be limited to, additional costs that may be incurred by other Contractors whose scope of work is affected by use of the product. The Contractor shall be responsible for those costs even if they do not become evident until after bidding.

1.17 Submittals

.1 Definitions:

.1 Shop Drawings are information prepared by the Contractor to illustrate portions of the work, such as ductwork layout arrangements, in more detail than shown in the Contract Documents.

.2 Submittals are a compilation of product data cutsheets fully describing performance, size, connections, colour selection, etc., as provided by the manufacturer.

.2 Submittal Procedures and Format

.1 Proof that final installation drawings have been reviewed by a Registered Communications Distribution Designer (RCDD).

.2 Review submittal packages for compliance with Contract Documents and then submit to Architect for review. Submit reproducible drawing and two blue- or black-line reproductions of each Shop Drawing larger than 8-1/2 x 11. Submit four sets of each smaller shop drawing. After review, reproducible original of each large Shop Drawing and three sets of each small shop drawing will be returned with reviewer's marks.

.3 Submittals and shop drawings shall be submitted COMPLETE, by trade, in heavy-duty three-ring binders. Each binder shall include a Table of Contents identifying each section. Each section shall be arranged in order of specification section and tabbed accordingly. Each item submitted shall reference the article and paragraph of its specification section. Each item specified shall be addressed. If specified item will not be used, state so in submittal with brief explanation. In the instance when a resubmission is necessary, resubmit only the items required; a complete resubmittal containing previously approved data is not required.

.4 Provide additional copies of approved submittals/shop drawings as required for full distribution.

.5 Shop drawings showing layouts of systems shall contain sufficient plans, elevations, sections, details, and schematics to describe work clearly. They shall be 1/4 inches = 1 foot 0-inch scale unless specified otherwise.

.6 Shop drawings and submittals showing manufacturer's product data shall contain detailed dimensional drawings, accurate and complete description of materials of construction, manufacturer's published performance characteristics and capacity ratings (performance data, alone, is not acceptable), electrical requirements and wiring diagrams. Drawings shall clearly indicate location (terminal block or wire number), voltage and function for all field terminations, and other information necessary to demonstrate compliance with all requirements of contract documents.

.7 Samples of each type of data/voice jack complete with faceplate;

.8 Samples of patch cord;

.9 Sample of ~~fibre optic cabling with proposed terminations, and~~ horizontal copper cabling;

.10 Sample of proposed labelling of components and wiring;

.11 Sample of proposed test sheet;

.12 Copy of tester calibration certificate;

.13 Written confirmation that telecommunication system vendor is manufacturer's valid certified system vendor for at least duration of contract work and is in good standing at time of Bid submission;

.14 Copy of system manufacturer's warranty.

.3 Required Use of Acceptable Manufacturers on this Project:

.1 Substitution of products other than those of the acceptable manufacturers specified herein shall not be made. Only the specified items or the comparable product by one of the specified alternate manufacturers shall be submitted. Products by other manufacturers shall not be used on this project.

.2 Listing of a manufacturer's name for a particular material or piece of equipment does not imply acceptance of all that manufacturer's products. Use of more than one manufacturer to supply any specific material or equipment shall have prior approval of the Consultant.

.4 Deviations

.1 Concerning deviations other than substitutions, proposed deviations from contract documents should be requested individually in writing whether deviations result from field conditions, standard shop practice, or other cause. Submit letter with transmittal of submittals / shop drawings which flags the deviation to the attention of the Consultant.

.2 Without letters flagging the deviation to the Consultant, it is possible that the Consultant may not notice such deviation or may not realize its ramifications. Therefore, if such letters are not submitted to the Consultant, the Contractor shall hold the Consultant harmless for all adverse consequences resulting from the deviations being implemented. This shall apply regardless of whether the Consultant has reviewed or approved submittals/shop drawings containing the deviation and will be strictly enforced.

.3 Approval of proposed deviations, if any, will be made at the discretion of the Consultant.

.4 Where equipment or methods different than those specified are submitted by this Contractor and approved for use by the Consultant and Owner, the installation shall be in full conformance with the intent of these contract documents. All costs related to the use of the different method and/or equipment shall be paid by this Contractor.

.5 Submittal Dispositions: Submittals will be returned from the Consultant marked as illustrated below:

REVIEWED - Submitted data is in compliance with contract document requirements.

REVIEWED AS NOTED - Submitted data is generally in compliance with contract document requirements with minor notations; no resubmission required. Address Consultant's notations.

REVISE AND RESUBMIT - Submitted data contains deviations, is incomplete, or requires further clarification any of which require resubmission for confirmation.

NOT REVIEWED - Submitted data is not required to be submitted for Consultant's review or was incorrectly transmitted to the Consultant for review.

.6 Responsibility

.1 Intent of Submittal review is to check for capacity, rating, and certain construction features. The Contractor shall ensure that work meets requirements of contract documents regarding information that pertains to fabrication processes or means, methods, techniques, sequences, and procedures of construction; and for coordination of work of this and other sections.

.2 Work shall comply with submittal notations to extent that they agree with contract documents. Submittal review shall not diminish responsibility under this Contract for dimensional coordination, quantities, installation, wiring, supports and access for service, nor shop drawing errors or deviations from requirements of contract documents.

.3 The Consultant's noting of some errors while overlooking others will not excuse the Contractor from proceeding in error. Contract documents requirements are not limited, waived nor superseded in any way by review.

.4 Inform subContractors, manufacturers, suppliers, etc., of scope and limited nature of review process and enforce compliance with contract documents.

.5 The Consultant's obligations to review shop drawings and other submittals and to return them in a timely manner are conditioned upon the prior review and approval of the shop drawings or submittals by the Contractor as required in the construction contract and the Contractor's submittal of the shop drawings and other submittals in accordance with a written schedule distributed in advance to the Consultant identifying the dates for the submittal of the various shop drawings and submittals.

.7 Schedule:

.1 Incorporate submittal review period into construction schedule so that Work is not delayed. The Contractor shall assume full responsibility for delays caused by not incorporating the following submittal review time requirements into his project schedule. Working days listed reference the time in the Consultant's office. It does not include transmittal or review time of Contractor or Consultant. If more than five submittals/shop drawings of a single trade are received in one week, allow at least five (5) additional working days, exclusive of transmittal time, for review, each time a submittal/shop drawing is submitted or resubmitted.

.8 Multiple Re-submittals:

.1 The Consultant will review the first submittal from the Contractor and respond with comments and will review one re-submittal for the same item(s) from the Contractor and respond with comments. If the Contractor is required to make subsequent submittals for the same item(s) the Consultant shall be compensated by the Contractor for the time to review each subsequent re-submittal.

1.18 Operating and Maintenance Manuals

.1 Obtain at time of purchase of equipment, three copies of operation and maintenance manuals for all items. Assemble literature in coordinated manuals with additional information describing combined operation of field assembled units, including as-built wiring diagrams. Manual shall contain names and addresses of manufacturers and local representatives who stock or furnish repair parts for items or equipment.

.2 The manuals shall include the following and shall have an index of contents and tabs for each specification section and each piece of equipment specified in that section and be provided in the order listed below, per specification section.

.1 Copies of all approved submittals/shop drawings;

.2 Manufacturer's operating and maintenance instructions and parts lists of all items or equipment. Where manufacturer's data includes several types or models, the applicable type or model shall be clearly designated;

.3 Riser diagrams;

.4 Wiring diagrams;

.5 Test records;

.6 Warranty documentation;

.7 Owner's written acknowledgement of satisfactory completion of instruction period.

.3 The operation manuals and instructions to the Owner are of prime importance and shall be provided prior to request for final payment.

.4 Furnish three copies of manuals and one soft copy to Consultant for approval and distribution to Owner. Deliver manuals no less than 30 days prior to acceptance of equipment to permit Owner's personnel to become familiar with equipment and operation prior to acceptance.

.5 Operating instructions: Upon completion of installation or when Owner accepts portions of building and equipment for operational use, instruct Owner's operating personnel in any or all parts of all systems. Factory-trained personnel shall perform instructions. Owner shall determine which systems require additional instructions. Duration of instructions shall take equipment through complete cycle of operation (at least five working days). Make adjustments under operating conditions.

.6 If it is desired to provide maintenance manuals in PDF format, the low voltage Contractor shall provide a written request prior to submitting the manuals indicating which equipment manuals they propose to provide in this format.

1.19 Cleaning and Painting

.1 Rubbish resulting from this work shall be removed and disposed of daily in manner as to be acceptable to the Owner.

.2 The Contractor shall clean exposed work and equipment, the interior and exterior of cabinets and pull boxes, etc., and remove rubbish and debris resulting from the work.

.3 Where painted surfaces of equipment have been damaged or rusted during construction, the Contractor shall repair and paint to match original finish.

.4 Clean other equipment indicated in other sections of the specification for specific equipment.

.5 Cleaning shall be performed prior to system start-up.

.6 Equipment

.1 After completion of project, clean the exterior surface of all equipment, including concrete residue, dirt, paint residue, etc.

1.20 Tests and Acceptance

.1 The operation of the equipment and communications systems does not constitute an acceptance of the work. The acceptance is to be made after the Contractor has adjusted his equipment and demonstrated that it fulfils the requirements of the drawings and the specifications.

.2 Tests and Acceptance procedures shall adhere to those specified within each Division 27 specification section.

.3 Delete the following paragraph and sub-paragraphs if a thermographic survey is not desired/required.

.4 Upon completion of the installation, the Contractor shall furnish certificates of approval from authorities having jurisdiction.

.5 In the presence of the Consultant and the Owner, the Contractor shall demonstrate the proper operation of miscellaneous systems.

.6 Perform other test as specifically stated in other sections of the specification for specific equipment.

1.21 Warranty

.1 Guarantee the Work of this Section in writing for two (2) years following the date of Substantial Completion of the Work of the entire project. If the equipment is used for ventilation, temporary heat, etc. prior to initial beneficial occupancy by the Owner, the bid price shall include an extended period of warranty covering the two (2) years of occupancy, starting from the initial date of beneficial occupancy by the Owner. The guarantee shall repair or replace defective materials, equipment, workmanship, and installation that develop within this period, promptly and to Owner’s satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within Contract Price.

.2 In addition to guarantee requirements of Division 1 and of this specification section, obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation, in Owner's name.

.3 Replace material and equipment that require excessive service during guarantee period as defined and as directed by Consultant.

.4 Submit copies of equipment and material warranties to Consultant as part of the close-out documents before final payment.

.5 At end of guarantee period, transfer manufacturers' equipment and material warranties still in force to Owner.

.6 This Article shall not be interpreted to limit Owner's rights under applicable codes and laws and under this Contract.

.7 Specific paragraphs of the specification sections may specify warranty requirements that exceed those of this article.

.8 Use of systems provided under Division 27 for temporary services and facilities shall not constitute final acceptance of work nor beneficial use by Owner and shall not institute guarantee period.

.9 Provide manufacturer's engineering and technical staff at site to analyze and rectify problems that develop during guarantee period immediately. If problems cannot be rectified immediately to Owner's satisfaction, advise the Consultant in writing, describe efforts to rectify situation, and provide analysis of cause of problem.

1.22 Spare Parts

.1 Requirements for spare parts are outlines in individual specification sections. Spare parts shall be turned over, unopened, to the Owner as part of the maintenance manual submittal.

1.23 Owner Training

.1 As part of this contract, the Contractor shall include all labour and materials to train the building Owner on the electrical systems installed. The Contractor shall be responsible for video and audio taping of all Owner training.

.2 Owner training shall adhere to the training specified in each Division 27 specification section.

PART 2 – PRODUCTS

2.1 General

.1 Refer to each specific Division 27 Communications specification section for specific details.

.2 Perform work such that progress of the entire project including the work of other disciplines and divisions shall not be interfered with or delayed.

2.2 Special Responsibilities

.1 Installation only items:

.1 Where the Contractor is required to install items which he does not purchase, he shall coordinate their delivery and be responsible for their unloading from delivery vehicles and for their safe handling and field storage up to the time of installation.

.2 The Contractor shall carefully examine such items upon delivery. Claims that any of these items have been received in such condition that their installation will require procedures beyond the reasonable scope of work of this Contractor will be considered only if presented in writing within one week of their date of delivery. Unless such claims have been submitted, this Contractor shall be fully responsible for the complete reconditioning or replacement of the damaged items.

.2 Maintenance of equipment and systems:

.1 Maintain equipment and systems until final acceptance.

.2 Ensure adequate protection of equipment and material during delivery, storage, installation, and shutdown and during delays pending final test of systems and equipment because of seasonal conditions.

.3 Use of premises:

.1 Use of premises shall be restricted as directed by Consultant and as noted below.

.1 Remove and dispose of dirt and debris and keep premises clean. During progress of work, remove equipment and unused material. Maintain building and premises in neat and clean condition and perform cleaning and washing required to provide acceptable appearance and operation of equipment, to satisfaction of Consultant.

.2 Store materials in a manner that will maintain an orderly, clean appearance. If stored on-site in open or unprotected areas, all equipment and material shall be kept off the ground by means of pallets or racks and covered with tarps.

.3 Do not interfere with function of existing sewers and water and gas mains, electrical or mechanical systems and services. Extreme care shall be taken to prevent debris from entering pipe, ductwork, and equipment.

.4 Confer with Consultant as to disruption of services or other utilities due to testing or connection of new work to existing. Interruption of services shall be performed at time of day or night deemed by Owner to provide minimal interference with normal operation.

.5 Obtain Owner's approval of the method proposed for minimizing service interruption.

~~**2.3 Basket Cable Tray (For Telecommunications Applications)**~~

~~.1 Legrand-Cablofil, CSA approved and labelled, basket type cable tray system complete with factory made couplers, fittings, tee sections, elbows, universal dropouts, etc., and required supporting and installation accessories. Features include but are not limited to following:~~

~~.1 minimum 300 mm x 100 mm (12" x 4") unless otherwise noted on drawings;~~

~~.2 for climate-controlled indoor applications – welded wire construction of minimum 5 mm (0.197") diameter carbon steel wires and hardware, conforming to requirements of ASTM A510 grade 1008 with black powder coated finish paint to ASTM D 3451;~~

.3 for non-climate controlled applications and corrosive environments – welded wire construction of minimum 5 mm (0.196") diameter stainless steel wires and hardware, conforming to requirements of AISI Type 304L cleaned and passivated to ASTM A 380;

.4 continuous, rigid, welded steel wire mesh cable tray system;

.5 top wire safety edge;

.6 wire mesh welded at intersections;

.7 mesh sections having minimum one (1) bottom longitudinal wire along entire length;

.8 warning signs;

.9 accessories included as required.

.2 Prior to start of work, prepare and submit detailed installation drawings, including plans, elevations and sections of proposed tray and routing. Coordinate such drawings with coordination drawings of trades. Include for design calculations to determine load limitations.

.3 Tray to not have sharp edges that may damage cables during running of cables. Final finish to be smooth with no burrs that may damage cables.

.4 Use manufacturer's trained and certified installers to perform work. Use tools as recommended by and supplied by tray manufacturer. Utilize manufacturer's supplied cutter for cutting tray. Submit with shop drawings, copies of installing technicians' certificates of training on respective tray systems.

.5 Provide support of a trapeze configuration containing horizontal hanger brackets and vertical threaded rods on each side. Secure rods to brackets as per system manufacturer's instructions. Space supports at maximum 1.5 m (5'), to provide support of loads up to 53 kg/m (36 lbs per foot).

.6 Where cable tray penetrates fire rated construction, provide ULC listed and labelled, fire stopping and smoke seal materials or fittings to protect integrity of fire rated construction. Install work in compliance with ULC standards and where required by local governing codes, provide suitable for plenum environments.

.7 Provide tray complete with grounding/bonding provisions, fittings, tee sections, elbows, universal dropouts, expansion fittings, etc., and required supporting and installation accessories. Provide dividers to separate various system cabling to a degree confirmed by Consultant, but typically two (2) dividers in a 300 mm (12") wide tray.

.8 Provide conduit fittings where conduits enter tray and provide dropouts at ends where cables exit/enter. Supply cable installation rollers for pulling cables safely into tray. System accessories to be supplied by system manufacturer and be as recommended by system manufacturer for specific applications.

.9 Acceptable manufacturers are:

.1 Legrand-Cablofil;

.2 Cooper "Flextray";

.3 Eaton B-Line;

~~.4 Canadian Electrical Raceways;~~

~~.5 Hubbell;~~

~~.6 WBT.~~

~~2.4~~2.3 Sleeves For Raceways And Cables

.1 Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends with plastic bushing on each of the sleeve.

.2 Sleeves for Rectangular Openings: Galvanized sheet steel.

.3 Minimum Metal Thickness:

.1 For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.

.2 For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

~~2.5~~2.4 Firestopping and Smoke Seal Materials

.1 Asbestos-free, elastomeric materials and intumescent materials, tested, listed and labelled by ULC in accordance with CAN 4-S115-M85, and CAN/ULC-S101-M for installation in ULC designated firestopping, and smoke seal systems to provide a positive fire, water and smoke seal and a fire resistance rating (flame, hose stream and temperature) no less than fire rating for surrounding construction.

.2 Fire stopping and smoke seal material system to be specifically ULC certified with designated reference number for its specific installation. As part of shop drawing submission, submit copies of firestopping drawings with ULC certificate and number for each specific installation. Submit schedule of opening locations and sizes, penetrating items, and required listed design numbers to seal openings to maintain fire resistance ratings.

.3 Systems to consist of both elastomeric and intumescent materials that are compatible with abutting dissimilar materials and finishes. Coordinate material requirements with trades supplying abutting areas of materials.

.4 Typically, for openings of up to 250 mm (10") in diameter, provide putty pad type firestop materials equivalent to Specified Technologies Inc. "SpecSeal" intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibres or silicone compounds.

.5 Typically, for openings of greater than 250 mm (10") in diameter, and for rectangular openings, provide pillow type firestop materials equivalent to Specified Technologies Inc. "SpecSeal" re-enterable, non-curing, mineral fibre core encapsulated on six sides with intumescent coating contained in a flame retardant poly bag.

.6 For applications where fire rated firestopping cable pathway system is to be special structurally reinforced, reusable and require no or minimal alterations to firestop component when cables are either added or removed, provide Specified Technologies Inc. "EZ-PATH" device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill. Structure to be sturdy enough to stand up to constant modification and use, but maintain its ULC firestopping rating.

.7 Supply products of a single manufacturer for use on work of this Division.

.8 Installer to be manufacturer trained and certified on specific product. Submit copy of certificate with shop drawings.

.9 Include for manufacturer's authorized representative to inspect and verify each installation and application. Submit test report signed and verified by system installer's authorized representative and manufacturer's representative.

.10 Acceptable certification to also include certification by Underwriters Laboratories of Northbrook IL, using tests conforming to ULC-S115 and given cUL listing published by UL in their "Products Certified for Canada (cUL) Directory".

.11 Acceptable manufacturers are:

.1 Specified Technologies Inc.;

.2 3M Canada Inc.;

.3 Tremco;

.4 A/D Fire Protection Systems;

.5 Nelson;

.6 Hilti Canada.

~~2.6~~2.5 Sleeve Seals

.1 Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

.1 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

.1 Advance Products & Systems, Inc.

.2 Calpico, Inc.

.3 Metraflex Co.

.4 Pipeline Seal and Insulator, Inc.

.5 Or approved equivalent

.2 Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

.3 Pressure Plates: Stainless steel. Include two for each sealing element.

.4 Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

.2 Installation Testing, Listings and Approvals

.1 Installation shall meet material manufacturer's recommendations exactly, particularly regarding safety, ventilation, removal of foreign materials and other details of installation. Dam openings as recommended. Remove flammable materials used for damming and forming seals in fire-rated construction.

.2 Sleeve penetration methods shall be water- and gas-tight and shall meet requirements of ASTM E-119 Standard Methods of Fire Tests of Building Construction and Materials.

.3 Fire-stop penetration seal methods and materials shall be FM-approved and UL-listed as applicable.

PART 3 – EXECUTION

3.1 Common Requirements For Communications Installation

.1 Measure indicated mounting heights to bottom of unit for suspended items and to centre of unit for wall-mounting items.

.2 Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

.3 Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

.4 Right of Way: Give to piping systems installed at a required slope.

.5 Materials and Workmanship:

.1 Work shall be neat and rectilinear. Cabling shall run concealed except in communications rooms and areas where no hung ceiling exists. Install material and equipment as required by manufacturers. Installation shall operate safely, without undue wear, noise, vibration or corrosion. Work shall be properly and effectively protected, and pipe and duct openings shall be temporarily closed to prevent obstruction and damage before completion.

.2 Except as specified otherwise, material and equipment shall be new. Provide supplies, appliances, and connections necessary for complete and operational installation.

.3 Finish of materials, components and equipment shall be as approved by Architect and shall be resistant to corrosion and weather as necessary.

.4 The Owner will not be responsible for material and equipment before testing, commissioning, and acceptance.

.6 Delivery, Storage and Handling:

.1 Protect equipment/materials from damage during shipping, storage, handling and installation. Delivery equipment/materials to the site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

.2 The Contractor shall provide for enclosed storage, when equipment/materials are stored on-site and prior to building "dry-in", to prevent any damage resulting from inclement weather or construction traffic. Sheet metal/specialties shall not be stored outdoors.

.3 Equipment exposed to weather during shipping and/or storage on site shall be plastic shrink-wrapped by the manufacturer to prevent damage due to weather and road debris during transportation and thereafter while in storage awaiting installation.

.4 Prevent dirt and construction debris from accumulating inside equipment (including pipe and conduit, ductwork, fittings, etc.).

.5 Equipment/materials, stored or installed, found to be damaged shall be replaced with new by the Contractor, to the satisfaction of the Owner and at no additional expense. Do not store equipment with PVC material with exposure to direct sunlight.

.6 Equipment/materials shall be handled and installed in accordance with manufacturer's instructions.

.7 Provisions and Installation of Equipment:

.1 For all equipment installed external to the building whether on roofs, supports, grade, etc., the installation must comply with wind loading and impact requirements of the applicable codes for this project site.

.2 All equipment being furnished on this project, shall be certified by the manufacturer that the equipment item meets the applicable seismic, wind, earthquake and hurricane impact requirements as set forth by the Authority Having Jurisdiction overseeing this project, and as defined in the following codes:

.1 International Building Code – Section 1621 "Earthquake Loads"

.3 Compliance with the above Paragraphs 2 and 3 can be reduced and/or eliminated if the equipment being provided is located inside a structural building enclosure, designed by a licensed professional Architect and Structural Engineer.

.4 Avoid interference with structure and with work of other trades, preserving adequate headroom and clearing doors and passageways, to satisfaction of Architect and in accordance with code requirements. Installation shall permit clearance for access to equipment for repair, servicing, and replacement.

~~3.2 Installation of Cable Tray~~

~~.1 Provide sample of tray and detailed drawing layout of work prior to start of work, accurately dimensioned and showing required routing, penetrations, connections, bends, supports, etc.~~

~~.2 Obtain required training from manufacturer's representative on any special installation procedures. Install tray in accordance with manufacturer's instructions to suit specific installation requirements. Use manufacturer's recommended tools for cutting and installing tray.~~

~~.3 Drawings are diagrammatic and do not identify required changes in elevations and architectural features. Site measure exact routing and lengths. Provide detailed drawing layout of work prior to start of work, accurately dimensioned and showing required penetrations, connections, bends, etc.~~

~~.4 Install and hang cable tray at maximum 1.5 m (5') centres and in accordance with manufacturer's published literature employing horizontal bracket supported to ceiling slab by vertical threaded rod hangers.~~

~~.5 Do not secure assembly from ductwork, suspended ceiling structures, lighting, etc. Secure rod hangers directly to ceiling slab. Locate supports as not to interfere with removal or opening of covers. Typically locate spans at intervals ¼ span from supports, as recommended by tray manufacturer. Refer to drawing details and/or manufacturer's instructions. Include for provision of required seismic restraints as to comply with local governing building code requirements.~~

~~.6 Provide proper fittings in cable tray at points of conduit entry. Terminate conduits at or in tray with proper grommeted and bushing terminations.~~

~~.7 Equip tray with necessary wall flanges, dropouts, enclosures, reducers, fittings, and similar accessories required, maintaining effective free cross-sectional area of tray clear of obstructions that might damage conductor insulation during installation.~~

~~.8 Properly secure, adequately support and neatly harness conductors in tray. Seal cable tray penetrations of building fire barriers by means of ULC listed and labelled fire stopping and smoke sealing material.~~

~~.9 Provide continuous paths along entire lengths of cable tray to maintain proper ground continuity. Utilize system manufacturer's proper grounding and bonding fittings and hardware. Ground and bond system as per local governing electrical code requirements.~~

~~.10 File smooth cuts to tray and re-touch with galvanizing compound.~~

~~.11 Install expansion connectors where cable tray crosses building expansion joints.~~

~~.12 After installation is complete, install warning signs on tray in visible locations.~~

~~.13 Inspect tray for rough finishing burrs, sharp edges, and mechanical deficiencies prior to installing of cabling. Eliminate these deficiencies to satisfaction of Consultant, prior to installing cables.~~

~~3.3~~3.2 Firestopping

.1 Openings in fire rated construction and annular spaces around conduits, cable trays, and other penetrating items shall be protected in accordance with NEC article 300-21. The fire rating of the protective seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating of the construction is maintained. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

.2 Wall or floor penetrations openings shall be as small as possible.

.3 Openings and annular spaces required by code to be protected shall be protected whether specifically indicated on the plans or not.

.4 Installation of materials and assemblies shall be in strict accordance with the manufacturer's instructions.

~~3.4~~3.3 Sleeve Installation for Communications Penetrations

.1 Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

.2 Lay out penetration and sleeve openings in advance, to permit provision in work. Set sleeves and conduit in forms before concrete is poured. Provide remedial work where sleeves and conduits are omitted or improperly placed.

.3 Provide sleeves and packing materials at all penetrations of foundations, walls, slabs (except on grade), partitions and floors. Sleeves shall meet U.L. rated assembly requirements and materials requirements of these specifications.

.4 Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

.5 Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

.6 Sleeves that penetrate outside walls, basement slabs, footings and beams shall be waterproof.

.7 Coordinate work carefully with architectural and structural work. Provide core drilling as necessary if walls are poured or otherwise constructed, without sleeves and a wall penetration is required. Provide core drilling as required for penetrations of existing construction. Do not penetrate structural members without Structural Engineer's/Architect's approval.

.8 Submit a list of the U.L. Listed details that the Contractor intends on using on this project, in all rated walls.

.9 Where sleeves/ cabling passing through openings are exposed in finished rooms, finishes of filling materials shall match and be flush with adjoining floor, ceiling, and wall finishes.

.10 Identify unused sleeves and slots for future installation.

.11 Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

.12 Cut sleeves to length for mounting flush with both surfaces of walls.

.13 Fill slots, sleeves and other openings in floors or walls if not used. Fill spaces in openings after installation of pipe, duct, conduit, or cable.

.14 Fill for floor penetrations shall prevent passage of water, smoke, fire, and fumes. Fill shall be fire resistant in fire floors and walls, and shall prevent passage of air, smoke and fumes.

.15 Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and pathway or cable, unless indicated otherwise.

.16 Seal space outside of sleeves with grout for penetrations of concrete and masonry

.1 Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

.17 Sleeves through floors shall be watertight and shall extend 2 inches above floor surface.

.18 Submit and coordinate with all trades complete penetration layout drawings showing all openings in building structural members including floor slabs, walls, bearing walls, foundation walls, shear walls, roof penetrations, etc. Indicate and locate, by dimension, all openings that shall be sleeved. Drawings shall be approved by Consultant prior to the preparation of any opening in a structural member.

.19 Provide 24-gauge galvanized steel sleeves for all walls, floors, including foundation, stem and exterior walls.

.20 All penetrations into rooms with STC-rated wall assemblies such as conference rooms, sleeping rooms, etc., must utilize an acoustical sealant in addition to any other sealants required for wall ratings.

.21 Contractor shall maintain complete integrity of all completed waterproofing, weatherproofing, fire rating, and penetrations during construction.

.22 Interior penetrations of non-fire-rated walls and floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."

.23 Fire-rated-assembly penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

.24 Roof-penetration sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

.25 Aboveground, exterior-wall penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

.26 Underground, exterior-wall penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

~~3.5~~3.4 Sleeve-Seal Installation

.1 Install to seal exterior wall penetrations.

.2 Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in centre of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

~~3.6~~3.5 Demolition

.1 Refer to all drawings for general description of areas requiring demolition.

.2 Refer to General Contractor's Instructions for all existing equipment and materials that shall remain the property of the Owner.

.3 Items of value which are not directed to be returned to the Owner shall become the property of the Contractor. Storage or sale of items on the project site is prohibited.

.4 Protection: Ensure the safe passage of persons in and around the building during demolition. Prevent injury to persons and damage to property. Provide adequate shoring and bracing to prevent collapse. Immediately repair damaged property to the condition before being damaged. Take effective measures to prevent windblown dust.

.5 Utilities: Maintain all utilities except those requiring removal or relocation. Keep utilities in service and protect from damage. Do not interrupt utilities serving used areas without first obtaining permission from the utility company and the Owner. Provide temporary services as required.

.6 Except as noted otherwise, remove from the premises, all materials and equipment removed in the demolition work

~~3.7~~3.6 Project Close-Out Procedure

.1 Close-out documentation shall be provided at the end of the project. Close out documentation shall comply with each applicable Division 27 Specification Section.

.2 It shall be each Contractor's responsibility to personally hand-deliver all the required project close-out checklist items and to obtain Owner's authorized representative(s) signed receipt on all items requiring Owner sign-off.

~~3.8~~3.7 Owner Training

.1 Owner training shall comply with the requirements specified in each Division 27 Specification Section.

.2 In general, training shall cover all aspects of the operation and human interface with the given system. Training shall include, but not be limited to:

.1 General description of the system and operating intent.

.2 Review and demonstration of all adjustments and programming available to the Owner.

.3 Review of all system display screens and annunciation functions, both audible and visual.

.4 Review and demonstration of all required and recommended periodic system/equipment maintenance. Review shall include all required lockout and tagging procedures.

.5 Refer to individual specification sections for additional requirements associated with Owner training.

.3 Training schedule shall be acceptable to the Owner and shall reflect the availability of Owner personnel. Schedule shall be provided fourteen (14) working days in advance of the first training session and shall be approved in writing by the Owner be-fore final dates and times are set.

.4 The Contractor shall be responsible for video and audio taping of all training. Recording format shall be digital. Verify exact format with the owner prior to commencing.

.5 A copy of all training video files shall be included with each Operating and Maintenance manual. Additional copies, up to a maximum of three, shall be provided at the Owner's request. Video files shall be copied to USB(s) for distribution to the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 This section includes a general description of the technical requirements of the physical spaces for communication systems and the supply and installation of all bonding and grounding, pathways, identification, racks, cabinets, multipair backbone cabling, optical fibre backbone cabling, horizontal copper cabling, patch panels, connectors, faceplates, and patch cords.

1.2 References

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

.2 Division 25 Specification Sections apply to this Section.

.3 Division 26 Specification Sections apply to this Section.

.4 Division 27 Specification Sections apply to this Section.

.5 Division 28 Specification Sections apply to this Section.

1.3 Submittals

.1 Action Submittals:

.1 Product data sheets.

.2 Shop drawings.

.3 Product schedules.

.4 Certifications

1.4 Quality Assurance

.1 Manufacturers Qualifications:

.1 All products shall be sourced from ~~a single~~acceptable manufacturers to ~~ensure an end-to-end solution is provided~~adhere to Owner standards.

.2 Manufacturer certification for the installation and testing ~~of both~~ the UTP copper products ~~as well as the optical fibre communications products~~. Third party certification is not acceptable.

.2 Installers Qualifications

.1 The structured cabling contractor's lead technician or project manager shall have a valid BICSI issued RCDD designation, and a copy of the valid RCDD certificate shall be provided.

PART 2 - PRODUCTS

.1 Acceptable Manufacturers:

.1 Panduit

.2 Belden

2.2 Cables

.1 Horizontal Copper Cables:

.1 TX6A 10 GIG UTP Copper Cable.

.2 Category 6A UTP, 4-pair, minimum 23 AWG, solid copper conductor.

.3 Cable jacket suitable for the environment in which it will be installed, and CSA rated accordingly as FT6 (CMP).

.4 Compliant with ANSI/TIA-568.2-D Category 6A specifications.

.5 Acceptable part number: PUP6AHD04BU-G

~~.2 Single-mode Fibre Optic Backbone Cables:~~

~~.1 OS2 single-mode fibre optic indoor small diameter trunk cable.~~

~~.2 Fibre optic cable formed into groups of twelve (12) fibre strands.~~

~~.3 Cable jacket suitable for the environment in which it will be installed, and rated accordingly as Optical Fiber Non-conductive Plenum (OFNP).~~

~~.4 Compliant with ANSI/TIA-568.3-E OS2 single-mode fibre optic cable specifications.~~

~~.3 Multi-mode Fibre Optic Fibre Backbone Cables:~~

~~.1 OM4 multi-mode fibre optic indoor small diameter trunk cable.~~

~~.2 Fibre optic cable formed into groups of twelve (12), twenty-four (24), forty-eight (48), and ninety-six (96) fibre strands.~~

~~.3 Cable jacket suitable for the environment in which it will be installed, and rated accordingly as Optical Fiber Non-conductive Plenum (OFNP).~~

~~.4 Compliant with ANSI/TIA-568.3-E OM4 multi-mode fibre optic cable specifications.~~

2.3 Patch Panels

.1 Copper CAT6A Patch Panels:

.1 Mini-Com Modular FacePlate patch panels with faceplates

.2 Mountable to 483mm EIA opening.

.3 Includes twelve (12) faceplates.

.4 Two (2) rack unit 48-port

.5 Black colour.

.6 Acceptable part number: CPPL48WBLY

.2 Copper CAT6 Patch Panels:

.1 Two (2) rack unit 48-port

.2 Black colour.

.3 Acceptable part number: KCONN PP Flat 48 2U

~~.2 Copper Patch Panels (Shielded):~~

.1 Mountable to 483mm EIA opening.

.2 One (1) rack unit 24-port

.3 Black colour.

.3 Fibre Optic Patch Panels:

.1 Rack mountable optical fibre enclosures

.2 Mountable to 483mm EIA opening

.3 Up to three (3) Fibre Adapter Panels (FAPs), 72 Fibres, one (1) rack unit

.4 Single-mode Fibre Adapter Panel:

.1 12 Duplex LC.

.2 OS2 Blue colour.

.5 Multi-mode Fibre Adapter Panel:

.1 12 Duplex LC.

.2 OM3/OM4/OM4+ Aqua colour.

.6 Fibre Patch Panel:

.1 HD Flex.

.2 One (1) rack unit, 6-port enclosure.

2.4 Connectors

.1 UTP Modular CAT6A Jacks:

.1 ANSI/TIA-568.2-D compliant 8P8C (RJ-45) Category 6A modular jack, blue.

.2 Acceptable part number: CJ6X88TGBU

.2 ANSI/TIA-568.2-D compliant 8P8C (RJ-45) Category 6A modular jack, shielded.

.2 UTP Modular CAT6 Jacks

.1 TIA-568.2.C compliant 8P8C (RJ-45) Category 6+ modular jack, blue.

.2 Acceptable part number: AX1041 series.

.2 Single-mode Adapter Cassette:

.1 LC Duplex Adapter.

.2 OS2 Fibre and Standard Loss.

.3 Universal Polarity (B).

.4 12-port, 24-fiber (2 MPOs).

.3 Multi-mode Adapter Cassette:

.1 LC Duplex Adapter.

.2 OM4 Fibre and Optimized Loss.

.3 Universal Polarity (B).

~~.4 12-port, 24-fiber (2 MPOs).~~

2.5 Faceplates

.1 Single Gang Faceplates:

.1 Equipped with two (2) ports which accommodate two (2) Category 6A modular jacks

.2 Blank inserts for unused ports matching the faceplate colour.

.3 White colour, Stainless steel where required.

.4 Acceptable part number: CFP2WH

.2 Modular Furniture Faceplates:

.1 Equipped with four (4) module spaces port which accommodate two (2) Category 6A modular jacks

.2 Blank inserts for unused module spaces matching the faceplate colour.

.3 Black colour, Stainless steel where required.

.4 Acceptable part number: CFFP4BL

2.6 Patch Cords

.1 Category 6A Copper Patch Cords:

.1 2.13 m (7’), 3.05 m (10’), 4.57 m (15’), and 7.62 m (25’) lengths, blue, small diameter series patch cords (for general use).

.2 2.13 m (7’) and 3.05 m (10’) lengths, yellow, small diameter series patch cords (for security cameras).

.3 28 AWG UTP.

.4 Solid copper insulated conductors, 4-pairs.

.5 Enclosed in a CSA rated CMP (FT6) jacket.

.6 Compliant with ANSI/TIA-568.2-D Category 6A specifications.

.7 Factory terminated with snag-less modular plugs.

.8 Acceptable part number: UTP28X series

~~.2 Single-mode Optical Fibre Patch Cords:~~

~~.1 LC connectors.~~

~~.2 Enclosed in an Optical Fiber Non-conductive Plenum (OFNP) jacket.~~

~~.3 Compliant with ANSI/TIA-568.3-E OS2 single-mode fibre optic cable specifications.~~

~~.4 Factory terminated at both ends.~~

~~.5 1 m, 2 m, and 3 m lengths, to suit application. Maximum length of 3m.~~

~~.3 Multi-mode Optical Fibre Patch Cords:~~

~~.1 LC connectors.~~

~~.2 Enclosed in an Optical Fiber Non-conductive Plenum (OFNP) jacket.~~

~~.3 Compliant with ANSI/TIA-568.3-E OM4 multi-mode fibre optic cable specifications.~~

~~.4 Factory terminated at both ends.~~

~~.5 1 m, 2 m, and 3 m lengths, to suit application. Maximum length of 3m.~~

2.7 Equipment Enclosures

.1 Consolidation points:

.1 Passive in-ceiling enclosure.

.2 8 Rack Units.

.3 ~~Up to~~Minimum ~~610~~ 597 mm (~~24~~23.5") in width, ~~up to~~minimum ~~610mm~~ 597mm (~~24~~23.5") in height, and ~~up to~~minimum ~~341~~ 305 mm (1~~3.43~~2") in depth.

.4 Acceptable part numbers:

.1 Panduit PZICE series and associated hardware.

.2 Belden XCPE244812 series and associated hardware.

2.8 Pathways

.1 Non-Continuous Cable Support:

.1 J-hooks with sufficient bearing surface to comply with bend radius of high-performance cables.

.2 Spaced no more than 1.2m apart

~~.2 Wire Mesh Cable Tray:~~

~~.1 High strength steel wires and formed into a standard 50mm by 100mm wire mesh pattern with intersecting wires welded together.~~

~~.2 Crosswire constructed with shaped wire to provide flat surface (not round crosswire) for cable support~~

~~.3 Masked at splice points to allow for bonding (to ground) without surface coating removal.~~

~~.4 Powder coated or hot dipped galvanize. Zinc coating is not permitted.~~

~~.3 Ladder Tray:~~

~~.1 Ladder tray is not permitted.~~

~~.4~~.2 Conduit:

.1 EMT Conduits no less than 21mm diameter.

.2 Conduits sized to suit the size and quantity of cables being carried in accordance with industry standards including fill rates for straight sections and sections with bends.

.3 Installation in accordance with ANSI/TIA-569 standards.

~~.5~~.3 Pull Boxes:

.1 Pull boxes sized in accordance with ANSI/TIA-569 standards to accommodate the number and size of conduits

~~.6~~.4 Outlet Boxes:

.1 Outlet boxes shall be sized to accommodate required conduits.

.2 Outlet boxes sized to accommodate required cable quantities and bend radius per ANS:I/TIA-568 standards.

~~.7~~.5 Innerduct:

.1 Corrugated non-metallic construction innerduct with required fittings, couplers and any additional accessories required for a complete innerduct system.

.2 Include pre-lubricated pull tape.

.3 Suitable for the environment in which it will be installed, and CSA rated accordingly as CMR (FT4) or CMP (FT6).

~~.8~~.6 Pull Cord:

.1 Polypropylene of a minimum 200lbs tensile strength to be pulled in all empty conduits and pathways

.2 Pull cords with permanent measurement markings.

2.9 Grounding And Bonding

.1 Grounding and bonding products in conformance with TIA/EIA J-STD-607.

.2 TMGB:

.1 Predrilled copper busbar provided with holes for use with standard sized lugs.

.2 Minimum dimensions of 6mm thick x 100mm wide.

.3 Length to meet the application requirements and with consideration of future growth.

.4 Insulated from its support with a minimum of 50mm separation from the wall

.5 ULC listed

.3 TGB:

.1 Predrilled copper busbar provided with holes for use with standard sized lugs.

.2 Minimum dimensions of 6mm thick x 50mm wide.

.3 Length to meet the application requirements and with consideration of future growth.

.4 Insulated from its support with a minimum of 50mm separation from the wall

.5 ULC listed

.4 TBB:

.1 Copper conductor sized in accordance with TIA/EIA J-STD-607 based on length.

.2 Minimum size #6 AWG.

.3 Green insulated cable jacket suitable for the environment in which it will be installed, and CSA rated accordingly as CMR (FT4) or CMP (FT6).

.5 Telecommunications Bonding Conductor:

.1 Copper conductor sized in accordance with TIA/EIA J-STD-607 based on length, continuous and connected to all sections of cable tray.

.2 Minimum size to match the TBB.

.3 Green insulated cable jacket suitable for the environment in which it will be installed, and CSA rated accordingly as CMR (FT4) or CMP (FT6).

.6 Conductor Lugs:

.1 Long barrel two-hole lugs

.2 Irreversible compression type connections

.3 ULC listed

2.10 Plywood Backboards

.1 Backboards shall be constructed of fire-rated plywood, 19mm thick, minimum 1219mm wide x 2438mm high.

.2 Backboard paint shall be white in colour, and non-conductive.

.3 A complete section of the approved fire-rating stamp shall remain visible after painting.

PART 3 - EXECUTION

3.1 Installation

.1 Install products in accordance with product manufacturer's written instructions for type, use and general industry standards, to suit specific applications.

.2 Install all cables to not to exceed the manufacture's requirements for static and dynamic bending and pull forces.

.3 Install pathways including conduits, innerduct and cable tray parallel or perpendicular to building lines.

.4 Mount equipment in accordance with manufacturers recommended hardware and fasteners by staff deemed to be qualified by the manufacturer.

.5 Location:

.1 Locate away from sources of electromagnetic interference, mechanical ductwork, and pipes from other mechanical and electrical systems.

.2 Avoid installing adjacent to building components that limit expansion such as stairs, elevators, and fixed building walls.

.3 Except for the Communications Entrance Rooms, do not locate on exterior walls.

.4 Maintain a minimum of 300mm clearance above drop-ceiling to mitigate interference when opening ceiling tiles and ceiling access hatches.

.6 Horizontal Copper Cables:

.1 Ensure that excess pressure is not placed on the cable that may result in the compression or deformation of the cable jacket and internal pair geometry.

.2 Cables shall not be scrapped or damaged in any way before, during or after installation. All damaged cable shall be replaced at no additional cost prior to acceptance.

.3 Ensure all cables are of sufficient length for vertical runs, wastage, and termination.

.4 All cables shall be continuous without splices unless otherwise noted.

.5 Untwist pairs at termination point no more than 13mm.

.6 All cabling shall be terminated following TIA 568A configuration.

.7 Horizontal cables shall not exceed 90m length.

.8 Terminate all copper pairs.

.9 Permanent-link test and labeling of all cables and patch panels

~~.7 Multipair Copper Backbone Cables:~~

~~.1 Ensure that excess pressure is not placed on the cable that may result in the compression or deformation of the cable jacket and internal pair geometry.~~

~~.2 Cables shall not be scrapped or damaged in any way before, during or after installation. All damaged cable shall be replaced at no additional cost prior to acceptance.~~

~~.3 Ensure all cables are of sufficient length to allow for vertical runs, wastage, and termination.~~

~~.4 Install a service loop of 5m at each end.~~

~~.5 All cables shall be continuous without splices unless otherwise noted.~~

~~.6 Terminate all copper pairs.~~

~~.7 Test all copper pairs and provide labels.~~

~~.8 Fibre Optic Backbone Cables:~~

~~.1 Optical fibre cabling shall be installed in conduit or innerduct.~~

~~.2 Ensure that excess pressure is not placed on the cable that may result in the compression or deformation of the cable jacket and internal fibre strands.~~

~~.3 Cables shall not be scrapped or damaged in any way before, during or after installation.~~

~~.4 Ensure all cables are of sufficient length to allow for vertical runs, wastage, and termination.~~

~~.5 Install a service loop of 5m at each end.~~

~~.6 All cables shall be continuous without splices unless otherwise noted.~~

~~.7 Terminate all strands using fusion spliced pigtails or connectors.~~

~~.8 Testing of all fibre optic strands and labeling of cables and patch panels.~~

~~.9~~.7 Copper Tie-Cables:

.1 Comply with manufacturer's recommended installation and bundling requirements for installation. Ensure that excess pressure is not placed on the cable that may result in the compression or deformation of the cable jacket and internal pair geometry.

.2 Cables shall not be scrapped or damaged in any way before, during or after installation. All damaged cable shall be replaced at no additional cost prior to acceptance.

.3 Ensure all cables are of sufficient length to allow for vertical runs, wastage, and termination.

.4 Install a service loop of 1m at each end.

.5 All cables shall be continuous without splices unless otherwise noted.

.6 Terminate all copper pairs.

~~.10~~.8 Patch Panels:

.1 Installed patch panels in consolidation points, racks, or cabinets with no less than four (4) bonding screws.

.2 Label all ports with adhesive labels

.3 Fully populate all populate all ports

~~.11~~.9 Connectors:

.1 Installation shall be free of dirt and complete with identification labelling.

~~.12~~.10 Faceplates:

.1 Ensure faceplates are labelled and level.

~~.13 Equipment Racks:~~

~~.1 Anchor equipment racks to the slab floor~~

~~.2 Install equipment racks parallel to walls and level to the floor~~

~~.3 Where equipment racks are installed adjacent to each other in a row, gang racks together using rack gang kits.~~

.11 Consolidation point

.1 Mounting location to be coordinated with ceiling devices and ceiling grid.

~~.14~~.12 Grounding and Bonding:

.1 Ground all equipment in accordance with ANSI/TIA-607.

.2 Route the bonding conductor in continuous link using the shortest possible straight-line path.

.3 Do not daisy chain grounding and bonding cables.

.4 Bond to the TGB any backbone cabling that incorporates a shield or metallic member where the cables are terminated or where pairs are broken out.

.5 Bond to the TGB all metallic pathways for structured cabling located within the same room or space as the TGB.

.6 Bond to the TGB all equipment racks and network cabinets located within the same room or space as the TGB.

.7 Metallic pathways containing grounding conductors where the pathway is bonded to the grounding conductor, no additional bond to the TGB is required.

.8 Short metallic pathways (e.g., wall and floor sleeves) are not required to be bonded.

.9 Apply antioxidant to all contact areas to control corrosion and reduce contact resistance.

~~.15 Pathways:~~

~~.1 Install cable tray around the room and over the racks and cabinets~~

~~.2 Where floor penetrations are used, install a 100mm high concrete curb around the penetrations for protection~~

~~.16~~.13 Identification Labels:

.1 The adhesive cable labels shall meet the legibility, defacement, adhesion, and general exposure requirements specified in UL 969.

.2 Self-laminating vinyl construction cable labels with a white printing area and black coloured text.

.3 Labels shall be mechanically printed using a laser printer.

.4 All labels shall be applied on clean and dry surfaces and shall align accurately.

.5 Apply labels to the following locations:

.1 On both ends of the cable, within 150mm of the cable termination.

.2 On the faceplate above each modular jack.

.3 On the patch panel above each modular jack and connector.

.4 On each equipment rack and network cabinet.

.6 Label all grounding and bonding conductors as indicated in TIA J-STD-607

.7 Cable jacket, modular jack, and patch cord colours shall be subject to Review by ~~Osler~~Owner.

3.2 Field Quality Control

.1 All equipment shall be installed in accordance with the equipment manufacturers' requirements and recommendations.

.2 Ensure that pre-assigned technical lead and engineering personnel remain fully engaged throughout the project, from the design phase through to commissioning.

.3 Testing And Commissioning:

.1 Perform a permanent link test for all UTP cables and components in accordance with ANSI/TIA-568.

.2 Test all fibre optic cables and components using fibre optic tester or OTDR in accordance with TIA-455-8.

.3 Test all fibre optic cables bi-directionally at all wavelengths that they support.

.4 For any permanent link that fails the test, diagnose the failure and correct. Any corrective action that must take place shall be documented and followed with a new test to prove that the corrected link meets performance requirements. Provide the final and passing result of the tests for all permanent links in the test results documentation.

.5 Test electrical continuity of bonding and grounding connections, and to demonstrate compliance with specified maximum grounding resistance.

.6 Provide test reports in hard copies and soft copies in PDF and native software files as part of the As-built documentation and close out package.

.7 Manufacturer warranty certification shall also be provided and included within the close-out package.

END OF SECTION

PART 1 – GENERAL

1.1 References

.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

.2 Division 25 Specification Sections apply to this Section.

.3 Division 26 Specification Sections apply to this Section.

.4 Division 27 Specification Sections apply to this Section.

.5 Division 28 Specification Sections apply to this Section.

1.2 Definitions

.1 "OWNER" shall mean the Owner or their appointed representative.

.2 "ARCHITECT" shall mean the Architect of Record for the project.

.3 "ENGINEER" shall mean the Electrical Engineer for the project.

.4 "CONSULTANT" shall mean the Project Security Consultant.

.5 "CONTRACTOR" shall mean the security system Contractor who shall provide the Building Security System.

.6 “GENERAL CONTRACTOR” shall mean the General Contractor for the project.

.7 "ELECTRICAL CONTRACTOR” shall mean the project electrical contractor.

.8 "FURNISH" shall mean purchase and deliver to the appropriate installing contractor/subcontractor or equipment manufacturer, complete with every appurtenance, document, commission, and warrant.

.9 "PROVIDE" and “SUPPLY AND INSTALL” shall mean furnish, install, test, commission, and warrant.

.10 "COMPONENT" shall mean any individual item of equipment, software or material, which is an element of the security system.

.11 The above definitions shall apply to the words regardless of capitalization.

.12 Words used in the singular shall not be construed as limiting to one item where other requirements of the contract documents or the scope of work require multiple items and associated accessories to provide a fully functional security system meeting all the requirements detailed in the contract documents.

.13 When a specific reference to a manufacturer of a product is made, and the terms "or approved equal" are used, substitutions of a product by another manufacturer or model will be permitted, but the substituted product must conform to all specified requirements. A submission including a compliance statement and technical information must be made to the Consultant for consideration.

.14 The Consultant determination on the acceptability of substitutes shall be final. Approved substitution equipment shall conform to available space, functional, and power requirements. Substituted equipment that does not conform to the requirements shall be replaced or required modifications made at no additional cost to the Owner.

.15 When a specific reference to a manufacturer of a product is made, and the terms "or approved alternate" are used, substitutions of a product by another manufacturer or model with a cost difference will be permitted. A submission including a compliance statement, technical information, and cost implication must be made to the Consultant for consideration. Areas where the product is not in compliance with the Specifications shall be clearly noted.

.16 The Consultant determination on the acceptability of substitutes shall be final. Approved substitution equipment shall conform to available space, functional, and power requirements. Substituted equipment that does not conform to the requirements shall be replaced or required modifications made at no additional cost to the Owner.

1.3 Abbreviations

.1 The following abbreviations shall apply to this and all subsequent sections of the Specifications:

ACS	-	Access Control System
AKCS	-	Automated Key Control System
CIS	-	Computer Interface Station
CO	-	Control Output
CPU	-	Central Processing Unit
DRS	-	Digital Recording System
DVR	-	Digital Video Recorder
FAS	-	Fire Alarm System
GSM	-	Global System for Mobile Communication (Cellular)
ICP	-	Intelligent Control Panel
ID	-	Identification
IDS	-	Intrusion detection system
MI	-	Monitored Input
NAS	-	Network Attached Storage
NDR	-	Network Digital Recorder
NDS	-	Network Data Server
NSW	-	Network Switch
NVR	-	Network video recorder
OIW	-	Operator Interface Workstation

PACS - Physical Access Control System
PCS - Parking Control System
PIDS - Perimeter Intrusion Detection System
RAM - Random Access Memory
REX - Request to Exit
RFI - Request for Information
RFP - Remote Field Panel
RM - Remote Module
RWS - Resident Wandering System
SAN - Storage Area Network
SER - Security Equipment Room
SIS - Security Intercom System
SMD - Security Monitoring Desk
VBS - Video Badging System
VDW - Video Display Wall
VMD - Video Motion Detection
VMS - Video Management System
WDS - Web Data Server
WDU - Wall Display Unit
WFP - Workstation Flat Panel

1.4 Requirements

.1 Provide a complete security system turnkey installation as detailed in this and other sections of these specifications. The security system shall comprise of the following systems:

.1 All facility CAT6A Network Cables for all ICT scopes of work will be supplied by and installed by the Structured Cable Contractor. Any Local or system only network will be part of each vendor.

.2 All facilities Access Control and multi-conductor security cabling by security contractor.

.3 An existing IP-based Video Management System (VMS) throughout the facility as detailed in the security system drawings and specification section 28 2~~3~~30 00. VMS shall be connected to and utilize the property's converged network for communication.

.4 Supply and install cameras for the VMS throughout the facility as detailed in the security system drawings and specification section 28 2~~3~~30 00.

~~.5 Supply and install sufficient VMS storage for a period of 60 days at a minimum of 15fps, at 1080P resolution, unless otherwise noted. Storage sizing and calculation shall be submitted at time of proposal to ensure sufficient provisions by owner or owner's representative. All event recording shall be pre-buffered for 15 seconds and post-buffered for 15 seconds.~~

~~.6 In addition to supplied VMS storage, supply an additional 20% storage capacity for future expansion.~~

~~.7~~.5 Supporting networking, signal conversion/transmission devices, servers, workstations, and associated peripherals as detailed on the security system drawings and specifications.

~~.8~~.6 For all systems, provide spare materials as detailed in the Execution section of the respective specification section(s).

~~.9~~.7 Provide Interfaces & Integration for the existing security system, subsystems, and to other systems in compliance with drawings and specifications.

.8 All equipment installed shall be compliant to either the issued drawings and specifications, approved alternates, or approved in the shop drawing review process. Any equipment found not to be compliant to the contract shall be replaced/reinstalled at no additional cost to the Owner.

~~.10~~.9 Provide all Access Control System components to interface and integrate with the existing Access Control System software.

.10 Provide all Intrusion Detection System components to interface and integrate with the existing Intrusion Detection System software.

.11 Provide all Duress Panic Alarm System components to interface and integrate with the existing Duress Panic Alarm System software.

.2 Provide the following for all components of the security system:

.1 All programming required for a turnkey system until final deficiencies are corrected, and substantial completion is achieved.

.2 Warranty on all components furnished, and maintenance/repair/replacement during the warranty period.

.3 Submittals, samples and record documentation in compliance with respective sections.

.4 Comprehensive commissioning and testing with the Owner or Consultant during substantial completion in compliance with respective specification sections.

.5 Training services for the Owner and Operators in compliance with respective specification sections.

.6 Coordination with other site trades and contractors/subcontractors.

.7 Reporting to the Owner, the Architect and Consultant for the coordinated and timely execution of the Work.

.8 All power supplies and conditioners, equipment enclosures, conduit and cable trays, junction and mounting boxes, cabling, sleeves, fire stopping, and other components, software, materials and services required for a completed and fully operational turnkey security system installation meeting these specifications.

1.5 General Criteria

.1 The security system shall meet the following general criteria:

.1 All security system equipment, including but not limited to system control panels, networked devices, servers, workstations, interface devices, storage devices shall be fully IP networked, microprocessor based, and feature real time distributed processing.

.2 The security system shall be configured to ensure reliability of systems operation and control of critical functions/systems. The following describes, in very general terms, a relationship between the various components of the security system that would be acceptable. Other security system topologies shall be acceptable if they meet the intent and performance requirements defined in these specifications.

.1 All Network Data Servers (NDS) supporting security system components shall incorporate, at minimum, rack-mountable server grade computers with sufficient NIC bandwidth, video card, processor capabilities, RAM, storage, USB ports to suit the application. The security system NDS computers shall reside in the location(s) noted on the security system drawings.

.2 Where requested in the security drawings and specifications, provide a security system Local Area Network (LAN) to serve the security system(s). The security system LAN shall be a high-speed Ethernet TCP/IP based network compliant to telecommunications standards, with either a copper or fibre backbone sufficient to support 10Gbs of network activity.

1.6 Warranty And Services During the Warranty Period

.1 The Warranty Period for all components of the new security system and their installation shall be a minimum of two (2) years from the date of Substantial Performance. The date of Substantial Performance shall be the date when all components have been certified by the Consultant and accepted by the Owner to be complete in accordance with the definition of Substantial Performance.

.2 All components and their installations shall be free from defects. Any defective material or workmanship and any resulting damage to work of other trades shall be replaced or repaired as directed during the Warranty Period. Comply with General Conditions, agreeing to repair or replace any components of the security system that have failed within the warranty period.

.3 Schedule repair work with the Owner's representative to prevent interference with normal building activities.

.4 The Base Tender price shall include the cost of all replacement parts during the warranty period and all the associated installation costs, and all the costs associated with the repair of components during the warranty period but shall not include the cost of labour for routine maintenance during the warranty period. The cost of labour for routine maintenance during the warranty period shall be provided separately as an Alternate Price as detailed below.

.5 Replace or repair all supplied defective installations. Respond and be on site within four hours of the Owner placing a system trouble call for items of a critical, urgent, or immediate nature (e.g. failed head end component, non-functioning controller, etc.). Response to Warranty call out by the Owner shall be within 24 hours for items not requiring immediate attention. Work to trouble shoot and identify the cause of the security system or component failure shall begin immediately and shall continue until repaired to the satisfaction of the Owner.

.6 Any software modifications or upgrades that become standard product offerings from the security system Contractor and/or security system equipment vendors during the warranty period shall be brought to the attention of the Owner and, at the discretion of the Owner, may be requested and, if so, shall be provided at no additional cost to the Owner.

.7 The security system Contractor shall maintain an inventory of commonly replaced components in the local office for the replacement of failed components. Larger components shall be readily available within the North America for overnight courier shipping response.

.8 Provide replacement components within the specified time periods for the following components. The Contractor shall guarantee to the Owner that the delivery of replacement components will be provided within the specified time periods.

1.7 Codes, Permits and Approvals

.1 The latest requirements of all national, provincial, county, municipal and other authorities having jurisdiction shall be met.

.2 Work that is not clearly defined by local ordinance or amendment shall be governed by the local Building Code, and by the Authorities Having Jurisdiction (AHJ).

.3 The requirements of The Occupational Health and Safety Act (OHSA), Environmental Protection Act (EPA), Americans with Disabilities Act (ADA), Accessibility for Ontarians With disabilities (AODA) and CSA Barrier Free Design Standards shall be followed for all job-site procedures and installation methods.

.4 Work shall be performed in compliance with Owner's insurance underwriters' requirements which will be provided to the successful security system proponent following project award.

.5 All equipment and materials furnished under this contract shall be new and shall meet all applicable UL/ULC standards and all requirements of these specifications.

1.8 Schedule

.1 Complete all requirements of the security system contract prior to the scheduled Substantial Performance date for each portion of the work.

.2 Provide to the General Contractor a schedule indicating the sequence of work, durations of individual tasks, delivery dates for all material, devices and equipment and detail any interface that must be coordinated with any other contractors/subcontractors.

.3 Attend all project meetings as requested by the Owner and the General Contractor.

.4 Provide written status reports at required intervals and in a format acceptable to the Owner. An updated schedule of work shall be included in each status report.

.5 Comply with the Project Construction Schedule. Provide additional staff and work overtime as required to comply with the Project Schedule and so as not to interfere with other on-site contractors/subcontractors in their effort to comply with the Project Schedule.

.6 Provide written Request for Information notices to the Owner when specific information or clarification of the specifications is required. Request for Information notices shall be provided at least two weeks prior to the need for the information.

1.9 Contractor Qualifications

.1 The Contractor shall:

.1 Be certified by the manufacturer to procure, install, program, maintain, and service the acceptable security system components.

.2 The Contractor must have permanent full-time certified staff available in the project area to perform all necessary project cycle installation functions, including service and maintenance work following system acceptance.

.3 Have staff and be able to supply information to support that their current installation and service technicians are competent factory trained and certified personnel capable of maintaining and servicing the proposed system.

.4 Have a proven record of experience with similar in the supply and installation of equivalent systems over a minimum period of five years. Document at least three and no more than six projects, of equal or greater size and complexity, on the acceptable security system components. Indicate quantities of VSS cameras included in the scope of the projects along with a description of the property secured.

.5 Have been a factory certified representative for the security system products indicated, for a minimum of three years entailing design, installation, configuration, and maintenance.

.6 Have comprehensive local service and support facilities in the project area for the total security systems as provided.

.7 Maintain local supplies or have access to a factory authorized organization that shall carry a complete stock of essential and expendable parts.

1.10 System Compliance and Performance Certification

.1 The security system contractor shall thoroughly review all aspects of the security system design documents and certify that their bid submission and proposed security system facilities are following the Contract Documents.

.2 The Contractor shall provide a Compliance Review of all Specifications and Addenda as part of the Contractor's proposal. The Compliance Review will be an item-by-item list and review of the Specifications.

.3 The security system tender Respondents shall clearly identify any areas where the proposed security system facilities are not in full compliance with the security systems design. An accompanying performance statement and technical supporting documentation must be supplied for consideration.

.4 In lieu of a full Compliance Review, one or more general Letter of Compliance may be supplied if the proposed system(s) are in full compliance with the issued drawings and specifications. A Letter of Compliance from the bidder, contractor/subcontractors, and manufacturers are acceptable.

.5 Unless an exception is specifically noted in the Compliance Review, it is assumed that the Contractor is in complete compliance with the Contract Documents. Exceptions taken in cover letters, subsidiary documents, by omission, or by contradiction do not release the Contractor from being in complete compliance unless the exception has been specifically noted (explicitly, not by implication) in the Compliance Review.

PART 2 – PRODUCTS

2.1 Equipment – Materials Requirements

.1 Equipment, materials, devices and facilities shall meet, at minimum, the following requirements:

.1 Manufactured by experienced manufacturers of the specific components and facilities.

.2 All equipment and materials shall be manufactured using new and high-quality components, without defects. All field devices of each system shall be products of one manufacturer with unified shape, colour, design, function, operation, and markings.

.1 Design shall minimize the requirement for field repair or maintenance.

.2 Modular design to allow expansion without substantial modification of existing installed components.

.3 Internal or self-diagnostics for component failures.

.4 Maintainable on a unit basis without affecting the ongoing operation of the balance of other systems.

.5 Modular components, test ports and cable terminations shall be accessible.

.6 Damage caused by the failure of one component will be limited to the component that has failed without affecting the ongoing operation of the systems.

.7 Equipment and materials shall be provided with an Underwriters Laboratories, Inc. (U.L.) and Canadian Standards Association C.S.A label wherever applicable.

.8 Hazardous Materials Notification: In the event that a product or material that does not contain asbestos, PCB, or other hazardous materials as determined by the Owner is not available, a "Material Safety Data Sheet" (MSDS) equivalent to OHSA Form shall be submitted for the proposed product or material prior to installation.

.9 Asbestos and PCB Certification: After completion of installation, but prior to Substantial Performance, the security system Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB).

2.2 Equipment – Mounting and Finishes

.1 Final mounting locations shall be verified with the Architect prior to installation. Notify the Architect if a particular location is not acceptable for the application.

2.3 Ambient Conditions

.1 Provide equipment, devices and materials for interior applications that shall be capable of withstanding and operate satisfactorily in, at minimum, the following ambient conditions:

.1 10 to 45 Deg. Celsius temperatures.

.2 10-90 percent relative humidity (non-condensing).

.3 Electrical power service of single phase, 85-110 percent of 120 Vac, 60 Hz.

.2 Provide equipment, devices and materials for exterior applications that shall be capable of withstanding and operate satisfactorily in, at minimum, the following ambient conditions:

.1 -40 to 50 Deg. Celsius temperatures.

.2 10 - 100 percent relative humidity.

.3 Electrical power service of single phase, 85-110 percent of 120 Vac, 60 Hz.

2.4 Pathways for Security System Equipment

.1 All security system cabling shall be in conduit unless otherwise noted. The electrical contractor shall provide the security system required conduits as detailed on the Security Drawings. The security system contractor shall review the Security Drawings and indicate within the tender form if any additional conduit is required. If additional conduit is requested by the security system contractor within the tender submittal, it will be added to the electrical contractor's scope of work. If confirmation is not received at tender time, and subsequently it is determined that additional conduit is required, then the security system Contractor shall provide all additional conduits required for a complete security system installation at no additional cost to the owner. Coordinate with electrical contractor for exact junction box and termination locations for all required conduits.

.2 Conduit sizes indicated on the drawings are to be considered the minimum size to be installed. Provide larger or additional conduit if required. Security system cabling shall not share conduit with any other cabling. Coordinate installation of conduit with building structure and other trades. All conduits shall be provided complete with “pull-string” for future pulls.

.3 All security system cabling required to be within conduit, shall be run in its own conduit and shall not share conduit with any other trade. Security system cabling of same type may be combined provided CEC minimum fill requirements are maintained.

.4 If lubricant is required for pulling of cables through conduits, only wipe on or spray on type shall be utilized. The wipe on or spray on type must be expressly designed for mitigation of wet link insertion loss. Cable damage from pulling of cables is the security Contractor’s responsibility and new cable shall be provided at no additional cost to the Owner.

.5 If a J-hook or trapeze system is used to support cable bundles, all cables shall be supported at a maximum of four-foot intervals- at no point shall cable(s) rest on acoustic ceiling grids or panels.

.6 Cables supported by J-hooks shall be run in conduits from ceiling area to field device location.

.7 Structural support members shall be galvanized.

2.5 Panels

.1 Provide panels and enclosures for all components of the security system which are susceptible to physical or environmental damage. Equipment or devices that are not equipped with enclosures, as a specified unit shall be mounted within panels or enclosures that meet, at minimum, the following requirements:

.1 NEMA 1 rated painted steel panels with locking door.

.2 Ventilated to prevent excessive heat build-up, where required.

.3 Field cabling shall be terminated on a terminal strip or directly on the component PCB fixed within the enclosure. Provide strain relief as necessary.

.4 Internal components shall be installed to allow easy access for diagnostics, maintenance, removal, or replacement of any component within the enclosure.

.5 Cabling shall be neatly installed within wire guides with removable covers for easy access.

.2 Interior panels and enclosures within plenum areas shall meet, at minimum, the following requirements:

.1 Approved plenum rated panel with locking door and gasketing as required.

.2 Field cabling shall be terminated on a terminal strip or directly on the component PCB fixed within the enclosure. Provide strain relief as necessary.

.3 Internal components shall be installed to allow easy access for diagnostics, maintenance, removal, or replacement of any component within the enclosure.

.4 Cabling shall be neatly installed within wire guides with removable covers for easy access and additional service-loop spare cabling common in best industry installation practices.

.3 Exterior and garage mounted panels and enclosures shall meet, at minimum, the following requirements:

.1 NEMA 4 painted steel panels with locking door.

.2 Field cabling shall be terminated on a terminal strip or directly on the component PCB fixed within the enclosure. Provide strain relief as necessary.

.3 Internal components shall be installed to allow easy access for diagnostics, maintenance, removal, or replacement of any component within the enclosure.

.4 Cabling shall be within wire guides with removable covers for easy access.

.4 All panels shall be lockable with the same key, which shall be unique to the building. Provide the Owner with ten keys.

.5 Provide cabling diagrams laminated in clear plastic at each field panel enclosure showing all cable terminations, relays, interlocks, power supplies, etc.

.6 Provide heat output and space conditioning requirements to the Owner and Architect for all security system components.

2.6 Labelling

.1 Provide labelling for all panels, and enclosures. Labelling shall meet, at minimum, the following requirements:

.1 Plastic laminated label, which shall be affixed to the panel or enclosure with rivets or permanent adhesive.

.2 Lettering .25-inch high which sharply contrasts with the background.

.3 Coordinated with the approved project labelling scheme and consistent throughout the project.

.4 Indicated on the record documentation.

2.7 Security Equipment Rack

.1 Install all required security system equipment as detailed within these documents within the existing racks in the Main IT room. Refer to the detail drawings within the security drawings for equipment locations and rack quantities.

.2 Provide all mounting hardware and supports as necessary to mount the equipment within the racks.

.1 Provide heat output and space conditioning requirements to the Owner and Architect for all security system components.

2.8 Pathways For Security System Equipment

.1 Conduit sizes indicated on the drawings are to be considered the minimum size to be installed. Conduit, where required, shall meet, at minimum, the following requirements:

.1 Building conduit shall be electrical metallic tubing (EMT), and shall be as follows:

.1 "Thin wall" zinc coated steel.

.2 ANSI C80.3 and UL-797.

.3 Assembled using concrete tight and rain tight gland-ring compression threaded type fittings.

.2 Liquid-tight conduit shall be used in wet locations.

.3 Flexible connections shall be provided for equipment subject to vibration or movement.

.4 Smooth interior surface free of obstructions.

.2 Junction and pull boxes shall be installed where required by the corresponding electrical code and at locations to facilitate the pulling of cable. Junction and pull boxes shall meet, at minimum, the following requirements:

.1 Meet NEMA/CSA and CEC Code requirements with respect to material, gages, dimensions and methods of fastening.

.2 UL/ULC approved for the installed application and location.

.3 Removable screw cover.

.4 Interior boxes shall be galvanized steel.

.5 Exterior boxes shall be hot-dip galvanized cast iron with weatherproof covers.

.6 100mm² or larger.

.7 Securely fastened to the conduit.

.3 Cable support (J-hooks) shall meet at minimum the following requirements:

.1 Shall Comply with UL, UL, NEC and EIA/TIA requirements.

.2 Shall be available in diameter sizes of 25mm (1in), 50mm (2in), 75mm (3in) and 100mm (4in).

.3 Shall provide a bearing surface of sufficient width to comply with required bend radius of cables.

.4 Shall be metal (at least 0.052” thickness) not plastic or any other similar materials to support cabling in fire event.

.5 Any fasteners used to affix the cable support shall be metal and fastened to the metal of support.

.6 Shall have flared edges to prevent damage while installing cables.

.7 Shall meet the bend radius support requirements of supporting four (4) times outer diameter (O.D.) per TIA-C.5.3.2.1; all edges shall support a bend radius of 1 ½" or more.

.8 Shall support bend radius requirements on the "neck" to allow for pathways around corners.

.9 Shall have a cable retainer wire form to provide containment of cables within the hanger. The cable retainer shall be removable and reusable.

.10 Shall have an electro galvanized, G60, or powder coated finish.

.11 Shall have a UL static load rating of 60lb.

.12 Coloured cable support shall have the two-letter colour code added to the product number.

.13 Multi-tiered cable support assemblies shall be used where separate cabling compartments are required.

.14 Manufacturer shall have minimum of five years documented experience in the industry and certified ISO900.

.4 Coordinate installation of pathways with building structure and other trades. Pathway's installation above accessible ceilings shall be such that there will be no interference with the installation of lighting fixtures, fire protection, air outlets or other devices.

.5 Colour-code all conduit and fittings with a unique colour at every junction box and at least every 3,000 mm (10 feet) along the conduit.

.6 Primary communication LAN cable shall not share conduit with any other cable.

.7 Secondary communication LAN cable shall not share conduit with any other cable.

.8 Conduit sizes indicated on the drawings are to be considered the minimum size to be installed. Provide any additional conduit required to provide a complete system.

.9 Pathway installed by the security systems contractor shall be securely mounted in accordance with CEC Regulations and shall be concealed in all high finish/guest areas and areas to which tenants and/or the public have access.

.10 Pathway shall run parallel or perpendicular to the building lines and shall be installed in a workmanlike manner. Avoid obstructions and crossovers where possible.

.11 Pathway shall be installed such that any condensation in the conduit cannot run into security system equipment. Where necessary conduit shall enter enclosures from the bottom or shall be sloped up to the enclosure.

.12 Conduit/cable tray/cable support shall be provided for all security system cables.

PART 3 – EXECUTION

3.1 Boring and Patching

.1 Provide boring and patching of work as required for a complete security system. Boring and patching shall meet, at minimum, the following requirements:

.1 Before boring any structural or fire rated components, obtain the Architects' approval.

.2 Make boring with clean, square and smooth edges. Patches shall be inconspicuous in the final installation.

.3 Restore fire ratings if boring has violated the fire rated assemblies.

3.2 Sleeves, Cutting, Patching, and Fire Stopping

.1 The Contractor shall be responsible for the timely placing of sleeves as detailed on the Drawings and the Coordination Drawings for all piping and conduit through walls and partitions, beams, floors and roofs as noted below, while the same are under construction:

.1 All concrete or masonry construction.

.2 Wall constructions where the penetration must be sealed airtight. Patches for penetrations through walls for Work installed prior to finish application shall be provided by others. 13mm (½")

.3 Fire rated wall construction.

.2 Sleeves shall be at least one size larger than the size of conduit or pipe, including the insulation where applicable; it serves except where “Link Seal” casing seals are used in sleeves through walls below grade.

.3 Sleeves shall be sized such that the annular space between the sleeve and the conduit will not be less than 13mm (½").

.4 All conduits passing through concrete or masonry walls above grade shall be at least 18-gauge galvanized steel sleeves.

.5 Sleeves shall be set flush with finished wall. All sleeves in floors shall extend a minimum of 50mm (2") above the finished floor.

.6 Sleeves installed in fire rated construction shall be of suitable length and diameter to accommodate the fire safe system used.

.7 Sleeves set in concrete floor construction shall be at least 16-gauge, galvanized steel. Where the conduit passes through a sleeve, no point of the conduit shall touch the sleeve, and the conduit shall be centred in the sleeve.

.8 Seal all penetrations in fire rated construction with factory-built devices or with manufactured fill, void or cavity materials “Classified” by Underwriters Laboratories, Inc. for use as a Through Penetration Firestop.

.9 All firestop devices and systems shall be approved for such use by the authorities having jurisdiction. The firestop system used shall maintain the fire resistance rating of the building component that is penetrated.

.10 Firestop systems and devices shall comply with ASTM E 814 (UL 1479) for all types of penetrations being sealed. Submittal data for firestop systems shall include the applicable UL System Numbers. Excessive shrinkage of the firestop materials, which would permit the transmission of smoke or water prior to exposure to a fire condition, is unacceptable.

.11 Where a mastic coating is used to seal the surface of the firestop, the mastic shall be non-hardening.

.12 The firestop manufacturer's representatives shall instruct the Contractor's representatives in the proper installation procedures so that the penetrations on the Project will be installed in accordance with the UL listing and the manufacturer's recommendations. If it complies with these Specifications, firestop-sealing component/system as manufactured by one of the following manufacturers will be acceptable:

.1 Specified Technologies, Inc. Spec Seal Systems or,

.2 3M Fire Barrier Penetration Sealing Systems or,

.3 Hilti FS-601 Systems

.4 Or approved equivalent

.13 Sleeves penetrating walls below grade shall be standard weight black steel pipe with 1/4" thick steel plate water seal secured to the pipe with continuous fillet weld.

.14 The water seal plate shall be located in the middle of the wall and shall be 50mm (2") wider all around than the sleeve it encircles. The entire assembly shall be hot dipped galvanized after fabrication.

.15 Seal off annular opening between pipe and sleeve with "Link Seal" type casing seal as manufactured by Thunderline Corporation or Innerlynx. The pipe sleeve shall be sized to accommodate the Thunderline casing seal.

.16 Casing seals shall be Series 300 for pipe size 20mm (¾") through 100mm (4") and Series 400 for pipe sizes 125mm (5") and larger. If holes and/or sleeves are not properly installed and cutting and patching becomes necessary, it shall be done at no additional expense to the Owner.

.17 The Contractor shall undertake no cutting or patching without first securing the Architect's written approval.

.18 All unused sleeves shall be sealed with firestop devices and systems to maintain the fire rating of the construction penetrated.

3.3 Labelling

.1 Provide labelling for all cabling. Labelling shall meet, at minimum, the following requirements:

.1 Plastic laminated label, which shall be affixed to the cable with self-adhesive backing.

.2 Marker labelling directly on the cable jacket shall not be permitted.

.3 Lettering which sharply contrasts with the background.

.4 Coordinated with the approved project labelling scheme and consistent throughout the project. Approve with consultant prior to labelling.

.5 Indicated on the record documentation.

3.4 Hanging and Supporting

.1 Install all equipment, devices, materials, and components in compliance with the manufacturer's recommendations. Supports shall be suitable for the environment within which the component is to be installed. Coordinate all hanging and supporting of components with all trades.

.2 Security system cables shall be bundled in groups of not greater than forty (40) cables. Attention to cable bundle size must be taken; excess of forty (40) cables may cause deformation of the bottom cables within the bundle.

.3 Cable shall be installed above fire-sprinkler and systems and shall not be attached to the system or any ancillary equipment or hardware.

.4 The cabling system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.

.5 Cables shall not be attached to ceiling grid or lighting support wires.

.6 Cable damaged (conductor, shield or jacket) or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.

.7 No plastic or metal cable ties are permitted.

.1 Allowable fill capacity and load rating shall not exceed manufacturer recommendation.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 ACS includes but not limited to field devices, termination hardware, supporting hardware, and miscellany required to ~~provide~~ tie into an ~~fully~~existing functional integrated ACS, include all equipment, labour, supervision, tooling, and miscellaneous mounting hardware and consumables to install ACS.

.2 Design, procure, install, integrate, test, and maintain an existing ACS.

1.2 Reference Standard

.1 IEEE 802.3, IEEE Standard for Ethernet

.2 SIA GB-01, Glass break False Alarm Reduction Standard

.3 SIA PIR-01, PIR False Alarm Immunity Standard

.4 UL 294, Standard for Access Control System Units Access Control System Units

.5 UL 609, Local Burglar Alarm Units and Systems

.6 UL 1076, Proprietary Burglar Alarm Units and Systems

.7 UL 1635, Standard for Digital Alarm Communicator System Units

.8 UL 1950, UL Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment

1.3 Submittals

.1 Contractor shall submit the finalized design data for Review to owner in PDF or CAD editable format prior to any work being done in accordance with Project Agreement.

PART 2 - PRODUCTS

2.1 Design and Performance Requirements

.1 General Scope:

.1 The system shall be an extension of an existing IP based, non – proprietary, redundant, enterprise solution. ~~The system shall be a complete solution that is scalable from the existing scope of this project to several thousand doors across multiple sites which can be added on a unit-by-unit basis. This future expansion capacity shall not require significant replacement or upgrading of hardware or equipment provided as part of the initial solution.~~

.2 The ACS shall be fully integrated with the VSS, and ~~SIS~~ DPAS Systems as well as provide all integration as described and required under the division 27 sections.

.3 All system testing shall follow the testing, commissioning and acceptance process outlined in Section 28 05~~8~~ 00 - ~~Commissioning of~~Common Work Results for Electronic Safety and Security.

.4 Provide detailed door wiring diagrams. Finalize the wiring diagrams to meet any site-specific conditions and provide a fully functional system.

.5 Provide and include all costs as a part of his proposal for a Specialty Engineer to be present at all testing and commissioning of the system. Provide the Specialty Engineer access to all points of the installation. Provide all test and access equipment required for the inspection.

.2 System Description:

.1 The ACS shall consist of field and termination equipment necessary to provide a fully automated system to control and monitor authorized traffic in and out of controlled areas of the facility.

.2 The ACS shall be designed on a distributed processing architecture employing remote DGP's and operator workstations connected to a redundant central server solution.

.3 Connect all doors and devices to centrally located DGP panels located in communications rooms.

.4 Connectivity from the DGP panels to the system front end shall be based on Ethernet IP based protocols over a converged supplied network.

.5 Each DGP panel to be configured to a maximum of 75% of its input, output and reader capacity.

.6 The field device to Telecommunications Room allocation shall be identified by contractor ensure that such allocations do not cause cable lengths to exceed a distance of ninety (90) meters regardless of whether the device uses IP or other communication protocols.

.7 System monitoring shall be centrally located in the locations indicated in the ~~OS~~drawings. System monitoring shall also be provided via web browser accessible from any workstation on the converged network. Access shall require a valid user ID and password.

~~.8 The system shall be capable of operating even in the event that the system management server is unavailable.~~

~~.9 Following a power failure and the restoration of main or backup power, the ACS shall revert automatically, within three and half (3.5) minutes, to normal service status without the need for operator intervention. The system shall restart in the same state as existed before the power interruption with no loss of functionality or transaction data.~~

~~.10~~.8 In the event that communication between the DGP and access control server is unavailable, the functionality of the DGP shall be preserved such that door functionality at every door shall is unaffected.

~~.11~~.9 This shall apply for all card records that were recorded in the access control system database prior to the loss of communication between the DGP and access control system server.

~~.12 The ACS shall provide continuous unattended access control and alarm monitoring at specified locations while meeting the technical, operational and feature requirements of this specification.~~

~~.13 The ACS shall grant or deny access within one (1) second of an access attempt. Alarms shall be fully displayed on client workstations within one (1) second of origination.~~

~~.14 The ACS shall allow no more than one (1) false reject per one thousand (1000) read attempts. A "miss" is an incorrect read of an otherwise valid card.~~

~~.15 Under no circumstances shall a false acceptance be allowed.~~

~~.16 The ACS shall support a minimum of forty thousand (40,000) cards and an unlimited amount of facility codes.~~

~~.17 The system shall be capable of responding to card only, card and PIN/key pad, card and biometrics, card and mobile credentials.~~

~~.18 Full fail over server redundancy is a mandatory requirement of this specification. It is intended that all system configuration and user authentication parameters be contained on a minimum of two (2) fully redundant mirrored system servers with real time replication be supplied and installed separately in the building equipment rooms. In no case shall both servers be installed in the same room.~~

~~.19~~.10 The ACS shall include but not be limited to the following elements:

.1 Supply install, and maintain new field devices per the ~~OS~~ drawings including, but not limited to:

.1 Card readers

.2 Keypads/PIN pads

.3 Door control units / DGP

.4 Door position switch

.5 Access cards

.6 Tamper alarms

.7 Local audio alarms

.8 RTE motion detectors

.9 RTE push buttons

.10 Key switches

.11 Interface to door hardware (Power transfer switches/crash bars, strikes, door operators, etc.) including monitoring circuit for “lock status” and or “bond sensors”

~~.20~~.11 Supply install, and maintain all necessary display and control equipment including, but not limited to:

.1 Door control units / DGP

~~.21~~.12 Equipment shall not carry any logos or text which identifies the Supplier or contractor.

~~.22~~.13 Portal Definition:

.1 Common portal functions

.2 The below functions are general to all doors where applicable, and unless otherwise stated within the respective portal sub-sections:

.1 Valid access trigger:

.1 The following are valid triggers which shut the door alarms and allow proper access through the respective portal.

.2 Valid access card swiped

.3 RTE motion detector or pushbutton

.4 Remote access granted

.5 Valid access card swiped and valid PIN pad input.

.3 Loss of Power Operation:

.1 Non-maglock doors shall fail secure on loss of power to the lock.

~~.2 Doors with maglocks shall fail safe when loss of power occurs.~~

~~.3 When power is restored maglocks shall not be re-energized Automatically. The master reset key-switch shall have secondary switch in public safety office.(Confirm with Client)~~

~~.4 Intercom:~~

~~.1 An Intercom icon shall be displayed in the ISMS upon alarm if an intercom station is installed at alarm location.~~

~~.5~~.4 Video Surveillance:

.1 Upon alarm event e.g. door forced open, or door held open, designated camera(s) at the location of the event shall immediately pan, tilt, and zoom to the appropriate pre-set (position pre-programmed), display on a designated alarm monitor Recording shall be 30fps minimum.

.2 When the operator acknowledges the alarm via the ISMS application, the VSS shall automatically acknowledge the alarm in parallel without any additional user intervention.

~~.6~~.5 Invalid Card Reader Swipe:

.1 Upon presentation of an invalid access card, the card reader shall provide an AV indication of the invalid access attempt and video footage of the action by the nearest camera.

~~.7~~.6 Door Forced Open Alarm:

.1 In the event that the Door contact or lock status switch activate without a valid access trigger, generate a door forced open alarm at the ISMS, and activate the local annunciator where permitted by owner.

.2 Local annunciator shall remain active until door is closed and a valid access card is swiped. Alarm can also be reset by the operator via the ISMS.

~~.8~~.7 Door Held Open Alarm:

.1 Door not closed during shunt time shall activate door held open indication in the monitoring location and activate local annunciator. The system should have the ability to keep the local annunciator active until door is closed and a valid card is swiped. Alarm can also be reset by the operator in the monitoring location.

~~.9~~.8 Delayed Egress – Panic bar activated:

.1 The security system shall be configured with fifteen (15) second delayed egress functionality.

.2 Upon panic bar activation, immediately activate the local annunciator, and a three (3) second timer shall start. If the panic bar is released within the first three (3) seconds, de-activate the local annunciator.

.3 After the first three (3) seconds of continuous activation of the panic bar, a twelve (12) second time shall start to unlock the door.

.4 When the twelve (12) second timer is activated, the VSS system shall immediately switch the appropriate camera(s) and shall record the sequence.

.5 After the first three (3) seconds of continuous activation of the panic bar, an alarm shall be generated. Alarm shall be indicated as “Door in Delayed Egress Mode”, which warns the operator that the door shall unlock at the end of a twelve (12) second delay.

.6 Upon door unlock, the lock status sensor shall indicate a door unsecure alarm.

.7 Upon door opening, the door contact shall indicate a door forced open.

.8 Upon initiation of the alarm, the operator workstation monitor shall be automatically switched to the appropriate camera(s).

.9 The door shall remain unlocked until the key switch is activated. The door can only be re-secured by activation of the local key switch.

.10 Where applicable, the door shall be interlocked (through software at the panel level) with all other downstream doors in the egress path, such that the total egress delay does not exceed fifteen (15) seconds.

~~.10 Fire Alarm Release Operation:~~

~~.1 Fire Alarm Release:~~

~~.1 Doors with magnetic locks that are required to be used exiting or for egress to exit are required to be released when the fire alarm is activated.~~

~~.2 This interface shall be a hardware relay provided by the fire alarm system and zoned from the fire alarm system. This shall release the door lock immediately and generate a single alarm indicating that the doors are in fire unlock mode, which warns the operator that all the fire egress doors are unlocked and record video footage of the action by the nearest camera. While the door is in fire unlock mode, inhibit the alarms from the lock status monitor. If the door is opened, generate a door forced open alarm for each respective door.~~

~~.3 Upon fire alarm restore, the maglocks need to be re-energized. This is done by operating a switch available only to authorized personnel.~~

~~.23~~.14 Equipment Rooms:

.1 Provide cable troughs, conduit, and emergency power circuits for DGP configurations. Cable troughs shall be grounded to earth ground.

.2 All Equipment mounted in each DGP configuration shall be mounted on fire rated plywood supplied and installed by contractor.

.3 Access control equipment, cable troughs, conduit, and emergency power circuits, and VSS power supplies shall be wall mounted as per Supplier's specifications.

.4 Provide emergency electrical panel power monitoring devices for each communications room and connect into the ACS for monitoring.

.5 Provide temperature sensor monitoring devices in each of the communications rooms and connect into the ACS for monitoring.

~~.24~~.15 Network:

.1 Ensure all IP addressing schemes used on the converged network are coordinated with and Reviewed by owner.

.2 Remote administrator access to be provided to public safety management.

~~.25~~.16 Interface with Other Systems:

.1 VSS:

.1 Refer to Section 28 20 00 Video Surveillance System and 28 0~~8~~5 00 ~~Commissioning~~ Common Work Results of Electronic Safety and Security, along with ICAT sections of the Specifications.

~~.26 Photo Badge and Verification:~~

~~.1 The system shall be capable of integrating a photo-badge and verification application into the access control system. This application shall have dual functionality:~~

~~.1 Design photo badge templates.~~

~~.2 Draw floor maps.~~

~~.3 Automatically update all owner ACS/Parking with the new badge information including photo.~~

~~.4 Automatically update HR systems~~

~~.5 Integrate data into other security systems as applicable.~~

~~.6 Allow for remote badge printing at any/all owner sites.~~

~~.2 The operator shall have the ability to capture a photo with at least 5MP resolution. The photo capture of a cardholder shall be done by any Twain compatible device, i.e., video capture card, scanner, digital camera, or other. The system shall also provide for importing JPEG or Bitmap images of cardholders.~~

~~.3 The application shall allow a photo to be displayed when viewing cardholder records or online transactions from the guard monitoring application.~~

~~.4 The photo badge and verification application shall provide a suite of tools to draw objects, edit text, and insert database fields to create or modify badge templates.~~

~~.5 The application shall provide an interface for a card printer and be capable of printing cards on one (1) or both sides and overlays at any given time.~~

~~.6 The system shall allow photo verification when a token is read by the reader displaying the cardholder photo in a separate window. The operator shall be able to set the window to show photos of the last ten (10) cardholders whose activity produced a transaction.~~

~~.7 The Maps function shall allow the operator to either import basic AutoCAD drawings (.dwg), graphical file formats, or draw original floor maps and insert icons representing doors and supervised and auxiliary input device locations.~~

~~.8 The operator shall have the option to display a map from a specified access control interface screen to assist in locating the source of the alarm event.~~

~~.27~~.17 Power:

.1 Connect to the 120 VAC power and for providing CSA listed power supplies and transformers to distribute low voltage power to system components.

.2 All power supplies shall be hard wired into source 120VAC power. Plug in transformers are not acceptable.

.3 Provide lockable, hinged covered, terminal cabinets for all power supplies, transformers, and power distribution terminal strips. Provide all conduit and wiring from the 120 VAC facilities to the terminal cabinets.

.4 Provide protection against surges, spikes, noise, and other line problems for all system equipment and their components.

.5 All equipment and system components which are powered by more than 48 volts AC or DC shall be ULC listed for safety. This includes equipment or system components classified as non-power limited.

.6 All system power supplies shall be monitored, by the ACS, for line failure on a dedicated monitoring input point. Therefore, when an AC line fails, a unique alarm condition shall be caused.

2.2 General Requirements

.1 Contractor shall be fully responsible for the ultimate design and implementation of the system topology (physical and logical) best suited for the project, given identified and recognized physical infrastructure and constraints. All equipment used shall be natively and fully compatible with the owners ACS indicated in specifications.

2.3 Field Devices

.1 Door Contact:

.1 Door contact shall be supplied and installed by contractor to monitor door status of all security points.

.2 Door contact shall be concealed discrete devices unless otherwise specified and shall not be integral to other devices including by not limited to strikes~~, and maglocks~~. Where exposed mounting is necessary devices shall be mounted so as to limit easy access to unauthorized personnel.

.3 Frame mounted magnetic door contacts, hinge mounted plunger type switches, are not acceptable except for overhead shutters and doors.

.2 Tamper Alarms:

~~.1 All security equipment cabinets (including VSS, ACS power supply cabinets) shall be equipped with sensors, which detect, locally alarm and remotely annunciate their opening.~~

~~.2~~.1 All AED devices shall be equipped with sensors, which detect, locally alarm, and remotely annunciate their opening and removal.

~~.3~~.2 All communication and alarm device cabling at the door and between the DGP and the door shall be supervised to detect and remotely annunciate open, high impedance, low impedance, and short conditions. The end of line supervision device shall be installed as close as possible to the security device.

.3 Local Annunciator Alarm:

.1 All perimeter and parking garage doors shall have a local AV alarm annunciator device.

.2 The objective of the local alarm is to alert security personnel of unauthorized entry. The annunciator device shall be controllable (On/Off) by the Guard Room operator upon the acknowledgement of the alarm. Alarm shall have been recorded by access control system

.4 RTE Motion Detector:

.1 RTE Motion Detectors shall be supplied and installed by contractor on all security doors that require free egress. The RTE shall mask the alarm when a person is using the door for egress vs other rooms where an additional card reader has been provided on the secure side of the door. RTE shall shunt the door contact alarm only.

.2 Activation of the RTE shall not unlock the door.

.5 Card Readers:

.1 Card readers shall be multi-technology as manufactured by HID or approved equivalent.

.2 Card reader shall support as a minimum:

.1 HID Prox, iCLASS, iCLASS SE, SEOS and MIFARE™ cards

.2 HID multi-technology Prox/iCLASS, iClass SE cards and Signo readers.

.3 low-current consumption and operate at 5 or 12 VDC.

.4 Auto tuning for more consistent read ranges.

.3 Card readers shall read the encoded data from the credential and transmit the data to the host panel. The card reader shall also present audio and visual feedback to the user that a card read operation is either "valid" or "invalid".

.4 Visual feedback shall be through the use of LED displays at doors with PIN pads or other advanced user interaction.

.5 Card readers shall be capable of being flush or surface mounted and shall typically be surface mounted. Flush or recess mounting of card readers is required when normal traffic may cause damage to surface mounted card readers. Provide vandal-resistant and anti-ligure devices and/or enclosures where required.

.6 Card reader shall include an integrated PIN pad where required. A separate PIN pad shall not be acceptable.

.6 Access Cards:

.1 Access cards shall be resistive to wear and environmental deterioration and shall be able to be punched to accept chains or clips.

.2 The access card shall be dual technology iClass SE and prox. The prox portion of the card shall be compatible with existing card technology currently used by owner, thus allowing for a single credential that can be used at all sites.

.3 The access card shall have up to eighty-four (84) programmable bits of Wiegand formatted information for universal compatibility with all HID' Wiegand reader applications.

.4 Ensure that owner is formally consulted to ensure card format and bit structure conform to their standards and allow for multiple site access capabilities where necessary.

.5 The access card shall be "Passive" (non-battery operated) proximity technology.

.6 The access card shall have a permanently engraved identification number printed onto it.

.7 The card numbering shall be:

.1 Sequential Matching - The internal identification numbers and the external numbers shall both be sequential and shall match (i.e. internal numbers 1-100, external numbers 1-100).

.8 The access card shall be capable of having a photo or image printed directly onto the surface of the card with a direct print printer. It shall be offered with multi-colour custom graphics and shall have the option of a slot punch on the short edge of the card for a vertical/portrait format.

.9 The access card shall be no larger than 8.57 X 5.40 cm, with a maximum thickness of 0.09 cm.

.10 The access card shall have an operating temperature of -45 to 70 degrees Celsius and shall have an operating humidity of 5-95% noncondensing.

.11 The read range of the access card shall be extremely consistent, and not affected by body shielding or variable environmental conditions.

~~.7 Badge Printer Station:~~

~~.1 Badge printer station shall be complete with badge printer and tripod mounted digital camera and with automatic capture of highest available image quality.~~

~~.2 Badge printer shall be of the highest quality and comply to the following minimum requirements:~~

~~.1 Dual sided,~~

~~.2 Dye-sublimation/resin thermal transfer,~~

~~.3 Minimum resolution of 600 dpi minimum.,~~

~~.4 Capability of supporting up to 16.7 million colours,~~

~~.5 Shall be compatible with owner supplied access control cards.~~

~~.3 Printer shall be complete with all consumables such as ribbons, cleaning kits, and any other necessities sufficient for printing the number of cards as indicated in this section.~~

~~.4 Provide a quantity of two (2) automatic card hole punch tools compatible with HID access cards.~~

~~.5 Camera shall be provided complete with all cables and software for use with PC and printer.~~

~~.8~~.7 Microwave-PIR Dual-technology Sensors:

.1 Description:

.1 Single unit combining a sensor that detects changes in microwave signals and a PIR sensor that detects changes in ambient level of infrared emissions caused by standard-intruder movement within detection pattern.

.2 Listed and labeled by a qualified Testing Agency for compliance with SIA PIR-01.

.3 Device Performance:

.1 An alarm is transmitted when either sensor detects a standard intruder within a period of three (3) to eight (8) seconds from when the other sensor detects a standard intruder.

.2 Minimum Detection Pattern:

.1 A room 6 by 9 m.

.4 PIR Sensor Sensitivity:

.1 Adjustable pattern coverage to detect a change in temperature of 1 deg C or less, and standard-intruder movement within sensor's detection patterns at any speed between 0.09 to 2.3 m/s across two (2) adjacent segments of detector's field of view.

.5 Microwave Sensor Sensitivity:

.1 Adjustable, able to detect standard-intruder movement within sensor's detection pattern at any speed between 0.09 to 2.3 m/s. Sensor sensitivity adjustments shall be accessible only when sensor housing is removed, and sensors shall comply with 47 CFR 15.

.6 Activation Indicator:

.1 LED indicator shall not be visible during normal operation. Indicator shall light when sensor detects a standard intruder. Locate test enabling switch under sensor housing cover.

~~.9~~.8 Intrusion Master Control Unit:

.1 Description:

.1 Supervise sensors and detection subsystems and their connecting communication links, status control (secure or access) of sensors and detector subsystems, activation of alarms and supervisory and trouble signals, and other indicated functions.

.2 Intrusion detection system shall be integrated with ACS and shall be capable of remotely arming, disarming acknowledging, and clearing alarms via the primary or secondary monitoring locations, or locally via reader or keypad.

2.4 Display And Control Equipment

.1 DPU:

.1 The DPU shall be independent and totally self-contained, microprocessor-controlled field panel with built-in Ethernet connection and backup phone modem used to enhance or control a variety of systems. The panel shall serve as the data collection and communications interface between the system server and the various field devices. The low battery fault and power fault outputs of the advanced power system should be looped together and attached to the power fail input on the panel.

.2 The DPU time shall be synchronized with the system server.

.3 The DPU shall be comprised of several components including the processor, Ethernet port, serial ports, and expansion connectors which can accept expansion cards. The board shall also include on-board flash memory and sockets for RAM expansion.

.4 Memory Configurations:

.1 The DPU shall support at a minimum 64MB of on-board memory for cardholder and event storage and be capable of being field upgradeable to at least 128MB. There shall be at a minimum 16MB of on-board flash that shall be used for boot code and operating system code.

.5 Serial Ports:

.1 There shall be an RS-232 serial port that may be used for on-site data-retrieval/programming, troubleshooting, or for dialup communication via an external modem.

.6 Ethernet Port shall support as a minimum 100BaseT Ethernet Communication. The interface to the Ethernet services shall be through a standard RJ-45 jack connector.

.7 Inputs/Outputs:

.1 The DPU shall support dedicated NC inputs to monitor cabinet tamper, power fail and low battery. The system administrative application shall support the configuration of all dedicated inputs connected to the DPU. The monitoring application interface shall provide the status of the inputs and shall log changes in input status. Inputs shall be able to be taken offline for diagnostic purposes and each input shall support being linked directly to an output or to a system event. All input activations shall be reported to the monitoring application and stored in the event history database of the system server.

.2 Cabinet tamper contacts shall be normally closed and pre-wired to the enclosure door to report opening of the door as a tamper event.

.3 Power fail and low battery inputs shall be normally closed and wired from the battery backup power supply outputs to report main power fail and low battery conditions.

.4 Supervised Inputs:

.1 Class A supervised optically isolated inputs shall be provided on each DPU or associated expansion board.

.2 The system software administrative application shall support the configuration of all supervised inputs connected to the DPU. The monitoring application interface shall provide the current status of the inputs and shall log changes in input status. Supervised inputs shall be able to be taken offline for diagnostic purposes and each input shall support being linked directly to and output or to a system event. All input activations shall be reported to the monitoring application and stored in the event history database on the system server.

.5 Outputs:

.1 Each DPU or associated expansion board shall provide multiple form C, general-purpose, dry contact relay outputs, which are user configurable. These relay contacts shall be rated at 10A at a nominal voltage of 28VDC\24VAC. Each relay contact shall have MOV's, rated at 56V, between the relay's common terminal and the normally open and normally closed contacts to prolong the contact life and protect the DPU from external devices being controlled by the relay.

.2 The system software administrative application shall support the configuration of all outputs connected to the DPU or associated expansion board. The monitoring application interface shall provide the current status of each output and shall allow the manual activation of each output individually or in used defined groups for diagnostic purposes. All output activations shall be reported to the monitoring application and stored in the event history database on the system server.

.8 Power Requirements:

.1 Each DPU shall accept a regulated DC input voltage and generate appropriate voltage levels for on-board use . All power output to external devices shall be current limited by the DPU.

.2 All DPU's shall contain a ULC or CSA approved power supply. In such cases where the DPU does not contain a ULC or CSA rating, a separate lockable and tamper monitored external power supply containing these ratings shall be provided.

.3 All power supplies shall be hard wired into source 120VAC power. Plug in transformers are not acceptable.

.9 System Enclosure:

.1 Sheet metal, of the appropriate gauge for the cabinet size per UL 294, shall be utilized.

.2 The DPU's shall be housed in a locking metal cabinet, suitable for wall mounting. All cabinet locks shall be keyed alike. The cabinet shall be

suitably sized to allow installation of the controller and all expansion modules and associated field wiring.

.3 A single tamper switch shall be incorporated into the door.

.4 Regulatory Approvals - UL 1950, UL 294, and UL 1076, ULC, CSA. All power supplies shall be ULC or CSA approved.

~~.2 Operator Workstations:~~

~~.1 Owner will provide computer workstations where required for administrative and monitoring functions of the ACS. Contractor shall submit the workstation requirements as per the ACS vendor to allow owner to procure the equipment in alignment with contractor's schedule.~~

~~.2 The configuration should be capable of displaying at a minimum sixteen (16) H.264 video streams at rate of 30fps.~~

~~.3 Workstation requirements shall include as a minimum the following components. Specifications for these components shall be in compliance with the software developers recommended requirements for all software applications that are installed on the system:~~

~~.1 Main memory~~

~~.2 Microprocessor~~

~~.3 Hard disk drive~~

~~.4 Two (2) accelerated video cards~~

~~.5 Network interface card~~

~~.6 Storage media~~

~~.7 Mainboard~~

~~.8 Integrated six (6) channel soundcard~~

~~.9 Integrated USB 2.0 controller with four (4) USB 2.0 ports and USB-C ports.~~

~~.10 Keyboard:~~

~~.1 101 key enhanced keyboards with USB 2.0 interface. Keyboard shall incorporate soft touch keys and a retractable cord of not less than 2 m in extended length.~~

~~.11 Mouse:~~

~~.1 Optical mouse with USB 2.0 interface.~~

~~.12 Operating System:~~

~~.1 Most current version of available windows based operating system.~~

~~.4 Main Memory:~~

~~.1 As recommended by system manufacture, with a minimum requirement of at least 16gb with the ability for further memory expansion..~~

~~.5 Network Interface Card:~~

~~.1 10/100/1000 Mbps Ethernet Fast Ethernet Controller, IEEE Compliance - 802.3, 802.3u, 802.3x, 802.3z, Compatible with Cat 6 cabling.~~

~~.6 Provide an audible annunciator capability to signal alarm activation to the operator. It shall be possible for the operator to vary the level of the annunciator but not to turn it completely "off". The minimum allowable setting shall be ten (10) dB.~~

~~.7 Provide the capability and program the system to annunciate different alarm signals for the various alarm types.~~

~~.8 Invalid entries by the operator shall be enunciated and displayed on the computer monitors with another altern~~

~~.9 Use appropriate common terms when displaying or printing text. The use of uncommon abbreviations is not acceptable.~~

~~.10 All Guard Room workstations shall be configured for dual 24" LCD 16:9 monitors.~~

~~.11 High Resolution Graphic:~~

~~.1 The system shall support a minimum of two hundred (200) user programmable color graphic map displays capable of showing the floor plan, location of alarm device, and alarm instructions. Floor plans shall be capable of being imported from other systems such as AutoCAD. All of the graphic maps are to be centralized in the system configuration and shall be displayed on the operator's workstations. Systems requiring separate display monitors or PC are not acceptable.~~

~~.3 Information Storage:~~

~~.1 All programmed information as well as transactional history shall be automatically stored onto the server hard disk for later retrieval. The system shall warn the operator when the disk space allocation approaches maximum capacity. The system shall allow the system administrator to determine at what percentage of capacity the warnings shall be issued. The system shall further allow the system administrator to define the frequency at which the warnings shall be issued.~~

~~.4~~.2 Rack Mounting:

.1 All equipment to be located within termination equipment cabinets shall be rack mounted.

~~.5~~.3 Equipment Cabinets:

.1 See Section 28 05 00 - Security System Structured Cabling Requirements.

~~.6 KVM:~~

.1 See Section 28 05 00 Security System Structured Cabling Requirements.

.7 Information Backup/Retrieval:

.1 The system server(s) shall be capable of transferring all programmed data and transactional history to an appropriate archive storage media. All programmed data shall be restorable from the back-up media in case of system hardware failure.

.8 Communication Rates:

.1 The system shall be capable of supporting 10/100/1000Mbps communication to all access control panels and 10/100/1000Mbps ethernet communications rates to client workstations.

.9 Printers:

.1 The system server shall support report printers. The report printers shall be network printers connected to the Security local area network.

.10 Communication Ports:

.1 Network Ports:

.1 The system server shall support the use of ethernet networks as the communications path between the server and DPU's, and other systems for the purpose of integration. This communications path shall be over the same network used for communications between the system server and the operator workstations. The communications between the system server and the field devices shall be encapsulated in a TCP/IP network/transport layer.

.2 Port Name:

.1 Each communications port shall be addressed with the system by a unique name.

.3 Port Description:

.1 The system server shall provide the ability to add a communication port description to each port configuration. There shall be no limit to the amount of text that can be used to describe the communications port.

.4 On-line/Off-line:

.1 The system server shall allow the operator to put a communications port on-line or off-line. If the communications port is placed off-line, the system server shall not use the port to communicate to field devise configured on that port. If the communications port is put on-line, the system server shall use the port to communicate to field devices configured on that port.

.5 Communication Failure:

.1 If the communications port is on a network device, such as a terminal server, the system server shall indicate if there is a loss of communications to that network address. All field units connected to

that network address should also be reported as being in communications failure.

.2 To allow for network delays, the system server shall allow the system administrator to define a wait time before annunciation of a communications failure.

.3 The system server shall provide the administrator the ability to set a reconnect retry period. This is the time period the system shall wait before attempting to re-establish communications with a network port which is in communications failure.

.4 Configuration of the remote communications port characteristics, i.e. baud rate, parity, error-checking etc. shall be done either on the network device or through network management tools. The configuration is not required to be executed by the central management system.

.5 IP address:

.1 For communications ports on a network device, the system server shall allow the operator to define the IP address of the device, as well as the local port address, to which the remote field devices are connected.

.11 Encryption:

.1 It shall be possible to configure a system such that the communications between the system server and the DPU is encrypted.

.12 RAID:

.1 The system shall support a RAID that provide high performance and fault tolerance. The RAID array shall appear to the system server as a single storage unit or as multiple logical units.

.2 RAID 1: The system server shall support the use of RAID level 1. RAID level 1 provides complete data redundancy.

.13 Redundancy:

.1 Through the use of third-party software and associated hardware, the system server shall support a second system server for redundant capability. During normal operation, data shall be written to either server and shall be mirrored to its counterpart in a bi-directional mirroring process.

.2 If a failure is detected, it shall be verified across both the network and the mirrored data links. When the failure has been verified, the surviving server shall assume the functions and identities of the failed server without having to sacrifice its own identities or functions. Applications originally running on the failed server are restarted on the surviving server.

2.5 Software

.1 DPU:

.1 General:

.1 The DPU serves as the data collection and communications interface between the host and the various field devices such as card readers, alarm inputs and control outputs. Communication between the server and the DPU shall be asynchronous. The unit shall consist of a separate general controller module and one or more access control modules.

.2 The software services are a set of common functions and applications that shall be installed on every DPU to perform system configuration, generic system event handling and communications between the DPU and system server or other DPUs.

.3 The DPU shall provide for configuration, status and event reporting.

.4 An ACS selectively allows certain people to enter an area. The DPU shall allow access to identified individuals, shall control entry by time, and shall record entries. The DPU shall also allow a server to control access or allow an access cycle to be controlled by a request-to-exit input.

.5 The DPU shall perform door and elevator access control. The primary difference between door and elevator is as follows:

.1 For a door, the DPU shall operate a single DLR to unlock the door to allow access.

.2 For an elevator, the DPU operates multiple relays, (usually one (1) per floor) to enable elevator buttons. When pressed, these buttons instruct the elevator to move to a particular floor where access is then allowed.

.3 The DPU shall use a door switch monitor to determine door use, while elevator access control may use floor selection inputs to give feedback about which floor was accessed. There are also differences between door and elevator clearance records. Door clearances contain information about the days and times that a cardholder is allowed to access a specific door, while elevator clearances include additional information about the floors that may be accessed from a particular elevator.

.2 Communication Services:

.1 A set of communications services shall be provided to facilitate communication between the system server and DPU, as well as between DPUs. The service shall also allow configuration of communication ports and shall handle all data encryption and communication protocol specifics.

.2 Communications:

.1 The ACS shall be designed to support advanced distributed network architecture, whereas DPU's do not need to be home-run wired back to the system database server. Controllers shall be wired at any point on the LAN via industry

standard TCP/IP communication protocol. DPUs shall be able to communicate back with the system database server through industry standard network switches and routers and shall not be required to reside on the same subnet. Any activity or event within the network can be routed to any client workstation(s) on the network, regardless of the Controller that manages the activity. The system server shall manage any message routing issues, thus isolating the subsystem applications from network-specific communication details.

.2 The DPU to system server communication shall include authentication IPSEC & 3DES on LAN communication encryption that conform to industry-accepted standards.

.3 Upon losing and then restoring communications between a DPU and the system server, database synchronization between the system server and the local database in each controller shall be fast and efficient. Every change made to the controller database shall establish a time/date stamp for the change. When communications are restored, database synchronization shall occur immediately and without system operator intervention. The time-date stamp shall be compared with any changes in the system database, hardware configuration, events, or output control commands and the system server shall log which changes occurred after the off-line event. Any changes made to the system server database while the DPU was off-line shall also be simultaneously downloaded to all DPU databases in the system.

.4 Communication between the system server and the DPU shall be asynchronous. The DPU shall not require any poll messages between the system server and the DPU. Messages shall only be transmitted when required and messages can be initiated by any DPU or by the system server. The DPU shall transmit a network heartbeat to the system server to satisfy UL requirements.

.3 Protocols:

.1 Multiple communication techniques may be utilized between the system server and DPU. Communication from controller to controller is via TCP/IP ethernet only.

.4 The DPUs shall support Static IP addresses.

.5 The DPU shall have RS232 and Ethernet (RJ-45) ports on-board and shall not require external devices to connect to the network.

.3 Common System Services:

.1 Common system services shall include a system watchdog, event handling services, time management services, software update services, database backup services and diagnostic services.

.2 The system shall constantly monitor all internal processes and if it detects a problem, it shall reboot the DPU. The DPU shall also reboot automatically if the system software fails to strobe it.

.3 Software Update Service:

.1 The system software shall provide the ability to update the flashed software remotely from a host. Two (2) images of the software shall always be stored, a permanent bootable image and an update image. If the update image becomes corrupt the DPU can fall back to the original image and inform the host to re-send the update image. This feature allows the DPU software to be easily upgraded to add new features or download patches.

.4 Database Backup to Flash:

.1 In the event of an unexpected power-loss, the system software shall automatically save the system and application databases by copying them to the Flash SIMM and restoring them to RAM when power is restored.

.4 Event Handling Services:

.1 The system software shall provide a service that shall serve as a clearinghouse for all activities generated on a DPU. The system server shall upload a list of action definitions and a list of events to each controller. Based on this information, the system shall perform the actions specified for each activity as it is reported. The system software shall provide an interface for reporting activities.

.2 Event Linking:

.1 Event linking on the system shall tie an activity on one (1) DPU to the triggering of an action on the same or a different DPU. Any conflict of event link requests shall be resolved in the system by means of a server-assigned priority for each event link.

.5 Action Scheduling:

.1 The system software shall provide an action scheduling service that shall execute actions on devices residing on the same or other DPUs at a predefined time, frequency, and time interval. The action definitions shall be the same server-defined actions utilized by event linking. The actions and the action schedule shall be defined by a server and shall be downloaded to the appropriate DPUs. The system shall allow a server to manually invoke a predefined action.

.6 Offline / Online Reporting:

.1 The system shall provide a mechanism to report activities to a server for display, reporting and archiving. If a server is not currently connected to the cluster of DPUs, the activity reports shall be buffered until the server connects to the DPU. Should the server-configured,

activity buffer limit be exceeded before a server connects, the first in first out rule shall apply.

.7 Time Management Services:

.1 The system shall provide a service to manage user-defined time periods, called time specifications. These time specifications shall be defined on the server and downloaded to all DPUs. The time management services shall also ensure that all controllers have a synchronized time clock. All time periods downloaded shall be defined according to GMT by the host.

.8 Input / Output Services:

.1 The system software shall allow the configuration and control of inputs and outputs. The software shall allow the retrieving of the current status of the inputs and shall log changes in input and output status. The software shall allow the control of the output including setting the current state to activated, deactivated or momentarily activated.

.2 Inputs monitored may include, but not limited to:

.1 Cabinet tamper, power fail input, and low battery input.

.3 Input configuration controls the behaviour of the input and includes the following parameters:

.1 Enabled/Disabled:

.1 A disabled input is not monitored.

.2 Reversed:

.1 Whether the input should be treated as reversed:

.1 Alert report as secure, secure report as alert.

.4 The DPU shall allow the configuration of input events. These events shall include activation outside a specified time specification causes event.

.5 Output configuration controls the behaviour of the output and includes the following parameters:

.1 Enabled/Disabled:

.1 Whether the output is enabled or disabled. Disabled outputs do not react to any output control requests.

.2 Reversed:

.1 Whether the output is reversed. At the lowest level of control, a reversed output shall have an activate request changed to deactivate and deactivate changed to activate.

.9 Diagnostic Services:

.1 The DPU shall provide real-time status and diagnostic information to system installers, trouble-shooters and tech support personnel. Based

on this information, a user should be able to determine the connection status, memory status, time and general condition of the controller. Predefined diagnostic tests may be executed, and the results of these tests presented to the user. The following minimal information should be available:

.1 Controller time/boot time

.2 Total/available memory

.3 Connection status

.4 Firmware and operating system versions

.5 Total and available memory (RAM)

.6 Current time information

.7 Controller type

.2 The DPU shall provide diagnostic services through either a diagnostic web server, through an RS-232 port supplied by the DPU, and HMI on the controller or any other reasonable method.

.10 Access Control Services:

.1 Door Access Control:

.1 The system server shall allow the DPU to handle door configuration and control.

.2 Panel Wide Door and Reader Configuration:

.1 If card readers include keypads used for PINs, the server may configure the number of digits required in the PIN as well as any other functionality on a panel-wide basis.

.3 Door Configuration:

.1 The door configuration defines the behaviour of a door and includes the following parameters:

.1 Inbound and Outbound Access Readers(s):

.1 Which readers are monitored at this door.

.2 DSM:

.1 A switch that changes state when the door is opened or closed. The switch, if enabled, connects to a monitored input. If the DSM input becomes active while not shunted, it shall generate a door forced open alarm.

.3 Door Shunt Time:

.1 How long the DSM should be shunted after the door is opened for access. The configuration may also indicate whether the DSM should remain shunted for the full shunt time, instead of clearing when the door

closes. If the DSM remains active after the shunt time expires, it shall generate a door held open event.

.4 RTE Input:

.1 An input whose activation triggers an access cycle that allows egress through a door. The RTE input should be placed on the protected side of the door. The configuration may indicate whether the DSM should be shunted as long as the RTE is active, and whether the DLR should be enabled for and RTE access.

.5 DLR:

.1 The output which controls the locking device for the door.

.6 Door Unlock Time:

.1 The length of time that the DLR is energized during a valid access cycle. The DLR is normally energized for a valid access, and de-energized as soon as the door opens, but a Re-lock Delay may cause the DLR to be energized for a number of seconds after the door opens. Access grant decisions based on presented cards, RTE access based on RTE input activation, and host requests for momentary unlock of the door all cause the DPU to perform a valid access cycle at the door.

.7 Continuous Active Mode:

.1 A door may be configured for continuous active mode or non-continuous active mode. In non-continuous active mode, each side of the door shall process only one (1) card or RTE access cycle at a time – from the time the card is read or the RTE activates, until the door is opened and closed for the access. During this access cycle, all other cars and RTE requests shall be ignored. In continuous active mode, cards and RTE requests may be processed at any time during the access cycle.

.8 ADA Output:

.1 An output may be configured to activate at one (1) second after the door is unlocked for valid access, for a duration of one (1) second when the door is being accessed by cardholders with an ADA flag in their personal record.

.9 Expanded Shunt Time:

.1 For certain cardholders, a longer shunt time may also be configured.

~~.4 Door Control:~~

~~.1 The DPU shall allow door control from a host. The door mode may be set to lock, unlocked momentarily unlocked, or access disabled modes. A momentary unlock request shall start a valid access cycle process on the door.~~

~~.5 Door Status Reporting:~~

~~.1 The DPU shall report door alarm status changes including door held open and door forced open.~~

~~.6 Door Event Configuration:~~

~~.1 The DPU shall allow the configuration of events that are activated by certain door event.~~

~~.7 Door Groups:~~

~~.1 The DPU shall allow the configuration of door groups by a server. Door groups may then be used in roles, or to group doors into specific access roles.~~

~~.8 Reader Configuration:~~

~~.1 The DPU shall allow reader configuration from a server. The reader configuration defines the behaviour specific to a reader on a door and includes the following parameters:~~

~~.2 Default PIN Mode:~~

~~.1 If a card reader includes a keypad, it may be configured to require the cardholder to enter a PIN, in addition to presenting a card, to gain access at a door. A time specification may be entered to control this mode on a time basis.~~

~~.3 Card Formats:~~

~~.1 The card formats supported at this reader.~~

~~.4 Entry Through PIN Pads:~~

~~.1 For card readers with PIN pads, they may be configured to allow the users to enter their pre-programmed pin number through the PIN pads instead of by presenting a card.~~

~~.5 Command Entry Through PIN Pads:~~

~~.1 Card readers with PIN pads, may be configured to allow the user to enter additional command sequences through the PIN pads during the card transaction process.~~

~~.9 Reader Events:~~

~~.1 The DPU shall allow the configuration of events that are activated by certain reader events:~~

~~.1 Reader communication failure causes event~~

~~.2 Reader tamper causes event~~

~~.10 Interface to Reader Hardware:~~

~~.1 The DPU shall communicate with reader-bus modules to receive card swipe, and to set the reader LED's and display to communicate access control results to cardholders.~~

~~.2 The DPU shall support the user of inputs and outputs on the reader-bus modules and on the DPU expansion card for use as door switch monitors, door latch relays, request to exit inputs and any other access control related purposes.~~

~~.11 Card Formats:~~

~~.1 The DPU shall allow the configuration of card format records describing data that may be read by the card readers. This includes whether the data read from the card is binary (typically from a Wiegand or proximity reader) or BCD (typically from a magnetic card reader), and the length and position of the card number, issue code, any facility or site codes, or parity bits in the data. The API shall allow for specification of which formats are valid at each card reader.~~

~~.12 APB and Area Related Features:~~

~~.1 The APB feature prevents cardholders from gaining access at a reader and then passing cards back through the door for other people to use. The ACS accomplishes this by keeping track of the area the cardholder is in. If a cardholder attempts to gain access to an area that he/she already occupies, then the ACS assumes that the cardholder passed the card back for another to use and access shall be denied.~~

~~.2 The APB feature also includes tests for tailgating. The tailgate rule prevents cardholders without using their own access cards. When the ACS receives a receives a request from a cardholder to enter a new area, it checks which are the cardholder last entered. If the area the cardholder is exiting differs from the area the system last recorded the cardholder as entering, the system assumes the cardholder exited the latter area by following someone out.~~

~~.3 APB and tailgating are tested for any access that leads to or from an area that is configured for APB.~~

~~.4 The system does not change the recorded area that the cardholder is in until it knows that the cardholder has actually passed through a door. If the door does not have a DSM input or some other means of determining entry, or if the door is open, the system shall record the area change as soon as the admit decision is made. For the case of a door configured as continuously active, where multiple cards may be presented~~

before the door is opened; all valid cards shall be recorded as entering into the area when the door finally opens.

.5 The single-threaded APB role prevents a cardholder from presenting a card at a door and after being admitted, but before opening the door, passes the card to someone else that presents it at an adjacent door and is admitted there. If the system grants access to a cardholder and, before the door is open, detects the same card presented at a second door, the system shall deny the cardholder access at the second door (APB violation), unless all the doors at which the card is presented are configured not to test for any form of APB. The exception to this rule is that if the readers on a particular door are not configured to lead in and out of any area at all, then that door shall not check for single-threaded APB nor shall accesses at that door affect other doors testing for single-threaded APB.

.6 Doors whose readers are not configured as part of any area shall not participate in any APB testing, and accesses at that door shall not cause the cardholders location to change, and these accesses shall not be recorded as part of the accesses recorded for timed APB testing. Normally these would be interior doors inside a controlled area.

.7 Timed APB:

.1 A simpler form of APB, known as timed APB, may be configured for a door. Timed APB is useful for locations where other types of APB are not possible. If the system records that a cardholder uses a card to enter an area more than once in a specified time period, the system assumes that a second person used the same card after the original cardholder entered the area. Timed APB is tested for each access that leads into an area configured for times APB. Due to memory constraints, it is not possible to record every access that a cardholder may make within the re-entry time, but the system shall record the last three (3) accesses entered and test against those to determine if the cardholder's card is being used to re-enter the area.

.8 APB Grace Flag:

.1 The APB grace flag is an indicator set in a personnel record that allows the cardholder to gain access at a door without being tested for any form of APB. When the cardholder goes through the door, the grace flag is cleared. An API shall be supplied to allow a single or all personnel records to be graced.

.9 Area Events:

.1 The DPU shall provide an API to allow the configuration of events that are activated by certain area events. These include:

.1 Entrance:

.1 This is activated when a cardholder with an AP Event flag is the personnel record triggers an APB violation while entering the area.

.2 Exit:

.1 This is activated when a cardholder with an AP Event flag in the personnel record triggers an APB violation while exiting the area.

.13 Input Services:

.1 The DPU shall allow the configuration and control of inputs connected to reader-bus modules and inputs connected to the DPU and any logical input that may be maintained by the DPU.

.2 Inputs monitored may include:

.1 The inputs directly connected to the DPU.

.2 The cabinet tamper and power fail inputs.

.3 The inputs connected to readers.

.4 The inputs connected to input boards.

.5 The tamper inputs on the reader, the input boards, and the output boards.

.3 Logical inputs monitored may include:

.1 The on-line/off-line condition of any of the reader-bus modules.

.2 Door force open and door held open on a door.

.3 Input Definition

.4 The DPU shall allow the configuration of inputs. Input configuration controls the behaviour of the input and includes the following parameters:

.1 Enabled/Disabled:

.1 A disabled input is not monitored.

.2 Armed/Disarmed:

.1 A disarmed input may report secure (or supervision error, if supervised), and armed

~~input may report secure, alert, or supervision error.~~

~~.3 Reversed:~~

~~.1 Whether the input should be treated as reversed – alert report as secure, secure report as alert.~~

~~.5 Input Control:~~

~~.1 The DPU shall allow the control if inputs including arming/disarming the input.~~

~~.6 Input Status Reporting:~~

~~.1 The DPU shall allow the retrieving of the current status of inputs and shall log changes in input status.~~

~~.7 Input Event Configuration:~~

~~.1 The DPU shall allow the configuration of input events.~~

~~.8 Input Groups:~~

~~.1 The DPU shall allow the configuration of input groups. Input groups may be referenced by events.~~

~~.14 Output Services:~~

~~.1 The DPU shall allow the configuration and control of outputs connected to reader-bus modules and of outputs connected directly to the DPU.~~

~~.2 Output Definition:~~

~~.1 The DPU shall allow the configuration of outputs. Output configuration controls the behaviour of the output and includes the following parameters:~~

~~.1 Enabled/Disabled:~~

~~.1 Whether the output is enabled or disabled. Disabled outputs do not react to any output control requests.~~

~~.2 Reversed:~~

~~.1 Whether the output is reversed. As the lowest level of control, a reversed output shall have an activate request changed to deactivate and deactivate changed to activate.~~

~~.3 Output Control:~~

~~.1 The DPU shall allow the control of outputs, including setting the current state to activated, deactivated, or momentarily activated.~~

~~.4 Output Groups:~~

~~.1 The DPU shall allow the configuration of output groups. Output groups are useful for elevator definitions, events or other purposes.~~

~~.15 Personnel Database:~~

~~.1 The DPU shall provide a database to facilitate the storage of personnel data.~~

~~.2 In addition to the database manipulation functions described below, the DPU shall supply an API to apply APB grace to one (1) or many personnel records.~~

~~.3 Personnel records used for access control may include the following parameters:~~

~~.1 Card Number:~~

~~.1 The number embedded in the access card or otherwise associated with the access request.~~

~~.2 Control Flags:~~

~~.1 Such as whether this cardholder may need the ADA output for accesses, or whether the card is currently disabled. These flags include ADA, lost, noticed, AP Event, expired, and disabled.~~

~~.3 Issue Code~~

~~.4 PIN~~

~~.5 Activation/Deactivation Date:~~

~~.1 Cardholder records typically contain field for an activation and a deactivation date which specify the date/time when the access card becomes valid and invalid, respectively. By setting the activation date, the card can be issued in advance of use; the deactivation date ensures that the card cannot be used after a certain time. The activation date may also be set to after the deactivation date to disable the card for a period of time.~~

~~.4 Clearance Database:~~

~~.1 The DPU shall provide a database to facilitate the storage of regular and elevator clearance data. Clearances describe the locations and times at which an access card is valid. Because people often share the same access privileges, clearances are created separately from personnel records. Clearance records~~

include a varying number of time specification and door group pairs.

.2 Central Management System Server

.1 General:

.1 Provide a comprehensive Central Management System solution which shall integrate the ACS with VSS, and ICS all communicating across the converged network.

.2 Provide such a central management system and the associated single GUI for managing the above noted systems within one environment, eliminating the need for a number of separate control systems.

.2 Software Capacities:

.1 System software and language development software shall be existing, industry accepted, and of a type widely used in commercial systems. Operating system shall be multi-user/multi-tasking capable of operating in a non-proprietary machine. The application software, substantially as offered, shall be written in a high level, industry standard programming language. The system shall be modular in nature, allowing the system capacities to be easily expanded without requiring major changes to the system operation and maintaining all defined system data as well as historical information.

.2 All system functions shall be accessible via point and click mouse control. Systems requiring command string control or complex syntax are not acceptable.

.3 The system software shall include the following features and be configured for minimum:

.1 One Thousand (1000) readers,

.2 Fifty thousand (50,000) active card holder records,

.3 Nine hundred and ninety-nine (999) client PC's definable on server,

.4 supporting at least two (2) simultaneous printers,

.5 One hundred and twenty-eight (128) time schedules,

.6 Two fifty-six (256) programmable holidays,

.7 Five thousand (5000) input points,

.8 Five thousand (5000) output points,

.9 Audible alarm annunciation at operator workstation,

.10 Two hundred (200) graphic maps to be displayed on the operator workstation monitor,

.11 Remote diagnostics, monitoring and user capabilities.

.12 Event scheduling,

~~.13 An unlimited number of user defined card holder data fields,~~

~~.14 An unlimited number of door groups.~~

~~.15 An unlimited number of areas~~

~~.16 Card holder access privilege activation date and time,~~

~~.17 Clearance activation/expiration date and time~~

~~.18 Interface with ICS~~

~~.19 Interface with Video Surveillance system~~

~~.4~~

~~.1 DPU communications through hardwired, and Ethernet network.~~

~~.5 Open Database Connectivity~~

~~.6 Language Localization~~

~~.7 Hardware Definitions~~

~~.8 Time Specifications:~~

~~.1 Holidays:~~

~~.1 The system software shall allow a maximum of two fifty-six (256) holidays and an unlimited amount of holidays per controller. The system shall support up to twenty-four (24) holiday-lists system wide.~~

~~.2 Setup:~~

~~.1 The system software shall have the capacity for a minimum of one hundred and twenty-eight (128) user programmable time specifications. Each time specification shall be comprised of a minimum of eighteen (18) individual time segments.~~

~~.3 Assignment:~~

~~.1 The system shall allow a time specification to be assigned to:~~

~~.1 Access control clearance~~

~~.2 Inputs/outputs~~

~~.3 Doors~~

~~.4 Scheduled functions~~

~~.5 Alarm events~~

~~.9 Events:~~

~~.1 Event names~~

~~.2 System usage~~

.3 Event priority

.4 Configuration

.10 Action list:

.1 The system shall allow an event to be configured to cause other system actions to occur.

.11 Time Control:

.1 It shall be possible to control via a user defined time schedule the period during which an event shall be armed and therefore capable of being activated by other system actions.

.12 Graphic Map Display:

.1 The system shall provide for a graphic map display to be linked to an event. This graphic map shall be available to the system operator to display when responding to the event activation. Graphical maps shall be centralized in the network on a shared disk and be available for display on all operator workstations.

.13 Automatic Graphic Map Display:

.1 The system shall provide automatic display of a graphic map linked to an event. This graphic map shall be available to the system operator to display when responding to the event activation. At the monitoring station, when an event is configured to automatically display a map, a map shall pop up each time the event is activated. The map shall disappear when the event is acknowledged. Graphical maps shall be centralized in the network on a shared disk and be available for display on all operator workstations.

.14 Alarm Configuration:

.1 the system by a unique user defined according to a common naming convention. The use of code numbers or mnemonics shall not be accepted.

.2 Alarm description:

.1 The system shall provide the ability to add a description text to each alarm point definition to a maximum of one-hundred-and-thirty-two 132 characters.

.3 Alarm point configuration:

.1 The system shall accept as an alarm input:

.1 Supervised alarm inputs, unsupervised alarm inputs and dedicated alarm points such as tamper alarms and controller AC power failure.

.4 Additional alerts. The system shall also generate alerts for the following:

.1 Enclosure tampering

.2 Controller communication loss

.3 Reader tampering

.4 Reader communication loss

.5 Alarm tampering (supervised)

.6 AC power loss

.7 Low battery

.5 Alarm supervision:

.1 When using supervised alarm points, the system shall monitor for open circuit, short circuit, in addition to normal/abnormal conditions.

.15 Card Record Definitions:

.1 Personnel records:

.1 Personnel record shall be constructed to contain multiple pages of personnel data in system and user defined fields. card record import\export

.2 The system software shall provide means for bulk loading and bulk editing of card records through the use of a data file generated from another source. The external file shall be an ASCII file in comma delimited format.

.3 The system shall also provide the ability to generate the same format file of existing card records, allowing the information in the system to be exported to other computers and application. The system shall allow the user to select the card records that shall be included in the export file.

.16 Global APB

.1 Global APB allows multiple DPU clusters to share APB information. Global APB is built on top of cluster APB. Members always ask their Master for the APB decision.

.2 The DPU global APB support: current APB location, time of last access, grace state, timed APB, and Area Lockout.

.17 Reporting:

.1 Reporting shall provide for the de-normalization and export of journal data to an external reporting database.

.2 Crystal Reports shall be used as the reporting engine to provide pre-defined reports. The end user may use any ODBC-compliant third-party data analysis tool. Examples of these tools are Excel, Crystal Reports, Actuate, and Access.

.3 The schema of the new reporting database shall be designed with the primary goals of ease of searching, analyzing, and reporting. Compression of data and optimization of real-time performance shall be secondary goals for this database. Indexing of the database shall be designed to achieve the reporting performance goals.

.4 The user shall be able to customize the filtering of data exported to the reporting database. This shall be implemented by using a monitoring privilege and partition to define the filter, allowing filtering based on message type, object, and person. This can be used to help in minimizing the size of the new database.

.18 Data Storage:

.1 All programmed and transactional history is automatically stored to the hard disk for later recall. Information written to the hard disk shall be immediately available for report generation.

.19 System Function:

.1 The system software shall be able to generate reports without affecting real-time operation of the system.

.20 Report Types:

.1 Programmed data reports shall be available for the following information:

.1 Database configuration

.2 Historical activity

.21 Database Configuration Reports:

.1 The system shall be capable of producing reports of database configuration information. These database configuration reports shall include the following:

.1 Hardware configuration

.2 System Configuration

.3 Group Reporting

.22 Activity Reports:

.1 Activity reports shall be available for the following:

.1 Select the personnel for report

.2 Select personnel group for report

.3 Select message type for report

.4 Select security items for report

.23 Audit Log Reports:

~~.1 Audit trail reports shall be available for the following based on all users or selected users:~~

~~.2 Audit trail creations~~

~~.3 Audit trail deletions~~

~~.4 Audit trail modifications~~

~~.24 Audit Trail:~~

~~.1 The system shall provide an audit trail function that is intended to record all permanent changes in data configured by system operators. The audit trail shall record permanent changes made to the configuration database by manual operator data entry, import/export or other system controlled devices, such as portable data entry devices. Temporary changes, such as running a report, and querying the card holder database need not be recorded by the audit trail function. Changes made to the system database, outside of the central management system application, such as using ODBC tools, do not need to be recorded by the audit trail function.~~

PART 3 - EXECUTION

3.1 Installation

.1 Install products in accordance with product manufacturer's written instructions for type and use.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 Provide all components to tie into existing intrusion detection system control panels and associated equipment, power supply, cabling, connectors, enclosures, and all other hardware and software to provide a fully operational system.

.2 The work covered by this section includes the furnishing, installation, and activation of all equipment & materials associated with complete intrusion detection systems as specified herein. This work may include, integration with the associated subsystems and components listed in these sections.

.3 The requirements of the conditions of the Contract, Supplementary Conditions, and General requirements apply to the work specified in this section.

1.2 Submittals

.1 Action Submittals:

.1 Product data sheets.

.2 Shop drawings.

.3 Product schedules.

1.3 References

.1 Systems specified in this Section shall meet or exceed the requirements of the following:

.1 Underwriters Laboratories (UL):

.1 UL 365 – Police Station Connected Burglar Alarm Units and Systems

.2 UL 609 – Local Burglar Alarm Units and Systems

.3 UL 1076 – Proprietary Burglar Alarm Units and Systems

.4 UL 1610 – Central Station Burglar-Alarm Units

1.4 Quality Assurance

.1 Manufacturers Qualifications:

.1 All products shall be sourced from a single manufacturer to ensure an end-to-end solution is provided.

.2 Where product model is specified and are deemed discontinued by the product manufacturer, provide the latest manufacturer recommend product model at the time of installation in leu of the specified model.

.2 Product Qualifications

.1 Commercial-grade, high quality, and rated for the environment in which it is being installed.

.2 All products and materials must be new and approved in the pre-installation submittals.

.3 Where product performance specifications are provided, provide the latest manufacturer product model at the time of installation.

1.5 System Requirements

.1 General:

.1 Provide all intrusion detection system control panels and associated equipment, power supply, cabling, connectors, enclosures, and all other hardware and software to ~~provide~~ tie into an ~~fully~~existing operational system.

.2 These "performance" specifications are to be translated into specific equipment and systems depicting proposed products.

.3 The Intrusion Detection system shall be an interconnected group of components.

.4 All components shall be good quality commercial grade consisting of the following devices:

.1 Controllers and associated enclosures

.2 Communicators and associated enclosures

.3 Peripheral devices, Sensors, and accessories

.4 Keypads

.5 Power supplies

.5 Where the Intrusion Detection system is integrated with an access control system the Intrusion Detection system shall provide the ability to arm or disarm intrusion zones from outside the protected area.

.1 Readers assigned to an armed intrusion zone shall deny access to cardholders unless the intrusion zone is disarmed.

.2 Readers assigned to an intrusion zone shall flash LED indicators on the reader to annunciate the intrusion zone status.

.3 Cards shall be authorized as to which intrusion zones they can arm and disarm.

.4 Users of the system shall enter keypad information to tell the system to arm or disarm and then they shall present their card

.5 If the user is authorized to arm zone, and they have active access right for the reader, then the intrusion zone shall be armed and any readers associated with the intrusion zone (other than the arm/disarm reader) shall be placed offline, any inputs associated with the intrusion zone shall be monitored on. An output shall be able to be generated based on the arm event. A history record shall be generated for this event.

.6 A configurable time delay before arming a zone shall exist allowing the user to leave the monitored area before the zone is armed.

.7 If the user is authorized to disarm the intrusion zone, and they have active access right for the reader, then the intrusion zone shall be disarmed and all readers associated with the intrusion zone shall return to normal operation, any inputs associated with the intrusion zone shall be monitored off. An output shall be able to be generated

based on the disarm event. A history record shall be generated for this event.

.8 If the user is not authorized to disarm the intrusion zone, but the user has an active access right for the reader, then access shall be denied, and a history record shall be generated.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers:

.1 DSC

.2 Or approved equal

2.2 Controllers

.1 Controller:

.1 Minimum 16 zones on main control panel

.2 Supports minimum 16 hardwired keypads

.3 Expandable up to minimum 128 zones using hardwire, wireless modules, and addressable zones

.4 Bus hardwired expansion

.5 Minimum 8 partitions

.6 Minimum 1,500 user codes (4 or 6 digits)

.7 Minimum 3,000-event buffer

.8 Minimum 9 accounts and 3 phone numbers

.9 Minimum 1 supervised bell zone

.10 Built-in telephone line and siren supervision

.11 Auto SIA and Contact ID formats

.12 Supports multiple types of alarm communicators

.13 Full upload/download support with system download software

.14 Complete with power supply modules as required Controller

.15 Complete with zone expanders as required

.16 Approval Listings: FCC/IC, UL/ULC

.2 Modules:

.1 Programmable Input Module

.2 Programmable Output Module

.3 Wireless Telephone Interface & Automation Control Module: As required

.4 TC/IP Integration Module IT: As required

2.3 Controller Enclosures

.1 All controller enclosures shall be provided to house all controllers.

.2 All controller enclosures shall be a single key locking metal box.

.3 Size as required

.4 Equipped with door tamper switch. Connect each door tamper switch to the intrusion detection system.

.5 The quantity and size of controller enclosures shall not exceed the real estate provided for mounting controller enclosures. Refer to contract drawings and coordinate as such.

2.4 Communicators

.1 Internet/Intranet Alarm Communicator: as required

.2 GSM/GPRS Wireless Alarm Communicator: as required

.3 Internet and GSM/GPRS Dual-path Alarm Communicator: as required

.4 Provide communicators as required

2.5 Peripheral Devices, and Sensors

.1 Magnetic Contacts (Steel)

.1 1" dia. contact for use in steel doors.

.2 Flush or surface mount as required

.3 Self-lock mounting

.4 Rugged Construction

.2 Magnetic Contacts (Wood)

.1 1" dia. contact for use in wood doors.

.2 Flush or surface mount as required

.3 "Wings" protect contact reed from being crushed from swelling wood

.4 Superior false alarm immunity

~~.3 Magnetic Contacts (Overhead Door)~~

~~.1 Miniature and low-profile design~~

~~.2 Stainless steel armored cable for added security and reliability~~

~~.3 Aluminum bar stock to resist corrosion in harsh environments~~

~~.4 Floor or track mount as required.~~

~~.4~~.3 Passive Infrared Motion Detector

.1 Motion detectors shall be masked or oriented to minimize the likelihood of nuisance alarms caused by environmental conditions.

.2 All devices shall be wired point to point and to the nearest controller interface.

.3 A centralized power supply shall be utilized to power motion detectors.

.4 PIR sensitivity adjustment

.5 Adjustable detection range as required

.6 Form ‘A’ or ‘C’ alarm contact and tamper switch

.7 Pet immunity

.8 Tamper-proof

.9 Ceiling or walls mount as required.

.10 Colour: White

~~.5~~.4 Power Supply:

.1 Power supplies shall include all controller power supplies, all-electric lock power supplies, and all peripheral device power supplies.

.2 All power supplies for controllers and peripheral devices shall provide a backup battery for up to three hours of operation upon loss of AC power. The controller shall retain database information for up to seven days upon loss of power.

.3 Agency Listings

.1 UL Listed for Access Control Systems (UL294),

.2 Power Supplies for use with Burglar-Alarm Systems ULC-S318

.3 Hospital Signaling and Nurse Call Equipment (UL1069),

.4 Power Supplies for Fire Protective Signaling Systems (UL1481),

.5 CUL Listed - CSA Standard C22.2 NO. 205-12, Signal Equipment.

.4 Features/Specifications

.1 Voltage: output as required.

.2 Amperage: Rating as required.

.3 Class 2 Rated power limited outputs.

.4 PTC (Positive Temperature Coefficient) protected outputs.

.5 Fuse rating as required

.6 115VAC 60Hz, input.

.7 Filtered and electronically regulated outputs.

.8 Short circuit and thermal overload protection.

.9 Built-in charger for sealed lead acid or gel-type battery backup.

.10 Zero voltage drop upon transfer to battery backup.

.11 AC input and DC output LED indicators.

.12 AC fail supervision.

.13 Low battery and battery presence supervision.

.14 Fire alarm system interface

PART 3 - EXECUTION

3.1 Installation

.1 Install products in accordance with product manufacturer's written instructions for type, use and general industry standards, to suit specific applications.

.2 Install the wiring system and integrate the system as indicated in this specification.

.3 All equipment shall be wall-mounted with sufficient clearance to meet all applicable codes and facilitate observation and testing. All equipment shall be securely fastened with appropriate fittings to ensure positive grounding and be free of ground loops.

3.2 Field Quality Control

.1 All equipment shall be installed in accordance with the equipment manufacturers' requirements and recommendations.

.2 Testing And Commissioning:

.1 Verify installation of all intrusion detection devices including motion detectors, door/window contacts, glass break sensors, control panels, keypads, and panic buttons in accordance with approved drawings and specifications.

.2 Perform functional testing of each intrusion detection device to confirm proper operation. This includes walk tests for motion detectors, open/close tests for magnetic contacts, and simulator tests for glass break sensors.

.3 Test system integration with access control and monitoring systems to ensure intrusion events trigger appropriate responses such as lockdowns, alerts, and event logging.

.4 Verify alarm signal transmission to the central monitoring station or control software, ensuring all zones and devices report correctly and are logged with accurate timestamps.

.5 Test system response under various scenarios including unauthorized entry, tamper conditions, and panic activation to confirm proper alarm activation and notification.

.6 For any device or zone that fails testing, diagnose the issue, perform corrective actions, and retest to confirm compliance. Document all corrective actions and include final passing results in the test documentation.

.7 Verify power supply and battery backup functionality under simulated power failure conditions to ensure uninterrupted operation of the intrusion detection system.

.8 Provide test reports in both hard copy and soft copy formats (PDF and native software files) as part of the As-built documentation and close-out package.

.9 Include manufacturer warranty certification for all intrusion detection system components within the close-out package.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 This document defines the VSS and subsystem components to include field devices, termination hardware, supporting hardware, and miscellany required to ~~provide~~ tie into an existing complete VSS including but not limited to equipment, labour, supervision, tooling, and miscellaneous mounting hardware and consumables to install a complete system.

.2 Design, procure, install, integrate, test, maintain, and demonstrate a fully functional system which is fully integrated with existing VSS.

1.2 References

.1 BS EN 60529, Degrees of protection provided by enclosures (IP Code).

.2 BS EN 62262, Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code).

.3 ANSI/NEMA 250, Enclosures for Electrical Equipment (1,000 Volts Maximum)

.4 IEEE 802.1X, Port-Based Network Access Control

.5 IEEE 802.3, IEEE Standard for Ethernet

.6 IEC/EN 60825-1, Safety of laser products

1.3 Submittal

.1 Submit the finalized Design Data for review to owner's Representative in AutoCAD or PDF editable format prior to any work being done.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers for VMS:

.1 Avigilon Unity Video

.2 Or approved equivalent

2.2 Acceptable Manufacturers for Cameras:

.1 Avigilon – Motorola Solutions

.2 Or approved equivalent

2.3 Design and Performance Requirement

.1 System Requirement:

.1 The system shall be an extension of an existing IP based, non-proprietary, redundant, enterprise solution supporting IP and IP megapixel camera technologies. ~~The system shall be a complete solution that is scalable from the existing scope of this project to several thousand cameras which can be added on a unit-by-unit basis. This future expansion capacity shall not require significant replacement or upgrading of hardware or equipment provided as part of the initial solution.~~

.2 All system testing shall follow the testing, commissioning and acceptance process outlined in Section 28 05 00 Common Work Results for Electronic Safety and Security.

.3 Provide detailed wiring diagrams. Finalize the wiring diagrams to meet any site-specific conditions and provide a fully functional system. See Section 28 05 00 Common Work Results for Electronic Safety and Security.

.4 Provide and include all costs as a part of their solution for a Specialty Engineer to be present at all testing and commissioning of the system. Provide the Specialty Engineer access to all points of the installation. Provide all test and access equipment required for the inspection.

.2 System Description:

.1 The VSS shall consist of field and termination equipment necessary to provide a fully automated system.

.2 The VSS shall be designed on a distributed processing architecture employing remote cameras and operator workstations connected to a redundant central server and storage solution.

.3 Connect all security cameras to centrally located network switches located in communications rooms.

.4 The system shall be configured to a maximum of 75% of its device and recording capacity.

.5 The field device to Telecom Room allocation shall be identified by contractor. Ensure that such allocations do not cause cable lengths to exceed a distance of ninety (90) meters. In the case of exterior remote locations fibre optic connectivity shall be employed.

.6 Location of additional video surveillance cameras shall be based on operational requirements of the Facility and subject to review by owner.

.7 All cameras shall be placed and provided in sufficient configurations and quantities to obtain the level of detail required in the output specifications.

~~.8 The VSS shall provide all integrated functionality as described in the drawings and this specification. This includes integration with the Access Control, Intercom and ICAT Systems. All integration shall be based on IP protocols and included as part of the standard product offering by the system supplier.~~

~~.9~~.8 All video streams from cameras shall be digitally encoded using H.264 or latest compatible compression formats for simultaneous monitoring and recording in real time.

~~.10~~.9 Each camera's bit rate, frame rate and resolution shall be set independently from other cameras in the system and altering these settings shall not affect the recording and display settings of other cameras.

~~.11 The system shall not require proprietary recording hardware, hardware multiplexers or time-division technology for video recording and monitoring.~~

~~.12 The system client and server applications shall be based on a true open architecture that shall allow for use of non-proprietary PC storage hardware~~

~~that shall not limit the storage capacity and shall allow for incremental upgrades of recording capacity.~~

~~.13 The system client and server applications shall support a minimum of thirty (30) simultaneous use VSS keyboards where each keyboard can operate the entire set of cameras throughout the system, including cameras of various suppliers' brands.~~

~~.14 The system shall digitally sign recorded video by way of watermarking to prevent image tampering and to confirm image integrity.~~

~~.15 The system server and client software applications shall be able to operate on separate networks.~~

~~.16 The system shall have the capability of simultaneous live viewing and recording of individual cameras at different frame rates and resolutions.~~

~~.17 Full "Fail Over" server redundancy is a mandatory requirement of this specification. It is intended that all system configuration and user authentication parameters be contained on a minimum of two (2) fully redundant mirrored system servers with real time replication be supplied and installed separately in MCR and ACR. In no case shall both servers be installed in the same room.~~

~~.18 The VSS shall incorporate SMART diagnostics that monitor the internal operation of a drive (including external storage drives) and provide early warning notification to guard room operators for many types of potential problems. This shall allow for the drive to be repaired or replaced before any data is lost or damaged.~~

~~.19 The VSS shall utilize a redundant centralized storage topology. All video system storage shall be located in the Main IT Room.~~

~~.20 The VSS shall allow authorized users to save video to a standard recordable DVD. The option to include the player software on the DVD shall be available so that no additional software needs to be purchased.~~

~~.21 The VMS shall incorporate full programming and prioritized control between users and PTZ domes.~~

.3 Monitoring Locations:

.1 System monitoring shall be as defined in the drawings and specifications.

~~.2 System monitoring shall also be provided via web browser accessible from any workstation on the converged network. Access shall require a valid user ID and password.~~

~~.3 The system shall be capable of operating even in the event that the system management server is unavailable.~~

~~.4 Following a power failure and the restoration of main or backup power, the VSS shall revert automatically, within 3.5 minutes, to normal service status without the need for operator intervention. The system shall restart in the same state as existed before the power interruption with no loss of functionality or transaction data.~~

.4 Communications Rooms:

.1 Provide cable troughs, conduit, and emergency power circuits for equipment configurations. Cable troughs shall be grounded to earth ground.

.2 All video termination equipment with the possible exception of non-PoE camera power supplies shall be rack mounted in equipment cabinets.

.3 Keep all video equipment clean and free of dust at all times during the instillation.

.5 Power:

.1 All Source 120VAC power for security equipment shall be Emergency power with UPS backup.

.2 Provide lockable, hinged covered, terminal cabinets for all power supplies, transformers, and power distribution terminal strips. Provide all conduit and wiring from the 120 VAC facilities to the terminal cabinets.

.3 Provide protection against surges, spikes, noise, and other line problems for all system equipment and their components. In addition to generator support, all power sources shall be equipped with uninterrupted power supply capable of supporting all attached equipment for a period of sixty (60) minutes.

.4 All equipment and system components which are powered by more than 48 volts AC or DC shall be ULC listed for safety. This includes equipment or system components classified as non-power limited.

.5 All video system power supplies shall have battery backup and shall be monitored, by the ACS, for line failure on a dedicated monitoring input point. Therefore, when an AC line fails, a unique alarm condition shall be caused.

.6 Network:

.1 Ensure all IP addressing schemes used on the converged network are coordinated and Reviewed by owner.

.7 Interface with Other Systems:

.1 ACS: Refer to Section 28 05 00 Common Work Results for Electronic Safety and Security along with Div 27 specifications.

~~.2 SIS: Refer to Section 28 05 00 Common Work Results for Electronic Safety and Security along with Div 27 specifications.~~

~~.3~~.2 DPAS: Refer to Section 28 05 00 Common Work Results for Electronic Safety and Security along with Div 27 specifications.

.8 Building Wires:

.1 Be fully responsible for the ultimate design and implementation of the system topology (physical and logical) best suited for the project, given identified and recognized physical infrastructure and constraints.

2.4 Field Devices

.1 Interior Fixed Dome Network Camera (Type – 01):

.1 For indoor public/ front of house applications.

.2 Be capable of being powered via POE and connected via an RJ-45 connector.

.3 Image sensor progressive RGB CMOS sensor.

.4 Fixed IRIS lens 2.8mm.

.5 Light sensitivity performance at minimum 0.5 lx (color) and light transfer capability F2 maximum.

.6 HDTV performance 1080P, 2MP resolution.

.7 Designed for quick and flexible installations. Wall, ceiling, or pendant mounts.

.8 Vandal resistant, IP42 water and dust resistant. IK08 impact resistant.

.9 Operating temperature: 0°C to 45°C.

.10 Multiple video streaming and controllable frame rate and band width.

.11 Image rotation 0°, 90°, 180°, 270°including Corridor format for vertically oriented video streams for areas such as corridors, hallways, etc.

.12 Enable for image setting: compression, color, brightness, sharpness, contrast, white balance, exposure control, wide dynamic range, text and image overlay, mirroring of images, and privacy mask.

.13 Enable installation of intelligent video application such as people counting, and enable installation for third party applications.

.14 IP address filtering, https encryption with password protection.

.15 Video motion detection and active tampering alarm.

.16 Minimum 512 MB RAM and 256 MB flash memory.

.2 Fisheye Lens Network Camera (Type – 02):

.1 For corridor intersection.

.2 Shall be powered by the Security LAN POE or POE+ and connected via an RJ-45 connector. Power Supply Equipment (PSE) is required, subject to the camera meeting the maximum POE power requirements and the minimum ambient operating temperature requirements.

.3 Image sensor progressive RGB CMOS.

.4 Varifocal, remote focus and zoom, P-IRIS control, IR corrected lens 3.5-10mm.

.5 Sensitivity performance at minimum 0.18 lx (color) 0.04 lx (black and white) and light transfer capability F1.7 maximum.

.6 Fixed dome with HDTV performance 1080P, 5MP resolution.

.7 Multiple video streaming and controllable frame rate and band width.

.8 Enable for image setting: compression, color, brightness, sharpness, contrast, white balance, exposure control, exposure zones, forensic WDR, text and image overlay, mirroring of images, privacy mask, and fine tuning of low light behavior.

.9 Image rotation 0°, 90°, 180°, 270° including Corridor format.

.10 IP address filtering, https encryption with password protection.

.11 Video motion detection and active tampering alarm. Enable installation of digital auto tracking, and third party application.

.12 Vandal and IK10 impact resistant. Weather-proof has IP66 and Nema 4X rating.

.13 Operate within the temperature range of -40°C to +55°C in a temperature controlled enclosure. Provide ventilation and/or heating elements either integral or within camera housing to achieve operational temperature.

.14 Minimum 1 GB Ram and 512 MB flash memory.

2.5 Display And Control Equipment

~~.1 Central Management Servers:~~

~~.1 The computer hardware described in this section shall be used to run the central management system server software used for storage of the VSS. This equipment as well as operator workstation PC will be supplied by owner. contractor shall submit requirements for management server and workstation PCs to owner to ensure suitability with system supplier's functional requirements and so they can be procured and deployed in alignment with contractor's schedule.~~

~~.2 Specifications for these servers shall be in compliance with the software developers recommended requirements for all software applications that are installed on the system. Servers provided shall match at minimum the Supplier's minimum recommended specifications at time of procurement, in addition to the minimums noted below.~~

~~.3 Operating System:~~

~~.1 Microsoft Windows Enterprise Server (latest version) or approved equivalent.~~

~~.4 Database:~~

~~.1 SQL Server (latest version) or approved equivalent.~~

~~.5 Hard Disk Drive:~~

~~.1 Hot swappable, 250 GB or more. It shall be possible to expand this capacity by upgrading the fixed disk or through additional disk drives.~~

~~.6 Redundancy:~~

~~.1 Minimum of RAID 1 (operating system), RAID 5 (storage array).~~

~~.7 Accelerated video card~~

~~.8 Dual Network Interface Card:~~

~~.1 10/100/1000 Mbps Ethernet Fast Ethernet Controller, IEEE Compliance - 802.3, 802.3u, 802.3x, 802.3z, Compatible with Cat 6 cabling.~~

~~.9 DVD:~~

~~.1 DVD+/-RW drive~~

~~.2 Keyboard Controller~~

~~.1 The control unit joystick shall include integral camera zoom lens control, allowing one hand operation.~~

~~.2 The controller shall provide, but not be limited to, selection of the following remote camera site functions:~~

~~.1 Joystick control of pan/tilt/zoom~~

~~.2 Focus, and iris lens control~~

~~.3 Auto pan, auto tour~~

~~.4 Selection of up to ninety-nine (99) pre-positioned scenes per camera.~~

~~.3 Mechanical Specifications~~

~~.1 Controls:~~

~~.1 Momentary push buttons.~~

~~.2 Pan/tilt/zoom joystick.~~

~~.3 Control unit shall be supplied as a desktop model.~~

~~.2 Operating Temperature: 0°C - +40°C.~~

~~.3 Humidity: 10 to 80% relative, non-condensing~~

~~.3 Video System Storage~~

~~.1 Supply, install, and configure network storage devices.~~

~~.2 Recorders and associated storage shall be deployed to data center rooms only. Include all current software, firmware and licenses.~~

~~.3 The storage system shall support storage of video images from cameras that terminate in remote communications room plus spare capacity and event storage capacity as required in specifications.~~

~~.1 Shall support recording parameters as such:~~

~~.1 The Video Surveillance system including the Video Surveillance system server and network video recorders shall be sized, equipped to record all video streams from all Video Surveillance cameras continuously at:~~

~~.2 Frames Per Second: 20~~

~~.3 Resolution: 4MP~~

~~.4 Compression: H.264 or H.265 (Good Quality)~~

~~.5 Recording: 100%, 24 hours per day 7 days per week~~

~~.6 Retention Days: 31~~

~~.7 Image Complexity: 50 - Average~~

~~.8 Motion %: 50 - Medium~~

~~.9 Spare capacity: 30%~~

.2 Support record and playback of H.264 video streams to all monitoring locations from any or all cameras simultaneously.

.3 Be IP attached via 10GBaseT PoE+ Ethernet using commonly available networking configurations and equipment.

.4 Conform to and be deployable in industry standard 19" rack configurations. Mounting of equipment on shelves is not acceptable.

.5 Storage system shall support high availability with no single point of failure causing loss of data or interrupting access to data:

.1 Protect data for up to three (3) simultaneous disk failures with no loss of data or loss of access to data.

.2 Protect against loss of a storage appliance or controller with no loss of data or loss of access to data.

.3 Protect against loss of a networking path between servers and storage, including network interface card, cables and switches, with the ability to dynamically reroute IO activity to an alternate network path.

.6 Support dynamic replacement of hardware components without interrupting access to data:

.1 Support the ability to replace disk drives without the need to interrupt data access.

.2 Provide redundant power supplies to support the ability to replace power supplies without the need to interrupt data access.

.3 Support the ability to replace fan modules without the need to interrupt data access.

.4 Support the ability to replace entire appliances without the need to interrupt data access.

.5 Support the ability to replace network switches without the need to interrupt data access.

.7 Support dynamic management features to insure continuous data access:

.1 Be expandable by the addition of disk capacity without the need to interrupt data access.

.2 Be expandable by the addition of processing capacity without the need to interrupt data access.

.3 Be expandable by the addition of network bandwidth without the need to interrupt data access.

.8 Be scalable in capacity to four (4) petabytes.

.9 Provide capacity and performance usage statistics.

.10 Allow dynamic configuration of volumes.

.11 Provide administrator security controls.

.12 Detect controller and drive failures and shall export and annunciate / notify the monitoring locations defined in the OS, via the ACS client application. The system shall also provide a local audible alarm.

.4 Include SNMP management support.

.4.1 Rack Mounting:

.1 All equipment to be located within termination equipment cabinets shall be rack mounted.

.2 Equipment to be security fastened in racks with supplier supplied or approved rails and mounting fasteners.

.5 Information Backup/Retrieval:

.1 The system server(s) shall be capable of transferring all programmed data and transactional history to an appropriate archive storage media. All programmed data shall be restorable from the back-up media in case of system hardware failure.

.6 Communication Rates:

.1 The system shall be capable of supporting 1GB Ethernet communications rates to client workstations.

.7 Printers:

.1 The system server shall support report printers. The report printers shall be network printers connected to the Security local area network.

.8 Communication Ports:

.1 Network Ports:

.1 The system server shall support the use of Ethernet networks as the communications path between the server and end devices, and other systems for the purpose of integration. This communications path shall be the same network used for communications between the system server and the operator workstations. The communications between the system server and the field devices shall be encapsulated in a TCP/IP network/transport layer.

.2 Port Name:

.1 Each communications port shall be addressed with the system by a unique name.

.3 Port Description:

.1 The system server shall provide the ability to add a communication port description to each port configuration. There shall be no limit to the amount of text that can be used to describe the communications port.

.4 On-line/Off-line:

.1 The system server shall allow the operator to put a communications port on-line or off-line. If the communications port is placed off-line, the system server shall not use the port to communicate to field devise configured on

that port. If the communications port is put on-line, the system server shall use the port to communicate to field devices configured on that port.

.5 Communications Failure:

.1 If the communications port is on a network device, such as a terminal server, the system server shall indicate if there is a loss of communications to that network address. All field units connected to that network address should also be reported as being in communications failure.

.2 To allow for network delays, the system server shall allow the system administrator to define a wait time before annunciation of a communications failure.

.3 The system server shall provide the administrator the ability to set a reconnect retry period. This is the time period the system shall wait before attempting to re-establish communications with a network port which is in communications failure.

.4 Configuration of the remote communications port characteristics, i.e. baud rate, parity, error-checking etc. shall be done either on the network device or through network management tools. The configuration is not required to be executed by the central management system.

.5 IP Address:

.1 For communications ports on a network device, the system server shall allow the operator to define the IP address of the device, as well as the local port address, to which the remote field devices are connected.

.9 RAID

.1 The system shall support a RAID that provide high performance and fault tolerance. The RAID array shall appear to the System Server as a single storage unit or as multiple logical units.

.2 RAID 5:

.1 The System Server shall support the use of RAID level 5. RAID level 5 provides complete data redundancy.

.10 Redundancy

.1 Through the use of third party software and associated hardware, the system server shall support a second system server for redundant capability. During normal operation, data shall be written to either server and shall be mirrored to its counterpart in a bi-directional mirroring process.

.2 If a failure is detected, it shall be verified across both the network and the mirrored data links through the ESB. When the failure has been verified, the surviving server shall assume the functions and identities of the failed server without having to sacrifice its own identities or functions. Applications originally running on the failed server are restarted on the surviving server.

.3 Shall send alerts via SMS or email.

~~2.6 Technical Requirements – Software~~

~~.1 General~~

~~.1 Provide all required hardware and software required to allow for complete system installation and in compliance with the scope outlined in the specifications and drawings.~~

~~.2 Supply the most recent version of software that supports full integration and functionality as described in the specifications and drawings.~~

~~.3 The System shall be an IP based solution which shall include the following functions:~~

~~.1 Live viewing~~

~~.2 Recording & playback~~

~~.3 Support of system integration as defined in the PSOS.~~

~~.4 Interactive maps~~

~~.5 Centralized administration~~

~~.1 Device discovery~~

~~.2 User groups~~

~~.3 Multiple administrator users~~

~~.4 System diagnostics~~

~~.4 Virtual Matrix:~~

~~.1 Enable CCTV keyboard control similar to matrix switcher.~~

~~.5 Analytics tools such as:~~

~~.1 Video motion detection~~

~~.2 Directional video motion detection~~

~~.3 Abandoned object detection~~

~~.4 Virtual tripwire~~

~~.5 Shape-based detection~~

~~.6 Theft detection~~

~~.6 Remote Video Management:~~

~~.1 The system shall work with a single remote software program that enables video management from a remote computer.~~

~~.7 Password Protection:~~

~~.1 To limit user access to the system, password log-on protection for up to sixty-four (64) users shall be provided. To increase user flexibility or restriction, eight (8) programmable levels of priority shall be provided for each user's password.~~

~~.8 On-screen Monitor Display:~~

.1 Each system output shall be configured to provide on-screen display of site number and title, video input number and title, time, date, camera and monitor status.

.2 The monitor display shall show the keyboard number or user number in situations where a higher priority keyboard or user has control of a camera or has locked a camera.

.9 Time Synchronization:

.1 Synchronize all video system devices to IP ethernet NTP for integration with other network devices.

.10 Communication Ports:

.1 The system shall be configured to provide external connection to computers, printers, alarm interface units, recorder interface units, and additional system control keyboards.

.11 Macros:

.1 Program and configure macro commands per keyboard as required.

.12 Alarms:

.1 The matrix switcher/controller shall be configured to provide e-mail messaging of specific alarms and diagnostic alarms when activated.

.13 Activity Logging:

.1 The system shall have activity logging and reporting to an IP network PC used for setup and file storage.

.14 Provide all programming and configuration of tours, salvos and camera patterns as required by owner during User Group Meetings.

.15 Recorder Control:

.1 The system shall provide for remote management to directly control important video management system functions such as play, stop, pause, record, rewind, and fast-forward.

.2 Server Applications:

.1 Windows Server latest version, or as specified by VMS manufacturer.

.2 All compatible necessary hardware/software drivers

.3 RAID management and diagnostics

.4 DVDRW/CDRW management software for video and data back-ups.

.5 Lightweight antivirus software ideal for storage intensive servers

.3 VMS:

.1 The VMS shall have the capability of viewing live and recorded video of all field cameras from all sites simultaneously.

.2 As a minimum the VMS shall be capable of quick analysis of thousands of recordings using events triggering, video motion detection, time, date and

camera search criteria, saving valuable incident search time and the ability to playback recordings from remote sites without interrupting current recordings.

.3 NVR recordings shall have the ability to be accessed simultaneously locally or remotely using the VMS client software by any number of users. It shall be possible to assign user rights and privileges to each user to restrict access to authorized users.

.4 NVR management and configuration shall be performed using a client application that forms part of the digital VMS.

.5 NVR recorded video shall not have the ability to be altered, ensuring the audit trail is intact for evidential purposes. Recordings exported from the system shall be protected by a watermark and a digital signature.

.6 VMS shall work with other 3rd party IP components, e.g., cameras, monitors, keyboards and PTZ units. The system shall enable users to control PTZ cameras when viewing live video. In addition, administrators can have the capability of configuring custom commands and pre-sets for each PTZ camera and also set user priorities and privileges by preventing other users from controlling it.

.7 PTZ cameras shall be controlled by using an external joystick, or directly in the video pane from the VMS using a mouse. The camera to be easily panned and tilted in different directions at variable speeds by simply moving the mouse and zoomed by clicking.

.8 The VMS operator shall have the ability select any of the encoded camera video streams, live or recorded and manually link to a display monitor.

.9 The VMS shall support motion detect, binary and video loss alarms and to also trigger relays and send IP triggers when an alarm occurs.

.10 The ability to playback simultaneously recordings from a minimum of eight (8) cameras.

.11 The VMS Shall come equipped with an interactive facility and site mapping graphical user interface to allow for all site locations including camera and alarm positions accurately plotted.

.12 The client monitoring application shall allow level access control per user to every camera.

.13 Several users shall have the ability to simultaneously view, manage and record across the network from any point on the network.

.14 The video management system software shall provide the ability to cut video streams from remote client workstation at any time.

.4 VMS Client Application:

.1 The VMS client application shall consist of but not be limited to the following tasks:

.1 Live camera viewing,

.2 Live PTZ control

.3 NVR playback

.4 Alarm event processing,

.5 Device configuration,

.6 System administration,

.7 Video and event archiving,

.8 Mapping

.9 Event reporting.

.2 The client application shall perform all the necessary standard monitoring functions simultaneously without interfering with any of the system server operations

.3 The client application shall support any form of IP network connectivity, including LAN, WAN, VPN, Internet, and WLAN technologies.

.4 All client applications shall support IP Multicast and Unicast (UDP) video streaming.

.5 Client application shall provide an authentication mechanism, which verifies the validity of the user.

.6 Each workstation shall be able to use a CCTV keyboard controller or PC keyboard/mouse that can control the entire set of cameras throughout the system, even if the system consists of motorized cameras produced by different Suppliers.

.7 The client applications shall allow for multiple instances to run simultaneously, by one or multiple users on separate workstations.

.8 The client applications shall provide administrators with the ability to block video streams to lower-level users.

.9 The client application graphical user interface shall include the following tasks and functions:

.10 Live Viewing:

.1 Display live video from any encoded camera on the workstation video panes.

.2 Display live video from any encoded camera on external monitors.

.3 Capability to view a set of cameras in succession.

.4 Perform camera to monitor call up, PTZ, focus, edit and enable pre-sets and perform customized actions using internal or external keyboard controller.

.5 Record live video and take snapshots of images.

.6 Performance

.7 The live viewer shall allow live viewing of video streams.

.8 Multiple users shall be able to view the same camera sequence simultaneously; users are able to pause the sequence without affecting other viewers.

.9 Shall enable live monitoring of one (1) to sixteen (16) video streams simultaneously on a single monitor and one (1) to thirty-two (32) video streams simultaneously on a dual monitor.

.10 Shall display all cameras, monitors and camera sequences in the system.

.11 Shall allow operators to control including pause, play, skip forwards, and skip backwards camera sequences.

.12 Shall have the option to perform drag and drop functions to an external monitor (decoder) or workstation to view a camera.

.13 The operator shall be able to control camera pan-tilt-zoom, iris, focus, call pre-sets and configure integrated PTZ dome features by using an external or internal application keyboard controller.

.14 Each operator shall be assigned a PTZ priority to allow a prioritization between operators on who has control over a camera.

.15 Users shall be able to take snapshots of live video feeds in the live viewer and be able to save or print the snapshots.

.16 Users shall be able to control PTZ functions with a CCTV style joystick using the workstation.

.17 Shall have the ability to view minimum of sixteen (16) simultaneous live video streams from the DVMS client application in two (2) windows using dual head monitors. Live and recorded video to be viewed at the same time.

.18 The operator shall be able to start/stop recording on any camera in the system.

.19 The video management system software shall provide the ability for guard room operators to stop video streams from displaying on a specific or group of remote client workstation at any time via an operator initiated command. Should the selected client workstation(s) be viewing the video stream at the time a guard room operator activates this feature, the remote client workstation(s) shall stop displaying the selected video stream, and automatically change the display to a black screen.

.11 NVR Playback and Video Event Archiving:

.1 Search through past recorded footage.

.2 Playback recordings.

.3 Save snapshots and recordings to file as evidence on workstation and export to DVD.

.4 View thumbnails of a fixed number of images, distributed at equal intervals across the current range of the timeline.

.5 Export and protect recordings

~~.6 Find motion in sections of recorded footage.~~

~~.7 View a thumbnail image of each time that the motion profile in the current timeline range exceeds the threshold.~~

~~.8 Shall allow for multiple recording schedules to be assigned to a single camera. Each schedule shall have the capability to vary parameters such as, video quality, recording mode and time and date settings.~~

~~.9 The NVR shall have the ability to dynamically change recording quality settings on alarm and events.~~

~~.10 The NVR shall keep a log and compile statistics on disk space usage.~~

~~.11 The NVR shall have the capacity to schedule backups of the video archives, with associated database events to an appropriate device.~~

~~.12 The NVR shall keep log of the system events for maintenance purposes.~~

~~.13 Shall support video playback of any time span.~~

~~.14 Shall enable operators to choose from a number of possible camera display patterns ranging from one (1) tile to sixteen (16) tiles patterns.~~

~~.15 Shall allow the operator to select between synchronous playbacks of all selected video streams.~~

~~.16 Shall allow the operator to simultaneously view the same camera in multiple tiles at different time intervals.~~

~~.17 Shall be able to query archived video from one or multiple archived video servers using various search criteria, including but not limited to, time, date, camera, site and past alarms.~~

~~.18 Shall allow operators to define an area of the video field in which to search for motion as well as define the amount of motion that shall trigger search results.~~

~~.19 Shall allow operators to validate if a digitally signed video sequence has been tampered with or not.~~

~~.20 Shall provide still image export to JPEG and BMP format with date and time stamp on the image.~~

~~.21 Shall provide tools to export video sequences in standard video formats, such as AVI and ASF.~~

~~.22 Shall provide tools to export video sequences and any required video player on DVD.~~

~~.23 Shall support playback of archived video to NTSC system monitors.~~

~~.12 Alarm Processing:~~

~~.1 View and acknowledge all alarms that have occurred on sites.~~

~~.2 Respond to alarms as specified by an administrator~~

~~.3 Play back recordings associated with alarms.~~

~~.4 View live video of the scene where an alarm has occurred.~~

.5 View a thumbnail image for each alarm in the current timeline range.

.6 Display a map of the site where an alarm has occurred

.7 The VMS shall receive all incoming events (motion detection, IP trigger) in the system and take appropriate actions based on user-defined event/action relationships.

.8 The VMS shall receive and log all alarm events and system generated events.

.9 The VMS shall have the capability to automatically execute any necessary actions in response to generated events.

.10 The VMS shall use an event and timestamp database for advanced search of video archives.

.11 The VMS shall provide the functionality of storing of video streams based on triggering events such as, digital motion detection, digital input activation or on a schedule.

.12 Each entry in a sequence shall have the capacity to trigger camera pre-sets, patterns or auxiliaries.

.13 The client application shall have advanced alarm management, which shall have the ability to assign alarms and procedures to specific users or user.

.13 Mapping:

.1 Client application shall support Mapping functionality, where digital maps are used to represent the physical location of cameras, alarms, NVR's and other devices throughout the entire system.

.2 Operators shall have the ability to double click on a camera map link to display live video to be displayed on the workstation on the first available monitor.

.3 Maps to automatically display alarm activity of a particular site.

.4 Administrators shall have the ability to create the following:

.1 Creating multiple maps of sites and linking sub maps to sites.

.2 Adding and modifying Alarm sources to maps

.3 Adding and modifying cameras to maps, including editable field of view illustrations

.4 Dual workstation display capabilities

.5 System administration

.14 Provide as part of their solution all associated cost for the supply, install, configuration, and coordination of the quantity of client licenses and workstations required by OS.

.15 Black Screen:

~~.1 For monitoring of video at the primary monitoring location defined in the OS, the system shall be configured as a black screen system such that incoming alarms shall be displayed on a block (group) of monitors with which they are associated. The first incoming alarm is displayed on the first (lowest numbered) monitor of the block. The second alarm is displayed on the next lowest numbered monitor of the block, and so on. When all monitors in a given block are displaying alarm video signals, all subsequent alarms shall be placed in sequence and shall cycle continuously until each is cleared. Each alarm shall be displayed for a pre-programmed dwell time before it is succeeded by the next received alarm. When the last alarm on a given monitor within a group is cleared, a black screen shall automatically appear indicating there are no further alarms to be displayed.~~

~~.2 During alarm response, the system shall provide programming for automatic call-up of a camera pre-set and provide on-screen text indicating the occurrence of an alarm.~~

PART 3 - EXECUTION

3.1 Installation

.1 Install products in accordance with product manufacturer's written instructions for type and use.

END OF SECTION

PART 1 - GENERAL

1.1 Section Includes

.1 The Duress Panic Alarm System (DPAS) including but not limited to field devices, termination hardware, supporting hardware, and miscellany required to provide a DPAS. Provide including but not limited to equipment, labour, supervision, tooling, and miscellaneous mounting hardware and consumables to install a complete system.

.2 All system testing shall follow the testing, commissioning and acceptance process outlined in Section 28 05 00 Common Work Results for Electronic Safety and Security.

.3 Provide and include all costs as a part of this proposal for a Manufacturer's Engineer to be present at all testing and commissioning of the system. Provide the Specialty Engineer access to all points of the installation. Contractor to provide all test and access equipment required for the inspection.

.4 The (DPAS) shall consist of duress alarm stations that are electronically monitored. Each duress alarm station shall consist of but not be limited to an alarm initiator siren and strobe light.

1.2 Submittals

.1 Submit the finalized Design Data for Review to Owner in PDF and CAD editable format prior to any work being done in accordance with Project Agreement.

1.3 System Requirements

.1 The (DPAS) shall consist of duress alarm stations that are electronically monitored. Each duress alarm station shall consist of but not be limited to an alarm initiator siren and strobe light.

.2 The (DPAS) shall facilitate instant locating of an activated duress alarm station. The location of the activated duress alarm station shall be displayed on a computer monitor via a "pop-up" graphical map.

.3 The (DPAS) management software shall provide real-time monitoring, command, and control in a unified system.

.4 The system shall integrate into access control, video surveillance, and other building systems.

.5 Supports user-definable, rule-based events and alarms, (triggerable by location and status), for automating and enhancing monitoring plus response processes.

PART 2 - PRODUCTS

2.1 Design and Performance Requirements

.1 Contractor shall be fully responsible for the ultimate design and implementation of the system topology (physical and logical) best suited for the project, given identified and recognized physical infrastructure and constraints.

.2 The system shall be an IP based, non-proprietary, redundant, enterprise solution. The system shall be a complete solution that is scalable from the existing scope of this project to at least two thousand locations across multiple facilities which can be added on a unit-by-unit basis. This future expansion capacity shall not require significant replacement or upgrading of hardware or equipment provided as part of the initial solution.

.3 The DPAS shall be installed such that no delay, distortion, or degradation of signal is experience on any sub or master station during normal operation of the system.

.4 The DPAS shall be fully integrated with the ACS and VSS as well as provide all integration as described. Supply and install all connectors, hardware, software, including hardware and software updates, and licenses to allow for the required functionality under this specification.

.5 System Description:

.1 The DPAS shall consist of field and termination equipment necessary to provide a fully automated system to control and monitor authorized traffic in and out of controlled areas of the facility.

.2 The DPAS shall be designed on a distributed processing architecture employing remote DGP's and operator stations connected to a redundant server / exchange solution.

.3 The field device to Telecommunication Room allocation shall be identified by Contractor Ensure that such allocations do not cause cable lengths to exceed a distance of ninety (90) meters. In the case of exterior remote locations fibre optic connectivity shall be employed.

.4 The areas that shall contain Emergency Call Stations include but are not limited to:

.1 Washrooms.

.5 Monitoring Locations:

.1 Security workstation(s)

.6 The DPAS shall include but not be limited to the following elements:

.1 Supply and install new devices including, but not limited to:

.1 Duress Panic Alarm System Stations (Mushroom button)

.7 Equipment shall not carry any logos or text which identifies the supplier or Contractor .

.8 Integration with Other Systems:

.1 ACS: Refer to Section 28 10 00 Access Control System and 28 05 00 Common Work for Safety and Security Systems

.2 VSS: Refer to Section 28 20 00 Video Surveillance System and Section 28 05 00 Common Work for Safety and Security Systems

.9 Power:

.1 Connect to the 120 VAC power and for providing CSA listed power supplies and transformers to distribute low voltage power to system components.

.2 All power supplies shall be hard wired into source 120VAC power. Plug in transformers are not acceptable.

.3 Provide lockable, hinged covered, terminal cabinets for all power supplies, transformers, and power distribution terminal strips. Provide all conduit and wiring from the 120 VAC facilities to the terminal cabinets.

.4 Provide protection against surges, spikes, noise, and other line problems for all system equipment and their components. In addition to generator support, all power sources shall be equipped with uninterrupted power supply capable of supporting all attached equipment for a period of sixty (60) minutes.

.5 All equipment and system components which are powered by more than 48 volts AC or DC shall be ULC listed for safety. This includes equipment or system components classified as non-power limited.

.6 All electrical components shall have a modular plug for easy service and replacement, and be equipped with a fuse for protection from transient voltage conditions.

2.2 Acceptable Manufacturers:

.1 Code Blue Corp.

.2 Aiphone

.3 Commend

.4 Talkaphone

.2 Or approved equal

.2 Mushroom Push button:

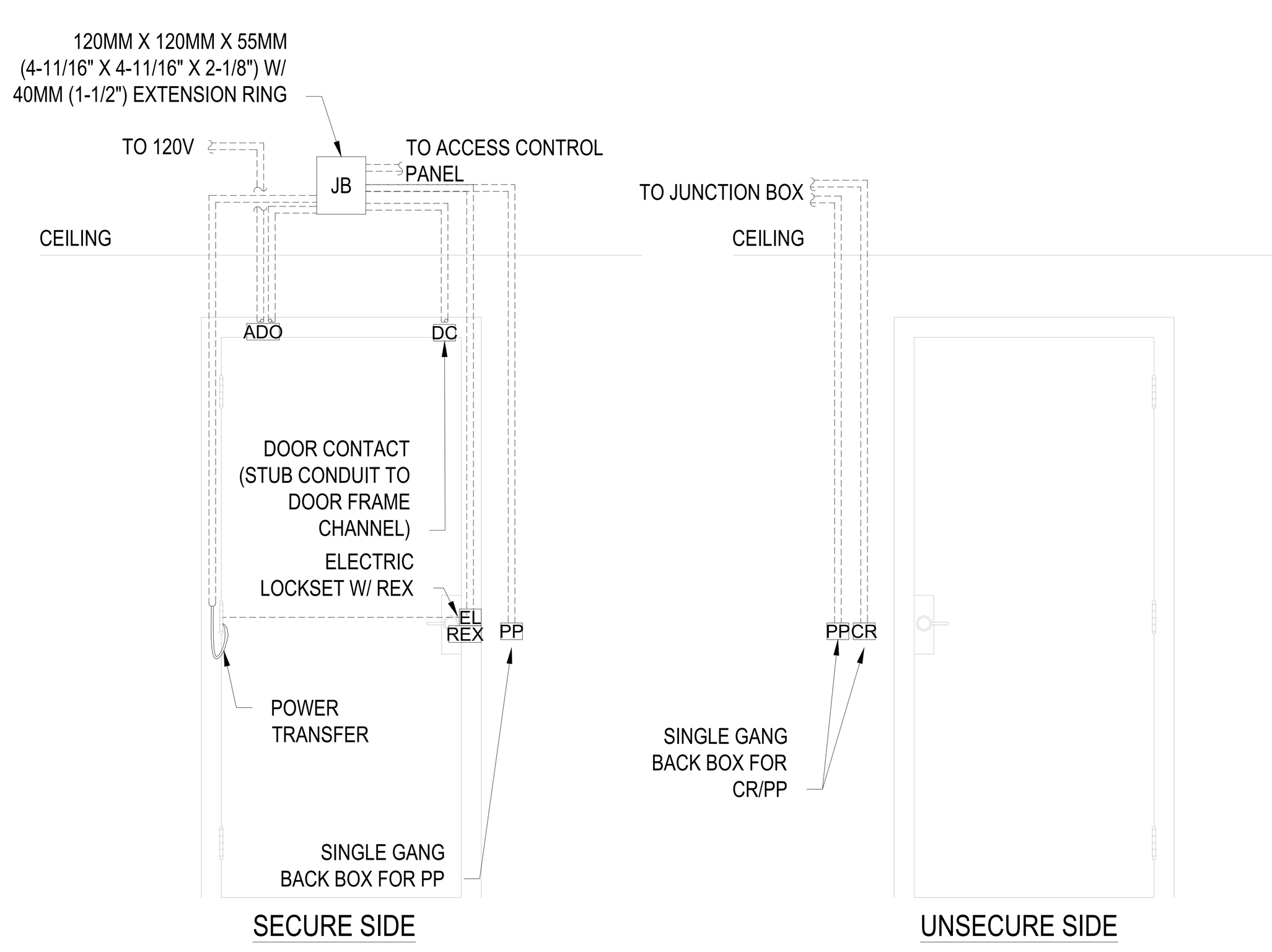
.1 SS2429EM-EN Stopper Station Push Button or approved equivalent.

PART 3 - EXECUTION

3.1 Installation

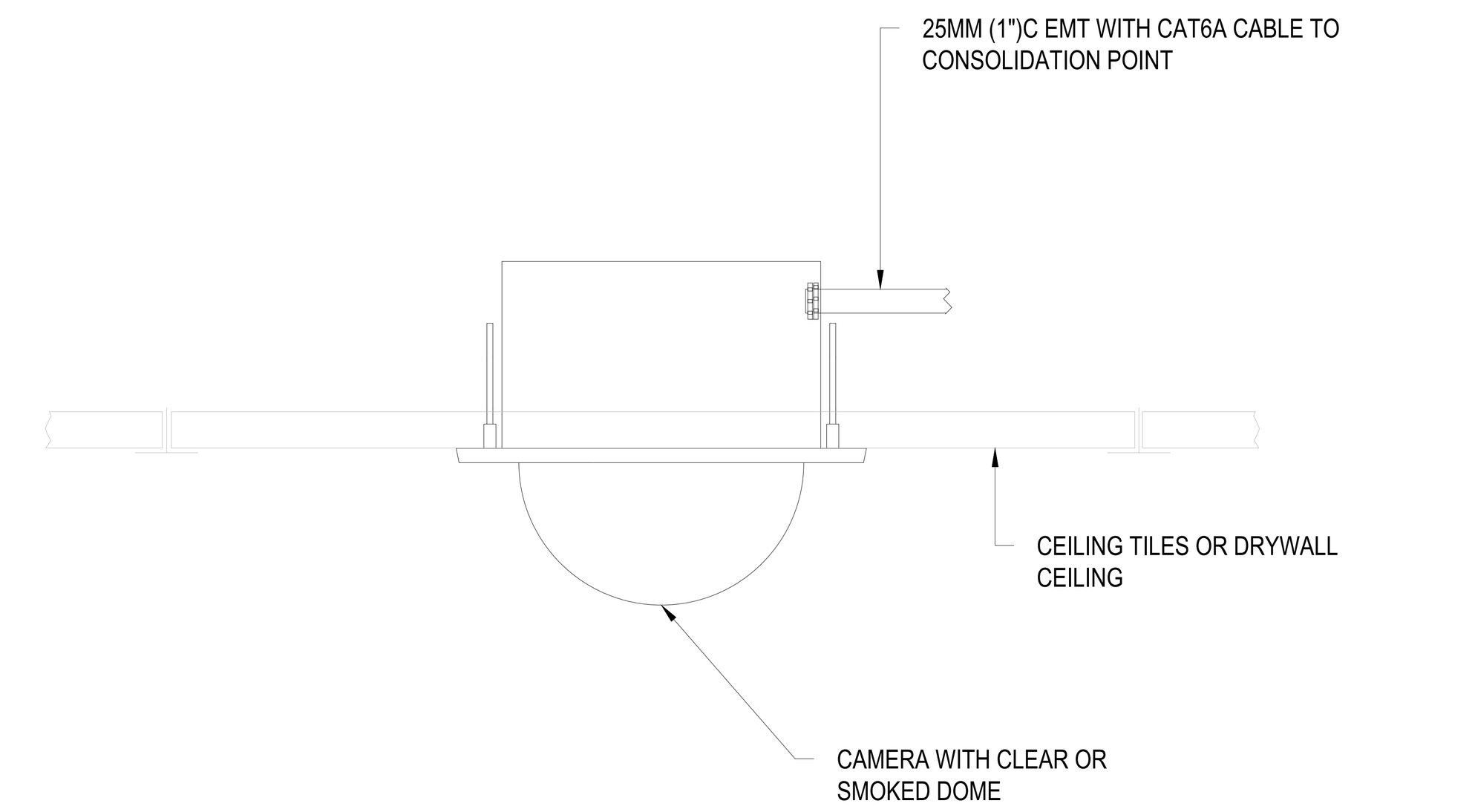
.1 Install products in accordance with product manufacturer’s written instructions for type and use.

END OF SECTION



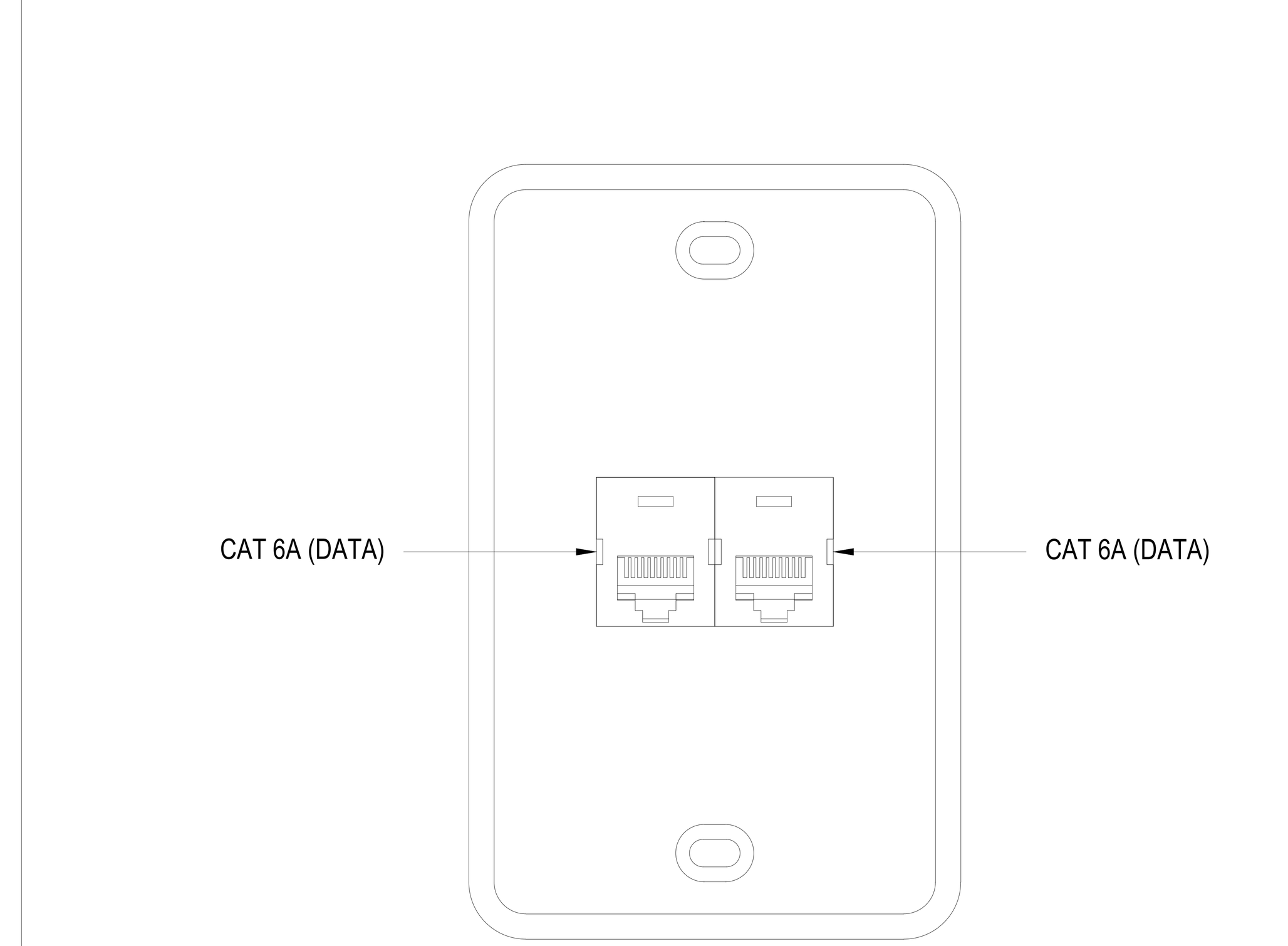
DETAIL NOTES:
1. ALL CONDUITS SHALL BE 20MM (3/4") UNLESS NOTED OTHERWISE.
2. ACCESS CONTROL DEVICES AND CABLING BY OWNER.
3. ELECTRICAL CONTRACTOR TO COORDINATE EXACT REQUIREMENTS WITH OWNER TO PROVIDE AND INSTALL INFRASTRUCTURE.
4. REFER TO PLANS FOR EXACT DOOR SWING AND AUTOMATIC DOOR OPERATOR REQUIREMENTS.
5. REFER TO DOOR HARDWARE DRAWINGS FOR EXACT CONDUIT ROUGH-IN LOCATIONS.

10 SINGLE ACCESS CONTROL DOOR WITH ELECTRIFIED LOCK DETAIL
E402 NTS



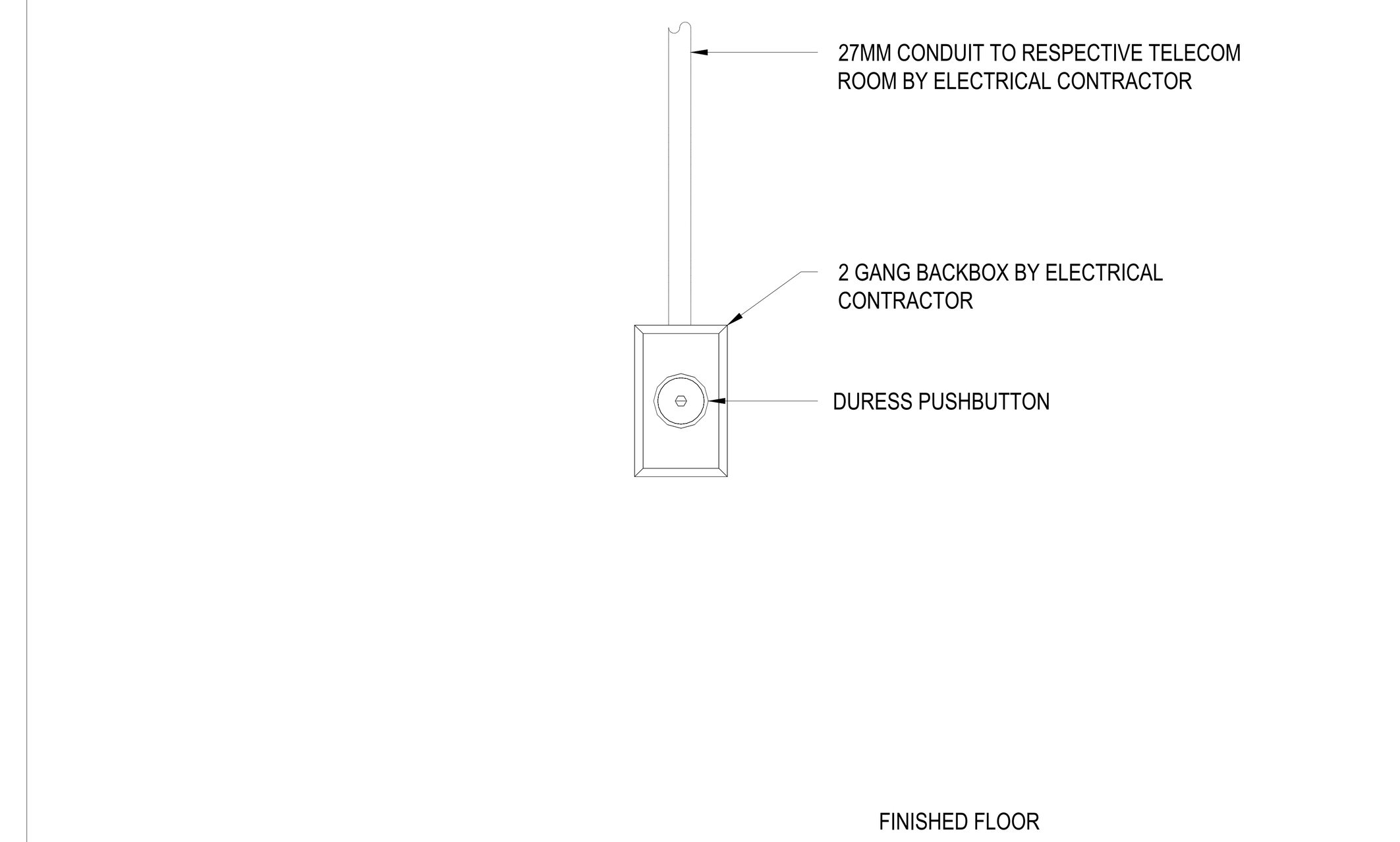
DETAIL NOTES:
1. DIAGRAM SHOWN IMPLIES INTENT AND NOT A SPECIFIC MANUFACTURE'S MODEL. REFER TO SPECIFICATIONS FOR REQUIREMENTS AND PLANS FOR EXACT QUANTITY OF DEVICES.
2. ALL CAMERAS SHALL BE SUPPLIED AND INSTALLED BY OWNER.
3. ELECTRICAL CONTRACTOR TO COORDINATE EXACT REQUIREMENTS WITH OWNER TO PROVIDE AND INSTALL INFRASTRUCTURE.
4. COMMUNICATIONS CONTRACTOR TO RUN CAT6A CABLE FOR ALL DEVICES BACK TO THE CORRESPONDING CONSOLIDATION POINT.

7 CEILING MOUNTED FIXED CAMERA DETAIL
E402 NTS



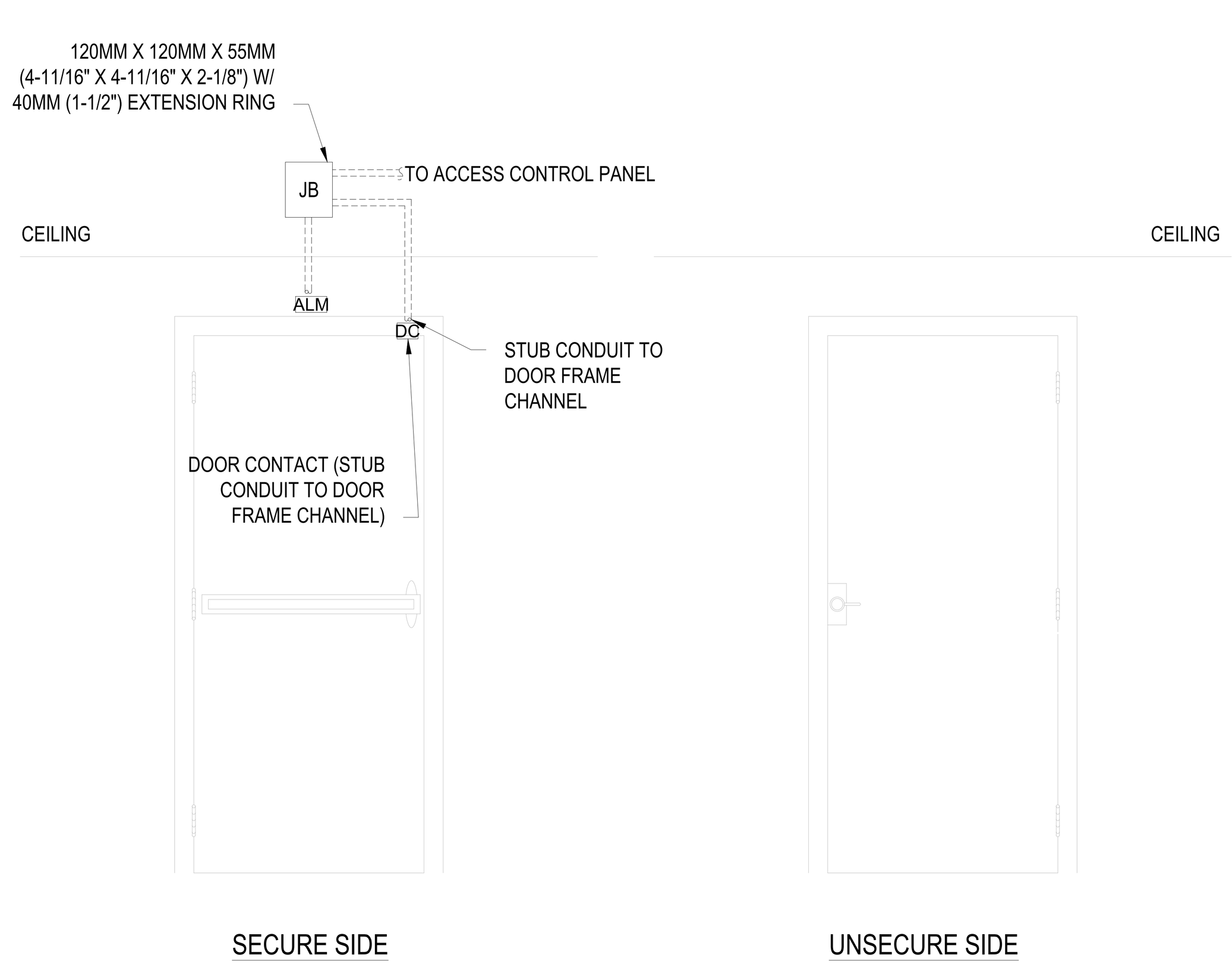
DETAIL NOTES:
1. STANDARD DATA TELECOMMUNICATION OUTLET WITH (2) CAT 6A CABLES TERMINATING AT DESIGNATED PATCH PANEL IN CONSOLIDATION POINT.
2. REFER TO SPECIFICATIONS SECTION 27 10 00 - STRUCTURED CABLING FOR OUTLET FACEPLATE COLOUR, DATA JACK COLOR, AND ADDITIONAL INFORMATION.

4 STANDARD SINGLE GANG DATA OUTLET
E402 NTS



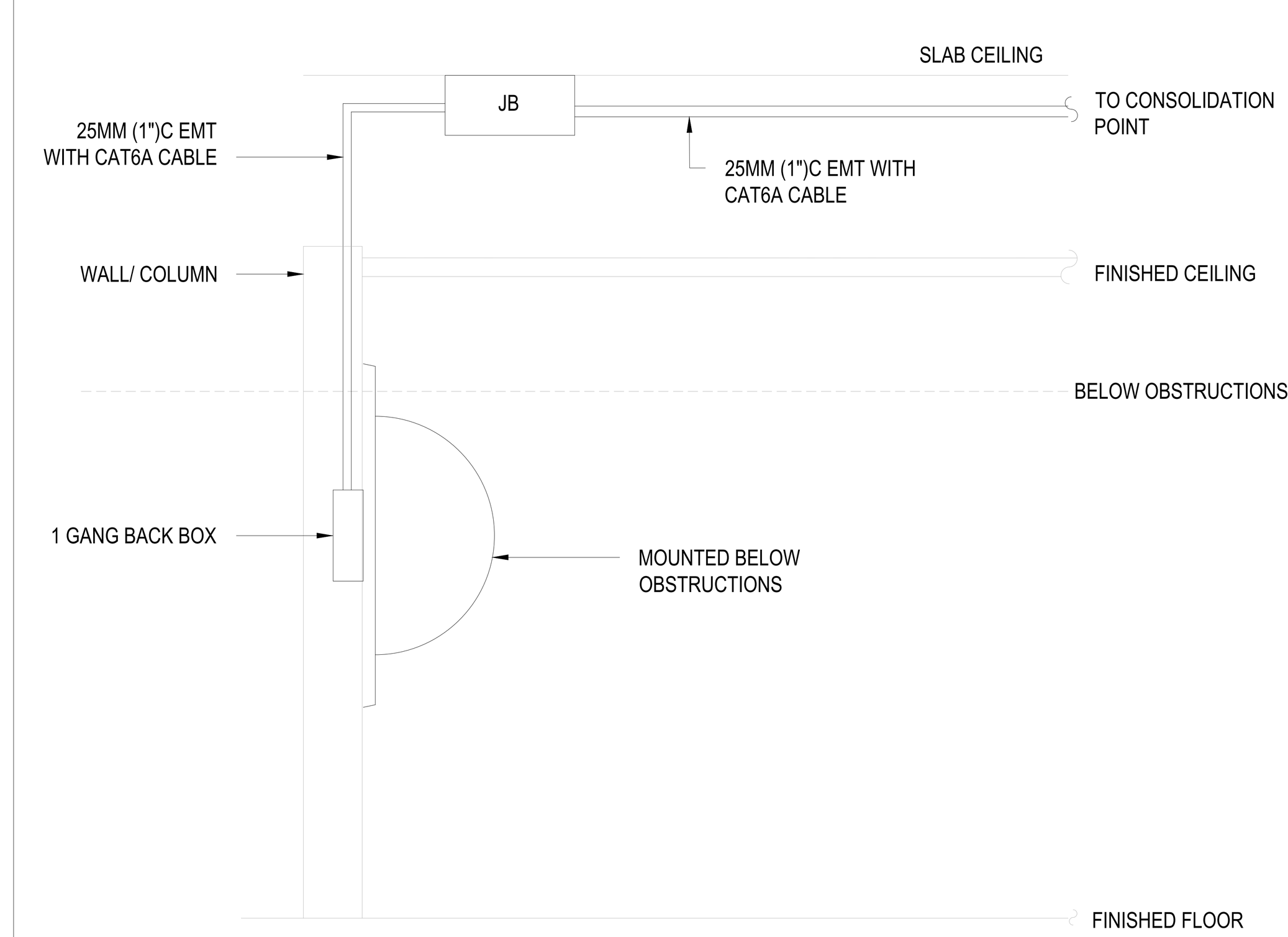
DETAIL NOTES:
1. DIAGRAM SHOWN IMPLIES INTENT AND NOT A SPECIFIC MANUFACTURER'S MODEL. REFER TO SPECIFICATIONS FOR REQUIREMENTS AND PLANS FOR EXACT QUANTITY OF DEVICES. PROVIDE AND INSTALL ALL MAJOR AND MISCELLANEOUS MOUNTING HARDWARE TO FACILITATE PROPER MOUNTING AS RECOMMENDED BY MANUFACTURER.
2. COORDINATE EXACT REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
3. ALL ITEMS BY SECURITY CONTRACTOR UNLESS OTHERWISE NOTED.
4. SECURITY CONTRACTOR TO PROVIDE CONTROL WIRING TO EXISTING DURESS ALARM PANEL.
5. SECURITY CONTRACTOR TO PROVIDE WIRING TO UNIVERSAL WASHROOM KIT FOR INTEGRATION.
6. SECURITY CONTRACTOR TO PROVIDE DURESS ALARM DEVICE.

6 DURESS BUTTON DETAIL
E402 NTS



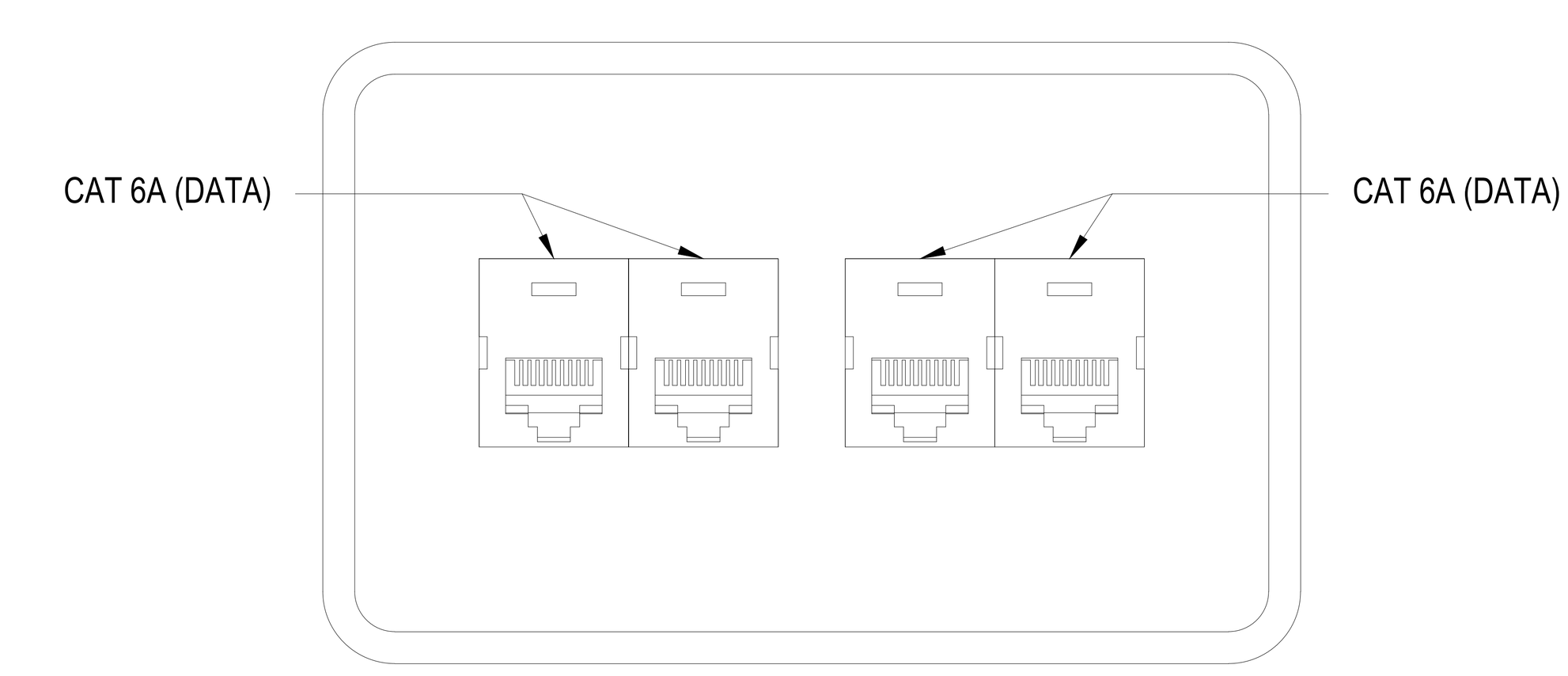
DETAIL NOTES:
1. ALL CONDUITS SHALL BE 20MM (3/4") UNLESS NOTED OTHERWISE.
2. ACCESS CONTROL DEVICES AND CABLING BY OWNER.
3. ELECTRICAL CONTRACTOR TO COORDINATE EXACT REQUIREMENTS WITH OWNER TO PROVIDE AND INSTALL INFRASTRUCTURE.
4. REFER TO PLANS FOR EXACT DOOR SWING.
5. REFER TO DOOR HARDWARE DRAWINGS FOR EXACT CONDUIT ROUGH-IN LOCATIONS.

11 SINGLE DOOR WITH DOOR CONTACT AND ALARM DETAIL
E402 NTS



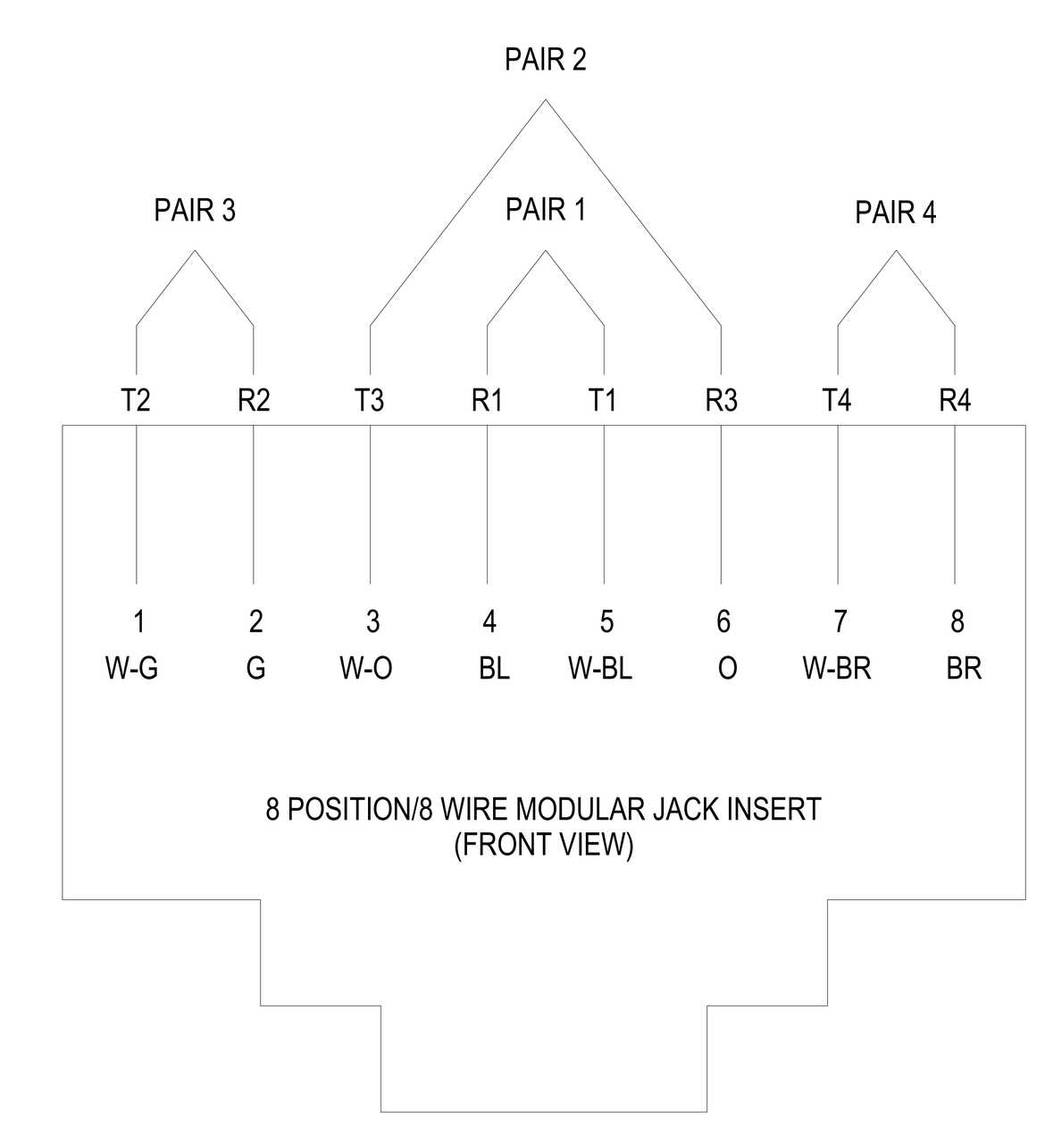
DETAIL NOTES:
1. DIAGRAM SHOWN IMPLIES INTENT AND NOT A SPECIFIC MANUFACTURE'S MODEL. REFER TO SPECIFICATIONS FOR REQUIREMENTS AND PLANS FOR EXACT QUANTITY OF DEVICES.
2. ALL CAMERAS SHALL BE SUPPLIED AND INSTALLED BY OWNER.
3. ELECTRICAL CONTRACTOR TO COORDINATE EXACT REQUIREMENTS WITH OWNER TO PROVIDE AND INSTALL INFRASTRUCTURE.
4. COMMUNICATIONS CONTRACTOR TO RUN CAT6A CABLE FOR ALL DEVICES BACK TO THE CORRESPONDING CONSOLIDATION POINT.

8 CAMERA WALL MOUNTED DETAIL
E402 NTS



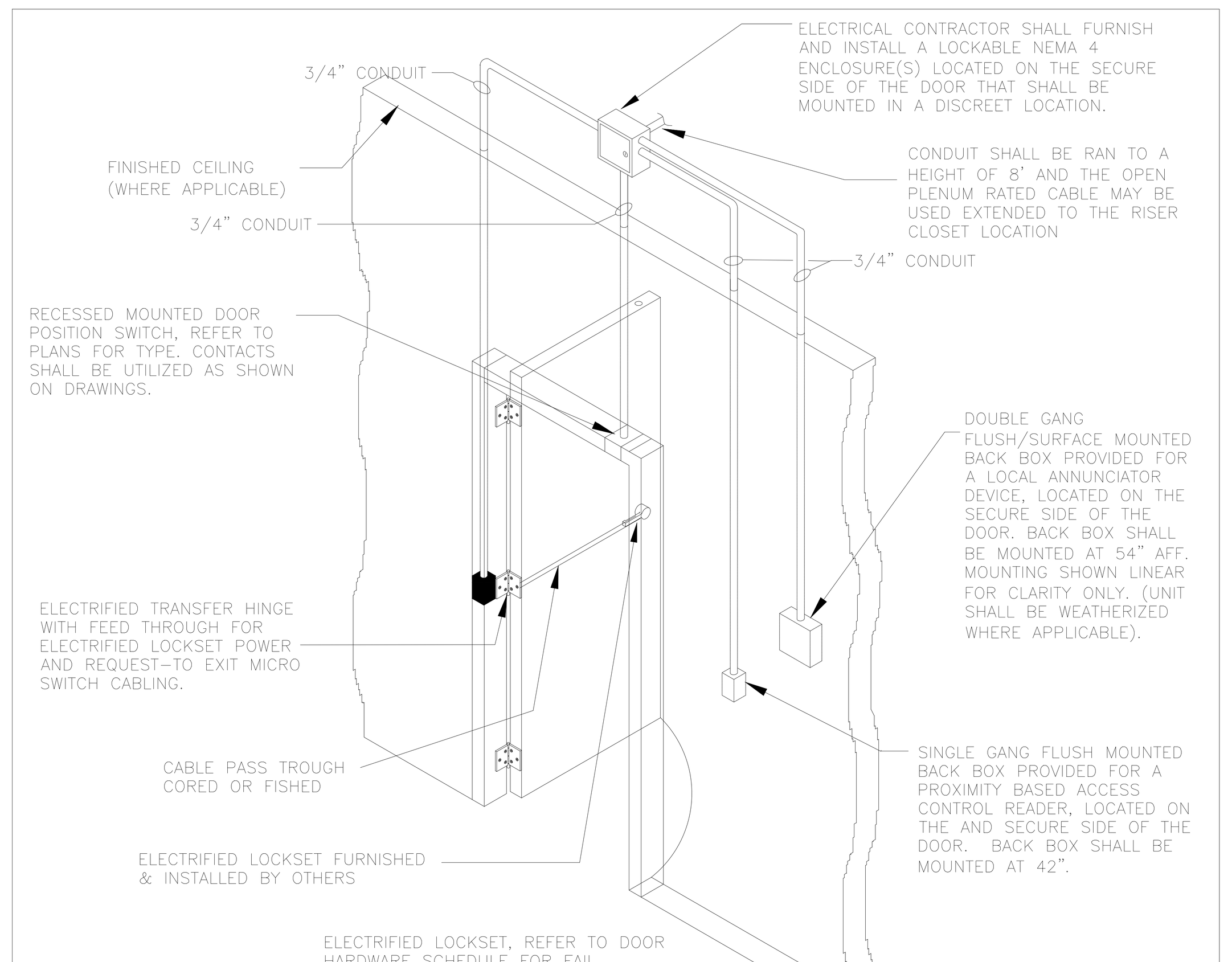
DETAIL NOTES:
1. STANDARD DATA TELECOMMUNICATION OUTLET WITH (4) CAT 6A CABLES TERMINATING AT DESIGNATED PATCH PANEL IN CONSOLIDATION POINT.
2. REFER TO SPECIFICATIONS SECTION 27 10 00 - STRUCTURED CABLING FOR OUTLET FACEPLATE COLOUR, DATA JACK COLOR, AND ADDITIONAL INFORMATION.

5 STANDARD MODULAR FURNITURE DATA OUTLET
E402 NTS



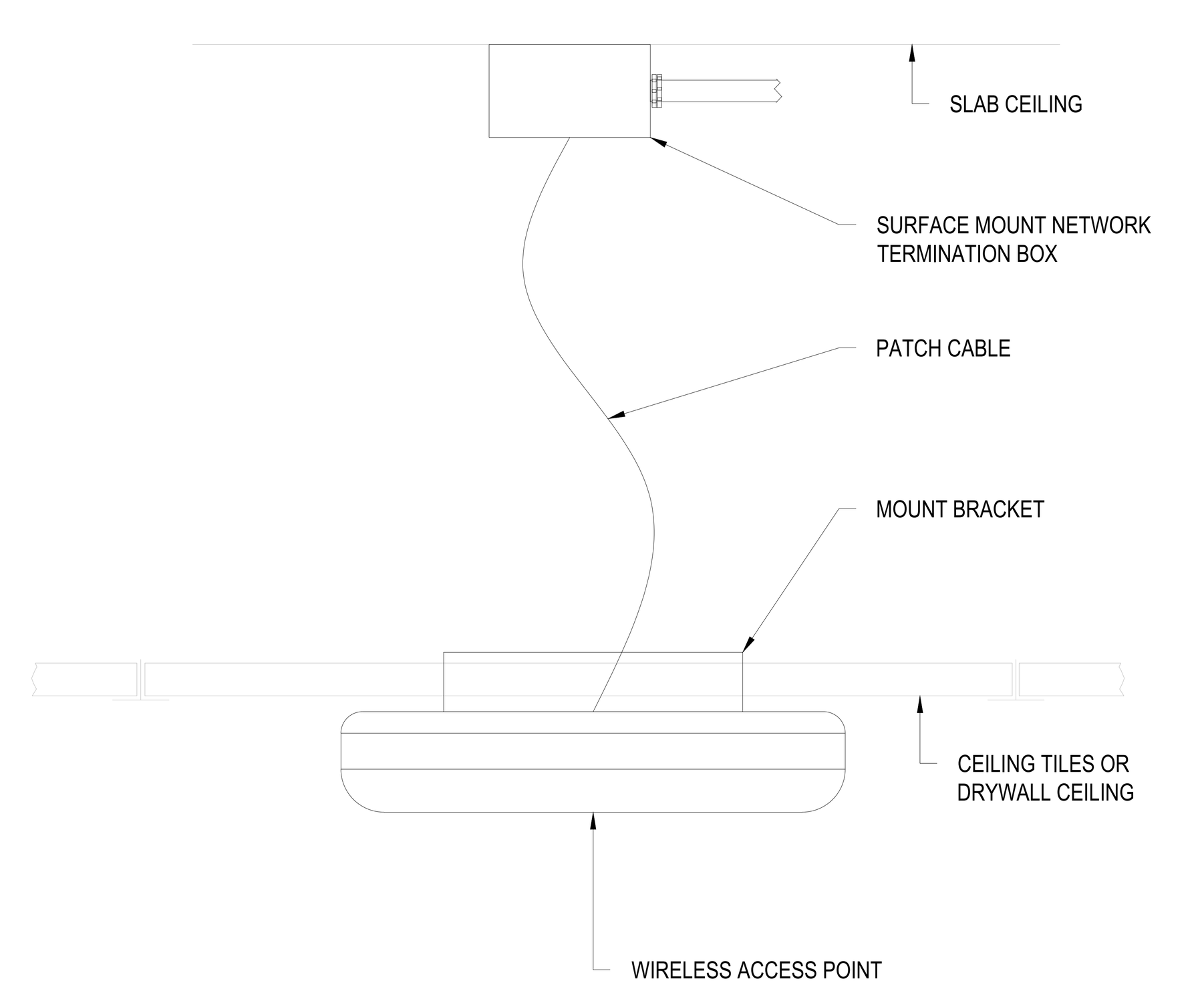
DETAIL NOTES:
PAIR 1: WHITE-BLUE/ BLUE
T1 R1
PAIR 2: WHITE-ORANGE/ ORANGE
T3 R3
PAIR3: WHITE-GREEN/ GREEN
T2 R2
PAIR 4: WHITE-BROWN/ BROWN
T4 R4

2 EIA/ TIA T568A WIRING SCHEME DETAIL
E402 NTS



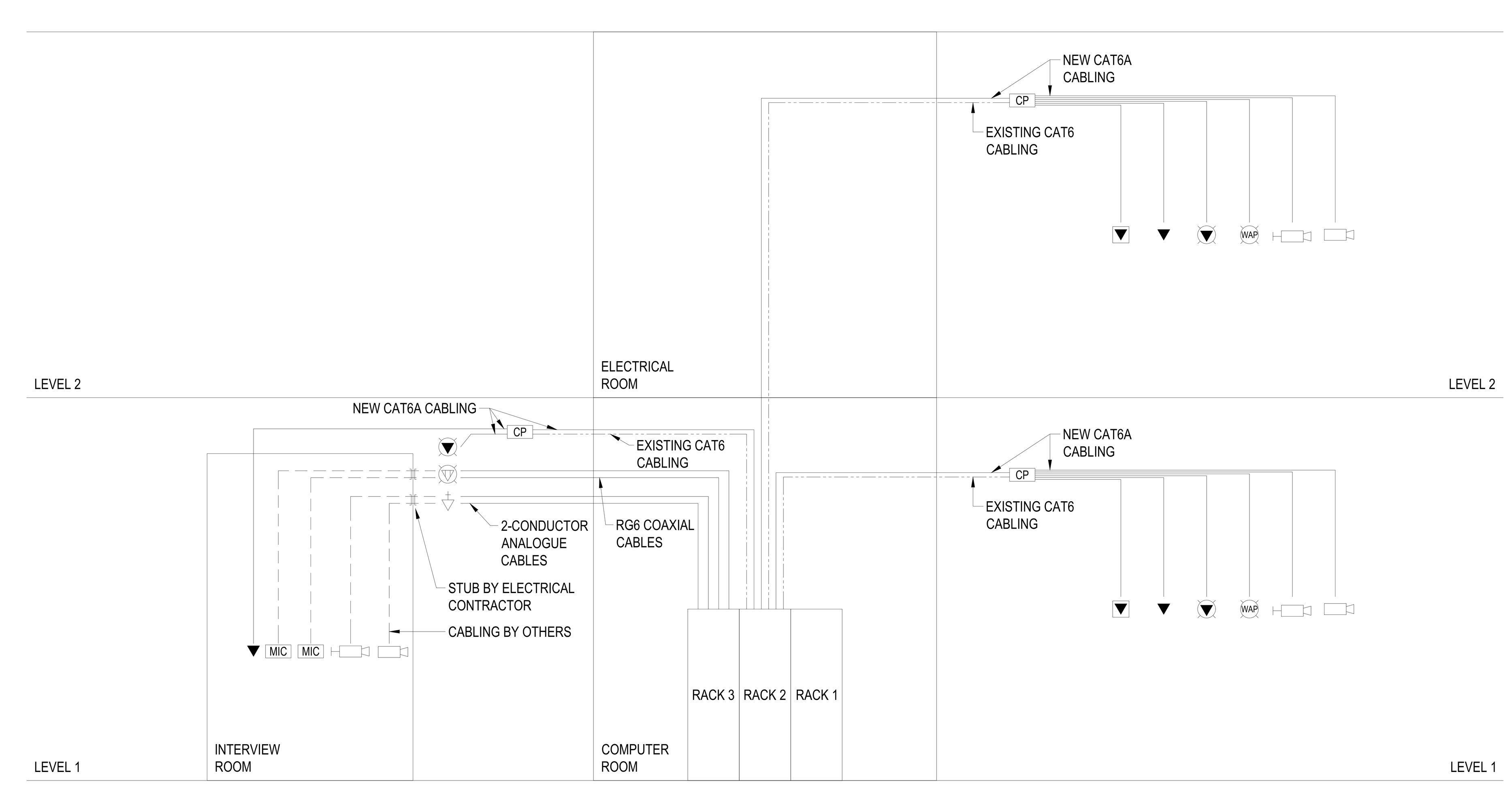
DETAIL NOTES:
1. ACCESS CONTROL DEVICES AND CABLING BY OWNER.
2. ELECTRICAL CONTRACTOR TO COORDINATE EXACT REQUIREMENTS WITH OWNER TO PROVIDE AND INSTALL INFRASTRUCTURE.
3. REFER TO DOOR HARDWARE DRAWINGS FOR EXACT CONDUIT ROUGH-IN LOCATIONS.
4. ELECTRICAL CONTRACTOR SHALL NOT PENETRATE ANY LABELED FIRE RATED DOOR. A TAC WELDED DUST BOX SHALL BE FURNISHED AND INSTALLED INSIDE THE FRAME, FURNISHED AND INSTALLED BY OTHERS.
5. DETAILS ARE TO BE UTILIZED TO SHOW ELEVATIONS AND SPECIFIC DOOR REQUIREMENTS AND ARE NOT INTENDED TO SHOW EVERY ASPECT OF THE DOOR. THEREFORE, THE FOLLOWING, BUT NOT LIMITED TO THE ARCHITECTURAL SWING OF THE DOOR, STYLE OF THE DOOR, HARDWARE REPRESENTED MAY NOT REPRESENT ACTUAL FIELD CONDITIONS.

9 SINGLE ACCESS CONTROL DOOR DETAIL
E402 NTS



DETAIL NOTES:
1. DIAGRAM SHOWN IMPLIES INTENT AND NOT A SPECIFIC MANUFACTURE'S MODEL. REFER TO SPECIFICATIONS FOR REQUIREMENTS AND PLANS FOR EXACT QUANTITY OF DEVICES.
2. WIRELESS ACCESS POINTS SHALL BE SUPPLIED BY OWNER.
3. COMMUNICATIONS CONTRACTOR TO PROVIDE AND INSTALL ALL MAJOR AND MISCELLANEOUS MOUNTING HARDWARE TO FACILITATE PROPER MOUNTING AS RECOMMENDED BY MANUFACTURER.
4. COORDINATE EXACT REQUIREMENTS WITH ELECTRICAL CONTRACTOR.
5. COORDINATE EXACT MOUNTING HEIGHT AND LOCATION ONSITE FOR PROPER COVERAGE. COORDINATE WITH ELECTRICAL CONTRACTOR.

3 WIRELESS ACCESS POINT SUSPENDED CEILING MOUNT DETAIL
E402 NTS



1 COMMUNICATIONS RISER DIAGRAM
E402 NTS

exp.
t: 905.695.3217 | f: 905.695.0167
220 Commerce Valley Drive West, Suite 110
Markham, ON L3T 0A8
Canada
www.exp.com

- BUILDINGS
- ENERGY
- INFRASTRUCTURE
- EARTH & ENVIRONMENT
- INDUSTRIAL
- SUSTAINABILITY

NO.	DESCRIPTION	DATE
5.	ISSUED FOR ADDENDUM-01	2026.01.09
4.	ISSUED FOR TENDER	2025.11.14
3.	ISSUED FOR BUILDING PERMIT	2025.10.17
2.	ISSUED FOR 75% CLIENT REVIEW	2025.10.17
1.	ISSUED FOR COSTING REVIEW	2025.09.29

REVISIONS

PROJECT

Region of Peel
working with you

REGION OF PEEL

21 DIVISION, PEEL REGIONAL POLICE FACILTY
INTERIOR RENOVATION PROJECT
10 PEEL CENTRE DRIVE, BRAMPTON, ON, L6T 4B9

NGA ARCHITECTS

ISSUED FOR CONSTRUCTION DATE

NORTH
PROJECT NORTH
TRUE NORTH

STRUCTURAL CONSULTANT
Stephenson Engineering
MECHANICAL CONSULTANT
EXP Services Inc.
ELECTRICAL CONSULTANT
EXP Services Inc.

SHEET TITLE
TECHNOLOGY DETAILS

SHEET NO.	DRAWN BY	CHECKED
E411	PROJECT NO. MRK-25008049-A0	
	SCALE AS NOTED	

EXP Services Inc.
220 Commerce Valley Drive West, Suite 110
Markham, Ontario
L3T 0A8

Telephone: 905.695.3217
Facsimile: 905.695.0167

Mechanical
Addendum No. 01

Reference: STC Rated wall requirement Issue Date: January 9, 2026

Project: 21 Division, Peel Regional Police – Facility Interior Renovations
(EXP Project Number MRK-25008049-A0)

This addendum shall form an integral part of the Bid Documents for the above project and shall be read in conjunction therewith. This addendum shall, however, take precedence over all requirements of the previously issued Drawings and Specifications with which it may prove to be at variance, unless otherwise clarified by the Consultant.

This addendum must be signed by the Bidder in the appropriate space and must be attached to the back of the Bid Form for submission at the time of bidding. Bids not including this addendum signed as requested may be rejected as informal.

Revisions / Clarifications

The following changes and clarifications shall be considered when submitting your bid.

1.1. MECHANICAL DRAWINGS

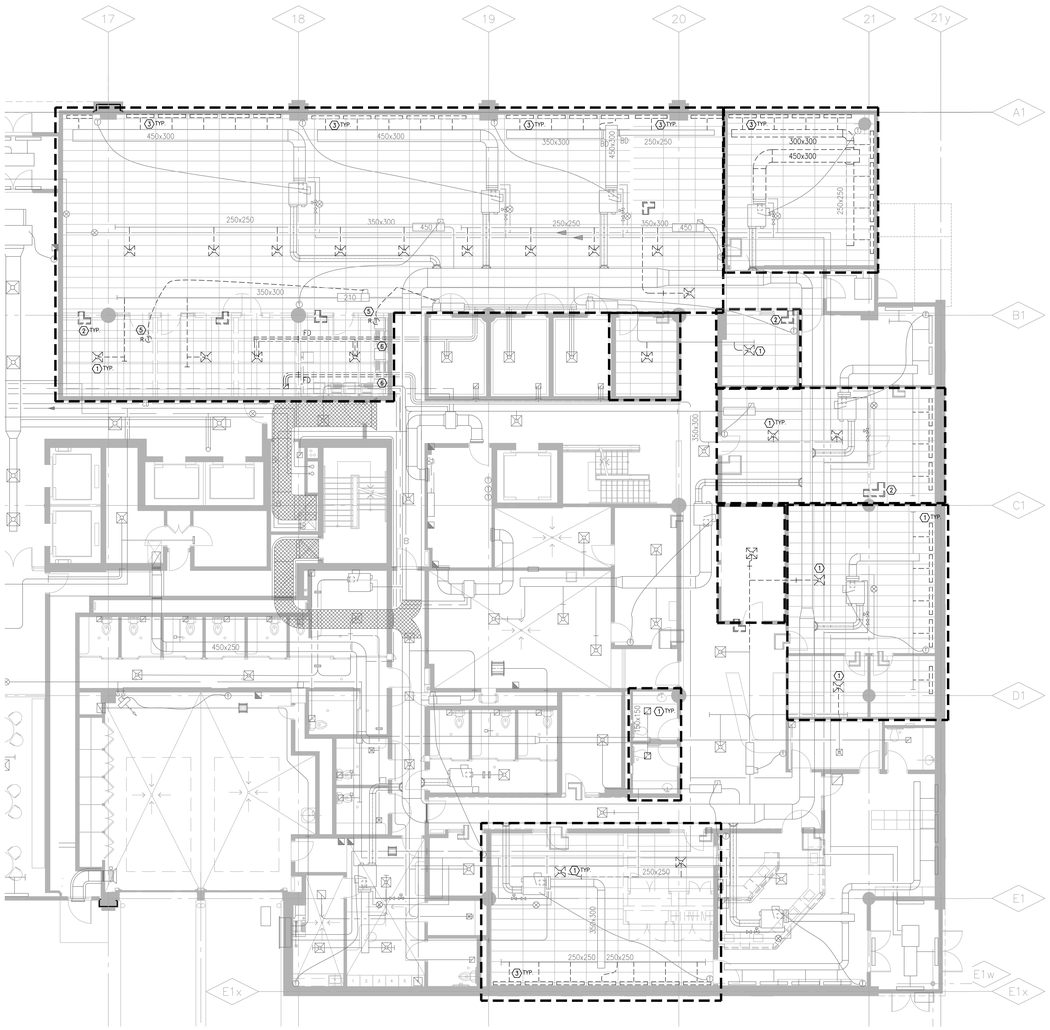
1.1.1. M201 – GROUND FLOOR – HVAC DEMO & NEW (included herein)

.1 Add drawing note as shown

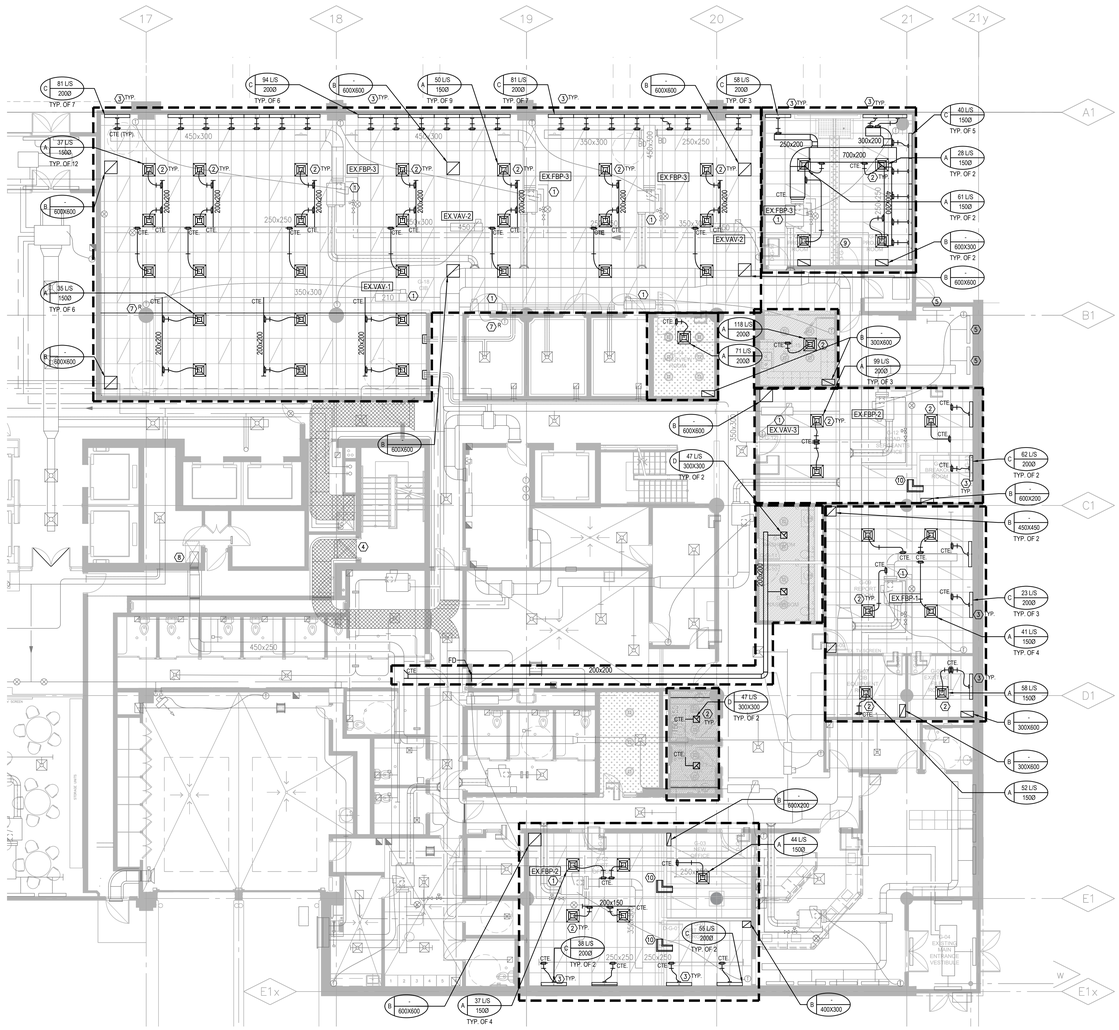
1.1.2. M501 – MECHANICAL DETAIL (included herein)

.1 Detail 9: Add typical duct penetration through STC-rated wall as shown.

---------- END OF MECHANICAL ADDENDUM No. 01 ----------



1 M201 PARTIAL GROUND FLOOR HVAC PLAN - DEMO
SCALE 1:100



2 M201 PARTIAL GROUND FLOOR HVAC PLAN - NEW
SCALE 1:100

HVAC GENERAL DEMO NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE ONTARIO BUILDING CODE, MINISTRY OF THE ENVIRONMENT, MINISTRY OF LABOUR, NFPA, BUILDING MANAGEMENT'S GUIDELINES (REFER TO ARCH. SPEC).
2. ALL NEW SERVICES SHOWN ARE DIAGRAMMATIC ONLY. THE ARRANGEMENTS OF EQUIPMENT SHOWN ARE APPROXIMATE AND MAY BE ALTERED ON SITE TO MEET THE ON-SITE CONDITIONS OF THE PROJECT. CONTRACTOR TO REVIEW ALL THE EXISTING SERVICES AND COORDINATE WITH THE NEW INSTALLATION.
3. CONTRACTOR TO COORDINATE WITH THE BUILDING MANAGEMENT FOR APPROVAL OF ANY SHUT DOWN OF EXISTING SYSTEM/SERVICES. THE CONTRACTOR SHALL DETERMINE THE BEST METHOD TO MINIMIZE SERVICE INTERRUPTION AND IMPACT ON FACILITY OPERATION, INCLUDING USE OF HOT TAP/TEMPORARY FREEZING AND AFTER-HOUR WORK AS REQUIRED. PROVIDE MIN. ONE WEEK NOTICE FOR BUILDING MANAGEMENT TO PLAN THE SHUT DOWN. CONTRACTOR TO ENSURE MIN. SHUTDOWNS.
4. CONTRACTOR TO REROUTE ANY EXISTING SERVICES IF REQUIRED TO INSTALL NEW SERVICES. ALL SERVICES SHALL BE INSTALLED USING EXISTING BEAM OPENINGS AS MUCH AS POSSIBLE, IN THE EVENT OF NO SPACE THROUGH BEAM OPENING, SERVICES SHALL BE INSTALLED AS HIGH AS POSSIBLE TO THE UNDERSIDE OF THE BEAM. COORDINATE ALL SERVICES PRIOR TO INSTALLATION. THE LOWER SERVICES INSTALLED WILL BE ASKED TO RELOCATE IF SPACE AVAILABLE AT HIGH LEVEL.
5. COORDINATE WITH ALL CONSULTANT DRAWINGS BEFORE ORDERING ANY NEW EQUIPMENT, GRILLES & DIFFUSERS, SPRINKLER HEADS ETC.
6. CONTRACTOR TO INCLUDE FOR ALL OFFSETS REQUIRED FOR COORDINATION WITHIN MECHANICAL AND ELECTRICAL SERVICES. THE OFFSETTING INCLUDES ALL HVAC, HYDRONICS, PLUMBING AND FIRE PROTECTION SERVICES.
7. THE DRAWINGS AND SPECIFICATIONS ARE PROVIDING THE MINIMUM PERFORMANCE REQUIREMENTS. THE FIRE PROTECTION SYSTEM SHALL BE PREPARED, COMPLETE, STAMPED, SIGNED, AND APPROVED BY A LICENSED SPRINKLER CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE FLOW TEST INFORMATION PRIOR TO PREPARATION OF DRAWINGS AND HYDRAULIC CALCULATIONS.
8. CONTRACTOR TO PROVIDE FIRE WATCH AS REQUIRED TO MAINTAIN FIRE SAFETY OF THE CONSTRUCTION SITE SCOPE AREA.
9. THE CONTRACTOR SHALL PROVIDE FIRE-STOPPING ON ALL NEW PIPING AND CONDUIT PENETRATIONS THROUGH A FIRE-RATED WALL OR FLOOR AND ANY HOLES THAT RESULT FROM REMOVAL OF EXISTING SERVICES THROUGH A FIRE-RATED WALL OR FLOOR.
10. READ ALL THE DRAWINGS FOR COMPLETE INFORMATION.
11. INCLUDE FOR FREEZING OF ALL SERVICES WITH THE ASSUMPTION THAT NO VALVES WILL HOLD AND REPLACE ALL WITH NEW LEVER BALL VALVES (OR SCREW TYPE ONLY WHERE APPROPRIATE)
12. THE EXISTING SERVICES SHOWN ON THIS DRAWING HAVE BEEN TAKEN FROM THE ORIGINAL CONSTRUCTION DRAWINGS AND SITE SURVEYS. THE MECHANICAL SHALL CARRY OUT A FULL SURVEY OF ALL EXISTING SERVICES TO CONFIRM THE SIZE AND LOCATION OF THESE SERVICES BEFORE THE COMMENCEMENT OF ANY WORK.
13. ALL EXISTING SERVICES ARE TO REMAIN AS IS UNLESS NOTED ON THE LAYOUT TO BE REMOVED, RELOCATED AND OR MODIFIED.

HVAC DEMO. DRAWING NOTES:

1. DIFFUSER/GRILLE TO BE DEMOLISHED. CAP DUCTWORK BACK TO MAIN, AS SHOWN.
2. TRANSFER DUCT TO BE DEMOLISHED, IN ITS ENTIRETY.
3. LINEAR SLOT DIFFUSER TO BE DEMOLISHED, IN ITS ENTIRETY, INCLUDING PLENUM BOXES. CAP DUCTWORK BACK TO MAIN, AS SHOWN. NEW LINEAR SLOT DIFFUSER(S) TO BE PROVIDED IN ITS PLACE.
4. (RESERVED)
5. EXISTING THERMOSTAT TO BE REMOVED, IN ITS ENTIRETY, INCLUDING ALL CONTROL WIRING. THERMOSTAT TO BE RETAINED AND PROPERLY STORED, FOR REUSE IN THE RELOCATED AREA, AS SHOWN ON NEW WORK PLAN.
6. CUT BACK EXISTING DUCTWORK, IN ITS ENTIRETY, INCLUDING ALL CONNECTED TERMINAL DIFFUSERS, AND FIRE DAMPERS CONNECTED DOWNSTREAM, AS SHOWN. CAP DUCTWORK AT THE WALL.

HVAC GENERAL NEW NOTES:

1. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE ONTARIO BUILDING CODE, MINISTRY OF THE ENVIRONMENT, MINISTRY OF LABOUR, NFPA, BUILDING MANAGEMENT'S GUIDELINES (REFER TO ARCH. SPEC).
2. ALL NEW SERVICES SHOWN ARE DIAGRAMMATIC ONLY. THE ARRANGEMENTS OF EQUIPMENT SHOWN ARE APPROXIMATE AND MAY BE ALTERED ON SITE TO MEET THE ON-SITE CONDITIONS OF THE PROJECT. CONTRACTOR TO REVIEW ALL THE EXISTING SERVICES AND COORDINATE WITH THE NEW INSTALLATION.
3. CONTRACTOR TO COORDINATE WITH THE BUILDING MANAGEMENT FOR APPROVAL OF ANY SHUT DOWN OF EXISTING SYSTEM/SERVICES. THE CONTRACTOR SHALL DETERMINE THE BEST METHOD TO MINIMIZE SERVICE INTERRUPTION AND IMPACT ON FACILITY OPERATION, INCLUDING USE OF HOT TAP/TEMPORARY FREEZING AND AFTER-HOUR WORK AS REQUIRED. PROVIDE MIN. ONE WEEK NOTICE FOR BUILDING MANAGEMENT TO PLAN THE SHUT DOWN. CONTRACTOR TO ENSURE MIN. SHUTDOWNS.
4. CONTRACTOR TO REROUTE ANY EXISTING SERVICES IF REQUIRED TO INSTALL NEW SERVICES. ALL SERVICES SHALL BE INSTALLED USING EXISTING BEAM OPENINGS AS MUCH AS POSSIBLE, IN THE EVENT OF NO SPACE THROUGH BEAM OPENING, SERVICES SHALL BE INSTALLED AS HIGH AS POSSIBLE TO THE UNDERSIDE OF THE BEAM. COORDINATE ALL SERVICES PRIOR TO INSTALLATION. THE LOWER SERVICES INSTALLED WILL BE ASKED TO RELOCATE IF SPACE AVAILABLE AT HIGH LEVEL.
5. COORDINATE WITH ALL CONSULTANT DRAWINGS BEFORE ORDERING ANY NEW EQUIPMENT, GRILLES & DIFFUSERS, SPRINKLER HEADS ETC.
6. CONTRACTOR TO INCLUDE FOR ALL OFFSETS REQUIRED FOR COORDINATION WITHIN MECHANICAL AND ELECTRICAL SERVICES. THE OFFSETTING INCLUDES ALL HVAC, HYDRONICS, PLUMBING AND FIRE PROTECTION SERVICES.
7. THE DRAWINGS AND SPECIFICATIONS ARE PROVIDING THE MINIMUM PERFORMANCE REQUIREMENTS. THE FIRE PROTECTION SYSTEM SHALL BE PREPARED, COMPLETE, STAMPED, SIGNED, AND APPROVED BY A LICENSED SPRINKLER CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE FLOW TEST INFORMATION PRIOR TO PREPARATION OF DRAWINGS AND HYDRAULIC CALCULATIONS.
8. CONTRACTOR TO PROVIDE FIRE WATCH AS REQUIRED TO MAINTAIN FIRE SAFETY OF THE CONSTRUCTION SITE SCOPE AREA.
9. THE CONTRACTOR SHALL PROVIDE FIRE-STOPPING ON ALL NEW PIPING AND CONDUIT PENETRATIONS THROUGH A FIRE-RATED WALL OR FLOOR AND ANY HOLES THAT RESULT FROM REMOVAL OF EXISTING SERVICES THROUGH A FIRE-RATED WALL OR FLOOR.
10. READ ALL THE DRAWINGS FOR COMPLETE INFORMATION.
11. INCLUDE FOR FREEZING OF ALL SERVICES WITH THE ASSUMPTION THAT NO VALVES WILL HOLD AND REPLACE ALL WITH NEW LEVER BALL VALVES (OR SCREW TYPE ONLY WHERE APPROPRIATE)
12. THE EXISTING SERVICES SHOWN ON THIS DRAWING HAVE BEEN TAKEN FROM THE ORIGINAL CONSTRUCTION DRAWINGS AND SITE SURVEYS. THE MECHANICAL CONTRACTOR SHALL CARRY OUT A FULL SURVEY OF ALL EXISTING SERVICES TO CONFIRM THE SIZE AND LOCATION OF THESE SERVICES BEFORE THE COMMENCEMENT OF ANY WORK.
13. ALL EXISTING SERVICES ARE TO REMAIN AS IS UNLESS NOTED ON THE LAYOUT TO BE REMOVED, RELOCATED AND OR MODIFIED.
14. ALL EXISTING & NEW HVAC DUCTWORK PENETRATION THROUGH STC RATED WALL ASSEMBLIES SHALL FOLLOW INSTALLATION DETAIL IDENTIFIED IN M501. REFER TO ARCHITECTURAL DRAWINGS FOR RATED WALL ASSEMBLIES WITH STC REQUIREMENTS. (TYP.)

5

HVAC NEW DRAWING NOTES:

1. EXISTING FAN POWERED BOX/VARIABLE AIR VOLUME BOX TO REMAIN. RECALIBRATE TERMINAL BOX TO AIR QUANTITIES SHOWN.
2. PROVIDE AND INSTALL NEW DIFFUSER/GRILLE. CONNECT TO EXISTING MAIN DUCTWORK AS SHOWN. PROVIDE BALANCING DAMPER AT EACH BRANCH DUCT SERVING NEW DIFFUSER/GRILLE. BALANCE AIRFLOW TO EACH DIFFUSER/GRILLE IN L/S AS INDICATED ON PLAN. REFER TO DIFFUSERS & GRILLES SCHEDULE ON MECHANICAL SCHEDULE DRAWING.
3. PROVIDE AND INSTALL NEW LINEAR SLOT DIFFUSER. CONNECT TO EXISTING MAIN DUCTWORK AS SHOWN. PROVIDE BALANCING DAMPER AT EACH BRANCH DUCT SERVING NEW DIFFUSER. BALANCE AIRFLOW TO EACH DIFFUSER IN L/S AS INDICATED ON PLAN. REFER TO DIFFUSERS & GRILLES SCHEDULE ON MECHANICAL SCHEDULE.
4. EXISTING SUPPLY AIR & RETURN AIR RISER FROM EXISTING AHU-5
5. RE BALANCE EXISTING LINEAR SLOT DIFFUSER TO 62 L/S (TYP.)
6. RESERVED.
7. EXISTING THERMOSTAT TO BE RELOCATED, AS SHOWN, INCLUDING ALL CONTROL WIRING, AS REQUIRED. THERMOSTAT SHALL BE INSTALLED 1200MM ABOVE FINISHED FLOOR, UNLESS NOTED OTHERWISE.
8. EXISTING 450X400 EXHAUST AIR RISER UP TO EXISTING, EF-4 IN MECHANICAL PENT HOUSE.
9. EXISTING 50MM Ø HYDRONIC HEATING WATER SUPPLY AND RETURN PIPING TO BE MODIFIED TO RUN OVER THE TOP OF THE CONTINOUS BEAM, B1. REFER TO STRUCTURAL DRAWINGS FOR BEAM DETAILS.
10. TRANSFER AIR DUCT AT WALL ABOVE CEILING C/W FIRE DAMPER (WHERE SHOWN). ALL TRANSFER AIR DUCT SHALL BE 250MMX200MM. LINED WITH 25MM THICK ACOUSTIC INSULATION. (TYPICAL)

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- BUILDINGS
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- INFRASTRUCTURE
- EARTH & ENVIRONMENT
- INDUSTRIAL
- SUSTAINABILITY

NO.	DESCRIPTION	DATE
5.	ISSUED FOR ADDENDUM-01	2026.01.09
4.	ISSUED FOR TENDER	2025.11.14
3.	ISSUED FOR BUILDING PERMIT	2025.10.17
2.	ISSUED FOR 75% CLIENT REVIEW	2025.10.17
1.	ISSUED FOR COSTING REVIEW	2025.09.29

REVISIONS

PROJECT

Region of Peel working with you

REGION OF PEEL

21 DIVISION, PEEL REGIONAL POLICE FACILTY INTERIOR RENOVATION PROJECT
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NORTH

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Stephenson Engineering

MECHANICAL CONSULTANT
EXP Services Inc.

ELECTRICAL CONSULTANT
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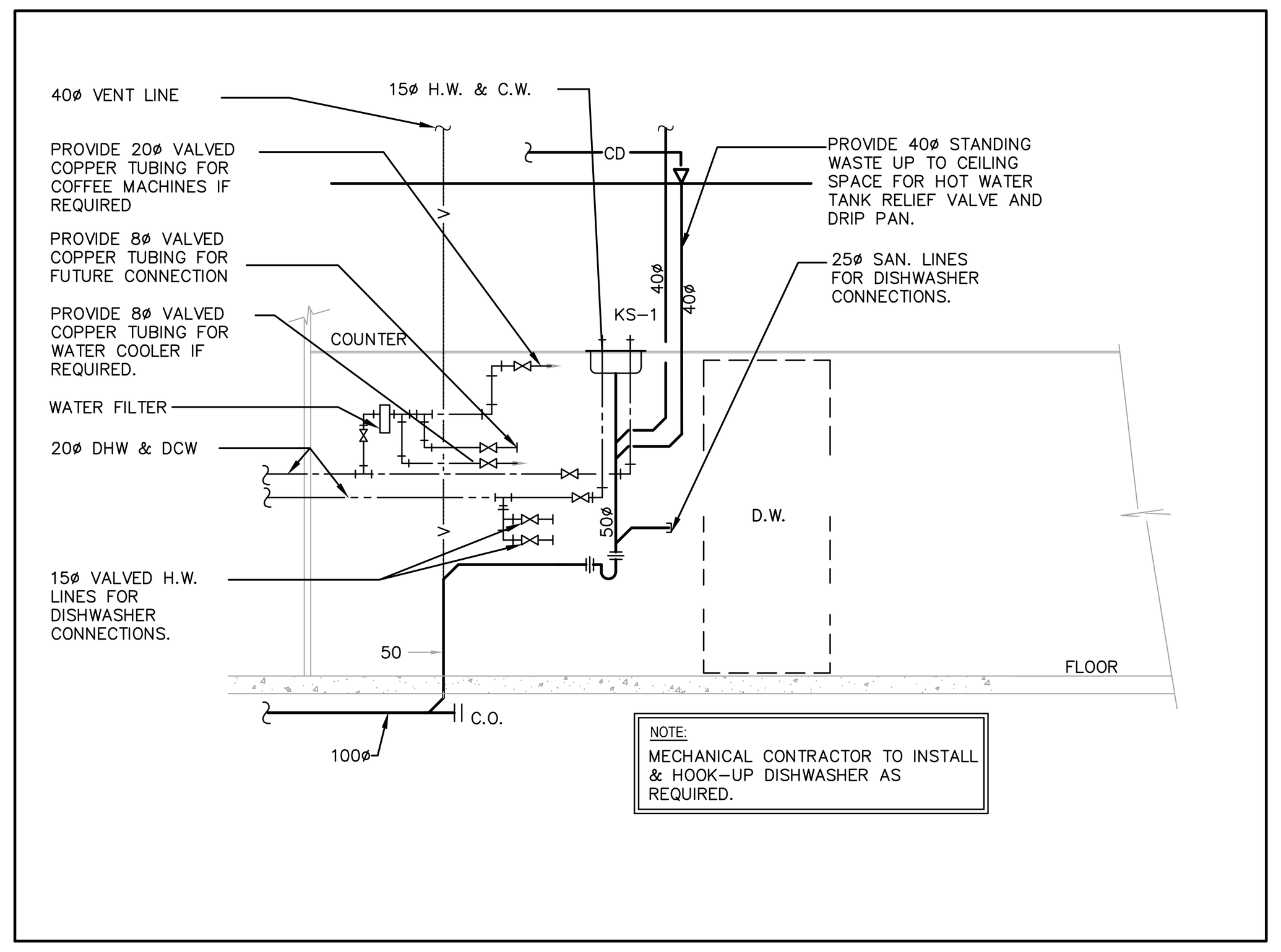
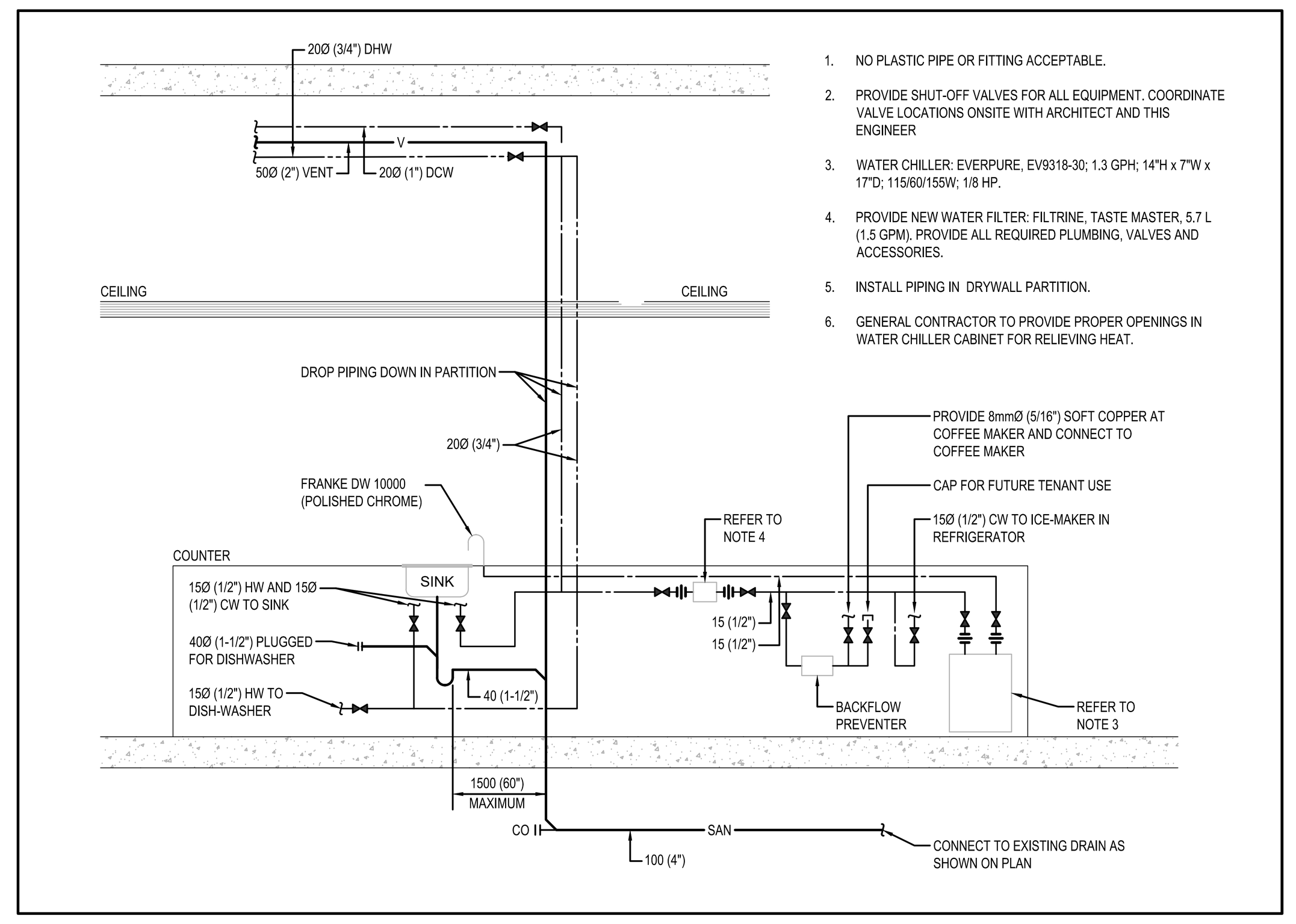
SHEET TITLE
PARTIAL GROUND FLOOR - HVAC DEMO AND NEW

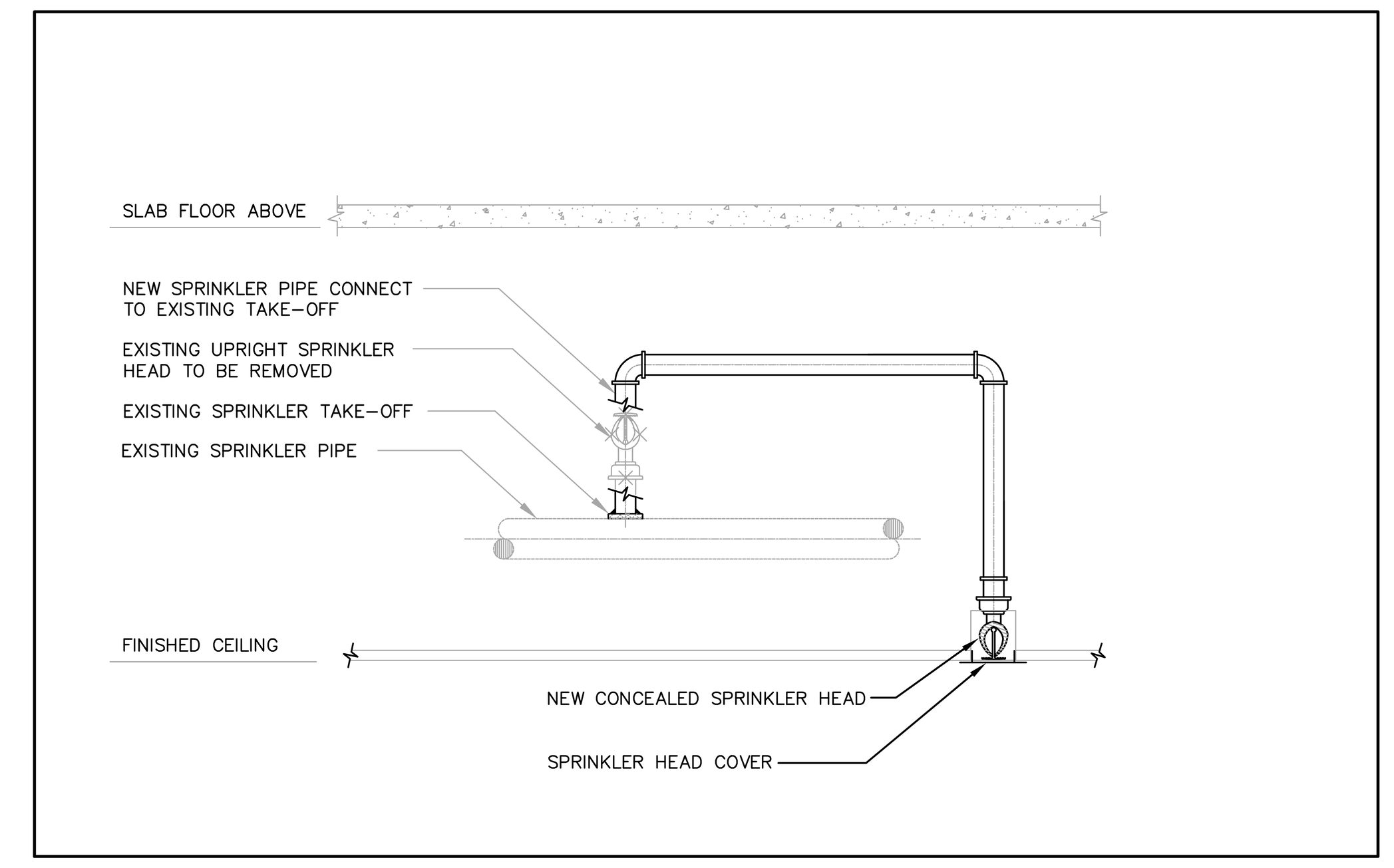
SHEET NO.	DRAWN BY	CHECKED
M201	PROJECT NO. MHK-25008049-A0	
	SCALE AS NOTED	



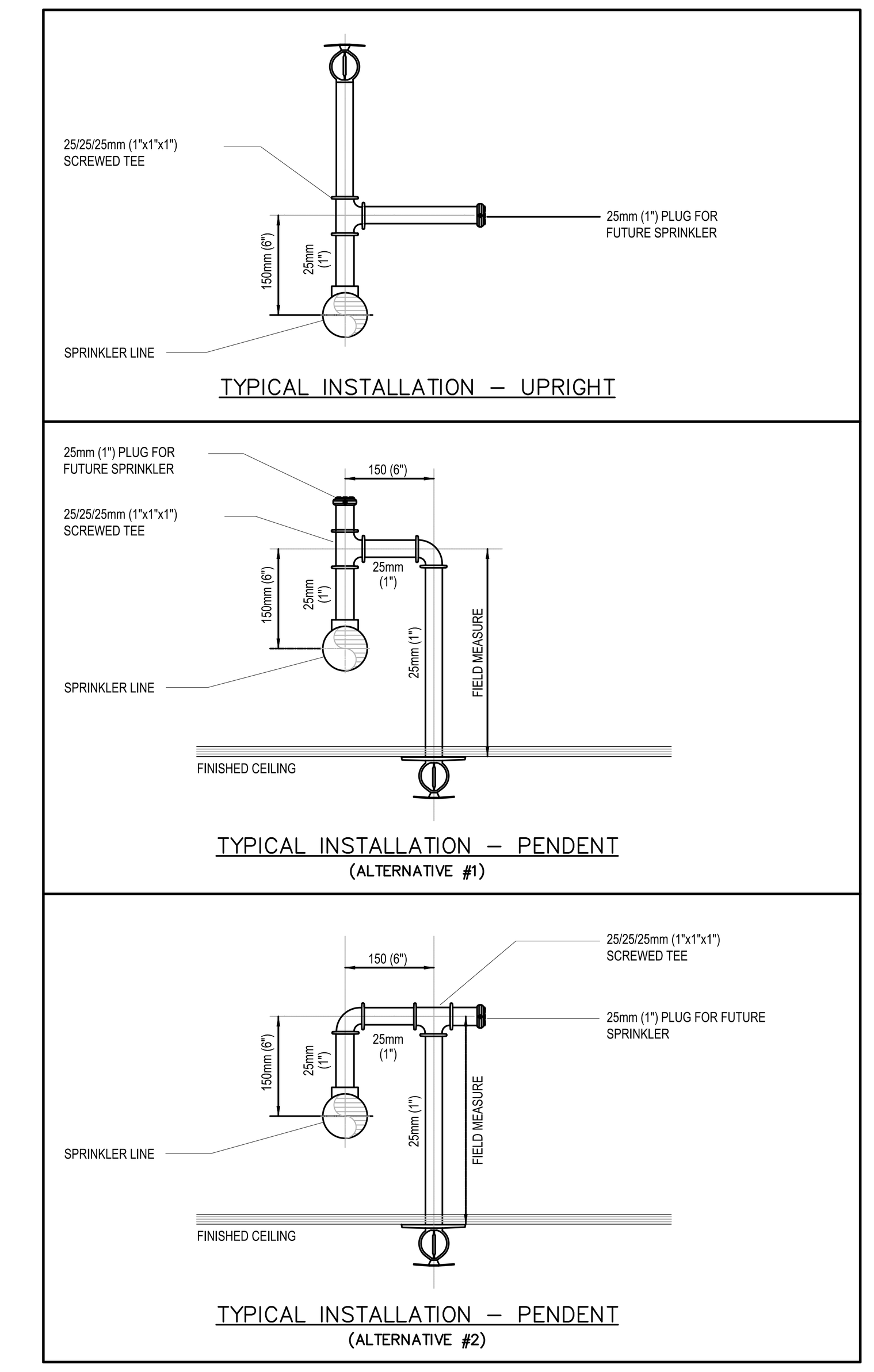
1 / M-501 KITCHEN SINK 'KS-1' PIPING DIAGRAM 1
N.T.S.



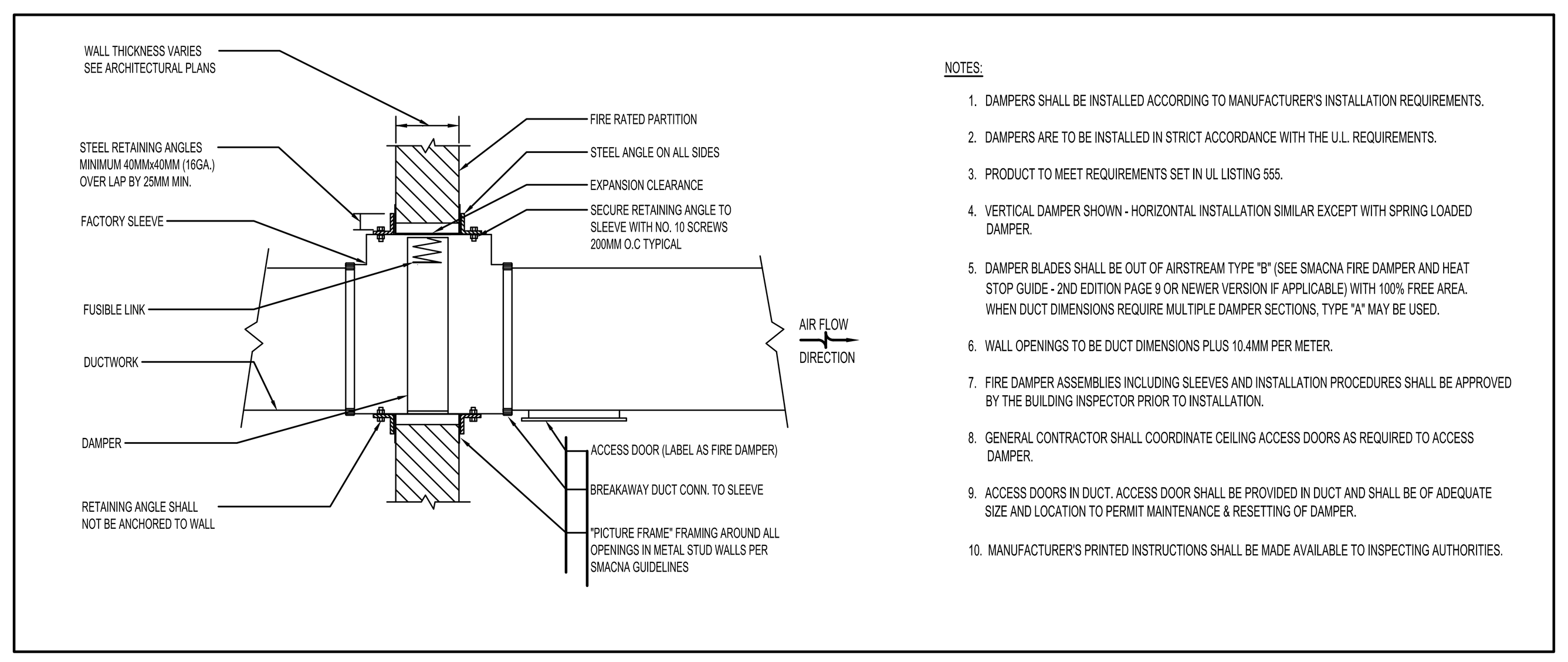
2 / M-501 KITCHEN SINK 'KS-1' PIPING DIAGRAM 2
N.T.S.



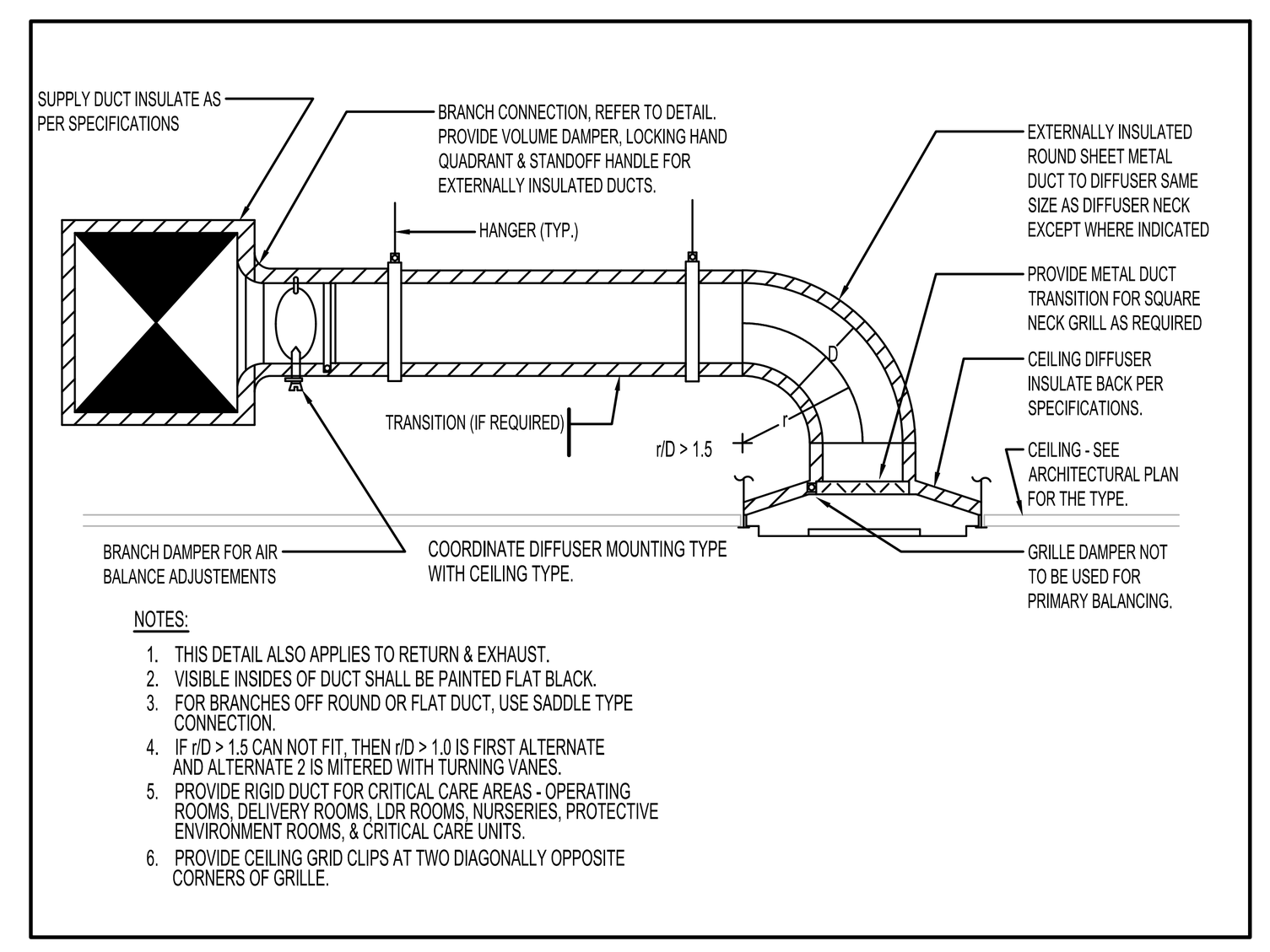
3 / M-501 NEW CONCEALED SPRINKLER HEAD DETAIL
N.T.S.



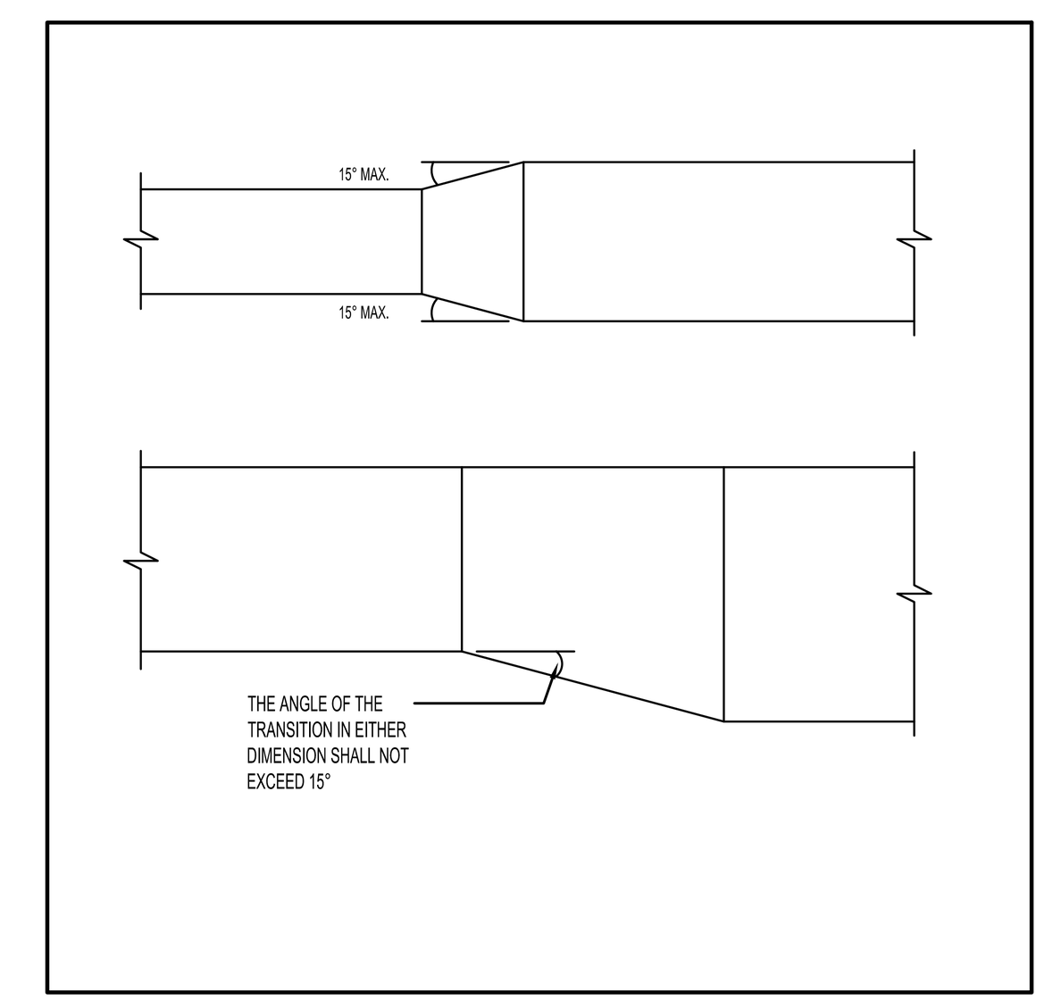
4 / M-501 TYPICAL SPRINKLER HEAD INSTALLATION
N.T.S.



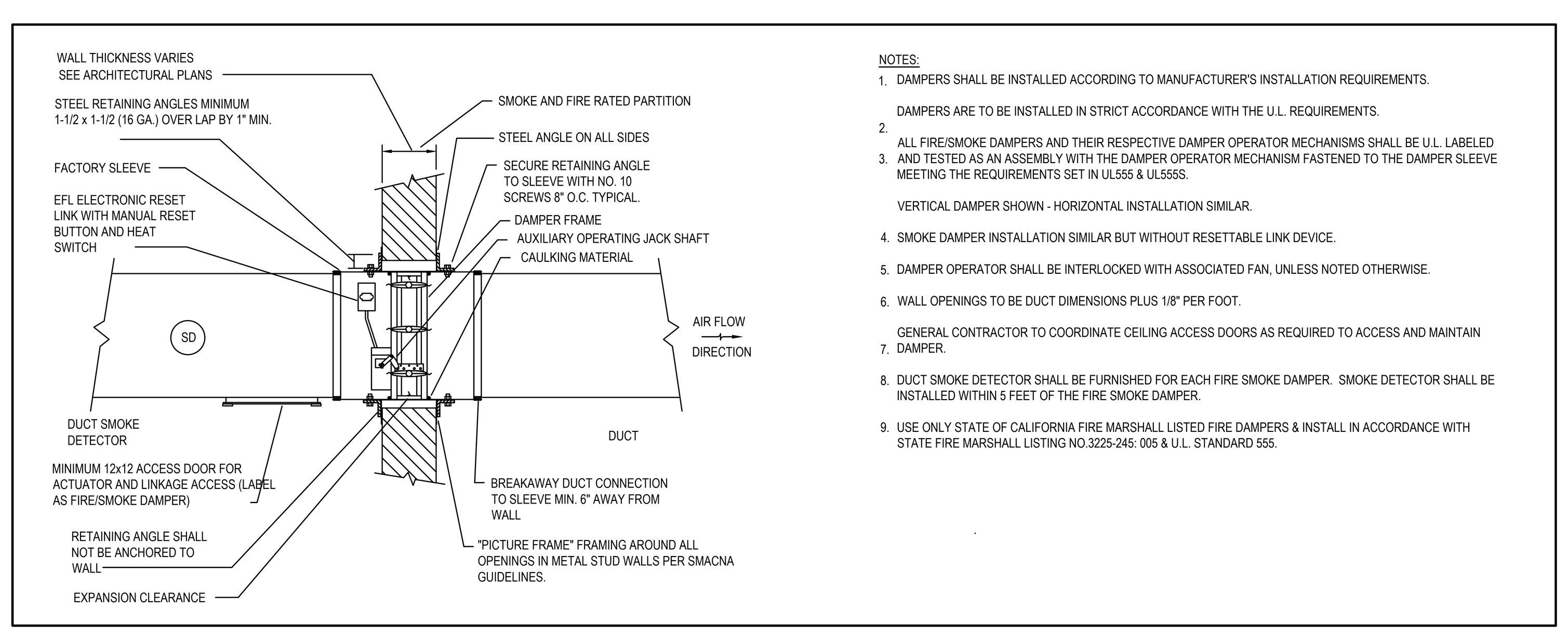
5 / M-501 VERTICAL FIRE DAMPER
N.T.S.



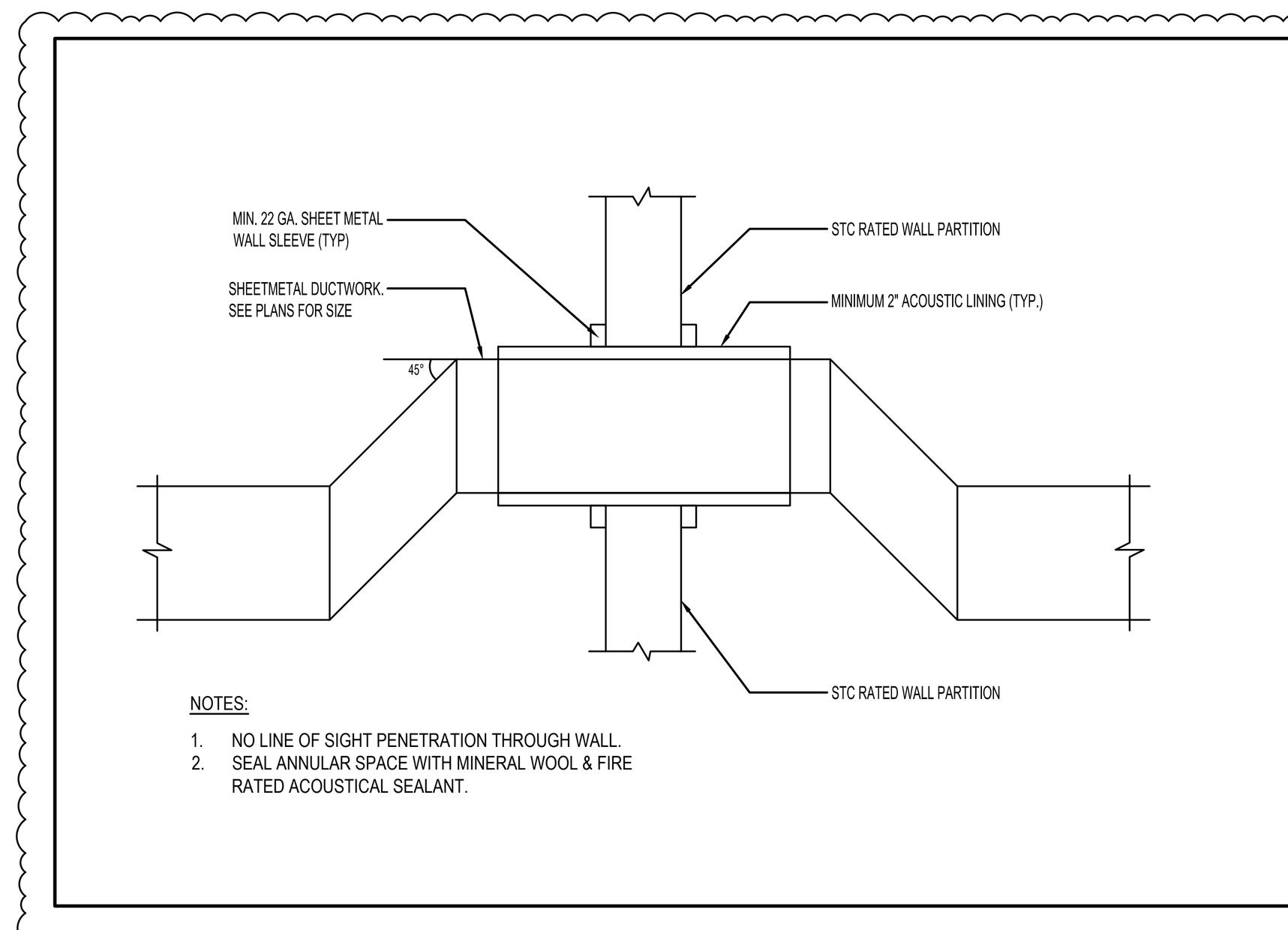
6 / M-501 CEILING DIFFUSER–RIGID DUCT
N.T.S.



7 / M-501 DUCT TRANSITION
N.T.S.



8 / M-501 COMBINATION FIRE SMOKE DAMPER
N.T.S.



9 / M-501 TYPICAL DUCT PENETRATION THRU STC–RATED WALL
N.T.S.

MISCELLANEOUS PLUMBING EQUIPMENT

WATER CHILLER:

SHALL BE OASIS MODEL R1P REMOTE DRINKING WATER CHILLER. POWER SUPPLY 115/1/60 FLA 1.3 135 WATTS, UNIT C/W GLASS FILLER MODEL 034913-001, 1.0GPH, POWDER COATED GALVANIZED STEEL CABINET WITH PLASTIC FRONT, UNDER COUNTER MOUNT, STAINLESS STEEL STORAGE TANK, ¼" STAINLESS STEEL WATER TUBE CONNECTIONS.

WATER FILTER PACKAGE:

SHALL BE 'EVERPURE' MODEL QL3 SINGLE HEAD COMMERCIAL GRADE FILTER HEAD EV9259-14 WITH BUILT IN SHUT OFF VALVE. FILTER CARTRIDGE SHALL BE 'EVERPURE' MODEL 4FC-S 0.5 MICRON FILTER CARTRIDGE EV9692-31. CAPABLE OF DELIVERING 2.5 GPM OF FLOW FOR 15,000 GALLONS OF SERVICE. 1/4" NOMINAL INLET AND OUTLET CONNECTIONS.

FOR QUARRY OR MOSAIC TILED AREAS PROVIDE 125MM X 125MM (5" X 5") SQUARE NICKEL BRONZE STRAINER. WATTS L5-1 5" X 5" (127 MM X 127 MM) NICKEL BRONZE, HEAVY DUTY, SQUARE STRAINER.

PIPE IDENTIFICATION

1. STENCILING:

1.1. STENCILING TO BE PERFORMED IN A NEAT, QUALITY MANNER.
1.2. USE CAPITAL LETTERS MINIMUM 51MM (2") HIGH FOR DN80 (3") DIAMETER PIPING OR LARGER, INCLUDING INSULATION, AND 19MM (3/4") SIZE CAPITAL LETTERS ON SMALLER DIAMETERS.
1.3. USE FLOW ARROWS TO INDICATE DIRECTION OF FLOW. USE DOUBLE ARROW WHERE FLOW IS REVERSIBLE. ARROW SHALL BE SOLID BLACK OR WHITE; MINIMUM 152MM (6") LONG BY 51MM (2") WIDE FOR DN80 (3") DIAMETER PIPING OR LARGER, INCLUDING INSULATION, AND 102MM (4") LONG BY 19MM (3/4") WIDE ON SMALLER DIAMETERS.
1.4. USE WORDING SHOWN ON THE LEGEND ON THE DRAWINGS OR AS INSTRUCTED BY THE CONSULTANT. SPECIAL SYSTEM DESIGNATIONS AND ABBREVIATIONS SHALL BE SUBMITTED TO CONSULTANT FOR APPROVAL PRIOR TO USE.
1.5. COLOUR CODING TO BE AS PER THE FOLLOWING SCHEDULE. FOR ALL OTHER SERVICES, PROVIDE COLOUR CODING IN CONFORMANCE WITH CAN/CGSB-24.3, ANSI AND MANUFACTURER'S RECOMMENDATIONS.

2. LOCATION:

2.1. LOCATE IDENTIFICATION AND FLOW ARROWS AS FOLLOWS:
- BEHIND EACH ACCESS DOOR.
- AT EACH CHANGE OF DIRECTION AND TAKE-OFF.
- NOT MORE THAN 12.2M (40 FT) APART ON ALL PIPES EXPOSED AND/OR LOCATED BEHIND ACCESSIBLE CEILING.
- ON BOTH SIDES OF SLEEVES.
- ADJACENT TO VALVES.
- ABOVE EACH FLOOR OR PLATFORM FOR VERTICAL EXPOSED PIPES APPROXIMATELY 1,524MM (5 FT.) ABOVE FLOOR.

3. MARKER LEGEND:

DESCRIPTION AND SERVICE	CLASSIFICATION COLOR
DOMESTIC COLD WATER	GREEN
DOMESTIC HOT WATER	GREEN
PLUMBING VENT	GREEN
FIRE LINE	RED

PIPE CONNECTION

SYMBOL	ITEM	DCW	DHW	DRAIN	VENT
WC	WATER CLOSET (FLUSH TANK)	15Ø	-	75Ø	40Ø
WC	WATER CLOSET (FLUSH VALVE)	25Ø	-	75Ø	40Ø
SH	SHOWER	15Ø	15Ø	40Ø	32Ø
LAV	LAVATORY	15Ø	15Ø	32Ø	32Ø
KS	KITCHEN SINK	15Ø	15Ø	40Ø	32Ø
DW	DISHWASHER (ROUGH-IN ONLY)	-	15Ø	40Ø	32Ø
FD	FLOOR DRAIN	PRIMED	-	50Ø/75Ø	40Ø

NOTES:
- ALL SANITARY VENTING TO BE INSTALLED IN ACCORDANCE WITH LATEST EDITION OF THE OBC.
- ALL FLOOR DRAINS & HUB DRAINS SHALL BE TRAPPED, VENTED AND PRIMED BELOW FLOOR.

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STRUCTURAL CONSULTANT: Stephenson Engineering
MECHANICAL CONSULTANT: EXP Services Inc.
ELECTRICAL CONSULTANT: EXP Services Inc.

SHEET TITLE: Mechanical Details

SHEET NO.: M501
DRAWN BY:
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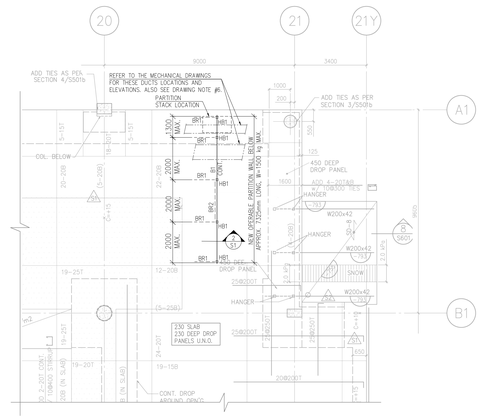
SCALE: AS NOTED



A. GENERAL

1. READ STRUCTURAL DOCUMENTS IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND OTHER CONTRACT DOCUMENTS.

2. BEFORE PROCEEDING WITH THE WORK, CHECK ALL DIMENSIONS SHOWN ON THE STRUCTURAL DOCUMENTS WITH SITE CONDITIONS AND THOSE SHOWN ON ARCHITECTURAL, MECHANICAL AND ELECTRICAL DOCUMENTS AND REPORT DISCREPANCIES TO THE CONSULTANT. STRUCTURAL DRAWINGS MUST NOT BE SCALED.

3. REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS AND SIZES OF OPENINGS, TRENCHES, PITS, SUMPS, EQUIPMENT, SLEEVES, DEPRESSIONS, GROOVES AND CHAMFERS NOT INDICATED ON THE STRUCTURAL DRAWINGS. UNLESS SPECIFICALLY NOTED, THE ABOVE ITEMS WHERE SHOWN ON THE STRUCTURAL DRAWINGS ARE INDICATED ONLY APPROXIMATELY AS TO SIZE AND LOCATION.

4. PROVIDE LABOUR, MATERIALS, PLANT AND EQUIPMENT TO COMPLETE ALL STRUCTURAL WORK INDICATED ON THE CONTRACT DOCUMENTS.

5. UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWINGS, NO PROVISION HAS BEEN MADE IN THE DESIGN FOR CONDITIONS OCCURING DURING CONSTRUCTION. THE CONTRACTOR IS TO PROVIDE ALL NECESSARY BRACING, SHORING, SHEET PILING OR OTHER TEMPORARY SUPPORTS REQUIRED FOR SAFETY AND PROTECTION OF NEW CONSTRUCTION, AS WELL AS TO SAFEGUARD ALL EXISTING OR ADJACENT STRUCTURES AFFECTED BY THIS WORK. CARRY OUT CONSTRUCTION OPERATIONS, INCLUDING THE INSTALLATION OF TEMPORARY GUYING AND SHORING REQUIRED, ENSURING THAT THE EXISTING STRUCTURE OR MEMBERS ALREADY ERECTED ARE NOT LOADED IN EXCESS OF THEIR SAFE LOAD CARRYING CAPACITY.

B. REFERENCE STANDARDS/CODES AND ACTS

1 DESIGN AND CONSTRUCTION IS TO CONFORM TO THE REQUIREMENTS OF THE CURRENT ONTARIO BUILDING CODE, AND ANY APPLICABLE REQUIREMENTS OR BY-LAWS OF THE AUTHORITY HAVING JURISDICTION. ALL CODES, MANUALS, STANDARDS AND SPECIFICATIONS REFERRED TO SHALL BE THE CURRENT EDITIONS, INCLUDING ALL LATEST REVISIONS, ADDENDA AND SUPPLEMENTS, UNLESS NOTED OTHERWISE IN BUILDING CODE. CONFORM ALSO TO THE FOLLOWING:

1.1 1.2	CSA A23.1	CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION.
1.3	CSA A23.2	METHODS OF TEST FOR CONCRETE.
1.4	CSA A23.3	DESIGN OF CONCRETE STRUCTURES.
1.5	CSSBI 10M	STANDARD FOR STEEL ROOF DECK.
1.6	CSSBI 12M	STANDARD FOR COMPOSITE STEEL DECK.
1.7	CSA-S16	DESIGN OF STEEL STRUCTURES.
1.8	RSIC	REINFORCING STEEL INSTITUTE OF CANADA (RSIC), MANUAL OF STANDARD PRACTICE.
1.9	CSA S136	NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS.
1.10	CAN/CSA G40.20/G40.21	GENERAL REQUIREMENTS FOR ROLLED OR WELDED STRUCTURAL QUALITY STEEL/STRUCTURAL QUALITY STEEL.
1.11	CSA W47.1	CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES
1.12	CSA W59	WELDED STEEL CONSTRUCTION (METAL ARC WELDING)
1.13	CSA-A371	MASONRY CONSTRUCTION FOR BUILDINGS.

2 ALL STANDARDS AND PUBLICATIONS REFERENCED BY THE STANDARDS NOTED ABOVE ARE TO APPLY.

3 WHERE THERE ARE DIFFERENCES BETWEEN THE DOCUMENTS AND THE STANDARDS, CODES AND ACTS, THE MOST STRINGENT SHALL GOVERN.

C. QUALIFICATIONS

1 ANY ORGANIZATION UNDERTAKING TO WELD UNDER THIS CONTRACT SHALL BE CERTIFIED BY THE CANADIAN WELDING BUREAU UNDER REQUIREMENTS OF DIVISION 1 OR DIVISION 2 OF CSA W47.1.

2 THE STRUCTURAL STEEL FABRICATOR AND ERECTOR SHALL BE MEMBERS IN GOOD STANDING OF THE CANADIAN INSTITUTE OF STEEL CONSTRUCTION.

3 THE STRUCTURAL STEEL FABRICATOR AND ERECTOR SHAL HAVE A MINIMUM OF FIVE (5) YEARS OF EXPERIENCE ON PROJECTS OF SIMILAR SIZE AND SCOPE. IF REQUESTED, THE FABRICATOR AND ERECTOR SHALL PROVIDE DOCUMENTATION WITH REFERENCES INCLUDING CONTACT NAMES AND PHONE NUMBERS.

4 FOR POST-INSTALLED CONCRETE OR MASONRY ANCHORS, THE CONTRACTOR SHALL ARRANGE FOR A MANUFACTURER'S FIELD REPRESENTATIVE TO PROVIDE INSTALLATION TRAINING FOR ALL PRODUCTS TO BE USED, PRIOR TO COMMENCEMENT OF WORK. ONLY TRAINED INSTALLERS SHALL PERFORM POST INSTALLED ANCHOR INSTALLATION. A RECORD OF TRAINING SHALL BE KEPT ON SITE AND BE MADE AVAILABLE TO THE STRUCTURAL CONSULTANT OR INDEPENDENT INSPECTION AND TESTING COMPANY REPRESENTATIVE AS REQUESTED.

5 ADHESIVE ANCHORS SUPPORTING SUSTAINED TENSION LOADS SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER (AAI) AS CERTIFIED THROUGH ACI/CRSI PROOF OF CURRENT CERTIFICATION SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCEMENT OF INSTALLATION.

6 FOR LIGHWEIGHT STEEL FRAMING, THE DESIGN OF MEMBERS, ERECTION DETAILS AND CONNECTIONS SHALL BE CARRIED OUT BY PROFESSIONAL ENGINEER LICENSED IN ONTARIO AND WITH A MINIMUM OF FIVE (5) YEARS OF EXPERIENCE IN THIS TYPE OF WORK.

D. SUBMITTALS

1 SHOP DRAWINGS

- 1.1 SUBMIT FOR REVIEW BY THE CONSULTANT COMPLETE SHOP DRAWINGS FOR ALL TEMPORARY AND PERMANENT STRUCTURAL WORK INCLUDING, BUT NOT LIMITED TO: STRUCTURAL STEEL INCLUDING CONENCTIONS AND TEMPORARY SHORING.
- 1.2 THE SCALE OF THE DRAWINGS SHALL BE SUCH THAT THE DETAILS OF THE STRUCTURAL WORK ARE CLEARLY SHOWN, AND IN NO CASE SMALLER THAN 1:50 (1/4" = 1'0").
- 1.3 THE STRUCTURAL DRAWINGS SHALL NOT BE REPRODUCED, IN WHOLE OR IN PART, FOR USE AS SHOP DRAWINGS, UNLESS AUTHORIZED BY CONSULTANT.
- 1.4 EACH DRAWING SUBMITTED FOR STRUCTURAL STEEL AND TEMPORARY SHORING SHALL BEAR THE SEAL AND SIGNATURE OF A QUALIFIED PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.
- 1.5 CONTRACTOR SHALL ALLOW FOR A 5 WORKING DAY TURN AROUND TIME FOR STRUCTURAL CONSULTANT TO REVIEW THE SHOP DRAWINGS.
- 1.6 STRUCTURE ERECTED PRIOR TO SUBMITTAL AND SATISFACTORY REVIEW OF SHOP DRAWINGS WILL BE CONSIDERED DEFICIENT.
- 1.7 REVIEW OF SHOP DRAWINGS BY THE STRUCTURAL CONSULTANT IS ONLY TO ASSESS THAT THE SUBMITTED SHOP DRAWINGS REFLECT THE INTENT OF THE STRUCTURAL DESIGN. THIS REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR SEEING THAT THE WORK IS COMPLETE, ACCURATE AND IN CONFORMITY WITH THE CONTRACT DOCUMENTS.

2 CALCULATIONS

- 2.1 SUBMIT CALCULATIONS, BEARING THE SEAL AND SIGNATURE OF PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO, FOR STRUCTURAL WORK, IF REQUESTED BY THE CONSULTANT.

3 MILL TEST REPORTS

- 3.1 MAKE AVAILABLE TO THE CONSULTANT COPIES OF ALL MILL TEST REPORTS COVERING CHEMICAL AND PHYSICAL PROPERTIES OF MATERIALS USED.

4 AS-BUILT DRAWINGS

- 4.1 MARK ON A COMPLETE SET OF REPRODUCIBLE AS-BUILT DRAWINGS ANY CHANGES, ADDITIONS, OR DELETIONS THAT OCCUR DURING CONSTRUCTION AS A RESULT OF THE CONTRACTOR'S WORK, CHANGE OF ORDERS OR FOR ANY OTHER REASON.

E. MATERIALS

1 PROVIDE ONLY NEW STRUCTURAL MATERIALS IN ACCORDANCE WITH THE REFERENCE STANDARDS AND THE FOLLOWING, UNLESS OTHERWISE NOTED.

- 1.1 POST-INSTALLED CONCRETE ANCHORS
  - 1.1.1 MECHANICAL ANCHORS SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ACI 355.2 AND ICC-ES AC193 FOR CRACKED, UNCRACKED AND SEISMIC CONCRETE APPLICATIONS, UNLESS NOTED OTHERWISE.
  - 1.1.2 ADHESIVE ANCHORS SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED, UNCRACKED AND SEISMIC CONCRETE APPLICATIONS, UNLESS NOTED OTHERWISE.
- 1.2 POST-INSTALLED MASONRY ANCHORS
  - 1.2.1 MECHANICAL ANCHORS SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC01 OR AC106.
  - 1.2.2 ADHESIVE ANCHORS SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC58.
- 1.3 POWER DRIVEN FASTENERS
  - 1.3.1 POWER DRIVEN FASTENERS SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC70
- 1.4 STRUCTURAL STEEL:
  - 1.4.1 STRUCTURAL WIDE FLANGE AND WELDED WIDE FLANGE SHAPES (W, WWF) TO CONFORM CSA-G40.20/G40.21 GRADE 350W.
  - 1.4.2 ANGLES AND CHANNELS (L, C) TO CONFORM TO CSA-G40.20/G40.21 GRADE 350W.
  - 1.4.3 PLATES (PL) TO CONFORM TO CSA-G40.20/G40.21 GRADE 300W.
  - 1.4.4 HOLLOW STRUCTURAL SECTIONS (HSS) TO CONFORM TO CSA-G40/G40.21 GRADE 350W (CLASS C U/N)
- 1.5 PRIME PAINT (FOR INTERIOR APPLICATIONS NOT EXPOSED TO HIGH HUMIDITY OR CHEMICALS): CONFORM TO CISC/CPMA STANDARD 2-75, UNLESS NOTED OTHERWISE.
- 1.6 STRUCTURAL BOLTS, NUTS AND WASHERS: CONFORM TO ASTM F3125/F3125M, GRADE A325M
- 1.7 NON-SHRINK GROUT = COMPRESSIVE STRENGTH OF 35 MPa AT 24 HOURS.
- 1.8 BLOCK: CONFORM TO CSA A165 SERIES, MINIMUM COMPRESSIVE STRENGTH = 15.0 MPa (MIN.) BASED ON NET AREA.
- 1.9 MORTAR: CONFORM TO CSA A179 TYPE S FOR LOADBEARING WALLS UNLESS NOTED.
- 1.10 MASONRY GROUT: CONFORM TO CSA A179, 15 MPa MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS, 250 mm (10") SLUMP, MAXIMUM AGGREGATE SIZE 10 mm (3/8")

F. EXECUTION

1. POST-INSTALLED CONCRETE AND MASONRY ANCHORS

- 1.1. POST INSTALLED ANCHORS SHALL BE USED ONLY WHERE SPECIFIED ON STRUCTURAL DRAWINGS.
- 1.2. ANCHOR CAPACITY USED IN THE DESIGN HAS BEEN BASED ON THE TECHNICAL DATA PUBLISHED BY THE MANUFACTURER. SUBSTITUTION REQUESTS FOR ALTERNATE ANCHORS MUST BE APPROVED IN WRITING BY THE STRUCTURAL CONSULTANT PRIOR TO USE. CONTRACTOR SHALL PROVIDE CALCULATIONS STAMPED BY LICENSED ENGINEER DEMONSTRATING THAT THE ALTERNATIVE ANCHOR IS CAPABLE OF ACHIEVING THE PERFORMANCE VALUES OF THE SPECIFIED PRODUCT. SUBSTITUTIONS WILL BE EVALUATED FOR COMPLIANCE WITH THE RELEVANT BUILDING CODE AND CSA A23.3 STANDARD. ADHESIVE ANCHOR EVALUATION WILL ALSO CONSIDER CREEP, IN-SERVICE TEMPERATURE AND INSTALLATION TEMPERATURE.
- 1.3. THE EXISTING REINFORCEMENT IN THE CONCRETE STRUCTURE MAY CONFLICT WITH THE SPECIFIED ANCHOR LOCATIONS. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURE SHALL NOT BE CUT UNLESS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD. THE CONTRACTOR SHALL LOCATE THE EXISTING REINFORCEMENT AND CONDUITS AT THE PROPOSED LOCATIONS OF THE ANCHORS BY NON-DESTRUCTIVE METHODS SUCH AS HILTI PS 250 FERROSCAN, HILTI PS 1000 X-SCAN, GROUND PENETRATING RADAR (GPR), X-RAYS OR OTHER APPROVED MEANS. MODIFY THE STRUCTURAL ANCHOR DETAILS AS REQUIRED TO AVOID CUTTING REBAR OR CONDUITS, AND SUBMIT THE REVISED DETAILS FOR REVIEW BY STRUCTURAL CONSULTANT PRIOR TO PROCEEDING WITH THE WORK.
- 1.4. ALL ANCHORS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII) IN CONJUNCTION WITH EDGE DISTANCE, SPACING AND EMBEDMENT DEPTH AS INDICATED ON THE DRAWINGS.
- 1.5. ADHESIVE ANCHORS MUST BE INSTALLED IN CONCRETE AGED A MINIMUM OF 21 DAYS.

2. STRUCTURAL STEEL

- 2.1. DETAILS AND CONNECTIONS OF STEEL MEMBERS SHALL BE DESIGNED BY A LICENSED PROFESSIONAL ENGINEER EXPERIENCED IN THIS TYPE OF WORK, TO THE REQUIREMENTS OF CSA-16 TO RESIST FORCES, MOMENTS AND SHEARS INDICATED OR IMPLIED BY THE DRAWINGS.
- 2.2. DESIGN OF STEEL JOISTS AND BRIDGING SHALL BE DONE BY A LICENSED PROFESSIONAL ENGINEER EXPERIENCED IN THIS TYPE OF WORK, TO CARRY THE LOADS INDICATED OR IMPLIED BY THE DRAWINGS IN ACCORDANCE WITH CSA S16 OR CSA S136. DESIGN JOISTS AND ANCHORAGES FOR UPLIFT FORCES AS INDICATED.
- 2.3. SHOP DRAWINGS AND CALCULATIONS BEARING THE STAMP AND SIGNATURE OF A LICENSED PROFESSIONAL ENGINEER RESPONSIBLE FOR THE DESIGN OF CONNECTIONS OR STEEL JOISTS SHALL BE SUBMITTED FOR REVIEW PRIOR TO FABRICATION AND ERECTION OF STRUCTURAL STEEL.
- 2.4. UNLESS OTHERWISE NOTED, BEAM CONNECTIONS SHALL BE DESIGNED FOR A MINIMUM OF VERTICAL SHEAR OF 100 kN. WHERE BOLTED CONNECTIONS ARE EMPLOYED, A MINIMUM OF TWO BOLTS PER CONNECTION ARE TO BE USED.
- 2.5. THE FOLLOWING TYPES OF CONNECTIONS ARE TO BE DESIGNED AS SLIP-CRITICAL CONNECTIONS:
  - 2.5.1. MOMENT CONNECTIONS (UNLESS END PLATE TYPE MOMENT-CONNECTIONS ARE USED).
  - 2.5.2. CONNECTIONS WHERE WELDS AND BOLTS SHARE IN TRANSMITTING SHEAR FORCES AT A COMMON FAYING SURFACE.
  - 2.5.3. CONNECTIONS THAT UTILISE OVERSIZED HOLES.
  - 2.5.4. CONNECTIONS SUBJECT TO FATIGUE OR FREQUENT LOAD REVERSALS.
- 2.6. CONFORM TO THE FIRE RATED ASSEMBLY DESIGN SPECIFIED TO THE PROJECT.
- 2.7. NO ITEMS ARE TO BE HUNG FROM OPEN WEB STEEL JOISTS WITHOUT PRIOR REVIEW BY THE STRUCTURAL CONSULTANT.
- 2.8. FOR INTERIOR APPLICATIONS NOT EXPOSED TO HIGH HUMIDITY OR CHEMICALS, PREPARE ALL STRUCTURAL STEEL PER SSPC-SP7 BRUSH-OFF BLAST CLEANING STANDARD AND PAINT TO REQUIREMENTS OF CISC/CPMA 2-75. TOUCH UP ALL FIELD WELDS.
- 2.9. ALL STRUCTURAL STEEL EXPOSED TO WEATHER SHALL GALVANIZED IN ACCORDANCE WITH ASTM A123/A123M. PREPARE SURFACE PER SSPC-SP7 BRUSH-OFF BLAST CLEANING AND SSPC-SP8 PICKLING PRIOR TO GALVANIZING.
- 2.10. ALL WELDS SHALL CONFORM TO CSA STANDARD W59.
- 2.11. ALL WELDS EXPOSED TO VIEW SHALL BE GROUND SMOOTH.
- 2.12. UNLESS A REINFORCED MASONRY OR CONCRETE LINTEL IS SHOWN, PROVIDE LOOSE STEEL LINTELS IN ACCORDANCE WITH REQUIREMENTS OF DOCUMENTS OVER DOORWAYS, OTHER OPENINGS AND RECESSES, INCLUDING THOSE FOR MECHANICAL OR ELECTRICAL SERVICES, IN MASONRY WALLS OR PARTITIONS.
- 2.13. DO NOT SPLICE STRUCTURAL STEEL SECTIONS WITHOUT PRIOR APPROVAL OF THE CONSULTANT. ALL SPLICES SHALL DEVELOP THE FULL CAPACITY OF THE SECTION AND ARE TO BE TESTED BY NON DESTRUCTIVE METHODS, BY AN INDEPENDENT INSPECTION AND TESTING COMPANY, AT THE CONTRACTOR'S EXPENSE.
- 2.14. SEE ARCHITECTURAL DRAWINGS FOR FIREPROOFING REQUIREMENTS. CONFIRM COMPATIBILITY OF FIREPROOFING MATERIAL WITH STEEL PAINT.
- 2.15. AN INDEPENDENT INSPECTION AND TESTING COMPANY IS TO INSPECT STRUCTURAL STEEL IN THE SHOP AND IN THE FIELD FOR WELDING, CONNECTIONS, BOLT TORQUES AND GENERAL CONFORMANCE WITH THE

3. ALTERATIONS AND/OR CONNECTIONS TO EXISTING STRUCTURE

- 3.1. PROPOSED SCHEDULE OF WORK TO BE COORDINATED WITH ALL SUBTRADES.
- 3.2. INSPECT THE EXISTING BUILDING AND BECOME THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS.
- 3.3. PRIOR TO PROCEEDING WITH THE WORK, DETERMINE THE EXACT FOUNDING ELEVATIONS OF EXISTING FOOTINGS ADJACENT TO THE NEW WORK. REPORT THESE FINDINGS TO THE CONSULTANT.
- 3.4. PRIOR TO FABRICATION OF STRUCTURAL STEEL, OPEN UP ALL AREAS WHERE CONNECTIONS ARE TO BE MADE TO EXISTING WORK AND TAKE FIELD MEASUREMENTS. MODIFY METHODS FOR CONNECTING TO SUIT SITE CONDITIONS FOUND AND TO THE APPROVAL OF THE CONSULTANT. CARRY OUT LOCAL REPAIRS TO THE EXISTING WORK AS NECESSARY AND AS DIRECTED BY THE CONSULTANT.
- 3.5. SHORE EXISTING WORK AS REQUIRED UNTIL ALL NEW WORK HAS BEEN COMPLETED AND REVIEWED BY THE CONSULTANT.
- 3.6. SHORE FLOORS AS REQUIRED TO SUPPORT CRANES, HOISTS AND OTHER CONSTRUCTION EQUIPMENT.
- 3.7. DO NOT CUT CONCRETE REINFORCEMENT UNLESS REVIEWED AND APPROVED BY THE CONSULTANT.
- 3.8. WHERE REQUIRED TO AVOID CUTTING EXISTING REINFORCEMENT, MODIFY THE LAYOUT OF NEW THROUGH BOLTS, EXPANSION ANCHORS AND OTHER ANCHORING DEVICES.
- 3.9. MAKE GOOD THE EXISTING WORK.

4. CUTTING AND CORING OF EXISTING STRUCTURE

- 4.1. PRIOR TO CUTTING AND CORING ANY OPENINGS IN THE EXISTING BUILDING, PROVIDE THE CONSULTANT WITH A SLEEVING DRAWING INDICATING THE SIZE AND LOCATION OF OPENING RELATIVE TO BUILDING GRID LINES. EXISTING OPENINGS IN THE VICINITY OF THE NEW OPENING MUST ALSO BE SHOWN.
- 4.2. ALL DIMENSIONS PROVIDED TO THE CONSULTANT ARE TO BE CONFIRMED WITH THE APPROPRIATE CONTRACTOR (MECHANICAL OR ELECTRICAL) PRIOR TO CUTTING/CORING.
- 4.3. ANY REVISIONS TO THE DIMENSIONS BY THE CONSULTANT MUST BE REVIEWED BY THE APPROPRIATE CONTRACTOR PRIOR TO CUTTING/CORING.
- 4.4. EXISTING REINFORCEMENT AND EMBEDDED SERVICES ARE TO BE LOCATED BY A POSITIVE MEANS, (i.e. X-RAYING, EM SCAN, COVER METER) PRIOR TO DRILLING/CUTTING/CORING.
- 4.5. AFTER REINFORCEMENT AND EMBEDDED SERVICES HAS BEEN LOCATED IN THESE AREAS, NOTIFY STRUCTURAL CONSULTANT WHO WILL REVIEW AND APPROVE OF LOCATION PRIOR TO CUTTING/CORING. MAKE ANY NECESSARY ADJUSTMENTS TO THE HOLE LOCATION AS DIRECTED BY THE CONSULTANT.
- 4.6. FOR ANY OPENINGS WHICH ARE TO BE SAWCUT INTO THE EXISTING STRUCTURE, PRE-DRILL THE CORNERS USING A 100 mm DIAMETER CORE DRILL. DO NOT OVERCUT CORNERS OF OPENING.
- 4.7. ALL PRICES FOR CUTTING/CORING ARE TO INCLUDE ANY COSTS ASSOCIATED WITH X-RAYING, CHIPPING, ETC.
- 4.8. FOR ANY AREAS WHERE REINFORCEMENT IS CUT, THE CONTRACTOR IS TO INDICATE THE DIRECTION AND LAYER OF REINFORCEMENT ON THE AS-BUILT SLEEVING DRAWINGS.
- 4.9. FOR LARGE OPENINGS THROUGH A FLOOR AREA, ADDITIONAL REINFORCEMENT OF THE SLAB MAY BE REQUIRED. THE STRUCTURAL CONSULTANT WILL ISSUE ADDITIONAL DETAILS AS REQUIRED.

G. QUALITY CONTROL

1 GENERAL

- 1.1 IMPLEMENT A SYSTEM OF QUALITY CONTROL TO ENSURE THAT THE MINIMUM STANDARDS SPECIFIED HEREIN ARE ATTAINED.
- 1.2 BRING TO THE ATTENTION OF THE CONSULTANT ANY DEFECTS IN THE WORK OR DEPARTURES FROM THE CONTRACT DOCUMENTS, WHICH MAY OCCUR DURING CONSTRUCTION. THE CONSULTANT WILL DECIDE UPON CORRECTIVE ACTION AND GIVE RECOMMENDATIONS IN WRITING.
- 1.3 EXTRA SITE VISITS OR DESIGN WORK BY THE CONSULTANT THAT RESULT FROM THE CONTRACTOR'S CONSTRUCTION DEFICIENCIES, EXTRA REQUESTS FOR SITE MEETINGS, REVIEW OF EXISTING CONDITIONS, OR COORDINATION ISSUES WILL BE PAID IN FULL BY THE CONTRACTOR TO THE CONSULTANT UNLESS OTHERWISE AGREED UPON IN WRITING PRIOR TO THE CONSULTANT ENGAGING IN THE WORK. PAYMENT WILL BE STANDARDIZED AT THE CONSULTANT'S CURRENT PER DIEM RATE UNLESS OTHERWISE AGREED UPON.
- 1.4 THE CONSULTANT'S GENERAL REVIEW DURING CONSTRUCTION AND INSPECTION AND TESTING BY INDEPENDENT INSPECTION AND TESTING AGENCIES REPORTING TO THE CONSULTANT ARE BOTH UNDERTAKEN TO INFORM THE OWNER/CLIENT OF THE CONTRACTOR'S PERFORMANCE AND SHALL IN NO WAY AUGMENT THE CONTRACTOR'S QUALITY CONTROL OR RELIEVE THE CONTRACTOR OF CONTRACTUAL RESPONSIBILITY.
- 1.5 ANY DESIGN CHANGES / ALTERNATIVES TO THE BASE DESIGN BY CONTRACTOR ARE TO BE PROPOSED FOR THE CONSULTANT'S REVIEW THROUGH A FORMAL P.ENG. STAMPED SUBMITTAL. CREDITS MAY BE APPLICABLE DEPENDING ON THE PROPOSED DESIGN CHANGE.

2 NOTIFICATION

- 2.1 PRIOR TO COMMENCING SIGNIFICANT SEGMENTS OF THE WORK, GIVE THE CONSULTANT AND INDEPENDENT INSPECTION AND TESTING COMPANIES APPROPRIATE NOTIFICATION (MINIMUM 24 HOURS) SO AS TO AFFORD THEM REASONABLE OPPORTUNITY TO REVIEW THE WORK. FAILURE TO MEET THIS REQUIREMENT MAY BE CAUSE FOR THE CONSULTANT TO CLASSIFY THE WORK AS DEFECTIVE.

2.1.1 IT IS THE RESPONSIBILITY OF BOTH THE OWNER AND THE CONTRACTOR TO NOTIFY THE ENGINEER OF CONSTRUCTION PROGRESS SO THE ENGINEER CAN COMPLETE GENERAL REVIEWS. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A CONSTRUCTION SCHEDULE PRIOR TO STARTING THE WORK. GENERALLY, REVIEWS BY THE ENGINEER WILL BE REQUIRED FOR REBAR PRIOR TO CONCRETE PLACEMENT, FOOTING, AND FOUNDATIONS PRIOR TO BACKFILLING. THE ENGINEER WILL ALSO NEED TO REVIEW ALL ABOVE GRADE FRAMING PRIOR TO INSTALLATION OF INTERIOR FINISHES.

2.1.2 CONTRACTOR TO SITE VERIFY THAT THE CEILING SPACE IS CLEAR OF OBSTRUCTIONS PRIOR TO PRICING OR FABRICATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND REINSTATE/RELOCATE EXISTING SERVICES WITHIN THE CEILING SPACE IN ORDER TO FACILITATE STRUCTURAL INSTALLATION. NO EXTRAS ARE ACCEPTABLE FOR COORDINATION TIME WITH ANY CONSULTANTS (M&E OR OUR OFFICE). SITE VISITS OR MEETINGS ON SITE WILL BE CONSIDERED AN EXTRA TO BE PAID BY THE CONTRACTOR.

2.1.3 STRUCTURAL DRAWINGS REFLECT THE BEST AVAILABLE INFORMATION AT THE TIME OF DESIGN, ALTHOUGH CONDITIONS IN THE CEILING SPACE COULD NOT BE DETERMINED PRIOR TO ISSUE. ONCE FINISHES HAVE BEEN REMOVED, CONTRACTOR IS TO IMMEDIATELY ADVISE THE PROJECT TEAM OF ANY INTERFERENCES WITH EXISTING MEP SERVICES IN THE CEILING SPACE. CONTRACTOR TO OBTAIN WRITTEN AUTHORIZATION PRIOR TO REMOVAL OF ANY MEP SERVICES.

3 INSPECTION AND TESTING

- 3.1 THE CONTRACTOR WILL APPOINT AN INDEPENDENT INSPECTION AND TESTING COMPANY TO MAKE INSPECTIONS OR PERFORM TESTS AS OUTLINED IN THIS DOCUMENT. THE INDEPENDENT INSPECTION AND TESTING COMPANIES SHALL BE RESPONSIBLE ONLY TO THE CONSULTANT AND SHALL MAKE ONLY SUCH INSPECTIONS OR TESTS AS THE CONSULTANT MAY DIRECT.
- 3.2 INCLUDE FOR AN INDEPDENT THIRD PARTY WELDING INSPECTION AND TESTING COMPANY TO REVIEW ALL CONNECTIONS AND PROVIDE A WRITTEN REPORT WITH COMMENTS. THE WORK WILL BE CONSIDERED DEFICIENT UNTIL THE INSPECTION COMPANY HAS CONFIRMED IN WRITING THAT ALL NEWLY INSTALLED CONNECTIONS ARE ACCEPTABLE.

4 DEFECTIVE MATERIALS AND WORK

- 4.1 WHERE EVIDENCE EXISTS THAT DEFECTIVE WORK HAS OCCURRED OR THAT WORK HAS BEEN CARRIED OUT INCORPORATING DEFECTIVE MATERIALS, THE CONSULTANT MAY HAVE TESTS, INSPECTIONS OR SURVEYS PERFORMED, ANALYTICAL CALCULATIONS OF STRUCTURAL STRENGTH MADE, AND THE LIKE, IN ORDER TO HELP DETERMINE WHETHER THE WORK MUST BE CORRECTED OR REPLACED. TESTS, INSPECTIONS OR SURVEYS OR CALCULATIONS CARRIED OUT UNDER THESE CIRCUMSTANCES WILL BE MADE AT THE CONTRACTOR'S EXPENSE, REGARDLESS OF THEIR RESULTS, WHICH MAY BE SUCH THAT, IN THE CONSULTANT'S OPINION, THE WORK MAY BE ACCEPTABLE.
- 4.2 ALL TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ONTARIO BUILDING CODE, EXCEPT WHERE THIS WOULD, IN THE CONSULTANT'S OPINION, CAUSE UNDUE DELAY OR GIVE RESULTS NOT REPRESENTATIVE OF THE REJECTED MATERIAL IN PLACE. IN THIS CASE, THE TESTS SHALL BE CONDUCTED IN ACCORDANCE WITH THE STANDARDS GIVEN BY THE CONSULTANT.
- 4.3 MATERIALS OR WORK, WHICH FAIL TO MEET SPECIFIED REQUIREMENTS, MAY BE REJECTED BY THE CONSULTANT WHENEVER FOUND AT ANY TIME PRIOR TO FINAL ACCEPTANCE OF THE WORK REGARDLESS OF PREVIOUS INSPECTION. IF REJECTED, DEFECTIVE MATERIALS OR WORK SHALL BE PROMPTLY REMOVED AND REPLACED OR REPAIRED TO THE SATISFACTION OF THE CONSULTANT, AT NO EXPENSE TO THE OWNER.

1/S1 PART SECOND FLOOR FRAMING PLAN

STRUCTURAL STEEL TO BE INSTALLED ON THE UNDERSIDE OF THE SLAB. 1:100

2/S1 SECTION

1:20

DRAWING NOTES:

1. READ THIS DRAWING IN CONJUNCTION WITH S1 (GENERAL NOTES) AND ALL OTHER CONTRACT DOCUMENTS.
2. REFER TO ARCHITECTURAL DRAWINGS FOR SIZE AND EXACT LOCATION OF OPERABLE PARTITION WALL, DIMENSIONS NOT SHOWN, AND EXTENT OF WORK. CONTRACTOR IS RESPONSIBLE TO SITE VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS. CONTRACTOR TO NOTIFY OUR OFFICE OF ANY DISCREPANCY NOTED BETWEEN THE AS-BUILT CONDITION AND WHAT IS SHOWN ON THESE DRAWINGS.
3. DESIGN LOADS PER EXISTING BASE BUILDING DRAWING:
   a. LIVE LOAD SECOND FLOOR .... 3.6 kPa
   b. SUPERIMPOSED DEAD LOADS SECOND FLOOR .... 1.7 kPa
   c. ASSUMED INTERIOR WIND PRESSURE........0.25 kPa
   c. FOR PARTITION WALL SELF WEIGHT SEE PLAN.
   d. EARTHQUAKE DATA PER OBC 2024:
   I_E (POST DISASTER BUILDING) = 1.5 ASSUMED SITE CLASS = D Sa (0.2) = 0.315 I_E Sa (0.2) = 0.4725
   BUILDING SEISMIC CATEGORY: SC3
4. SECTION MARKS:
   a. B1: W200X36, CONTINUOUS. TO BE INSTALLED AT UNDERSIDE OF THE EXISTING FLOOR SLAB. TOP OF STEEL ELEVATION TO BE VERIFIED ON SITE AND TO BE PER ARCHITECTURAL DRAWINGS. SEE SECTION 2/S1 FOR DETAILS. B1 TO BE ALIGNED WITH OPERABLE PARTITION WALL BELOW. PRE-DRILL BOTTOM FLANGE OF B1 PER PARTITION WALL FINAL SHOP DRAWINGS AT HANGER ROD LOCATIONS. DETAILS FOR BEAM SPLICE DETAILS TO BE INCLUDED IN STEEL SHOP DRAWINGS.
   b. BR1: L64x64x6.4 DIAGONAL VERTICAL BRACING, PERPENDICULAR TO PARTITION WALL DIRECTION. CONNECT TO B1 BOTTOM FLANGE AND PL1 FOR Tf = Cf = 25 kN. BR1 CAN BE INSTALLED ON EITHER SIDE OF THE B1. SEE SECTION 2/S1 FOR DETAILS AND PLAN FOR LOCATIONS.
   c. BR2: L64X64x6.4 DIAGONAL VERTICAL BRACING, PARALLEL TO PARTITION WALL DIRECTION. CONNECT TO B1 TOP FLANGE AND PL1 FOR Tf = Cf = 25 kN. SEE PLAN FOR LOCATIONS.
   d. HB1: HSS 64X64X6.4. NEW HANGER. CONNECT FOR Tf = 50 kN.
   e. PL1: END PLATE 220mm x 100mm x 12mm c/w 2-16mm ø (5/8" ø) HILTI KWIK BOLT TZ2-CS OR APPROVED EQUIVALENT WITH 102mm EMBEDMENT. TO BE INSTALLED AT U/S OF SLAB. ANCHOR LOCATIONS TO BE FINALIZED PER SLAB SCAN RESULTS. ANCHORS TO BE CENTRED ON PL1. SEE SECTION 2/S1 FOR DETAILS.
   f. PL2: END PLATE 200mm x 200mm x 12mm c/w 2-19mm ø (3/4" ø) SPACED 130mm c/c HILTI KWIK BOLT TZ2-CS OR APPROVED EQUIVALENT WITH 120mm EMBEDMENT. TO BE INSTALLED AT FACE OF COLUMNS. ANCHOR LOCATIONS TO BE FINALIZED PER COLUMN SCAN RESULTS. ANCHORS TO BE CENTRED ON PL2. SEE SECTION 2/S1 FOR DETAILS.
   g. C1: HSS 102x102X8 FULL HEIGHT. CONNECT FOR Vf= 40 kN. CONNECT TO THE EXISTING FLOOR SLAB USING B.PL. 260X110X10 c/w 2-16mmø HILTI KWIK BOLT TZ2-CS OR APPROVED EQUIVALENT WITH 102mm EMBEDMENT INTO THE SLAB. BASE PLATE AND ANCHORS TO BE INSTALLED WITHIN THE NEW PARTITION WALLS. LENGTH OF C1 TO BE SITE VERIFIED. TOP OF C1 TO HAVE VERTICAL SLOTTED CONNECTION AS SHOWN IN TYPICAL SECTION 3/S1.
   h. B2: HSS 102X102X6.4. CONNECT FOR Vf= 40 kN.
5. BEFORE DRILLING AT ANCHOR LOCATIONS, CONTRACTOR TO CONDUCT X-RAY OR GPR SCAN TO LOCATE ANY EXISTING SERVICES OR REINFORCEMENT IN THE SLAB. DO NOT CUT EXISTING REBAR OR CONDUITS FOR ANCHOR INSTALLATION.
6. WE UNDERSTAND THAT SOME MECHANICAL AND ELECTRICAL INTERFERENCES ARE TO BE REMOVED/RELOCATED/REINSTATED TO ALLOW INSTALLATION OF STRUCTURAL STEEL SUPPORT SHOWN IN THIS DRAWING. COORDINATE WITH MECHANICAL AND ELECTRICAL CONSULTANTS PRIOR TO ANY REMOVALS. CONTRACTOR IS RESPONSIBLE TO SURVEY THE SITE PRIOR TO PRICING FOR FABRICATION OF STEEL.
7. UNLESS NOTED OTHERWISE, CONNECT ALL STEEL MEMBERS FOR Vf = 50 kN. CONNECT WITH WELDS OR MINIMUM 2 BOLTS.
8. STEEL SHOP DRAWINGS TO BE PREPARED PER SITE CONDITION/ MEASUREMENTS AND COORDINATED WITH PARTITION WALL SUPPLIER. SUBMIT STAMPED SHOP DRAWINGS FOR CONSULTANT'S REVIEW.
9. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN, EXTENT OF THE WORK, AND FIREPROOFING REQUIREMENTS.
10. SEE GENERAL NOTES ON S1 FOR THIRD PARTY INSPECTION REQUIREMENT.
11. CONTRACTOR IS RESPONSIBLE TO PROVIDE SUFFICIENT NOTICE FOR OUR FINAL SITE REVIEW PRIOR TO CLOSING THE WORK AREA WITH FINISHES.
12. EXISTING STRUCTURE HAS BEEN REVIEWED AGAINST NEW LOAD IMPOSED BY THE NEW OPERABLE PARTITION WALL IN PROPOSED LOCATION. IN OUR OPINION, THE SECOND FLOOR SLAB CAN SAFELY SUSTAIN THIS LOAD.

NOTE TO GC:

1- GC TO PROVIDE STRUCTURAL LINTEL FOR THE NEW DOORS IN NEW MASONRY PARTITION WALLS PER TABLE M01A AND TYPICAL DETAIL M01B. FOR LOCATIONS OF NEW MASONRY PARTITION WALLS AND NEW DOOR OPENING SIZES AND QUANTITY SEE ARCHITECTURAL DRAWINGS.

2- TOP OF ALL NEW PARTITION MASONRY WALLS SHOULD BE LATERALLY SUPPORTED PER TYPICAL DETAIL M07B. FOR LOCATION OF NEW MASONRY PARTITION WALLS SEE ARCHITECTURAL DRAWINGS.

3- GC TO FOLLOW BELOW STEPS WHERE EXISTING DOOR OPENING IN AN EXISTING MASONRY WALL NEEDS TO BE WIDEN. FOR LOCATIONS AND DOOR OPENING SIZES SEE DRAWING S2 AND ARCHITECTURAL DRAWINGS.

- 3.1. NEEDLE SHORE THE EXISTING MASONRY WALL ABOVE THE EXISTING LINTEL. GC TO SUBMIT STAMPED SHORING SHOP DRAWINGS FOR CONSULTANT'S REVIEW.
- 3.2. REMOVE EXISTING LINTEL.
- 3.3. INSTALL NEW LINTEL PER TABLE M01A AND TYPICAL DETAIL M01B.

3/S1 TYPICAL SECTION – STC DOOR LATERAL SUPPORT

FOR NEW PARTITION WALL CONSTRUCTION 1:20

SEE ARCHITECTURAL DRAWINGS FOR QUANTITY AND LOCATION.

NON-LOAD BEARING BLOCK WALL LINTELS — M01A

STRUCTURAL STEEL LINTELS

WALL OPENING CLEAR SPAN	MASONRY BLOCK THICKNESS				
	90 (4")	140 (6")	190 (8")	240 (10")	290 (12")
300mm TO 500mm (12" TO 22")	75mm X 8mm PL (3"x5/16" PL)	125mm X 8mm PL (5"x5/16" PL)	175mm X 8mm PL (7"x5/16" PL)	225mm X 8mm PL (9"x5/16" PL)	275mm X 8mm PL (11"x5/16" PL)
550mm TO 1200mm (22" TO 4'-0")	1-L89x89x6.4 OR 2-L44x44x4.8	1-L127x89x6.4 (LLH) OR 2-L64x44x6.4	2-L89x89x6.4	L102x89x6.4 (LLH) + L127x89x6.4 (LLH)	3-L89x89x6.4
1200mm TO 1830mm (4'-0" TO 6'-0")	1-L127x89x7.9 (LLV) OR 2-L51x38x6.4(LLV)	1-L127x127x7.9 OR 2-L89x64x6.4 (LLV)	2-L89x89x6.4	L102x89x6.4 (LLH) + L127x89x6.4 (LLH)	3-L89x89x6.4
1830mm TO 2440mm (6'-0" TO 8'-0")	1-L127x89x7.9 (LLV)	1-L127x127x7.9 OR 2-L89x64x7.9 (LLV)	2-L127x89x6.4 (LLV)	L102x102x7.9 + L127x102x7.9 (LLH)	3-L127x89x6.4 (LLV)
2440mm TO 3080mm (8'-0" TO 10'-0")	1-L127x89x9.5 (LLV)	1-L127x127x7.9	2-L127x89x7.9 (LLV)	L152x102x7.9 (LLV)+ L127x127x7.9	3-L127x89x7.9 (LLV)
3080mm TO 3660mm (10'-0" TO 12'-0")	N/A	N/A	W200x27 + 175x6.4 PL. BOTTOM	W200x27 + 225x6.4 PL. BOTTOM	N/A

STRUCTURAL STEEL LINTEL NOTES:

1. WHEN PROVIDING MULTIPLE ANGLES SEE DIAGRAMS FOR ORIENTATION. BOLT DOUBLE ANGLES BACK TO BACK USING 16mmØ BOLTS OR PROVIDE 6mmX50mm (1/4"x2") LONG WELDS @450mm (18") O/C STARTING AT 100mm (4") MAX FROM THE EACH END OF THE LINTEL.
2. SAWCUT WEBS OF BLOCK IN COURSE OF BLOCK OVER OPENING AS NECESSARY TO INSTALL ANGLES.
3. ALTERNATIVES PROVIDED FOR CASES WHERE EXPOSED FACE OF SINGLE ANGLE IS NOT ACCEPTABLE.
4. AL COMPONENTS OF THE STEEL LINTELS THAT ARE EXPOSED TO WEATHER SHOULD BE HOT-DIP GALVANIZED.

MASONRY BEAM LINTELS

WALL OPENING CLEAR SPAN	MASONRY BLOCK THICKNESS				
		140 (6")	190 (8")	240 (10")	290 (12")
0mm TO 1200mm (0" TO 4'-0")		390 (16") DEEP 1-10M B	390 (16") DEEP 1-10M B	190 (8") DEEP 1-10M B	190 (8") DEEP 1-10M B
1200mm TO 1830mm (4'-0" TO 6'-0")		390 (16") DEEP 1-10M B	390 (16") DEEP 1-10M B	390 (16") DEEP 1-10M B	390 (16") DEEP 1-15M B
1830mm TO 2440mm (6'-0" TO 8'-0")		390 (16") DEEP 1-10M B	390 (16") DEEP 1-15M B	390 (16") DEEP 1-15M B	390 (16") DEEP 1-15M B
2440mm TO 3080mm (8'-0" TO 10'-0")		390 (16") DEEP 1-10M B	390 (16") DEEP 1-15M B	390 (16") DEEP 1-15M B	390 (16") DEEP 3-10M B

MASONRY BEAM LINTEL NOTES:

1. BEAM MUST BE FILLED WITH MASONRY GROUT (MORTAR IS NOT ACCEPTABLE). REFER TO M03 FOR DETAILS.
2. TEMPORARILY SHORE LINTEL UNTIL GROUT HAS REACHED FULL DESIGN STRENGTH.

NON-LOAD BEARING BLOCK WALL LINTEL DETAILS — M01B

LINTEL DETAILS

STRUCTURAL STEEL LINTEL DETAILS

MASONRY AND PRECAST BEAM LINTEL DETAILS

DETAILS OF NON LOAD-BEARING MASONRY WALLS AT CONCRETE SLAB AND WALL — M07B

LATERAL SUPPORT OF NON LOAD-BEARING MASONRY WALLS AT UNDERSIDE OF CONCRETE SLABS/PRECAST CORE SLABS*

MASONRY WALL ABUTTING CONCRETE

MASONRY FACING CONCRETE

NO.	DESCRIPTION	DATE
3	ISSUED FOR TENDER ADDENDUM	2025.01.07
2	ISSUED FOR TENDER	2025.11.14
1	ISSUED FOR PERMIT	2025.10.17

REVISIONS

PROJECT

Region of Peel
working with you

REGION OF PEEL

21 DIVISION, PEEL REGIONAL POLICE FACILTY INTERIOR RENOVATION PROJECT
10 PEEL CENTRE DRIVE, BRAMPTON, ON, L6T 4B9

NGA ARCHITECTS

The contractor shall check and verify all dimensions and report all errors and ommisions to the architect and the design professional whose seal is affixed to this drawing. Do not scale the drawings.

This drawing shall not be used for construction purposes until issued for construction by the design professional whose seal is affixed to this drawing and whose signature is below.

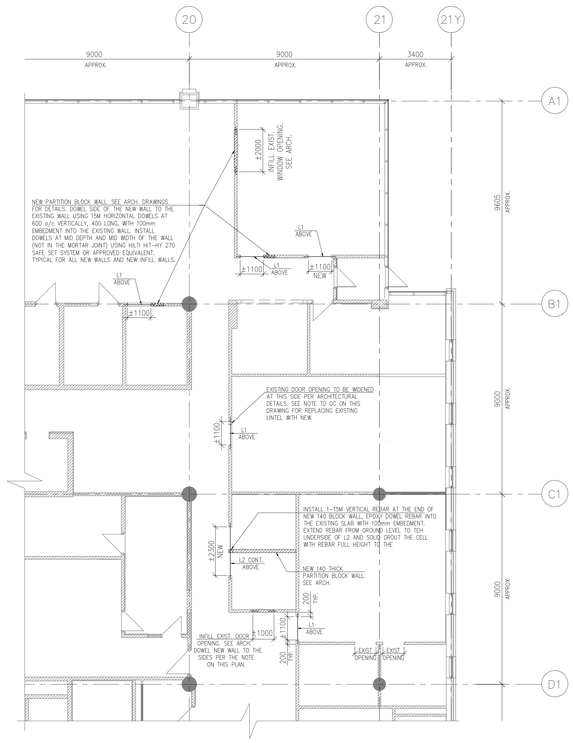
ISSUED FOR CONSTRUCTION DATE

NORTH
PROJECT NORTH

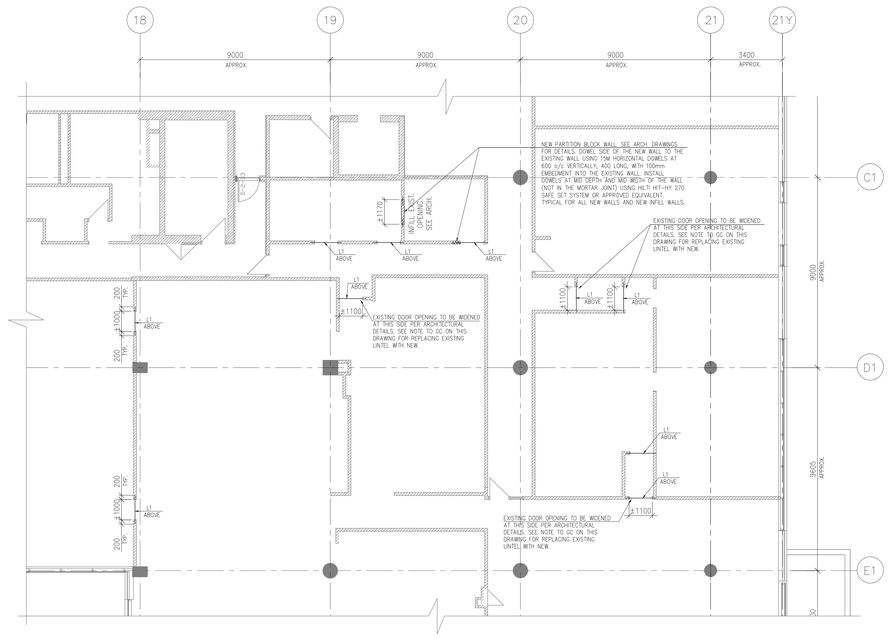
STRUCTURAL CONSULTANT: Salas O'Brien Canada Inc.
MECHANICAL CONSULTANT: EXP Services Inc.
ELECTRICAL CONSULTANT: EXP Services Inc.

SHEET TITLE
INTERIOR RENOVATIONS
STRUCTURAL SCOPE
PLAN, SECTIONS, AND TYPICAL DETAILS

SHEET NO.: S1
DRAWN BY: RA
CHECKED: RA
PROJECT NO.: 20250485
SCALE: AS NOTED



1 S2 PART GROUND FLOOR PLAN 1:100



2 S2 PART SECOND FLOOR PLAN 1:100

NEW CONSTRUCTION NOTES:

1. READ IN CONJUNCTION WITH GENERAL NOTES AND TYPICAL DETAILS ON S1, AND ALL OTHER CONTRACT DOCUMENTS.
2. BASE BUILDING INFORMATION AND DESIGN LOADS:
3. GIVEN DIMENSIONS AND MEMBER SIZES RELATED TO THE BASE BUILDING SHOULD BE SITE VERIFIED BEFORE COMMENCING THE WORK. CONTRACTOR TO NOTIFY OUR OFFICE OF ANY DISCREPANCY NOTED BETWEEN THE AS-BUILT CONDITION AND WHAT IS SHOWN ON THIS DRAWING.
4. SECTION MARKS:
   - a. L1: 2-L89X64X8, LLV, BACK TO BACK LINTEL FOR DOOR OPENINGS THROUGH THE EXISTING 140mm THICK BLOCK MASONRY PARTITION WALLS, AS SHOWN ON PLANS AND ARCHITECTURAL DRAWINGS AND WITH A MAXIMUM OPENING WIDTH OF 1100 mm. CONSIDER MINIMUM 200mm BEARING LENGTH AT EACH END OF L1. SAWCUT WEBS OF BLOCK IN COURSE OF BLOCK OVER OPENING AS NECESSARY TO INSTALL ANGLES. BOLT DOUBLE ANGLES BACK TO BACK USING 16mmØ BOLTS OR PROVIDE 6mm X 50mm LONG WELDS @ 450mm o/c STARTING AT 100mm MAX FROM THE EACH END OF THE LINTEL.
   - b. L2: 2-L89X64X9.5, LLV, BACK TO BACK LINTEL FOR THE OPENING THROUGH THE EXISTING 140mm THICK BLOCK MASONRY PARTITION WALL, AS SHOWN ON PLANS AND ARCHITECTURAL DRAWINGS AND WITH A MAXIMUM OPENING WIDTH OF 2300 mm. CONSIDER MINIMUM 200mm BEARING LENGTH AT EACH END OF L2. SAWCUT WEBS OF BLOCK IN COURSE OF BLOCK OVER OPENING AS NECESSARY TO INSTALL ANGLES. BOLT DOUBLE ANGLES BACK TO BACK USING 16mmØ BOLTS OR PROVIDE 6mm X 50mm LONG WELDS @ 450mm o/c STARTING AT 100mm MAX FROM THE EACH END OF THE LINTEL.
5. GC TO RETAIN A THRD PARTY WELDING INSPECTION COMPANY TO REVIEW WELDED CONNECTIONS OF THE TWO BACK TO BACK LINTEL ANGLES AND SUBMIT A REPORT FOR CONSULTANT'S REVIEW.
6. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN, EXACT LOCATION, AND EXTENT OF THE WORK.
7. FIREPROOFING REQUIREMENTS ARE PER ARCHITECTURAL DRAWINGS AND SHOULD BE ACCOUNTED FOR WHEN PROVIDING BUDGETARY PRICING.
8. E/M SCAN BE CONDUCTED ON EXISTING GROUND FLOOR CONCRETE SLAB AND WALLS BY CONTRACTOR'S FORCES. EXISTING REBAR AND EMBEDDED SERVICES LOCATIONS ARE TO BE MARKED OUT AND ACTIVE CONDUITS TO BE VERIFIED BY ELECTRICAL CONSULTANT AND TO BE REROUTED BY CONTRACTOR'S QUALIFIED FORCES. DO NOT CUT EXISTING REBAR AND SERVICES FOR DOWEL OR ANCHOR INSTALLATION.

NOTE TO GC:

1- GC TO PROVDE STRUCTURAL LINTEL FOR THE NEW DOORS IN NEW MASONRY PARTITION WALLS PER THE PLANS IN THIS DRAWINGS AND TYPICAL DETAIL M01B ON S1. FOR LOCATIONS OF NEW MASONRY PARTITION WALLS AND NEW DOOR OPENINGS THAT ARE NOT SHOWN ON THIS DRAWING AND QUANTITY OF THE NEW LINTELS SEE ARCHITECTURAL DRAWINGS. FOR SIZE OF STEEL LINTELS SEE TABLE M01A ON S1.

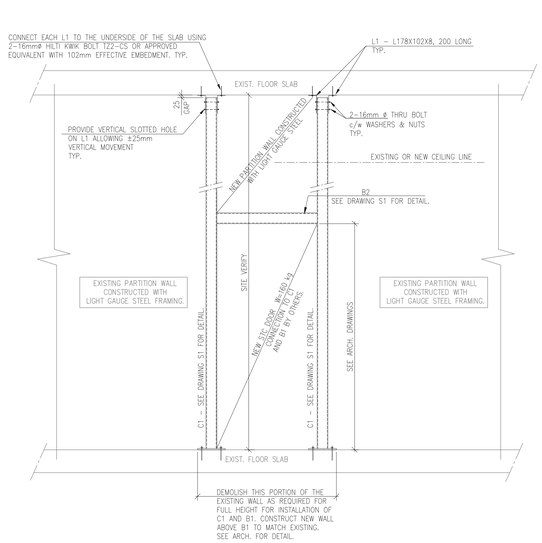
2- TOP OF ALL NEW PARTITION MASONRY WALLS SHOULD BE LATERALLY SUPPORTED PER TYPICAL DETAIL M07B ON S1. FOR LOCATION OF NEW MASONRY PARTITION WALLS SEE ARCHITECTURAL DRAWINGS. GC TO SUBMIT STAMPED SHOP DRAWINGS FOR THE LATERAL SUPPORTS FOR CONSULTANT'S REVIEW.

3- GC TO FOLLOW THE BELOW STEPS WHERE EXISTING DOOR OPENING IN AN EXISTING MASONRY WALL NEEDS TO BE WIDEN OR A NEW DOOR OPENING NEEDS TO BE CREATED THROUGH AN EXISTING BLOCK WALL. FOR EXACT OPENING LOCATIONS AND OPENING SIZES SEE ARCHITECTURAL DRAWINGS.

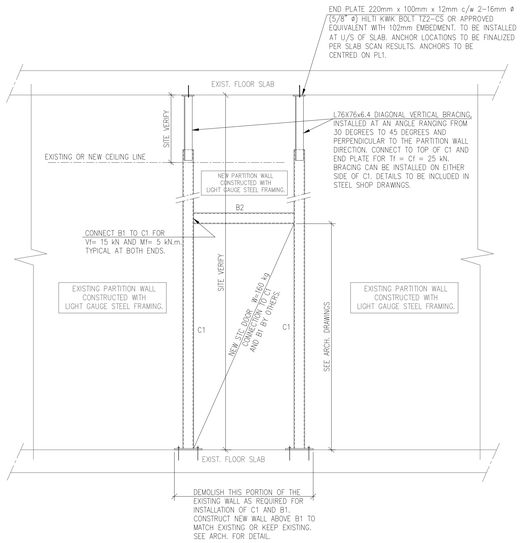
   3.1. NEEDLE SHORE THE EXISTING MASONRY WALL OR SHORE THE LIGHT GAGE STEEL WALL ABOVE THE EXISTING LINTEL OR THE NEW OPENING. GC TO SUBMIT STAMPED SHORING SHOP DRAWINGS FOR CONSULTANT'S REVIEW.

   3.2. REMOVE EXISTING LINTEL OR BLOCK UNITS FOR NEW OPENING OR WIDENING EXISTING OPENING.

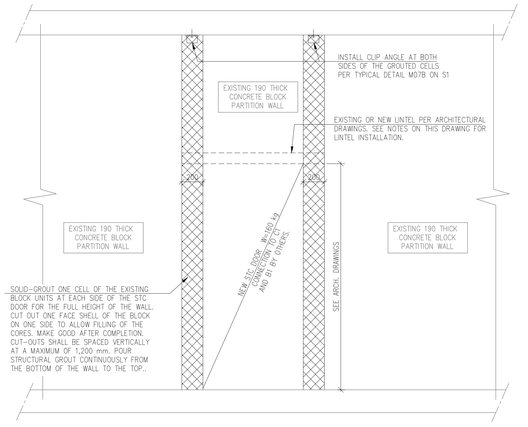
   3.3. INSTALL NEW LINTEL PER THE PLAN IN THIS DRAWING AND TYPICAL DETAIL M01B.



3 S2 OPTION 1 – STC DOOR LATERAL SUPPORT WHEN INSTALLED WITHIN EXISTING LIGHT GAUGE STEEL PARTITION WALL 1:20
SEE ARCHITECTURAL DRAWINGS FOR QUANTITY AND LOCATION.



4 S2 OPTION 2 – STC DOOR LATERAL SUPPORT WHEN INSTALLED WITHIN EXISTING LIGHT GAUGE STEEL PARTITION WALL 1:20
SEE ARCHITECTURAL DRAWINGS FOR QUANTITY AND LOCATION.



5 S2 STC DOOR LATERAL SUPPORT WHEN INSTALLED WITHIN EXISTING CONCRETE BLOCK PARTITION WALL 1:20
SEE ARCHITECTURAL DRAWINGS FOR QUANTITY AND LOCATION.

NO.	DESCRIPTION	DATE
2	ISSUED FOR TENDER ADDENDUM	2025.01.07
1	ISSUED FOR TENDER	2025.11.14

REVISIONS

PROJECT

Region of Peel
working with you

REGION OF PEEL

21 DIVISION, PEEL REGIONAL POLICE FACILTY INTERIOR RENOVATION PROJECT
10 PEEL CENTRE DRIVE, BRAMPTON, ON, L6T 4B9

ISSUED FOR CONSTRUCTION DATE

NORTH

STRUCTURAL CONSULTANT: Salas O'Brien Canada Inc.
MECHANICAL CONSULTANT: EXP Services Inc.
ELECTRICAL CONSULTANT: EXP Services Inc.

SHEET TITLE
INTERIOR RENOVATIONS - STRUCTURAL SCOPE
STRUCTURAL LINTELS AND
STC DOORS LATERAL SUPPORT
PLAN, SECTIONS, AND DETAILS

SHEET NO.	DRAWN BY	CHECKED
S2	EY	RA
	PROJECT NO.	20250485
	SCALE	AS NOTED