Regional Municipality of Durham

Bid Opportunity: T-1032-2021 – Relocation of Oral Health Clinic to 200 John Street, Oshawa

Closing Date: Tuesday May 11, 2021 2:00 PM

Addendum Number 01 – April 29, 2021

This addendum will form a part of the bid documents for the above-noted bid and shall be read in conjunction therewith. This addendum will take precedence over all requirements of the original bid documents and any addenda issued previously.

Bidders shall acknowledge receipt of this addendum with their electronic bid submission on the declaration page in the bidding system.

Specifications

.1 Section 09 65 43(R1) Linoleum Flooring

Replace this Section with the attached revised Section 09 65 43(R1).

.2 Section 10 80 00(R1) Miscellaneous Specialties

Replace this Section with the attached revised Section 10 80 00(R1).

Drawings

Architectural

.1 Drawing A-004 Demolition Reflected Ceiling Plan has been modified as part of this addendum.

.1 Noting demolition on existing access hatches in washrooms.

.2 Drawing A-005 Ground Floor Plan has been modified as part of this addendum.

.1 Door 111B was shifted to the west.

.2 Reception 102 millwork has been slightly revised. Also refer to revised Drawing A-014 Millwork Details.

.3 Drawing A-006 Reflected Ceiling Plan has been modified as part of this addendum.

.1 Relocated location of new access hatches in washrooms.

.2 610 mm x 2440mm ceiling tiles for filter access have been removed.

.3 Ceiling heights have been adjusted.

.4 Drawing A-014 Millwork Details has been modified as part of this addendum.

.1 Removed deal trays from drawing and provided cut out in glazing. Refer to details 1-3/A-014.

.2 Noted locations and quantity of speak-thru’s required. Refer to details 2&3/A-014.

.3 Extra reception chair included.

.5 Drawing A-017 Schedules has been modified as part of this addendum.

.1 See clouded revisions on door schedule to reflect questions throughout Addendum 01.

.2 Ceiling heights have been adjusted.

Mechanical

.1 Drawing M-002 Ground Floor Plan – HVAC Sheet Metal has been modified as part of this addendum:

.1 Ductwork routing for RTU-1, 2 & 3 revised as shown.

.2 Revised location, number, quantities and duct sizes of VAV's as shown.

.3 Revised location, number, quantities and duct sizes of Bypass terminals as shown.

.4 Revised quantity, location and capacities of baseboard heaters as shown.

.5 Revised exhaust airflow volumes for EF-3 & EF-4.

.6 Revised supply airflow volume for VAVs and BTs as shown on drawing.

.7 Relocated FLT-2 where shown. Reassigned FLT-2 to FLT-1. Deleted original FLT-1 from drawing.

.8 Deleted transfer ducts from drawing.

.9 Added temperature sensors for constant volume RTUs where shown.

.10 Revised location and duct routing of EF6 and EF-7

.11 Drawing notes 13, 15 and 21 revised as shown.

.2 Drawing M-003 Ground Floor Plan – HVAC Piping has been modified as part of this addendum:

.1 Deleted Humidifier H-1 and associated steam piping and ductwork located in the Admin Area from the drawing.

.3 Drawing M-004 Roof Plan – Mechanical Demolition has been modified as part of this addendum:

.1 Gas piping demolition revised as shown.

.4 Drawing M-005 Roof Plan – Mechanical Construction has been modified as part of this addendum:

.1 Revised footprint and gas pipe routing for RTU-2.

.2 Revised footprint and gas pipe routing for RTU-1.

.5 Drawing M-007 Ground Floor Plan – Plumbing Construction has been modified as part of this addendum:

.1 Humidifier H-2 located in Custodial 133 reassigned to H-1.

.2 Humidifier H-1 Located in Admin 104 and associated cold water piping deleted from drawing.

.3 Hot water and cold water pipe sizes revised as shown on drawing.

.6 Drawing M-009 Ground Floor Plan – Drainage Construction has been modified as part of this addendum:

.1 Humidifier H-2 located in Custodial 133 reassigned to H-1.

.2 Humidifier H-1 located in Admin 104 and associated funnel floor drain deleted from drawing.

.3 Instrument washer drains revised from funnel floor drains to standpipe as shown on floor plan and detail.

.4 Drain for washer/dryer revised to standpipe.

.7 Drawing M-012 Mechanical – Schedules has been modified as part of this addendum:

.1 Rooftop Air Conditioning/Heating Unit Schedule revised as shown.

.2 VAV Terminal/Venturi Valve Schedule revised as shown.

.3 Electric Heater Schedule revised as shown.

.4 Air Filter Schedule revised as shown.

.5 Bypass Terminal Unit Schedule revised as shown.

.6 Exhaust EF-3 & EF-4 performance parameters revised as shown.

.8 Drawing M-015: Control Sequences & Legend & Drawing List has been modified as part of this addendum:

.1 Room Pressurizations schedule revised as shown.

.2 RTU 1 & 2 Sequence of Operation now applies only to RTU-1.

.3 Deleted Supply Air Temperature Limit from Operatory sequence of operation.

.4 Deleted Supply Air Temperature Limit from Corridor sequence of operation.

Attachments

.1 Section 09 65 43(R1) – Linoleum Flooring (7 pages)

.2 Section 10 80 00(R1) – Miscellaneous Specialties (5 pages)

.3 Drawing A-004: Demolition Reflected Ceiling Plan

.4 Drawing A-005: Ground Floor Plan

.5 Drawing A-006: Reflected Ceiling Plan

.6 Drawing A-014: Millwork Details

.7 Drawing A-017: Schedules

.8 Drawing M-002: Ground Floor Plan – HVAC Sheet Metal

.9 Drawing M-003: Ground Floor Plan – HVAC Piping

.10 Drawing M-004: Roof Plan – Mechanical Demolition

.11 Drawing M-005: Roof Plan – Mechanical Construction

.12 Drawing M-007: Ground Floor Plan – Plumbing Construction

.13 Drawing M-009: Ground Floor Plan – Drainage Construction

.14 Drawing M-012: Mechanical – Schedules

.15 Drawing M-015: Control Sequences & Legend & List

.16 Facilities DCAM – Building Automation System Design Standards and Guidelines for Facilities Projects (27 pages)

.15 Regional Municipality of Durham – Network Standards (9 pages)

.16 Regional Municipality of Durham – Corporate Policy and Procedures Manual titled Security Services Installation and Security System Standards (10 pages)

.17 Panelboard: RP-A Schedule (2 pages)

.18 Panelboard: RP-B Schedule (3 pages)

.19 Panelboard: RP-C Schedule (2 pages)

.20 Panelboard: RP-D Schedule (2 pages)

Questions and Answers

Question 1:

Please confirm if any mandatory vendors for roofing.

Answer 1:

No mandatory vendors are required for this Project.

Question 2:

Please confirm if any mandatory vendors for security.

Answer 2:

No mandatory vendors are required for this Project.

Question 3:

Could you please provide the name of BAS contractor?

Answer 3:

Any new controls should be connected to the Region’s Metasys ADS Server. Please see The Regional Municipality of Durham; Building Automation System Design Standards and Guidelines for Facilities Projects, which is attached to this Addenda.

Question 4:

Confirm if Hubbell Cabling Solution acceptable for structural cabling.

Answer 4:

Please reference the Regional Municipality of Durham – Network Standards document, which is attached to this Addendum.

Question 5:

Please confirm if any asbestos removals involved in this project.

Answer 5:

Refer to Pre-Renovation Designated Substances and Hazardous Materials Assessment Survey - 200 John Street West, Unit 5C, Oshawa, Ontario.

Question 6:

The specification indicated 3.2mm Forbo Marmoleum. The standard gauge is 2.5mm. Could you please clarify?

Answer 6:

Section 09 65 43(R1) has been revised and is attached to this Addendum.

Question 7:

The pre-formed cove base is specified as Flash cove 4 inch. Forbo Flooring does offer a pre-fabricated cove base 4.25 inch, called Armorcove. As compared to flashcove, Armorcove has a full metal backer and comes with cap. It is integral. 30 year warranty. Can we submit as equal?

Answer 7:

The TD Forbo Armorcove is an approved equivalent to the specified FlashCove.

Question 8:

The walls in the operation rooms have lead lines, but not specified on the doors. Do the doors require lead lining as well or no? (Nothing is mentioned on door schedule or spec)

Answer 8:

The operatory doors do not require to be lead-lined.

Question 9:

Lots of cost break down for Mechanical. Is it compulsory along with bid or after 24hrs of closing and only for successful GC / Mechanical?

Answer 9:

Divisional breakdown is mandatory at time of Tender submission. Appendix - Schedule of Sections and Prices are submitted later, and only by the successful bidder.

Question 10:

Please confirm that all dental equipment and office furniture is under the $180,000.00 cash allowance provided.

Answer 10:

Dental equipment will be part of a separate tender. The cash allowance dedicated for furniture is only for office furniture.

Question 11:

We would like to request our DLW Linoleum be submitted as an alternate to the specified Forbo linoleum product. Our product meets the performance specification. Link to the DLW Linoleum Collection: https://www.gerflor.com/product-ranges/linoleum-flooring.html

Answer 11:

As indicated in the Information for Bidders Document, paragraph 1.7 Equivalent Products; Proposed equivalent products must submit a complete application as outlined in this paragraph, to the attention of the Procurement Officer. Any products accepted by the Region as an “Approved Equivalent” will be defined in an addendum provided to all Registered Plan Takers prior to tender closing.

Question 12:

We would like to request our Creation 55 Luxury Vinyl Tiles (LVT) be submitted as an alternate to the specified Armstrong Natural Creations product, Link to Creation 55 collection: https://www.gerflor.com/professionals-products/flooring/creation-55.html

Answer 12:

Please see Answer 11above.

Question 13:

Can I have DEXcell FA gypsum roofing board considered as an equal to DensDeck Prime with Eonic Technology?

Answer 13:

Please see Answer 11 above.

Question 14:

From door schedule, Door 111B frame is noted as wood. Just paint grade wood frame?

Answer 14:

Yes.

Question 15:

From door schedule, Screen SC01 – please confirm material is hollow metal? And on both screens, the middle band is framing material or film on the glass?

Answer 15:

Material for SC01 and SC02 is to be hollow metal. The middle band is a hollow metal horizontal mullion on both screens.

Question 16:

Please advise thickness of existing concrete slab.

Answer 16:

Exact thickness of existing concrete slab is unknown. Assume slab is 6” thick.

Question 17:

Structural drawing 018 - Web reinforcing - Per the note in the middle of the drawing the joist reinforcing has already been completed? If not and is part of project, please clarify/confirm that only the 3 joist indicated (pointed at) need to be reinforced and that only the 4 webs on each end of each joist per detail 5/ST001 require reinforcing.

Answer 17:

Only the three (3) webs pointed to on drawing ST-001 are to be reinforced in accordance with details 4/ST001 & 5/ST001. Total of eight (8) web members are to be reinforced at each joist.

Question 18:

Fire Alarm System - it notes to employ the landlord's contractor? Who is that? And are there any other mandatory systems or sub-contractors that must be used like communications, sprinkler, building controls, roofers, etc.?

Answer 18:

Please see Answer 1 above.

Question 19:

Specification - Misc. Specialties item 2.3 Deal Trays. How many? Just 1? And please provide a detail on installation. Is there a glass cut out or is it recessed into the millwork, or both?

Answer 19:

The deal trays have been removed from the scope to only glass cut out in screen. Refer to revised details 1/A014, 2/A014 & 3/A014 for additional notes. Section 10 80 00(R1) has been revised and is attached to this Addendum.

Question 20:

Specification - Misc. Specialties; Item 2.4 Speak Thrus - Please confirm how many are required?

Answer 20:

Speak-thru locations have been laid out. Refer to revised details 2/A014 & 3/A014.

Question 21:

Specification - Misc. Specialties; Item 2.12 Mailbox – is this the outdoor drop box noted on A005? If not, I can't find any mailboxes on the drawings.

Answer 21:

Yes, the mailbox specified is the outdoor drop box to the right of door V02A on drawing A-005.

Question 22:

Specification - Misc. Specialties; Item 2.6 Sliding Door hardware – is this not covered on hardware schedule door 111B? If not where is this meant for?

Answer 22:

Yes. Sliding Door Hardware has been removed from Section 10 80 00. Section 10 80 00(R1) has been revised and is attached to this Addendum.

Question 23:

Specification - Misc. Specialties; Item 2.13 AED Signs - can't find on the drawings. How many are required?

Answer 23:

See drawing E-010 for location of AED in Reception 102.

Question 24:

From Door schedule, please confirm finish on door 118?

Answer 24:

Door finish should be urethane, not paint. Refer to revised Drawing A-017, attached to this Addendum.

Question 25:

From Door schedule, Door 111B should be 2 doors?

Answer 25:

Yes.

Question 26:

Please provide names and contact of fire alarm, controls, security, and sprinkler contractors.

Answer 26:

Please see answer 1 above.

Question 27:

What is the make of security systems and fire alarm systems?

Answer 27:

Base building fire alarm system manufacturer is Mircom. Please reference the Regional Municipality of Durham – Security Services Installation and Security System Standards, which is attached to this Addendum.

Question 28:

Is existing roof under warranty? Who is roofing contractor if the roof is under warranty?

Answer 28:

Existing roof is not currently under warranty. No mandatory vendors are required for this Project.

Question 29:

Please provide type of existing roof.

Answer 29:

TPO as noted on roof plan.

Question 30:

Who will provide mechanical and electrical hook-up of dental equipment? Dental equipment contractor or bidders?

Answer 30:

Dental equipment contractor will hook-up the dental equipment as this is part of a separate tender.

Question 31:

Please provide location of control panel for card readers.

Answer 31:

Access control panels will be located in electrical room 130. Refer to electrical drawings for exact location.

Question 32:

Are alternatives accepted in lieu of Hollow Metal frames? If so we would like to propose an option for PC350 frames as an alternate. PC350 frames come with hardware to support a Wood Door and are factory finished (power coated) which can help with costs.

Answer 32:

Alternatives to hollow metal frames are not acceptable.

Question 33:

The documents state that we are to provide professional liability insurance. This is not a design-build project. Is this really required? Please clarify.

Answer 33:

Please provide professional liability insurance as indicated in the Contract Documents.

Question 34:

When is start date, substantial completion and total completion?

Answer 34:

Refer to the Supplementary Conditions for the “Contract Time”.

Question 35:

Are we to provide new RTU’s?

Answer 35:

Yes.

Question 36:

Are new dental chairs to be provided by Durham by their separate contract?

Answer 36:

Yes.

Question 37:

Are we connecting the HVAC to the existing BAS control system?

Answer 37:

Please see Answer 3 above.

Question 38:

Who is the subcontractor for the previous project for T1001-2021.

Answer 38:

That tender will be issued in the next month.

Question 39:

What are the union requirement for this project?

Answer 39:

There are no union requirements.

Question 40:

Who is the BAS contractor?

Answer 41:

Please see Answer 3 above.

Question 42:

Is work and demolition work permitted during the day?

Answer 42:

Refer to section 01 14 00 but extended hours can be arranged as the building is vacant. Contractor must work within Municipality noise by-laws.

Question 43:

What is the cash allowance going to cover?

Answer 43:

As indicated in Section 01 21 13.

Question 44:

Is the site visit on Wednesday mandatory.

Answer 44:

No.

Question 45:

Is there a loading dock and elevator we can use?

Answer 45:

No loading dock or elevator. The space is on ground floor, so this is not required.

Question 46:

Is there any structural demolition?

Answer 46:

See structural drawing ST-001. Some structural work but no extensive demolition. Exterior walls will be partially broken out for new window openings and engineered shoring to be provided.

Question 47:

Can we use existing power and washrooms?

Answer 47:

Refer to the tender documents. All power for the suite including washrooms shall be new.

Question 48:

Will the patient lift be removed?

Answer 48:

There is no existing lift and the one going in Operatory 1 is new.

Question 49:

Any equipment’s/furniture by GC?

Answer 49:

Reference the tender documents.

Question 50:

Is the lift contractor specified in the tender documents?

Answer 50:

Reference Section 11 73 13.

Question 51:

Please send us COVID screening tool.

Answer 51:

The Region has a COVID screening tool that will be provided once we have you booked for a site visit.

Question 52:

Are there any LEED requirements?

Answer 52:

There are no LEED requirements for this project.

Question 53:

Is there a phasing or staging plan?

Answer 53:

There is no phasing plan. It is a vacant space. There will possible be a need to do some traffic control and manage deliveries to the site.

Question 54:

May we please have our lighting and controls equals considered for approval? Please see in link below.
https://1drv.ms/u/s!AudqS7cNWgWcijCOyyBXobnoRDHr?e=gfKr4b

Answer 54:

Please see answer 11 above.

Question 55:

Are there panel schedules for the electrical panels?

Answer 55:

Please see the Panelboard Schedules attached to this Addendum.

End of addendum

1 General

1.1 Section includes

.1 Supply and installation of all linoleum flooring.

1.2 Related requirements

.1 Section 03 30 00 Cast-in-Place Concrete

.2 Section 07 92 00 Sealants

.3 Section 09 21 16 Gypsum Board

.4 Section 09 65 00 Resilient Flooring and Accessories

1.3 References

.1 ASTM International (ASTM)

.1 ASTM D2047-17 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine

.2 ASTM E648-19ae1 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

.3 ASTM E662-19 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

.4 ASTM F710-19e1 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

.5 ASTM F970-17 Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading

.6 ASTM F2034-18 Standard Specification for Sheet Linoleum Floor Covering

.2 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule 1113-06 Architectural Coatings.

.2 SCAQMD Rule 1168-03 Adhesives and Sealants Applications.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Selection Samples: Two sets of colour chips representing manufacturer's full range of available flooring tile colours.

.3 Quality Assurance Submittals: Manufacturer's printed installation instructions; include product storage requirements.

.4 Provide maintenance data for linoleum flooring for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

.1 Installer shall be competent in the installation of linoleum sheet flooring using heat-welded seams.

.2 Provide types of flooring and accessories supplied by one manufacturer, including levelling and patching compounds, and adhesives.

.3 If required, provide flooring material to meet the fire test performance criteria as tested by a recognized independent testing laboratory.

1.6 Delivery, storage, handling and protection

.1 Deliver materials in good condition to the job site in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions.

.2 Store materials in a clean, dry, enclosed space off the ground, and protected from the weather and from extremes of heat and cold. Protect adhesives from freezing. Store flooring, adhesives and accessories in the spaces where they will be installed for at least 48 hours before beginning installation.

.3 Store all materials in manufacturer's unopened packaging until installation.

.4 Maintain storage area conditions for all materials in accordance with manufacturer's instructions

1.7 Project Conditions

.1 Maintain a minimum temperature in the spaces to receive the flooring and accessories of 18 °C and a maximum temperature of 38 °C for at least 48 hours before, during, and for not less than 48 hours after installation.

Thereafter, maintain a minimum temperature of 13 °C in areas where work is completed. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances.

.2 Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 00 – Cleaning and waste management.

1.9 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five (5) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

2 Products

2.1 Materials

.1 Linoleum: To ASTM F2034, Type I. Homogenous linoleum floor covering, single layer on jute backing. Wood and cork flour, linseed oil, natural resins, pigments. Rolls of 20-30 linear metres.

.2 Acceptable Manufacturers:

.1 Forbo Linoleum: Global 3 Marmoleum

.2 Or approved equivalent.

.3 2.0 m wide, having a nominal total thickness of 2.5 mm. The wear surface shall consist of a homogeneous mixture of linoleum cement (linseed oil, natural tree resins, drying oil catalysts), wood flour, cork flour, colour pigments and filler calendared onto a jute fabric backing. Colours and pattern detail shall be dispersed throughout the thickness of the wear layer

.4 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I, ASTM E648.

.5 Smoke Generation Maximum Specific Optical Density of 450 or less, ASTM E662.

.6 4 colours with design pattern from the currently available range are to be selected by the Consultant.

.7 Provide manufacturers recommended solid colour linoleum weld rod intended for heat welding of seams. Colour shall be compatible with field colour of flooring or as selected by Consultant from the range currently available to contrast with field colour of flooring.

2.2 Adhesives

.1 Provide Linoleum Adhesive recommended by manufacturer used.

.2 Adhesives shall be low VOC type to meet requirements of SCAQMD Rule 1168-03.

2.3 Accessories

.1 For patching, smoothing, and levelling monolithic concrete subfloor, provide fast-setting cement-based patch and underlayment as recommended by the flooring manufacturer.

.2 For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.

.3 Provide integral flash cove base accessories. Cove Strip/Filler: 15 mm radius provided or approved by floor covering manufacturer.

.4 Provide transition/reducing strips tapered to meet abutting materials.

.5 Provide top shield application for occupancy ready.

.6 Provide threshold of thickness and width as shown on the drawings.

.7 Provide resilient edge strips, of equal gauge to the flooring, homogeneous vinyl or rubber composition, tapered or bullnose edge, with colour to match or contrast with the flooring, or as selected by the Consultant from standard colours available.

.8 Provide metal edge strips of width shown on the drawings and of required thickness to protect exposed edges of the flooring. Provide units of maximum available length to minimize the number of joints. Use butt-type metal edge strips for concealed anchorage or overlap-type metal edge strips for exposed anchorage. Unless otherwise shown, provide strips made of extruded aluminum with a mill finish.

3 Execution

3.1 Inspection

.1 Conform to requirements of ASTM F710.

.2 Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.

.3 Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, dusting, mold, or mildew.

.4 Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

.5 Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.2 Preparation

.1 Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with fast-setting cement-based patch and skim coat as recommended by the flooring manufacturer.

.2 Remove paint, varnish, oils, release agents, sealers, and waxes. Remove residual adhesives as recommended by the flooring manufacturer.

Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents.

.3 Perform subfloor tests in accordance with the manufacturer’s instructions to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring.

.4 Vacuum or broom-clean surfaces to be covered immediately before the application of flooring. Make subfloor free from dust, dirt, grease, and all foreign materials.

3.3 Installation

.1 Install flooring in strict accordance with the manufacturer’s instructions.

.2 Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

.3 Scribe, cut, and fit or flash cove to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.

.4 Install cove base to a height of 100 mm.

.5 Adhere flooring to the subfloor without cracks, voids, raising and puckering at the seams. Roll with a 45 kilogram roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer.

.6 Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips. Match edges for colour shading and pattern at the seams in compliance with the manufacturer's recommendations.

.7 Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

.8 Install flash cove base by certified master mechanic as per manufacturer instructions and where specified on the room finish schedule.

.9 Use methods and sequence of work in conformance with written instructions of the flooring manufacturer. Finish all seams flush and free from voids, recesses, and raised areas.

3.4 Cleaning

.1 Proceed in accordance with Section 01 74 00 – Cleaning and waste management.

.2 Perform initial maintenance according to the manufacture’s latest edition.

.3 Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

End of section

1 General

1.1 Section includes

.1 Supply and installation of all miscellaneous specialties as indicated.

1.2 Related requirements

.1 Section 03 30 00 Cast-in-Place Concrete

.2 Section 05 50 00 Metal Fabrications

.3 Section 06 20 00 Finish Carpentry

.4 Section 10 28 13 Washroom Accessories

1.3 Reference standards

.1 ASTM International (ASTM)

.1 ASTM A312/A312M-19 Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes

.2 Aluminum Association (AA)

.1 Aluminum Association Designation System for Aluminum Finishes

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit detailed shop drawings and where applicable complete colour charts or colour samples for each item specified herein.

.3 Submit manufacturer’s preprinted technical literature for pre-manufactured products.

.4 Submit samples of metal finishes when requested by the Consultant.

.5 Submit operating and maintenance instructions for all manufactured products and specialties, for inclusion in the Operations and Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

1.5 Delivery, storage, handling and protection

.1 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.2 Protect finished surfaces during shipment and installation.

1.6 Waste management and disposal

.1 Refer to Section 01 74 00 – Cleaning and waste management.

2 Products

2.1 Materials

.1 Items specified herein shall be standard manufactured items, modified if required and as specified to suit conditions of this project.

.2 Fabricate work true to dimensions, square and plumb, to suit site conditions.

.3 Thickness of metals shall be adequate for the various conditions with requirements specified as a minimum.

.4 Finished work shall be free from warping, open seams, weld marks, rattles and other defects. Drilling shall be reamed and exposed edges finished smooth.

.5 Fastenings shall be concealed or theft-proof type where possible. Exposed fastenings shall be neatly executed and shall be of the same material and finish as the base metal on which they occur.

.6 Clear Anodic Finish: For work specified to have clear anodic finish, provide an AA-M12C22A31 finish, unless otherwise specified.

2.2 Access Doors

.1 1.994 mm galvanized steel for non-fire rated applications. Doors in fire rated assemblies shall be of thickness required to meet fire rating requirements. Generally, and unless noted otherwise, fire rated doors shall be UL/ULC rated for 1 ½ hour “B” label with 250 °F temperature rise in 30 minutes. Door shall be provided with a 25 mm recess or 14 mm to suit the thickness of the drywall ceiling. The frame shall be provided with a galvanized steel drywall taping bead on all sides. The hinge shall be a concealed pivoting rod. The latch shall be a flush to the surface, screwdriver operated cam latch. The steel finish shall be 5 stage iron phosphate preparation with prime coat of greybaked enamel.

.2 Supply access doors to the relevant building trade to provide access in furred ceilings for the following:

.1 Servicing equipment

.2 Access to plumbing cleanouts

.3 Access to shut off valves.

.4 Inspection of life safety equipment.

.5 Service of operating devices

.6 All locations where periodic maintenance is required.

.3 Access door sizes shall be as follows:

.1 Body Entry: 600 x 600 mm

.2 For Hand Entry: 450 x 450 mm

.3 For Viewing Only: 300mm x 300mm

2.3 Speak Thrus

.1 Through Glass Two Way Electronic Communicators with removable gooseneck microphone. 115V power supply. complete with mounting hardware.

.1 CR Laurence Through Glass Two Way Electronic Communicators Deluxe Model TTU1AJB1 or reviewed equivalent.

2.4 Door Louvres

.1 Aluminum door louvre with sight-proof chevron blades. All blades, frames and trim members to be 6063-T5 aluminum extrusion, minimum 1.3 mm thick. Fasteners to be stainless steel or aluminum. Frames and trim members to be mitred at corners and rigidly secured by corner brackets. Finish clear anodized. Size as indicated.

2.5 Closet Rods

.1 Commercial grade steel; long-lasting, corrosion resistant finish. Meeting or exceeding ANSI/BHMA weight load requirements.

.1 Round Closet Rod Tubing, Outside Diameter: 27 mm.

.2 2.7 mm wall thickness; inside diameter: 21 mm.

.3 Finish: Brilliant Chrome; premium double-plated finish, seamless, pit-free.

.4 Size as indicated on the drawings.

2.6 Safety / Security Mirror

.1 180-degree half-dome.

.1 Acrylic eighth-sphere for interior surveillance and collision prevention.

.2 Size: 610 mm.

2.7 Corner Guards

.1 Stainless steel corner guards to 1.613 mm stainless steel. 1220 mm high. Stainless steel corner guard with 89 mm standard legs. Mounted with construction adhesive; stainless steel screws. All necessary fasteners to be supplied by the manufacturer. To be type 304 alloy with #4 satin finish.

2.8 Television Mounting Brackets

.1 Supplied by Owner for installation by Contractor.

2.9 Adjustable Wall Mount Laptop Arm

.1 Supplied by Owner for installation by Contractor.

2.10 Mailbox

.1 18-gauge steel construction. Locking front retrieval door. Includes 2 keys. Galvanized steel with powder-coat finish. Hinged lid. U Line Model H-6078 or reviewed equivalent.

2.11 AED Signage

.1 Wall mounted Projecting sign “AED”, 3 way, 6 ¾ x 8 x 5 ½”.

.1 U-line Model S-21990 or reviewed equivalent.

3 Execution

3.1 Installation

.1 Install manufactured items in accordance with manufacturer's printed instructions and recommendations.

.2 Mount standards to solid backing capable of supporting intended loads. Install standards using fasteners suitable for supporting intended loads.

.3 Install brackets as indicated on the Drawings.

.4 Install shelving, and accessories as indicated on the Drawings.

.5 Coordinate with Section 08 80 05 for installation of speak throughs in tempered glass screens.

3.2 Cleaning

.1 Proceed in accordance with Section 01 74 00 – Cleaning and waste management.

End of section

1 / A004 DEMOLITION REFLECTED CEILING PLAN

1:75

NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

NORTH

CEILING TYPES SCHEDULE

- REMOVE AND DISPOSE OF EXISTING T-BAR CEILING AND TILE
- CAREFULLY REMOVE AND DISPOSE OF EXISTING GYPSUM BOARD CEILING FINISH & FRAMING
- EXISTING LIGHT FIXTURES TO BE REMOVED & DISPOSED OF
- REMOVE AND DISPOSE EXIST. EGGCRATE PLASTIC COVER
- REMOVE AND DISPOSE EXIST. RECESSED FLUORESCENT LGHT.
- REMOVE & DISPOSE EXIST. 150mm RECESSED POT LIGHT
- EXISTING EXTERIOR RECESSED POT LIGHTS
- 1 REMOVE & DISPOSE EXISTING EXHAUST GRILLE & ASSOCIATED DUCTWORK. REFER TO MECHANICAL
- REMOVE & DISPOSE EXISTING ACCESS HATCH

DEMOLITION NOTES

1. REFER TO MECHANICAL DRAWINGS FOR REMOVAL OF EXISTING AIR DIFFUSERS, RETURN AIR GRILLES, EXHAUST FANS AND OTHER MECHANICAL EQUIPMENT.
2. GENERAL NOTES ON A003 APPLY.

CEILING PLAN NOTATION LEGEND

- EXISTING WALL, PARTITION OR COLUMN
- EX. FINISHED CEILING HEIGHTS
- HATCHED AREA DENOTES NOT IN CONTRACT

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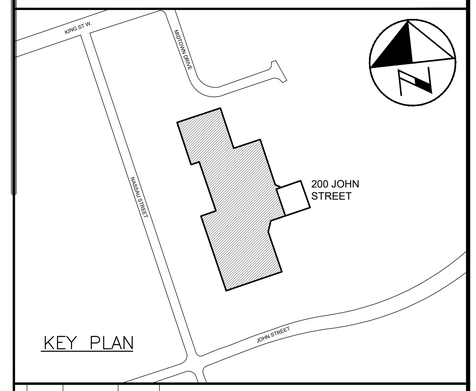

CONSULTANT REVISIONS

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1	APR 29/21	BBA	ISSUED FOR ADDENDUM No.1

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DESIGN BY: WW	SCALE 1:75
DRAWN BY: KM	DATE: 2021-02-12
CHECKED BY: CM	CONSULTANT PROJECT NO. 20060
APPROVED BY: WW	

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THE REGIONAL MUNICIPALITY OF DURHAM

WORKS DEPARTMENT

DESIGN, CONSTRUCTION & ASSET MANAGEMENT

RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA
DEMOLITION REFLECTED CEILING PLAN

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-O-07	LEA-O-07-19-01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	A-004	004

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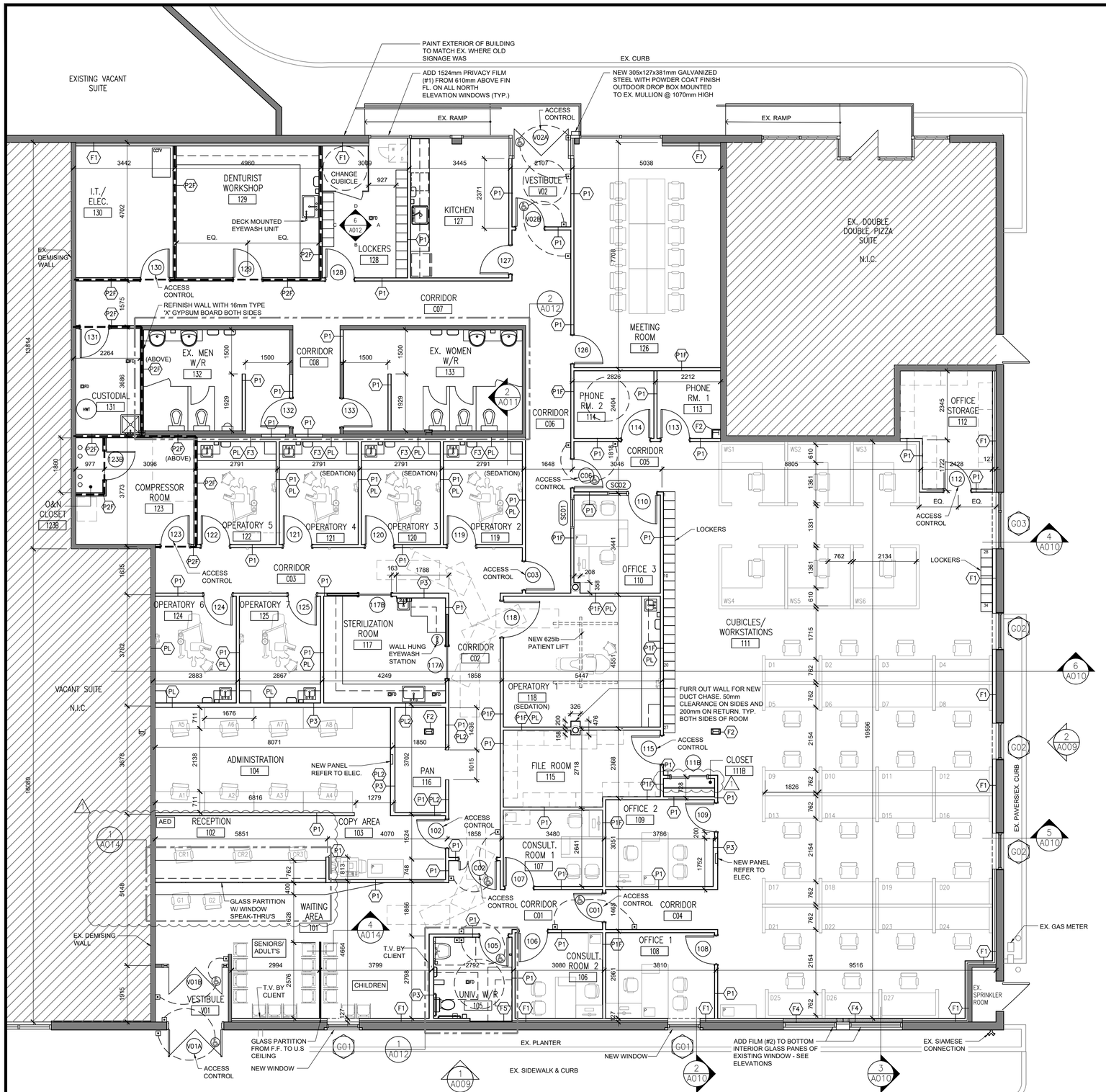

1 A005 GROUND FLOOR PLAN
1:75

NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

NORTH

PARTITION TYPES SCHEDULE

- P1 — 118 — 12.7mm GYPSUM WALL BOARD, 92mm STEEL STUDS c/w 76mm MIN. SOUND ATTENUATION BATTS, 12.7mm GYPSUM WALL BOARD
- P1F — SIMILAR TO P1, BUT P1F TO EXTEND TO U/S OF DECK
- P2F — 124 — 15.8mm TYPE 'X' GYP. BOARD, 92mm STEEL STUDS c/w 89mm MIN. SOUND ATTENUATION BATTS, 15.8mm TYPE 'X' GYP. BOARD
  - 1 HOUR RATED - STC 48
  - DES. No. UL419

  EXTEND TO U/S OF DECK & FIRE SEAL ALL JOINTS
- P3 — 166 — 12.7mm GYPSUM WALL BOARD, 140mm STEEL STUDS c/w 152mm MIN. SOUND ATTENUATION BATTS, 12.7mm GYPSUM WALL BOARD
- PL — -0.8mm MEDICAL GRADE LEAD FROM 500mm ABOVE FINISHED FLOOR TO 2000mm A.F.F. min. BEHIND GYPSUM BOARD.
- PL2 — -1.6mm MEDICAL GRADE LEAD, OR TWO LAYERS 0.8mm FROM 500mm ABOVE FINISHED FLOOR TO 2000mm A.F.F. min. BEHIND GYPSUM BOARD.

FURRING TYPES SCHEDULE

- F1 — 122 — 50mm AIR SPACE, 64mm STEEL STUDS @ 610mm O.C. SPRAY FOAM INSULATION, 6mil VAPOUR BARRIER, 13mm GYPSUM BOARD
- F2 — 51 — 38mm STEEL STUDS @ FLANGE ENDS OF COLUMN, 13mm GYPSUM BOARD
- F3 — 153 — 140mm STEEL STUDS @ 610mm O.C. 13mm GYPSUM BOARD
- F4 — 77 — 64mm STEEL STUDS @ 610mm O.C. 13mm GYPSUM BOARD, FILL VOID SOUND ATTENUATION BATTS
- F5 — 35 — 22mm RESILIENT HAT CHANNELS 610mm O.C. 13mm GYPSUM BOARD

PARTITION, FURRING & GENERAL NOTES:

1. UNLESS OTHERWISE NOTED ALL PARTITIONS TO TERMINATE AT +3300mm A.F.F.
2. ALL SWING DOORS TO BE 100mm FROM ADJACENT WALL UNLESS DIMENSIONED OTHERWISE.
3. REFER TO DENTAL CONSULTANT DRAWINGS FOR ADDITIONAL PLYWOOD BACKING SUPPORT & EXTRA FRAMING REQUIREMENTS AT ORAL X-RAY SUPPORT LOCATION.
4. PROVIDE BLOCKING AS REQUIRED IN WALLS TO SUPPORT NEW MILLWORK AND WALL MOUNTED LAPTOP ARM BRACKET. REFER TO FINISH PLAN A-007.
5. PATCH ALL FLOORS WHERE SAWCUT FOR NEW MECHANICAL & ELECTRICAL SERVICES. REFER TO STRUCTURAL FOR DETAIL.

FLOOR PLAN NOTATION LEGEND

- CORRIDOR XXX — ROOM NAME & NUMBER
- P1 — INTERIOR PARTITION OR FURRING TYPE (REFER TO PARTITION SCHEDULE)
- 101 — DOOR NUMBER (REFER TO DOOR SCHEDULE)
- SC01 — SCREEN NUMBER (REFER TO SCREEN ELEVATIONS)
- PB — BARRIER FREE DOOR OPERATOR PUSH BUTTON
- D / C / A / B — XX / AXXX — INTERIOR ELEVATION REFERENCE NUMBER
- XX / AXXX — DETAIL REFERENCE NUMBER
- XX / AXXX — ELEVATION REFERENCE NUMBER
- XX / AXXX — SECTION REFERENCE NUMBER
- HATCHED AREA DENOTES NOT IN CONTRACT

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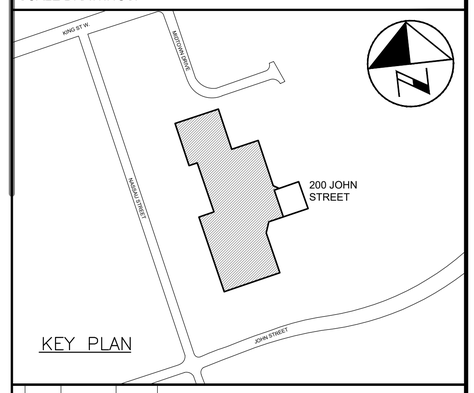

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DESIGN BY: WW	SCALE 1:75
DRAWN BY: KM	DATE: 2021-02-12
CHECKED BY: CM	CONSULTANT PROJECT NO. 20060
APPROVED BY: WW	

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GROUND FLOOR PLAN

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-O-07	LEA-O-07-19-01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	A-005	005

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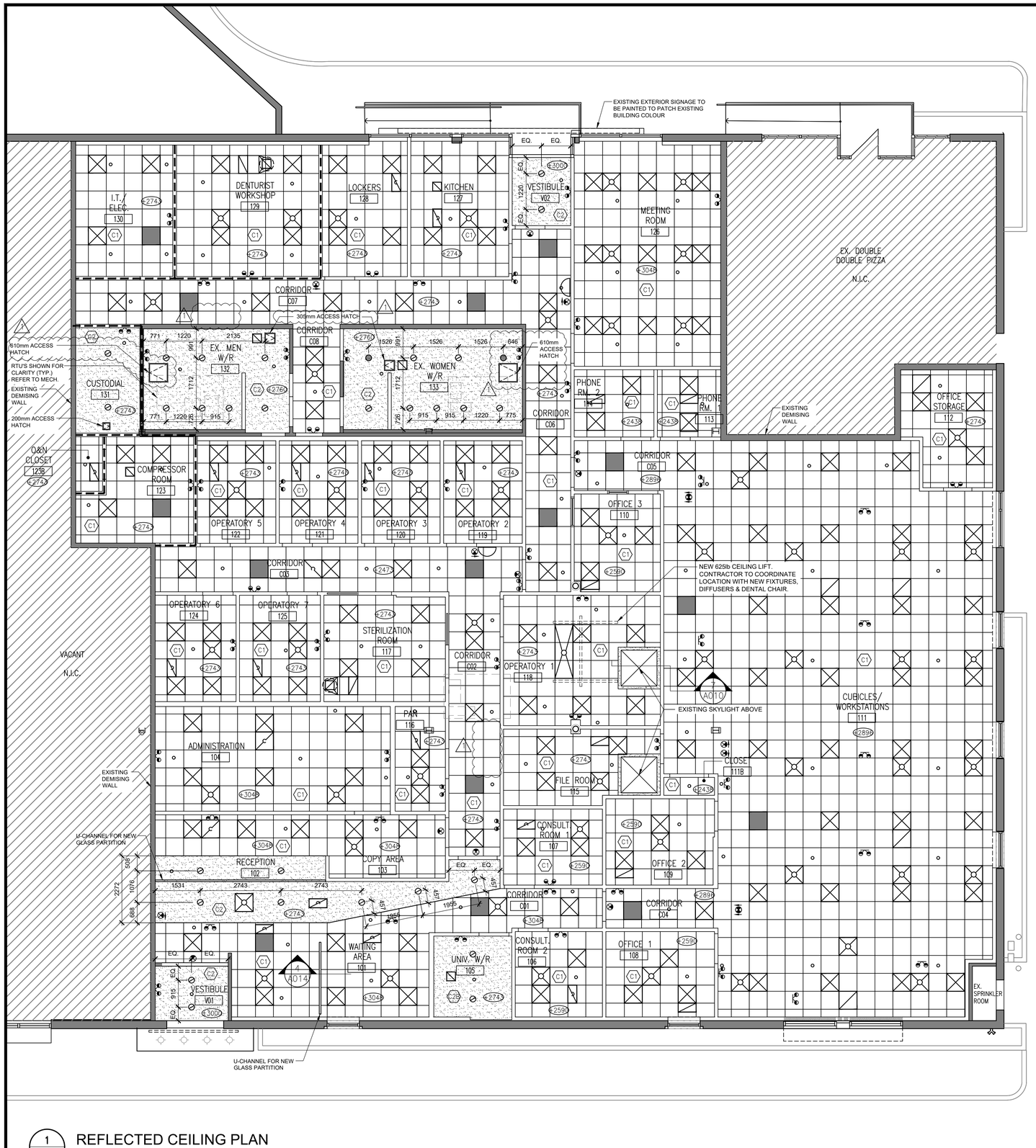

1 / A006 REFLECTED CEILING PLAN
1:75

NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

NORTH

CEILING TYPES SCHEDULE

- C1 — 610 x 1220 mm ACOUSTIC CEILING TILE METAL SUSPENSION FRAMING SYSTEM
- C2 — 13mm GYPSUM BOARD 22mm METAL FURRING CHANNEL 41mm METAL STUD FRAMING SUSPENDED FROM STRUCTURE
- C2B — 13mm GYPSUM BOARD 22mm METAL FURRING CHANNEL 41mm METAL STUD FRAMING SUSPENDED FROM STRUCTURE W/ BATT INSULATION ON TOP

CEILING FIXTURE LEGEND

- NEW 610mm X 610mm FLUORESCENT LIGHTING AS PER ELEC.
- UPGRADED RECESSED FLUORESCENT LIGHTING AS PER ELEC. NEW LIGHT COVER TO BE INSTALLED ON EXISTING METAL SUPPORT BRACKETS (REFER TO SPEC.)
- NEW RECESSED/PENDANT DOWNLIGHT AS PER ELEC.
- UPGRADED POT LIGHT LAMPS
- EXISTING EXTERIOR POT LIGHT
- CEILING DIFFUSERS, REGISTERS & GRILLES AS PER MECH
- EXHAUST FAN - AS PER MECH
- EMERGENCY LIGHTING - AS PER ELEC
- EXIT SIGNAGE - AS PER ELEC
- SPRINKLER HEAD AS PER MECH
- SAFETY SECURITY MIRROR 180° HALF DOME
- NEW ACCESS PANEL - COORDINATE LOCATION WITH MECHANICAL

FLOOR PLAN NOTATION LEGEND

- CORRIDOR XXX — ROOM NAME & NUMBER
- 3000 — CEILING HEIGHT
- XX / A4XX — SECTION REFERENCE NUMBER
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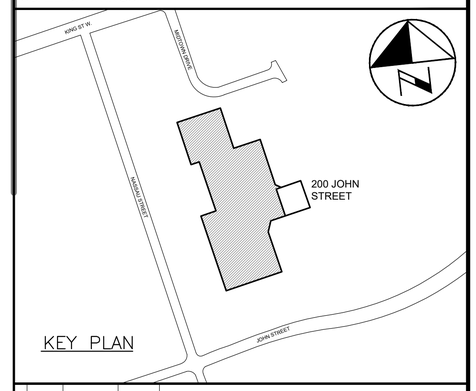

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DRAWN BY: KM	DATE: 2021-02-25
CHECKED BY: CM	CONSULTANT PROJECT NO. 20060
APPROVED BY: WW	

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REFLECTED CEILING PLAN

PROPERTY NO. N/A	FACILITY CODE LEA-O-07	FACILITIES PROJECT NO. LEA-O-07-19-01
CONTRACT NO. T-1032-2021	DRAWING NO. A-006	SHEET NO. 006

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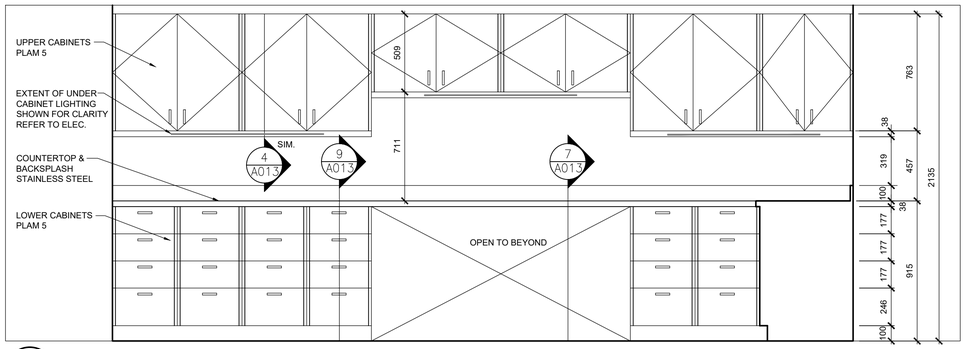

8 A014 DENTURIST WORKSHOP MILLWORK ELEVATION 2

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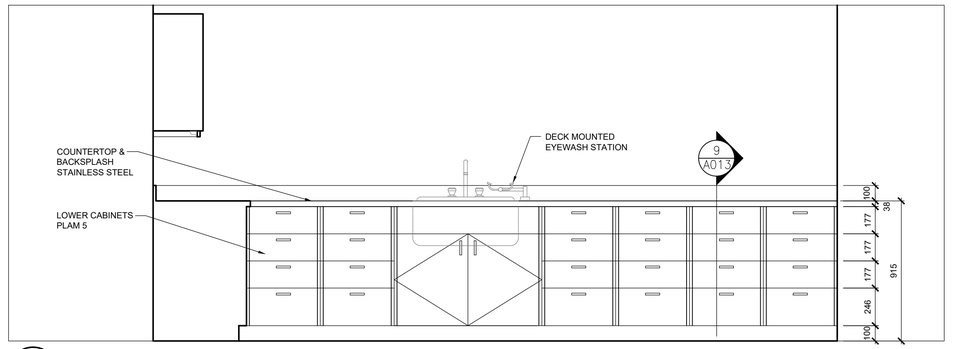

7 A014 DENTURIST WORKSHOP MILLWORK ELEVATION 1

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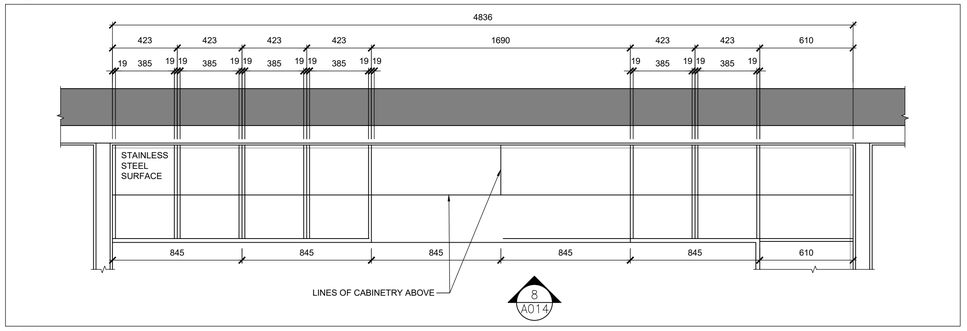

6 A014 DENTURIST WORKSHOP MILLWORK DETAIL PLAN 2

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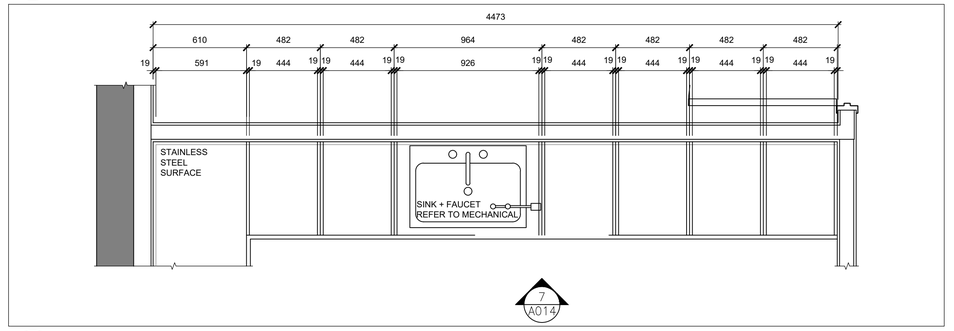

5 A014 DENTURIST WORKSHOP MILLWORK DETAIL PLAN 1

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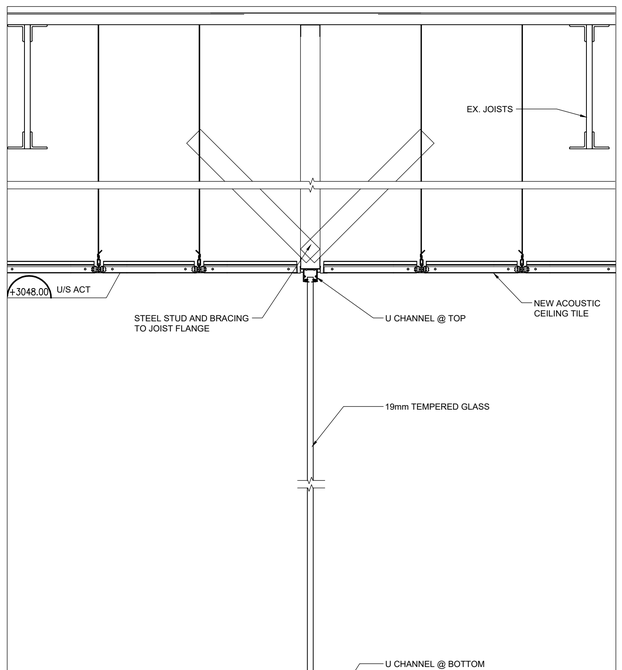

4 A014 GLASS PARTITION SECTION

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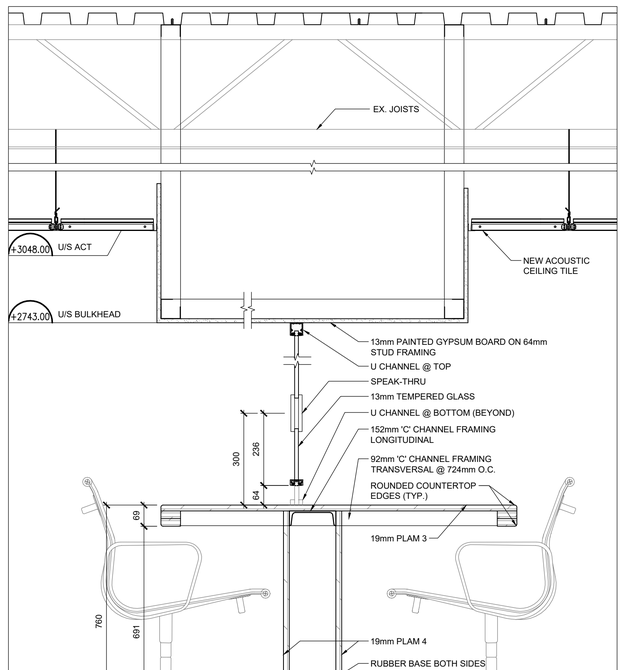

3 A014 RECEPTION DESK SECTION

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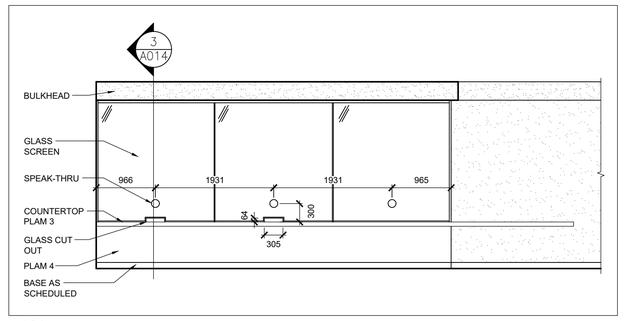

2 A014 RECEPTION MILLWORK ELEVATION

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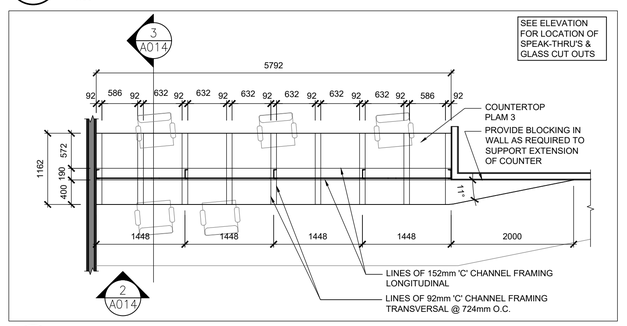

1 A014 RECEPTION MILLWORK DETAIL PLAN

1:50

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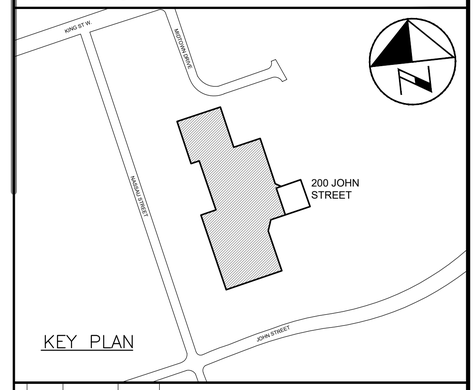

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MILLWORK DETAILS

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA–0–07	LEA–0–07–19–01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T–1032–2021	A–014	014

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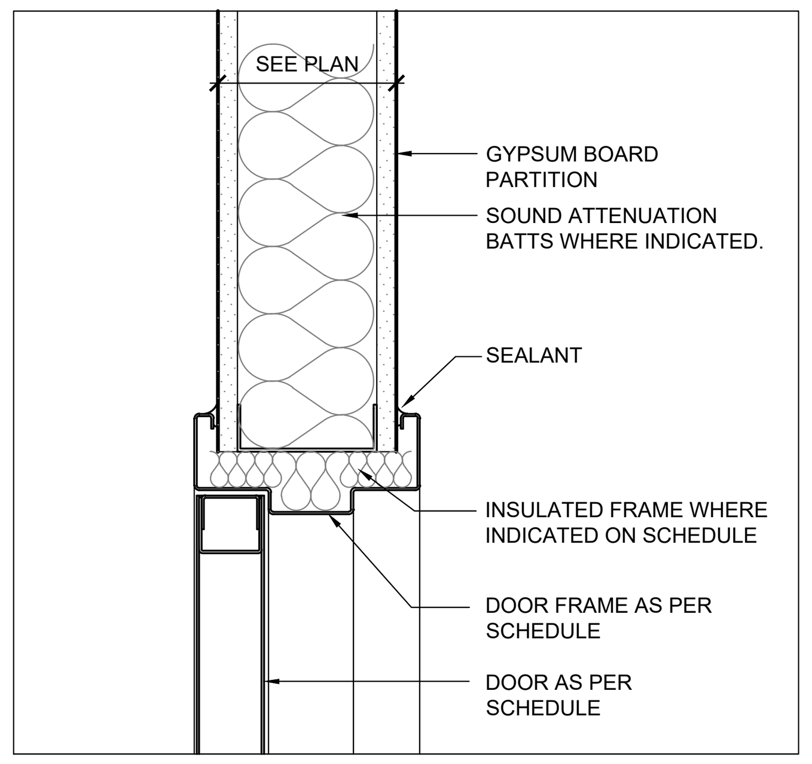
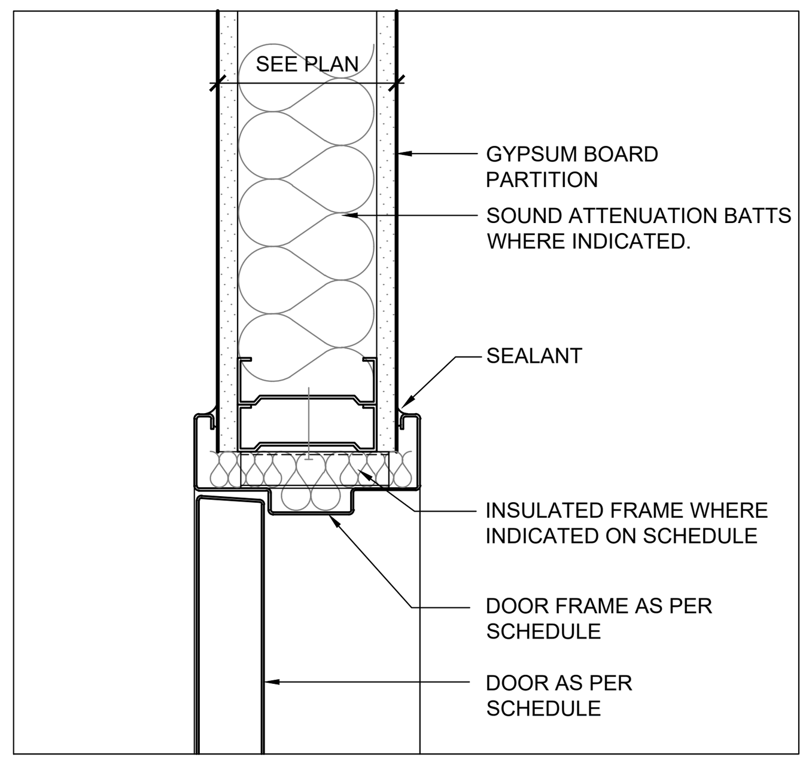


DETAIL H1



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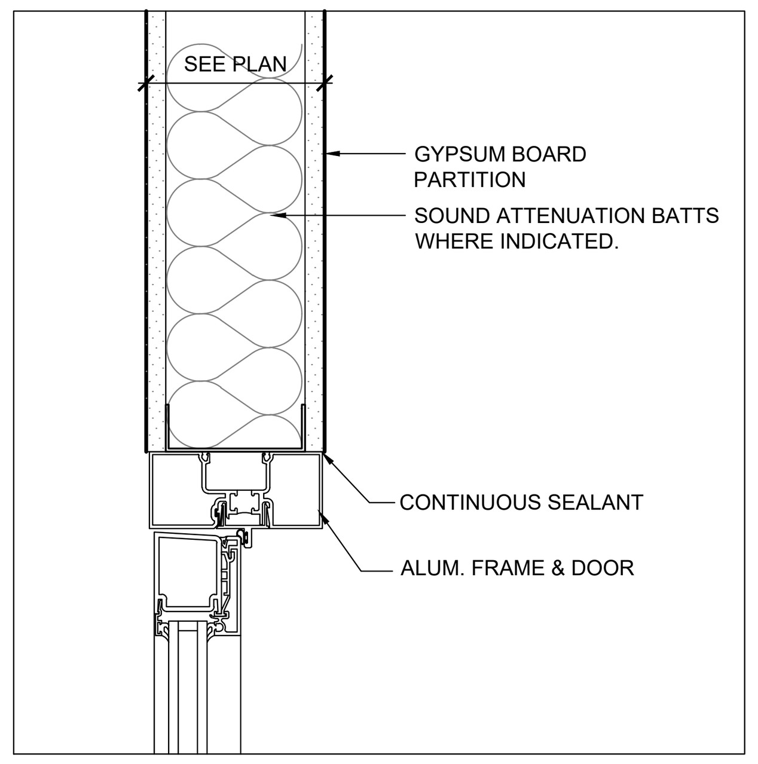

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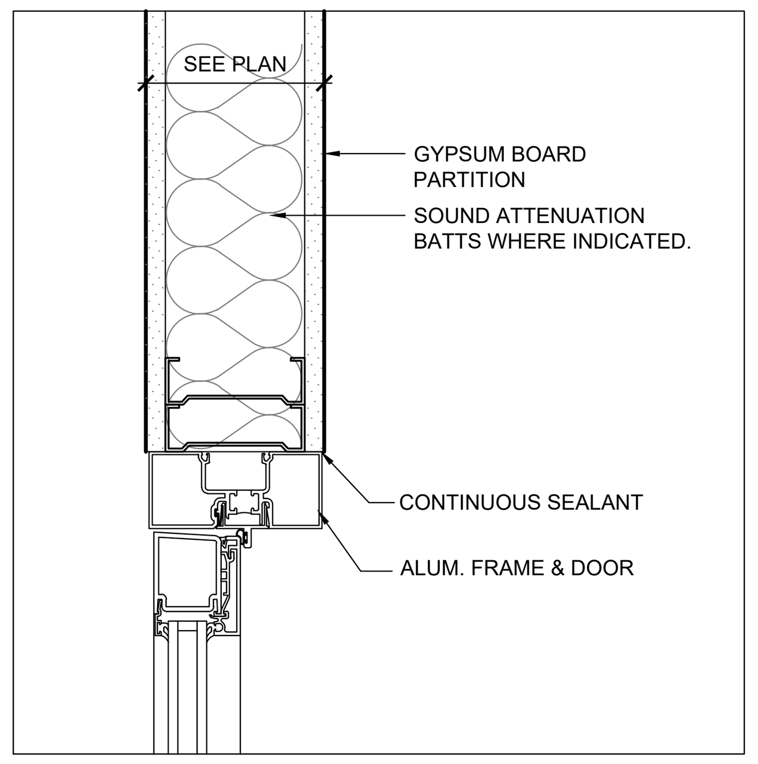

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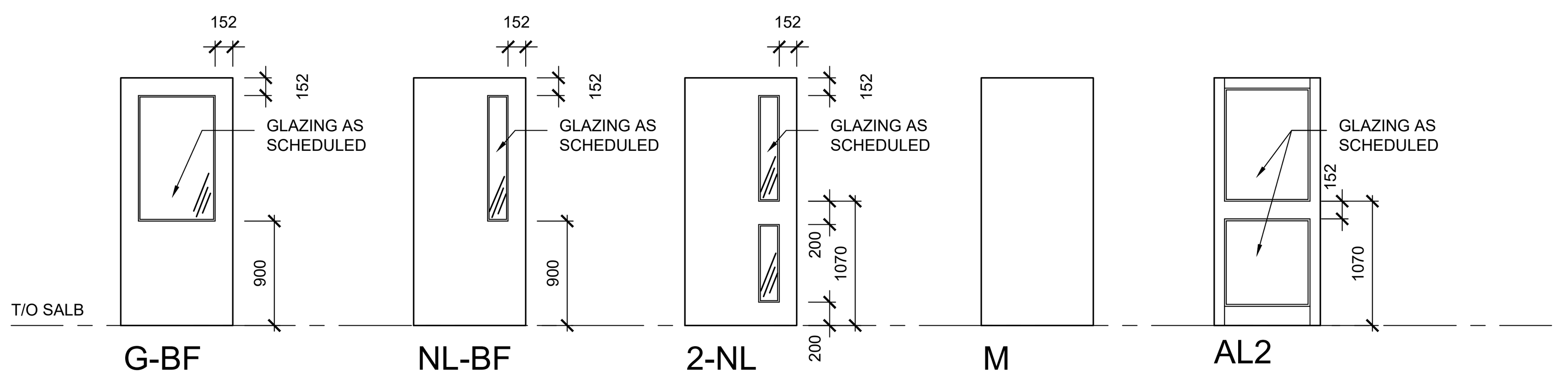
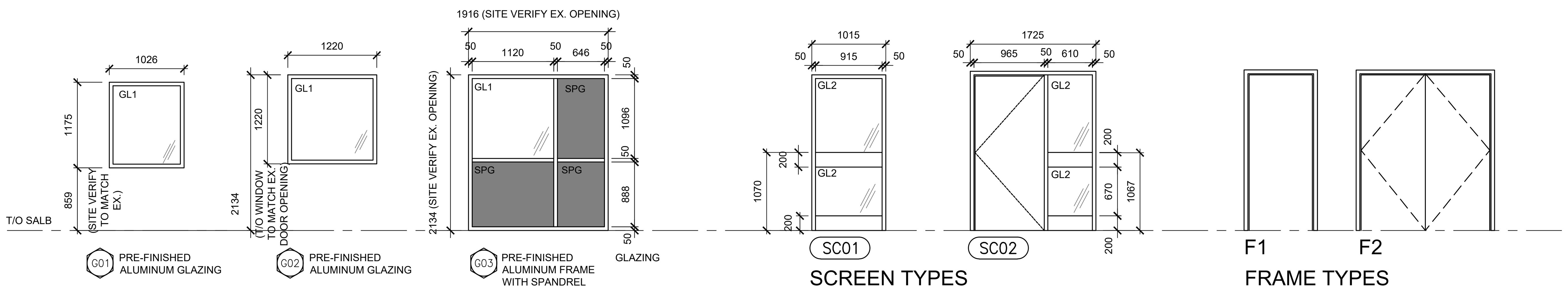


DOOR TYPES



SCREEN TYPES

FRAME TYPES

GENERAL NOTES

A. PREPARE DOORS AND FRAMES FOR ELECTRONIC HARDWARE WHERE INDICATED. CONDUITS SHALL BE CONCEALED IN FRAMES.

B. ALL DOORS IN FIRE SEPARATION LOCATIONS SHALL HAVE LATCHING DEVICE.

GLAZING LEGEND

GL1	25 mm SEALED TEMPERED, DOUBLE GLAZED UNITS (COLOURED GLASS TO MATCH EXISTING).
GL2	6mm TEMPERED GLASS
FRG	FIRE RESISTANT GLAZING
SPG	8.0mm GLASS WITH INSULATED METAL BACK-PAN

FINISH ABBREVIATION LEGEND

ACP	ACOUSTIC CEILING PANEL
ALUM	ALUMINUM
ANOD	ANODIZED
CPT	CARPET
CB	CONCRETE BLOCK
CONC	CONCRETE
CONT	CONTINUE
CT	CERAMIC TILE
EXIST	EXISTING
EXP	EXPOSED
G	GLASS
GB	GYPSUM BOARD
HM	HOLLOW METAL
LVT	LUXURY LINYL TILE
NTS	NOT TO SCALE
P	PAINT
PCT	PORCELAIN TILE
PREFIN	PREFINISHED
PS	PRESSED STEEL
RSF	RESILIENT SHEET FLOORNG
R	RUBBER
SC	SEALED CONCRETE
SEAL	SEALER
TG	TEMPERED GLASS
URETH	URETHANE

DOOR AND FRAME SCHEDULE

DOOR						FRAME					FIRE RATING	DOOR HARDWARE																			REMARKS
NO.	SIZE AND THICKNESS	TYPE	MATERIAL	FINISH	GLASS	TYPE	DETAIL HEAD	DETAIL JAMB	MATERIAL	FINISH		BALL BEARING HINGE	CONTINUOUS HINGE	CLOSER	DOOR STOP	THRESHOLD	KICK PLATE	DOOR OPERATOR	PANIC DEVICE	Mul-T-Lock KEYWAY	Schlage Key Lock	LOCKSET	LATCHSET	PRIVACY	ELECTRIC STRIKE	PUSH PLATE	SLIDING DOOR TRACK & PULLS	PUSH TO LOCK	DOOR PULL	CARD READER	
V01A	EXISTING	EX.	ALUM	ANOD	EX.	EX.	EX.	EX.	ALUM	ANOD								●	●	●					●					●	EXISTING HARDWARE AND LOCKSETS TO REMAIN. NEW ADO
V01B	EXISTING	EX.	ALUM	ANOD	EX.	EX.	EX.	EX.	ALUM	ANOD								●	●												EXISTING HARDWARE AND LOCKSETS TO REMAIN. NEW ADO
V02A	EXISTING	EX.	ALUM	ANOD	EX.	EX.	EX.	EX.	ALUM	ANOD								●	●	●					●					●	EXISTING HARDWARE AND LOCKSETS TO REMAIN. NEW ADO
V02B	965x2150x45	AL2	ALUM	ANOD	GL1	-	H2	J2	ALUM	ANOD			●					●	●												NEW ADO
C01	965x2150x45	2NL	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●		●	●	●	●					●					●	NEW ADO
C02	965/305x2150x45	NL-BF/M	WD	URETH	GL2	F2	H1	J1	PS	PAINT		●			●		●	●	●	●			●		●					●	NEW ADO
C03	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●		●	●		●		●	●			●		●					●	
C06	965x2150x45	2NL	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●		●	●		●	●		●					●					●	NEW ADO
102	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●		●	●		●			●					●					●	
105	965x2150x45	M	WD	URETH	-	F1	H1	J1	PS	PAINT		●					●	●							●			●			UNIVERSAL WASHROOM HARDWARE KIT, DOOR LOUVRE, NEW ADO
106	965x2150x45	G-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●		●						●								
107	965x2150x45	G-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●		●						●								
108	965x2150x45	G-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●		●				●										SCHLAGE KEY
109	965x2150x45	G-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●		●				●										SCHLAGE KEY
110	965x2150x45	G-BF	WD	URETH	GL2	SC-02	H1	J1	PS	PAINT		●			●		●				●										SCHLAGE KEY
111B	2-610x2150x45	M	WD	URETH	-	-	-	-	WD	PAINT																	●				SLIDING DOOR HARDWARE KIT
112	915x2150x45	M	WD	URETH	-	F1	H1	J1	PS	PAINT		●			●		●			●										●	
113	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●		●							●							
114	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●		●							●							
115	965x2150x45	M	WD	URETH	-	F1	H1	J1	PS	PAINT		●		●	●		●			●					●					●	
117A	1070x2150x45	G-BF	WD	URETH	GL2	-	-	-	-	-																	●				SLIDING POCKET DOOR HARDWARE KIT W/ MAGNET HOLD CLOSE
117B	1070x2150x45	G-BF	WD	URETH	GL2	-	-	-	-	-																	●				SLIDING POCKET DOOR HARDWARE KIT W/ MAGNET HOLD CLOSE
118	1220x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
119	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
120	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
121	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
122	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
123	965x2150x45	M	HM	PAINT	-	F1	H1	J1	PS	PAINT	45 MIN.	●		●			●			●			●		●					●	
123B	965x2150x45	M	HM	PAINT	-	F1	H1	J1	PS	PAINT	45 MIN.	●		●									●								LATCHING DEVICE
124	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
125	965x2150x45	NL-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
126	965x2150x45	G-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
127	965x2150x45	G-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●			●								●								
128	965x2150x45	G-BF	WD	URETH	GL2	F1	H1	J1	PS	PAINT		●		●	●		●									●			●		
129	965x2150x45	NL-BF	HM	PAINT	FRG	F1	H1	J1	PS	PAINT	45 MIN.	●		●			●						●								
130	965x2150x45	M	HM	PAINT	-	F1	H1	J1	PS	PAINT	45 MIN.	●		●	●		●			●					●					●	
131	965x2150x45	M	HM	PAINT	-	F1	H1	J1	PS	PAINT	45 MIN.	●			●		●														
132	965x2150x45	M	WD	URETH	-	F1	H1	J1	PS	PAINT		●		●	●		●									●			●		300mm x 356mm DOOR LOUVRE
133	965x2150x45	M	WD	URETH	-	F1	H1	J1	PS	PAINT		●		●	●		●									●			●		300mm x 356mm DOOR LOUVRE

ROOM SCHEDULE

GROUND FLOOR

ROOM NO.	ROOM NAME		FLOOR	BASE	WALLS NORTH	WALLS EAST	WALLS SOUTH	WALLS WEST	CEILING	CEILING HEIGHT	REV.	REMARKS
V01	VESTIBULE	MAT.	CONC.		GB	GB	GB	GB	GWB	+/-3060	-	NEW CEILING TO TERMINATE AT TOP OF EXISTING TRANSOM
		FIN.	PCT	PCT	P	P	P	P	P	-	-	
					-	-	-	-	-	-	-	
V02	VESTIBULE	MAT.	CONC.		-	GB	GB	GB	GWB	+/-3060	-	NEW CEILING TO TERMINATE AT TOP OF EXISTING TRANSOM
		FIN.	PCT	PCT	-	P	P	P	P	-	-	
									-	-	-	
C01	CORRIDOR	MAT.	CONC.		GB	GB	GB	-	ACT	+3048	-	
		FIN.	LVT	RB	P	P	P	-	-	-	-	
									-	-	-	
C02	CORRIDOR	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
C03	CORRIDOR	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
C04	CORRIDOR	MAT.	CONC.		GB	-	GB	GB	ACT	+2896	-	
		FIN.	LINO	RB	P	-	P	P	-	-	-	
									-	-	-	
C05	CORRIDOR	MAT.	CONC.		GB	-	GB	GB	ACT	+2896	-	
		FIN.	LINO	RB	P	-	P	P	-	-	-	
									-	-	-	
C06	CORRIDOR	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
C07	CORRIDOR	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
C08	CORRIDOR	MAT.	CONC.		-	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	-	P	P	P	-		-	
									-	-	-	
101	WAITING AREA	MAT.	CONC.		GB	GB	EXIST.	EXIST/GB	ACT/GB	+3048/2743	-	CEILING HEIGHT VARIES. SEE BULKHEAD DETAIL
		FIN.	LVT	RB	P	P	P	P	P	-	-	
									-	-	-	
102	RECEPTION	MAT.	CONC.		GB	GB	-	GB	ACT/GB	+3048/2743	-	CEILING HEIGHT VARIES. SEE BULKHEAD DETAIL
		FIN.	LVT	RB	P	P	-	P	P	-	-	
									-	-	-	
103	COPY AREA	MAT.	CONC.		GB	GB	GB	GB	ACT	+3048	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
104	ADMINISTRATION	MAT.	CONC.		GB	GB	GB	GB	ACT	+3048	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
105	UNIV. W/R	MAT.	CONC.		GB	GB	GB	GB	GWB	+2743	-	REFER TO ELEVATION FOR EXTENTS OF CT WALL FINISH. REST OF GB TO BE PAINTED.
		FIN.	PCT	PCT	CT	CT	CT	CT	P	-	-	
									-	-	-	
106	CONSULT. ROOM 2	MAT.	CONC.		GB	GB	GB	GB	ACT	+2590	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
107	CONSULT. ROOM 1	MAT.	CONC.		GB	GB	GB	GB	ACT	+2590	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
108	OFFICE 1	MAT.	CONC.		GB	GB	GB	GB	ACT	+2590	-	
		FIN.	LINO	RB	P	P	P	P	-	-	-	
									-	-	-	
109	OFFICE 2	MAT.	CONC.		GB	GB	GB	GB	ACT	+2590	-	
		FIN.	LINO	RB	P	P	P	P	-	-	-	
									-	-	-	
110	OFFICE 3	MAT.	CONC.		GB	GB	GB	GB	ACT	+2590	-	
		FIN.	LINO	RB	P	P	P	P	-	-	-	
									-	-	-	
111	CUBICLES/ WORKSTATIONS	MAT.	CONC.		GB	GB	GB	GB	ACT	+2896	-	
		FIN.	LINO	RB	P	P	P	P	-		-	
									-	-	-	
111B	CLOSET	MAT.	CONC.		GB	GB	GB	GB	ACT	+2438		
		FIN.	LINO	RB	P	P	P	P	-			
									-			
112	OFFICE STORAGE	MAT.	CONC.		EXIST	GB	GB	EXIST/GB	ACT	+2743	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
113	PHONE RM. 1	MAT.	CONC.		GB	EXIST	GB	GB	ACT	+2438	-	
		FIN.	LINO	RB	P	P	P	P	-	-	-	
									-	-	-	
114	PHONE RM. 2	MAT.	CONC.		GB	GB	GB	GB	ACT	+2438	-	
		FIN.	LINO	RB	P	P	P	P	-	-	-	
									-	-	-	
115	FILE ROOM	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
116	PAN	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
117	STERILIZATION ROOM	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
118	OPERATORY 1	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
119	OPERATORY 2	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
120	OPERATORY 3	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
121	OPERATORY 4	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
122	OPERATORY 5	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
123	COMPRESSOR ROOM	MAT.	CONC.		GB	GB	GB	GB	-	+2743	-	
		FIN.	SFF	RB	P	P	P	P	-	-	-	
									-	-	-	
123B	O&N CLOSET	MAT.	CONC.		GB	GB	GB	GB	-	+2743	-	
		FIN.	SFF	RB	P	P	P	P	-	-	-	
									-	-	-	
124	OPERATORY 6	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
125	OPERATORY 7	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
126	MEETING ROOM	MAT.	CONC.		GB/GL	EXIST	GB	GB	ACT	+3048	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
127	KITCHEN	MAT.	CONC.		GB/GL	GB	GB	GB	ACT	+2743	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
128	LOCKERS	MAT.	CONC.		GB/GL	GB	GB	GB	ACT	+2743	-	
		FIN.	LVT	RB	P	P	P	P	-	-	-	
									-	-	-	
129	DENTURIST LAB	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
130	I.T./ELEC.	MAT.	CONC.		GB	GB	GB	GB	ACT	+2743	-	
		FIN.	SFF	RB	P	P	P	P	-	-	-	
									-	-	-	
131	CUSTODIAL	MAT.	CONC.		GB	EXIST	GB	GB	GWB	+2743	-	
		FIN.	LINO	LINO	P	P	P	P	-	-	-	
									-	-	-	
132	EX. MEN W/R	MAT.	CONC.		GB	GB	GB	GB	EX. GWB	+2760	-	REFER TO ELEVATION FOR EXTENTS OF CT WALL FINISH. REST OF GB TO BE PAINTED.
		FIN.	PCT	PCT	CT	CT	CT	CT	P	-	-	
									-	-	-	
133	EX. WOMEN W/R	MAT.	CONC.		GB	GB	GB	GB	EX. GWB	+2760	-	REFER TO ELEVATION FOR EXTENTS OF CT WALL FINISH. REST OF GB TO BE PAINTED.
		FIN.	PCT	PCT	CT	CT	CT	CT	P	-	-	
									-	-	-	

NOTE: ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

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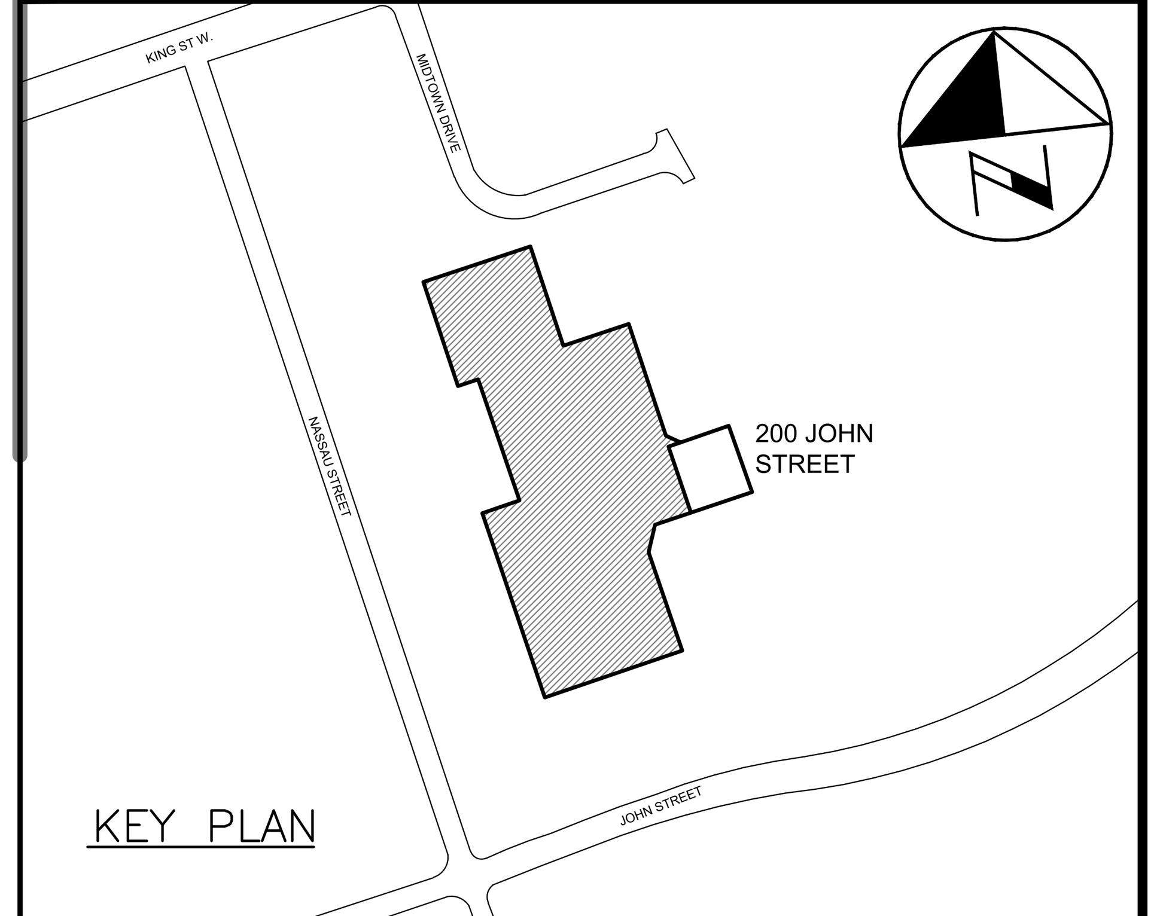


KEY PLAN

CONSULTANT REVISIONS

NO.	DATE	NAME	REVISIONS
1	APR 29/21	BBA	ISSUED FOR ADDENDUM No.1

PRIME CONSULTANT

BARRY BRYAN ASSOCIATES
Architects
Engineers
Project Managers
250 Water St.
Suite 201
Whitby, Ontario
L1N 0G5
Tel: (905) 666-5252
Fax: (905) 666-5256
e-mail: bba@bba-archeng.com

SUB-CONSULTANT

DESIGN BY: BBA	SCALE N.T.S.
DRAWN BY: LQ/KM	DATE: 2021-03-24
CHECKED BY: CM	CONSULTANT PROJECT NO. 20060
APPROVED BY: WW	

CONTRACT REVISIONS

NO.	DATE	NAME	REVISIONS
5	FEB 12/21	BBA	ISSUED FOR PERMIT & TENDER
4	JAN 13/21	BBA	RE-ISSUED FOR 90% CLIENT REVIEW
3	NOV 5/20	BBA	ISSUED FOR 90% CLIENT REVIEW
2	AUG 14/20	BBA	ISSUED FOR REVISED 60% CLIENT REVIEW
1	MAY 27/20	BBA	ISSUED FOR 60% CLIENT REVIEW

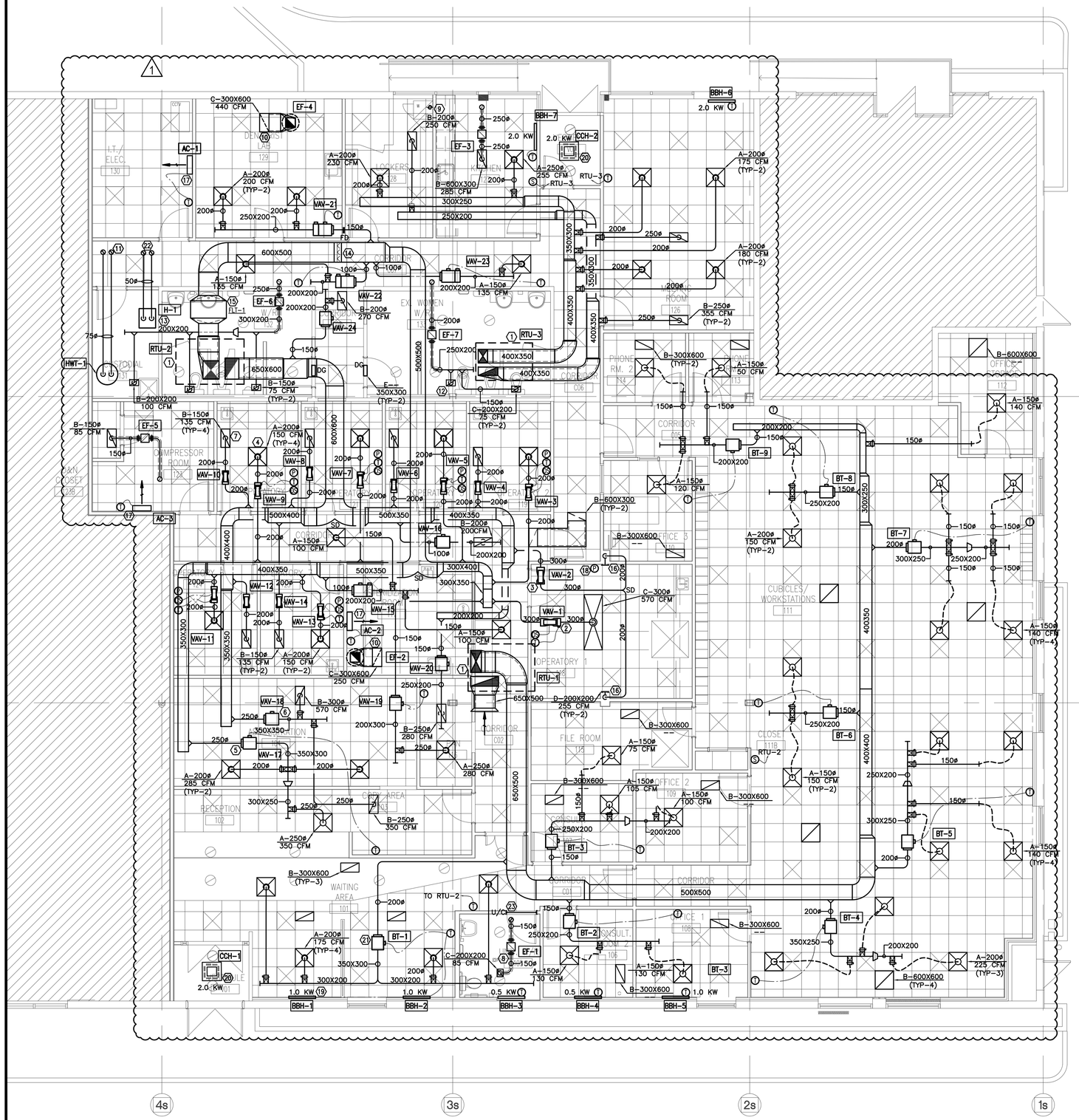
THE REGIONAL MUNICIPALITY OF DURHAM
WORKS DEPARTMENT
DESIGN, CONSTRUCTION & ASSET MANAGEMENT

RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA

SCHEDULES

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-0-07	LEA-0-07-19-01
CONTRACT NO. T-1032-2021	DRAWING NO. A-017	SHEET NO. 017

\\filesrv\Project Data\2020\20060 Durham Region-New Dental Clinic, 200 John St. W, Oshawa\Drawings\Current\20060 A-017 SCHEDULES.dwg



HVAC CONSTRUCTION NOTES

1. NEW ROOFTOP UNIT AS SPECIFIED. ROUTE NEW SUPPLY/RETURN DUCTWORK DN THRU ROOF AS INDICATED. SIZE DUCTWORK TO MATCH SUPPLY/RETURN COLLAR ON UNIT AND PROVIDE TRANSITION TO SUIT. REFER TO "DUCTWORK INSULATION SCHEDULE" FOR INSULATION DETAILS.
2. NEW SUPPLY AIR VENTURI VALVE AS SPECIFIED. REFER TO "VAV TERMINAL SCHEDULE" FOR REHEAT AND BALANCING INFO (TYPICAL).
3. NEW RETURN AIR VENTURI VALVE AS SPECIFIED. REFER TO "VAV TERMINAL SCHEDULE" FOR BALANCING INFO.
4. NEW SUPPLY AIR DIFFUSER AS SPECIFIED (TYPICAL).
5. NEW SUPPLY AIR VAV TERMINAL AND ASSOCIATED DUCTWORK. REFER TO "VAV TERMINAL SCHEDULE" FOR REHEAT AND BALANCING INFO (TYPICAL).
6. NEW RETURN AIR VAV TERMINAL AND ASSOCIATED DUCTWORK. REFER TO "VAV TERMINAL SCHEDULE" AND FOR INFO (TYPICAL).
7. NEW RETURN GRILLE C/W DUCT CONNECTION AS SPECIFIED (TYPICAL).
8. NEW INLINE EXHAUST FAN AS SPECIFIED. TERMINATE DUCTWORK UP THRU ROOF C/W GOOSENECK TERMINATION. REFER TO DETAILS (TYPICAL).
9. NEW 100ø VENT TO DRYER OUTLET. VENT MATERIAL SHALL BE RIGID DUCT SUITABLE FOR DRYER VENTING AS PER MANUFACTURER'S INSTALLATION INSTRUCTION. ROUTE DRYER VENTING UP THROUGH ROOF.
10. NEW EXHAUST DUCTWORK DN FROM ROOF MOUNTED EXHAUST FAN. PROVIDE NEW EXHAUST GRILLE AS SPECIFIED. BALANCE EXHAUST FLOW RATE AS INDICATED.
11. NEW 75ø COMBUSTION AND INTAKE PIPING FOR HWT. INSTALL AS PER MANUFACTURERS INSTRUCTIONS.
12. NEW EXHAUST GRILLE C/W DUCT CONNECTION AS SPECIFIED. PROVIDE ASSOCIATED DUCTWORK AS INDICATED (TYPICAL).
13. NEW HUMIDIFIER AS SPECIFIED. REFER TO M-3 FOR ROUTING OF ASSOCIATED PIPING.
14. NEW DUCT MOUNTED STEAM MANIFOLD AS SPECIFIED.
15. NEW INLINE DUCT FILTER AS SPECIFIED. PROVIDE DUCT TRANSITION TO SUIT.
16. NEW RETURN AIR DUCTWORK DN THRU DUCT SHAFT C/W WALL MOUNTED GRILLE @ LOW LEVEL (TYP-2).
17. NEW WALL MOUNTED AC-UNIT AS SPECIFIED. ASSOCIATED CONDENSING UNIT SHALL BE MOUNTED ON ROOF. REFER TO M-3 FOR REFRIGERATION PIPE ROUTING.
18. NEW ROOM PRESSURE MONITOR AS SPECIFIED (TYPICAL).
19. NEW ELECTRIC BASEBOARD HEATER AS SPECIFIED. REFER TO CONTROL SEQUENCES (TYPICAL).
20. NEW CEILING FAN HEATER AS SPECIFIED (TYP-2).
21. NEW BYPASS TERMINAL AND ASSOCIATED DUCTWORK AS SPECIFIED (TYPICAL).
22. NEW 75ø COMBUSTION AND INTAKE PIPING FOR H-2. INSTALL AS PER MANUFACTURERS INSTRUCTIONS.
23. NEW DOOR UNDERCUT AS SHOWN.
24. NEW 600X300 ACOUSTICALLY LINED TRANSFER AIR DUCTWORK C/W GRILLES (TYPICAL)

GENERAL NOTES

1. INSULATE DUCTWORK AS PER THE "DUCTWORK INSULATION SCHEDULE".
2. MAINTAIN 10'-0" SEPARATION FROM FRESH AIR INTAKE TO ANY EXHAUST/ PLUMBING VENT AND 3'-0" SEPARATION BETWEEN EXHAUST AND PLUMBING VENT AS PER O.B.C.
3. ALL EQUIPMENT ON ROOF TO BE COORDINATED WITH EXISTING EQUIPMENT AND VENT LOCATIONS.
4. ALL DUCTWORK SHALL MEET SMACNA STANDARDS.
5. PROVIDE FIRE DAMPER AT ALL DUCTWORK PENETRATING A FIRE RATED WALL.
6. INSTALL ALL EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS.
7. DUCTWORK PATH SHALL BE COORDINATED ON-SITE WITH EXISTING STRUCTURAL MEMBERS. REPORT ANY DISCREPANCIES TO ENGINEER.
8. ALL DUCT DIMENSIONS ARE CLEAR INSIDE DIMENSIONS. ACTUAL DUCT SIZING SHALL BE INCREASED TO SUIT INTERNAL ACOUSTIC LININGS.
9. ALL DUCT CONNECTIONS HVAC EQUIPMENT BEING SERVED BY RTU-2 SHALL BE RIGID DUCTWORK. THE USE OF FLEXIBLE DUCTWORK IS NOT PERMITTED IN THE CLINIC ZONE.
10. OWNER SHALL ENSURE THAT DUCT MOUNTED FILTERS ARE CHANGED EVERY 6 MONTHS.

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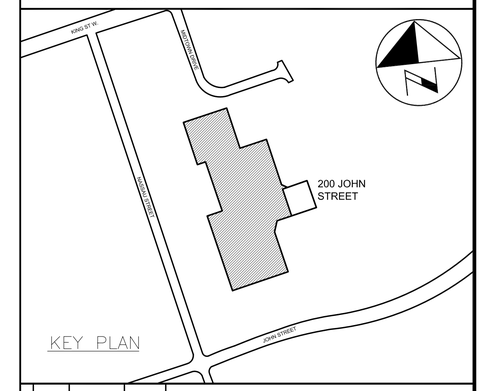

CONSULTANT REVISIONS

NO.	DATE	NAME	REVISIONS
1	APR 22/21	JM	REVISED AS PER ADDM1

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DESIGN BY: JM	SCALE 1:75
DRAWN BY: JM	DATE: FEB 2021
CHECKED BY: AM	CONSULTANT PROJECT NO. 20-0033
APPROVED BY:	

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THE REGIONAL MUNICIPALITY OF DURHAM
WORKS DEPARTMENT
DESIGN, CONSTRUCTION & ASSET MANAGEMENT

RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA GROUND FLOOR PLAN - HVAC SHEET METAL

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-O-07	LEA-O-07-19-01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	M-002	020

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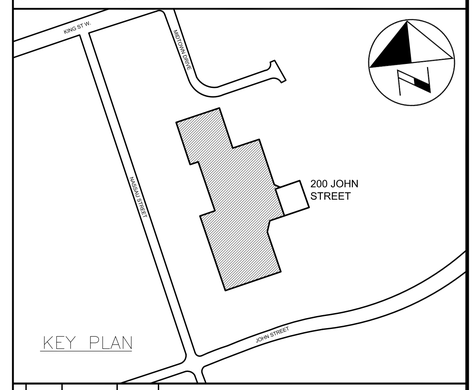

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THE REGIONAL MUNICIPALITY OF DURHAM
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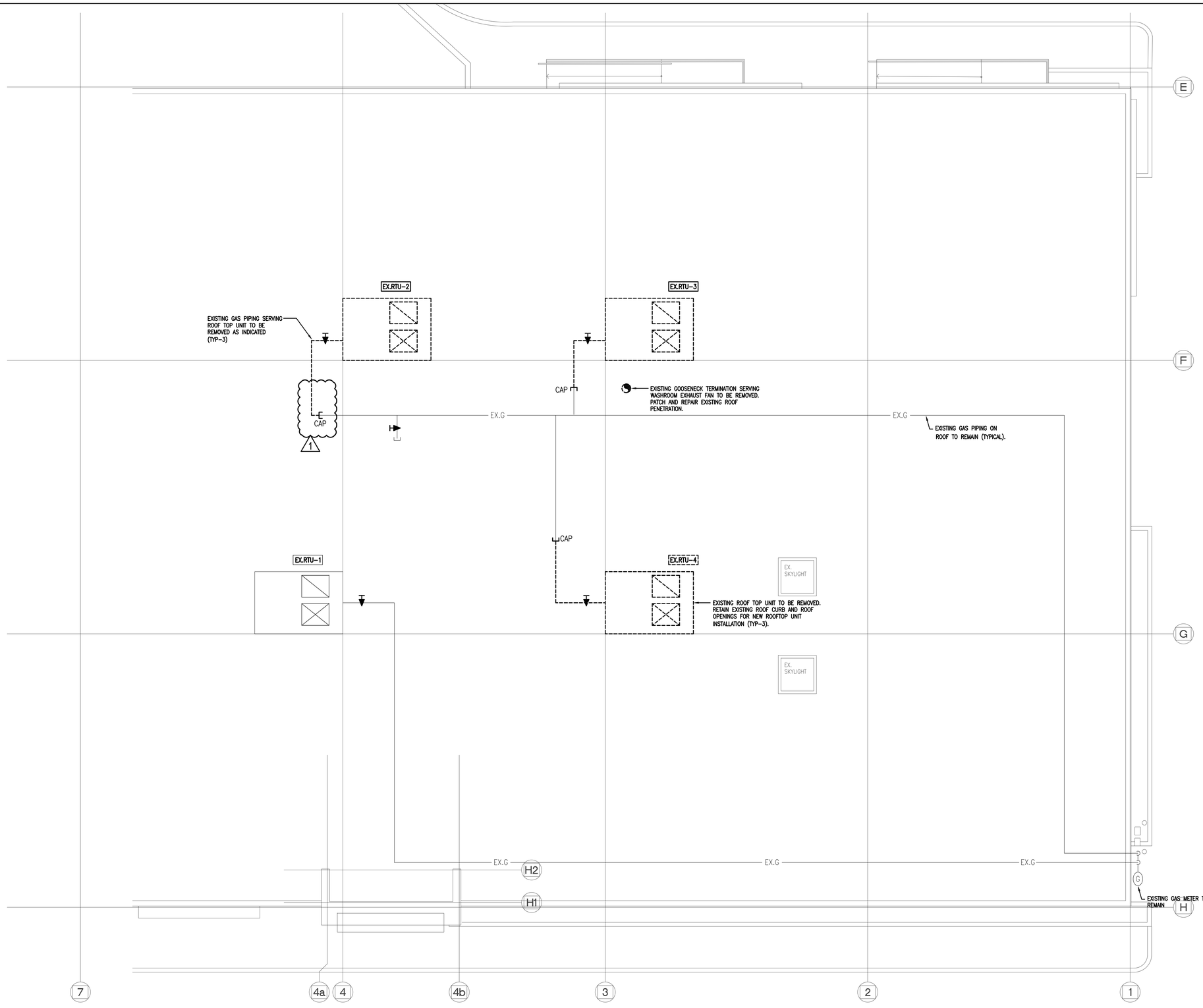
RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA
GROUND FLOOR PLAN - HVAC PIPING

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-O-07	LEA-O-07-19-01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	M-003	021



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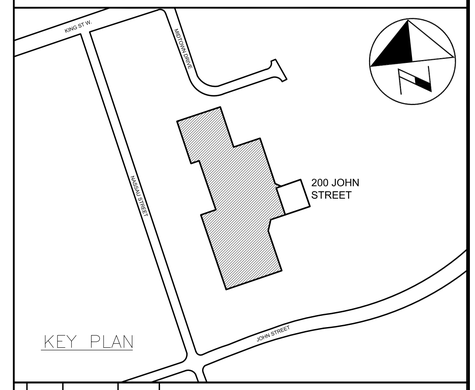

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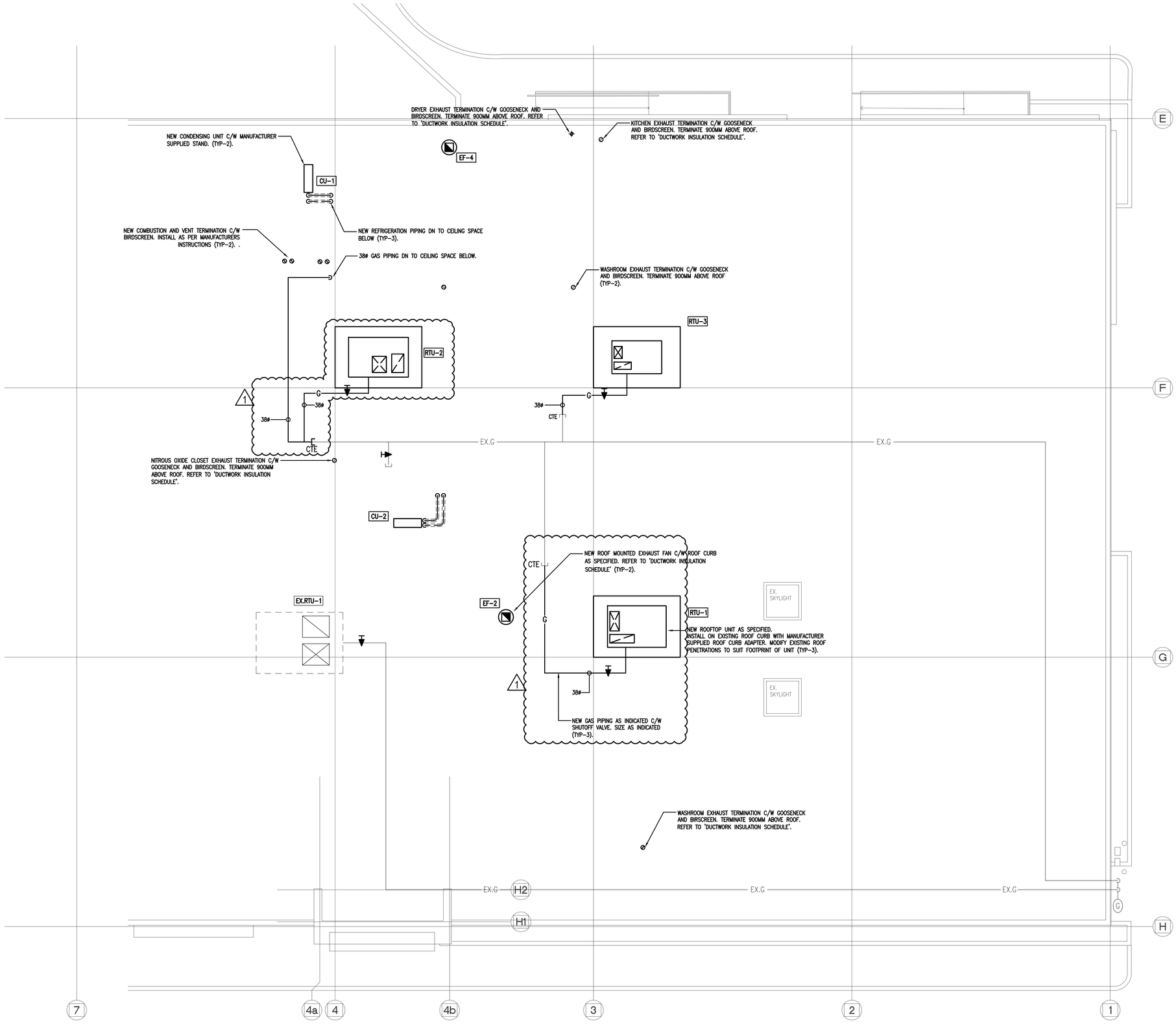
WORKS DEPARTMENT
DESIGN, CONSTRUCTION & ASSET MANAGEMENT

RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA
ROOF PLAN - MECHANICAL DEMOLITION

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-O-07	LEA-O-07-19-01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	M-004	022



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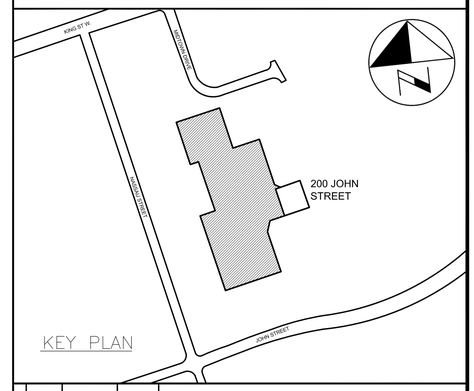

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RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA
ROOF PLAN - MECHANICAL CONSTRUCTION

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
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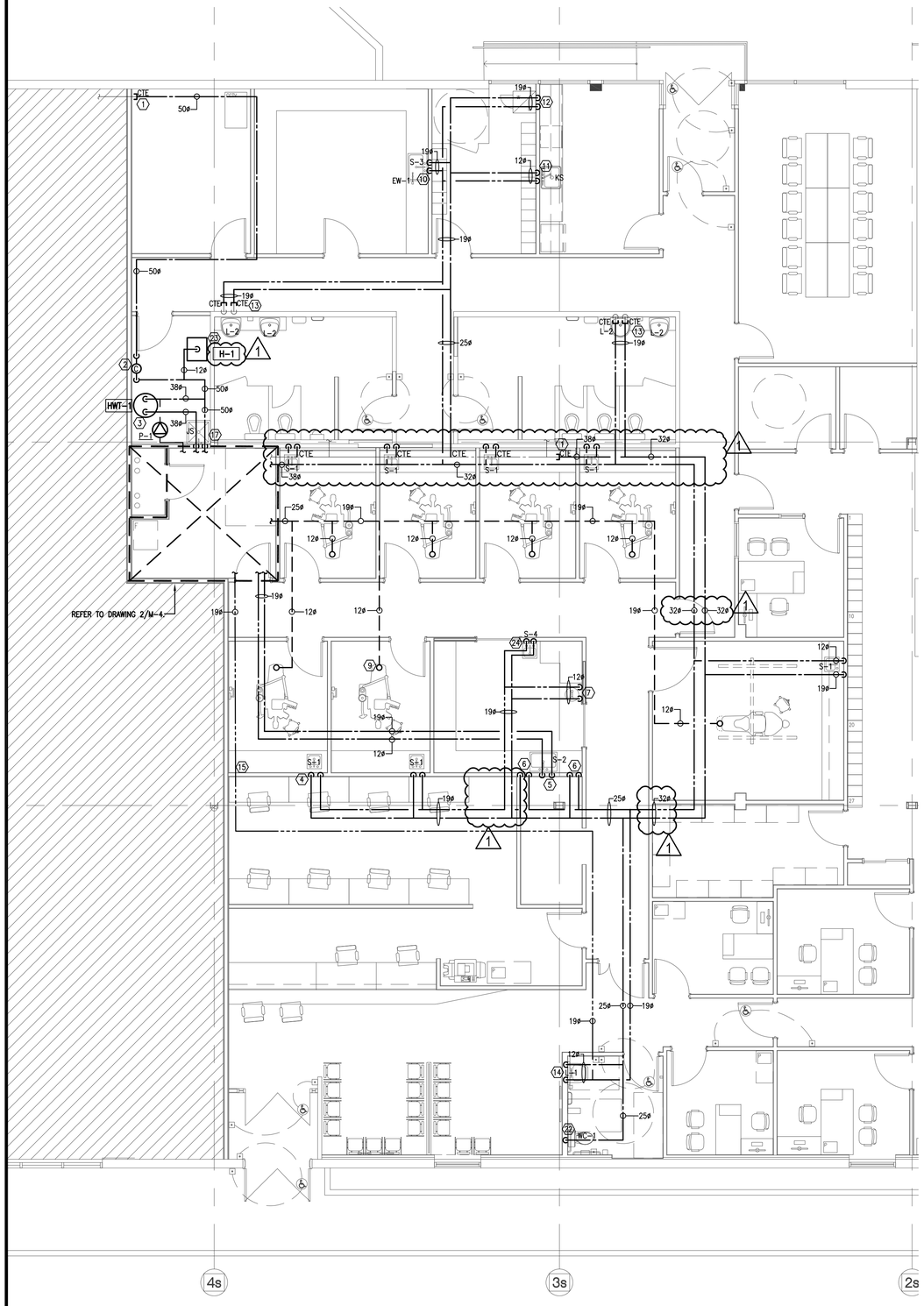
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	M-005	023



1 M-007 GROUND FLOOR PLAN – PLUMBING CONSTRUCTION

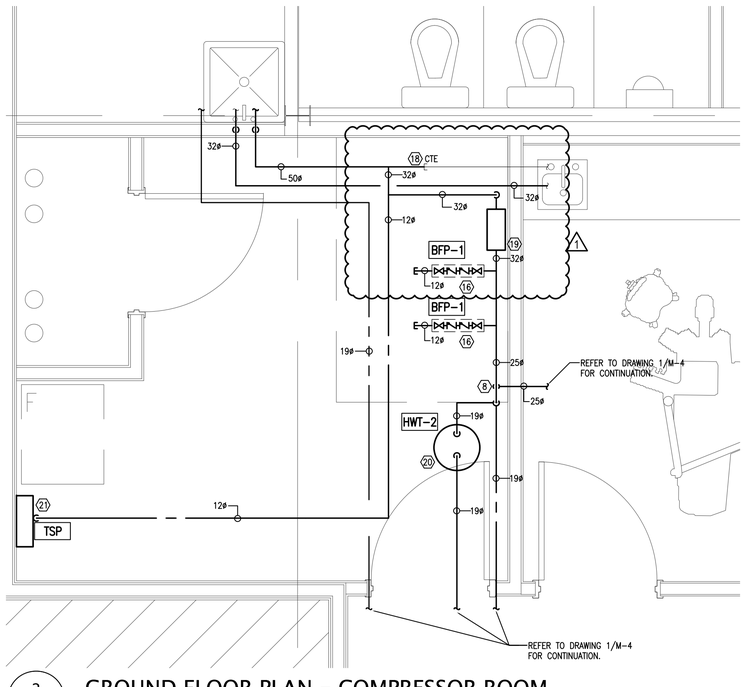
1:75

PLUMBING DRAWING NOTES

1. NEW COLD WATER PIPING IN CEILING SPACE. CONNECT TO EXISTING COLD WATER PIPING AS INDICATED.
2. NEW COLD WATER PIPING DN TO CHECK METER C/W BACKFLOW PREVENTER AS SPECIFIED. REFER TO DETAILS.
3. NEW GAS HOT WATER TANK C/W RECIRCULATION PUMP AS SPECIFIED. PROVIDE ASSOCIATED CW, HW & HWR PIPING DN TO HOT WATER TANK AS INDICATED.
4. NEW 19ø CW AND 12ø HW PIPING DN TO DENTAL SINK S-1. PROVIDE 12ø SECONDARY CW PIPING CONNECTION BELOW SINK LEVEL, VALVE AND CAP. REFER TO DETAIL (TYP-8).
5. NEW 19ø CW AND 12ø HW PIPING DN TO STERILIZATION SINK S-2. PROVIDE 12ø SECONDARY CW PIPING CONNECTION BELOW SINK LEVEL, VALVE AND CAP. REFER TO DETAIL.
6. NEW 19ø CW/HW PIPING DN TO INSTRUMENT WASHER. INSTRUMENT WASHER TO BE PROVIDED BY OTHERS (TYP-2).
7. NEW 12ø CW/HW PIPING DN TO EYEWASH STATION. EYEWASH STATION TO BE PROVIDED BY OTHERS.
8. NEW 25ø CW PIPING DN THROUGH FLOOR. ROUTE COLD WATER PIPING BENEATH SLAB AS INDICATED.
9. NEW 12ø CW PIPING STUB OUT AT DENTAL CHAIR JUNCTION BOX. TERMINATE PIPING 50MM ABOVE FINISHED FLOOR AND CAP. DENTAL CHAIR TO BE PROVIDED BY OTHERS (TYP-7).
10. NEW 19ø CW/HW PIPING DN TO LABORATORY SINK S-3 AND EYEWASH STATION EW-1.
11. NEW 12ø CW/HW PIPNG DN TO KITCHEN SINK KS.
12. NEW 19ø CW/HW PIPNG DN TO CLOTHES WASHER. CLOTHES WASHER TO BE PROVIDED BY OTHERS AND INSTALLED BY THIS CONTRACTOR.
13. NEW 19ø CW/HW PIPNG TO SERVE LAVATORIES. CONNECT TO EXISTING CW/HW PIPING AS INDICATED.
14. NEW 12ø CW/HW PIPNG DN TO SERVE LAVATORY L-1.
15. NEW 19ø HOT WATER RETURN PIPING AS SPECIFIED. ROUTE PIPING IN CEILING SPACE AS INDICATED.
16. NEW 12ø CAPPED CW CONNECTION C/W BACKFLOW PREVENTER TO SERVE VACUUM PUMP. VACUUM PUMP TO BE PROVIDED BY OTHERS.
17. NEW 12ø CW/HW PIPING DN TO JANITOR SINK JS.
18. NEW 50ø CW PIPING IN COMPRESSOR ROOM CEILING SPACE. CONNECT TO EXISTING AS INDICATED.
19. NEW 25ø CW PIPING DN TO REMOTE WATER CONTROL VALVE. ROUTE CW PIPING AS INDICATED. REMOTE WATER CONTROL VALVE TO BE PROVIDED BY OTHERS.
20. NEW CEILING MOUNTED ELECTRIC HOT WATER TANK. PROVIDE ASSOCIATED CW/HW PIPING AS SPECIFIED.
21. NEW 12ø CW PIPING DN TO TRAP SEAL PRIMER.
22. NEW 25ø CW PIPING DN TO WATER CLOSET WC-1.
23. NEW 12ø CW PIPING C/W BFP DN TO HUMIDIFER. REFER TO DETAILS (TYP-2).
24. NEW 12ø CW/HW PIPING DN TO SINK S-4.

GENERAL NOTES

1. THERMALLY INSULATE ALL PIPING AS PER THE "PIPING INSULATION SCHEDULE".
2. PROVIDE ISOLATING VALVES ON MAIN AND/OR BRANCH LINES AND FOR ALL EQUIPMENT AND FIXTURES SERVED WITH HOT AND COLD WATER LINES. ALL VALVES SHALL BE SUITABLE FOR THE OPERATING PRESSURE OF THE SYSTEM IN WHICH THEY ARE INSTALLED.
3. PROVIDE ADEQUATE ACCESS TO ALL SHUT-OFF VALVES AS PER ONTARIO BUILDING CODE.
4. INSTALL ALL PIPING MAXIMUM 12" ABOVE FINISHED CEILING.
5. ALL DENTAL EQUIPMENT SHALL BE INSTALLED AT THE END OF CONSTRUCTION AFTER SITE CLEANUP. AS PART OF THIS SCOPE OF WORK. CONTRACTOR SHALL COORDINATE AND SCHEDULE TIME TO COMPLETE FINAL MECHANICAL CONNECTIONS TO DENTAL EQUIPMENT.



2 M-007 GROUND FLOOR PLAN – COMPRESSOR ROOM

1:25

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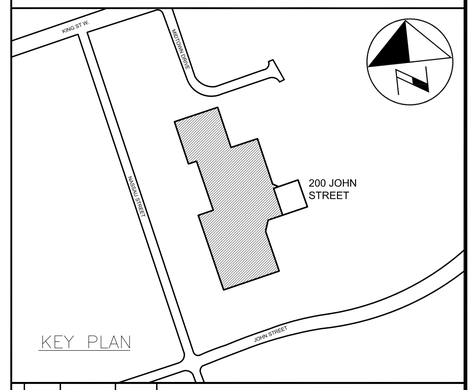

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THE REGIONAL MUNICIPALITY OF DURHAM
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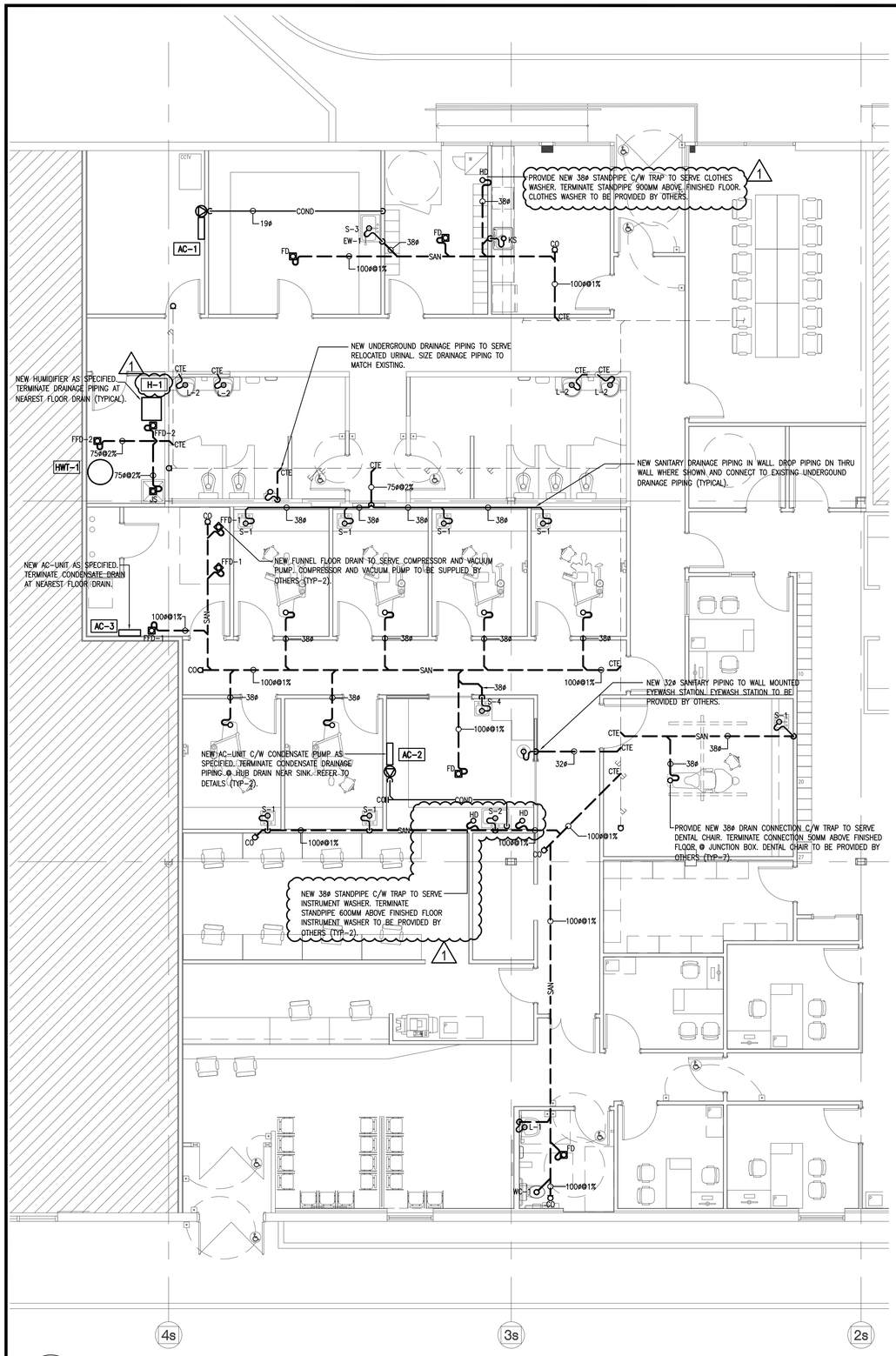
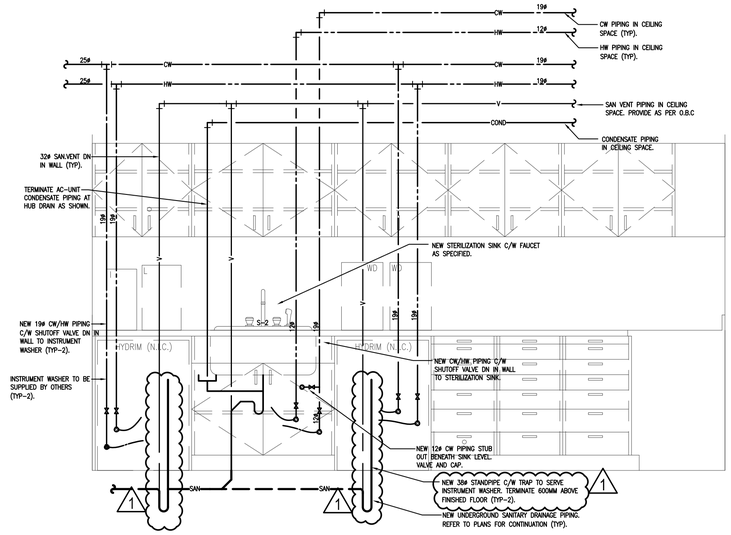
RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA
GROUND FLOOR PLAN
PLUMBING – CONSTRUCTION

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-O-07	LEA-O-07-19-01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	M-007	025



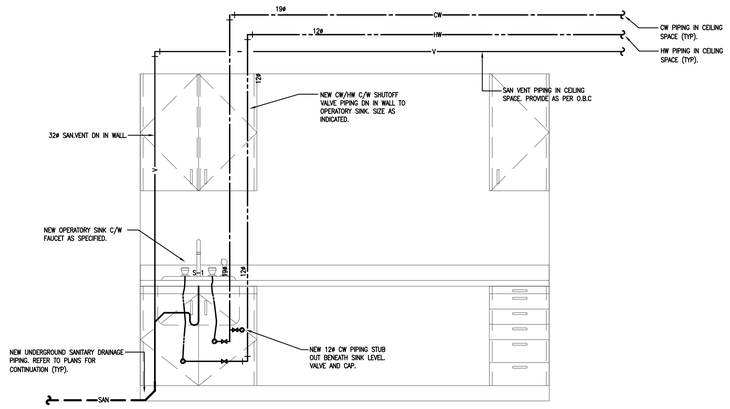
1 M-009 GROUND FLOOR PLAN – DRAINAGE CONSTRUCTION

1:75



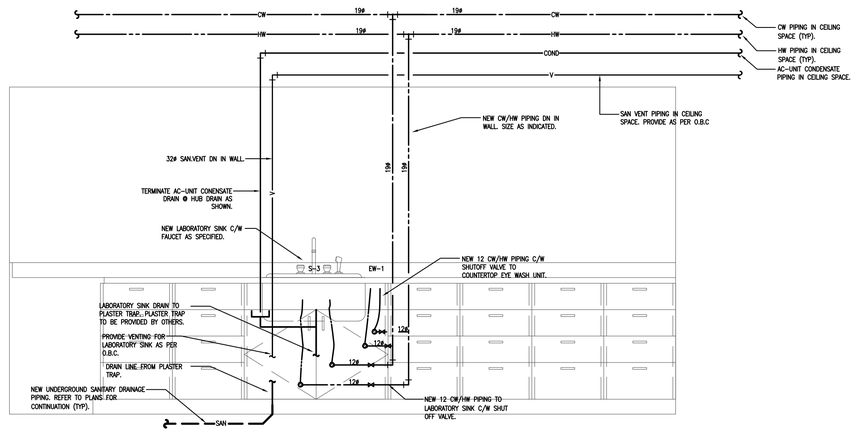
2 M-009 STERILIZATION ROOM SINK CONNECTION DETAIL

NTS



3 M-009 TYPICAL OPERATORY SINK CONNECTION DETAIL

NTS



4 M-009 DENTURIST LABORATORY SINK CONNECTION DETAIL

NTS

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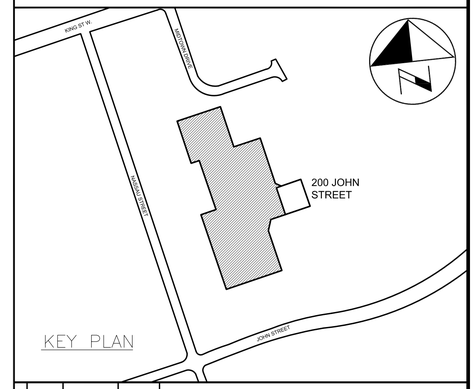

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CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	M-009	027

PLUMBING FIXTURE SCHEDULE

REF.	DESCRIPTION	COLD WATER (MM)	HOT WATER (MM)	DRAIN (MM)	VENT (MM)	SPECIFICATION
WC-1	BARRIER-FREE FLUSH VALVE TYPE, FLOOR MOUNTED WATER CLOSET	25ø	-	75ø	38ø	ZURN #Z5665-BWL1 VITREOUS CHINA ELONGATED BOWL, 425 MM (16 3/4 IN) IN HEIGHT, SIPHON JET ACTION, 54 MM (2 1/8 IN) COMPLETELY GLAZED TRAPWAY, BOLT CAPS, 38 MM (1 1/2 IN) TOP SPUD CONNECTION, 6.0 L (1.6 US GAL), 4.8 L (1.28 US GAL) AND AS LITTLE AS 4.2 L (1.1 US GAL) PER FLUSH, DEPENDING ON THE FLUSH VALVE SELECTED. ZURN #ZEMS6000AV-1-IS-HET EXPOSED ELECTRONIC FLUSH VALVE FOR WATER CLOSETS, TPE CHLORAMINE RESISTANT DUAL SEAL DIAPHRAGM WITH TRIPLE FILTER BY-PASS, POWERED BY HARDWIRED 6 VDC POWER CONVERTER, INFRARED CONVERGENCE TYPE PROXIMITY SENSOR, MOTORIZED ACTUATOR WITH OVERRIDE BUTTON, METAL CASING, CONTROL STOP WITH VANDAL RESISTANT STOP CAP, CAST WALL FLANGE, 38 MM (1 1/2 IN) VACUUM BREAKER TUBE WITH WATER SUPPLY 406 MM (16 IN) ABOVE CLOSET BOWL, POLISHED CHROME FINISH, 4.8 L (1.28 US GAL) PER FLUSH, (NOT INCLUDED) ELECTRICAL POWER CONVERTER 120 VAC/6 VDC, RECESSED INSTALLATION. ZURN #P6000-HW6 HARDWIRED POWER CONVERTER 120VAC/7.6 VDC, 2 AMP, CAPABLE OF SUPPLYING FOR 8 FAUCETS OR 8 FLUSH VALVES OR 8 FAUCETS/FLUSH VALVES COMBINED. ZURN #Z5956SS-EL-STS SOLID PLASTIC ELONGATED SEAT FOR SUPER-INTENSIVE USE, OPEN FRONT, COVERLESS, MOLDED BUMPER GUARD, STAINLESS STEEL CHECK HINGES AND FASTENERS. (WHITE). SANCERAM BACK REST CODE GRBR103
L-1	SINGLE BOWL BARRIER-FREE WALL-HUNG LAVATORY	12ø	12ø	32ø	32ø	ZURN #Z5321 581 X 514 MM (22 7/8 X 20 1/4") VITREOUS CHINA WALL HUNG LAVATORY FOR BARRIER-FREE APPLICATION, 581 X 514 MM (22 7/8 X 20 1/4 IN), BACKSPLASH, FRONT OVERFLOW, PRE-DRILLED FOR CONCEALED ARMS, DRILLED SINGLE HOLE. ZURN #Z6956XL-CWB-FS ARCHED STYLE HARDWIRED ELECTRONIC SENSOR FAUCET, 1.9 L/MIN. (0.5 USGPM) SPRAY OUTLET, SINGLE HOLE INSTALLATION, POLISHED CHROME FINISH, INFRARED CONVERGENCE TYPE PROXIMITY SENSOR, ON-DEMAND ACTIVATION WITH A 30 SECONDS RUN TIME, IN-LINE FILTER, PRE-MIXED WATER SUPPLY. INCLUDES 4 "AA" BATTERIES AS BATTERY BACK-UP TO FAUCET DURING POWER OUTAGES, BRAIDED STAINLESS STEEL HOSE SUPPLIES. SUPPLIED WITH 85 IN CABLE WIRE (CWB). ZURN #P6000-HW6 HARDWIRED POWER CONVERTER 120VAC/7.6 VDC, 2 AMP., CAPABLE OF SUPPLYING FOR 8 FAUCETS OR 8 FLUSH VALVES OR 8 FAUCETS/FLUSH VALVES COMBINED. ZURN #170-LF 127 MM X 120 MM (5 X 4") THERMOSTATIC POINT OF USE MIXING VALVE, 3/8" INLETS, 3/8" OUTLET, COMPRESSION CONNECTIONS, BRONZE BODY, LOCKED TEMPERATURE ADJUSTMENT CAP (VANDAL RESISTANT), COPPER ENCAPSULATED THERMOSTAT ASSEMBLY WITH, POLYMER THERMOPLASTIC SHUTTLE, STAINLESS STEEL SPRINGS, BUNA-N O'RINGS, INTEGRAL CHECK VALVES ON HOT AND COLD INLETS, COMPRESSION FITTINGS ON INLETS AND OUTLET. OS&B #37DWC 32 MM "DAISY" TYPE STRAINER OFFSET DRAIN ASSEMBLY, CAST BRASS BODY, 32 MM (1 1/4 IN), POLISHED CHROME FINISH. ZURN Z8700-8-PC-BD 32 MM (1 1/4") CAST BRASS ADJUSTABLE P-TRAP, 32 MM (1 1/4 IN) WITH DEEP WALL FLANGE AND CLEANOUT, CHROME PLATE FINISH. ZURN #Z1231-EZ CONCEALED WALL HUNG CARRIER, STEEL UPRIGHTS WITH WELDED FEET, CAST IRON ADJUSTABLE HEADERS, CONCEALED ARMS, ALIGNMENT TRUSS AND MOUNTING FASTENERS. ZURN #Z8946-3-NT ANTIMICROBIAL PROTECTORS, RESISTS THERMAL TRANSFERS FOR P-TRAP, OFFSET DRAIN ASSEMBLY, STOP AND SUPPLY.
L2	SINGLE BOWL SEMI COUNTER TOP LAVATORY - GENERAL USE	12ø	12ø	32ø	32ø	AMERICAN STANDARD MEZZO #9960.403.020 BASIN, 3 HOLES, 4" (102 MM) CENTER, 559 MM X 546 MM X 210 MM (22" X 21-1/2" X 8-1/4") HIGH, VITREOUS CHINA, WHITE FINISH, SEMI-COUNTER, REAR OVERFLOW, FAUCET LEDGE, SPACE SAVING DESIGN, MOUNTING KIT. PROVIDE BASIN RIM SEALANT. AMERICAN STANDARD SERIN #2064101.002/2064.101P SINGLE HANDLE FAUCET, POLISHED CHROME FINISH, ESCUTCHEON PLATE, BRASS, WASHERLESS CERAMIC DISC VALVE CARTRIDGES, 4.5 L/MIN (1.2 GAL/MIN) AERATOR OUTLET, CAST BRASS SPOUT, 112 MM (4-7/16") PROJECTION REACH, METAL LEVER HANDLE, SPEED CONNECT CABLE OPERATED METAL POP-UP DRAIN ASSEMBLY WITH 32 MM (1-1/4") TAILPIECE. LAWLER #TMM-1070, BELOW DECK MECHANICAL WATER MIXING VALVE, BRONZE BODY, TEMPERATURE ADJUSTING DIAL, 10 MM (3/8") INLETS AND OUTLET COMPRESSION FITTINGS, HIGH TEMPERATURE THERMOSTATIC LIMIT STOP, SHUT-OFF WITH AUTOMATIC RESET WHEN TEMPERATURE EXCEEDS 120 °F (48.8 °C), INTEGRAL CHECKS, OFFER TEMPERATURE RANGE FROM FULL COLD THROUGH 46 °C (114.8 °F). PROVIDE TEE, ADAPTORS AND FLEX. COPPER TUBING TO SUIT INSTALLATION. PROVIDE TEMPERED WATER TO HOT SIDE OF FAUCET. MCGUIRE #LFH170BV FAUCET SUPPLIES, CHROME PLATED FINISH POLISHED BRASS, COMMERCIAL DUTY 1/4 TURN BALL VALVE ANGLE STOPS, 13 MM (1/2") I.D. INLET X 127 MM (5") HORIZONTAL EXTENSION TUBES, CONVERTIBLE 1/4 TURN/LOOSE KEY HANDLES, ESCUTCHEON AND FLEXIBLE COPPER RISERS. MCGUIRE #8872C P-TRAP, HEAVY CAST BRASS ADJUSTABLE BODY, WITH SLIP NUT, 32 MM (1-1/4") SIZE, SHALLOW WALL FLANGE AND SEAMLESS TUBULAR WALL BEND.
KS	SINGLE BOWL COUNTERMOUNT - KITCHEN SINK	12ø	12ø	32ø	32ø	SOLERA #S848TS (33" X 22" X 9 1/2") TRUE-GRANITE SINGLE BOWL SINK, 80% QUARTZ 20% ACRYLIC, SILVER FINISH,ALL NATURAL MATERIALS, RECYCLABLE, HEAT RESISTANT UP TO 550 DEGREES, NON-PORUS ANTIBACTERIAL, INSTALLATION KIT, 89 MM (3 1/2 IN) REAR CENTERED CRUMB CUP DRAIN ASSEMBLY, PRE-DRILLED AS SPECIFIED. PFISTER STELLEN 1.5 GPM FLOW RATE 3 FUNCTION PULL-DOWN SPRAYER 1 OR 3-HOLE INSTALLATION; DECK PLATE OR SINGLE HOLE MOUNTING OPTION ACCUDOCK™ SPRAYHEAD DOCKING PFOREVER SEAL CERAMIC DISC VALVE PFOREVER WARRANTY®. ZURN #Z8702-9BD 38 MM (1 1/2") CAST BRASS ADJUSTABLE P-TRAP, 38 MM (1 1/2 IN) WITH CLEANOUT, DEEP SEAL FLANGE, POLISHED CHROME FINISH.
S-1	SINGLE BOWL COUNTERMOUNT - DENTAL SINK	12ø	12ø	38ø	32ø	SOLERA S3281T DROP-IN SINGLE BOWL, 304 SERIES STAINLESS STEEL, BRUSHED SATIN FINISH, 23 X 20 X 9 INCHES, FULLY INSULATED, OFF SET DRAIN, ONE PIECE CONSTRUCTION, THICK SOUND DAMPENER, INSTALLTION KIT INCLUDED. ZURN #Z6920XL-CWB-K-MJ-CP4 HARDWIRED ELECTRONIC SENSOR FAUCET, CAST BRASS BODY WITH GOOSENECK SPOUT 137 MM (5 3/8 IN), 3.8 L/MIN. (1.0 USGPM) LAMINAR FLOW SPOUT OUTLET, SINGLE HOLE INSTALLATION, POLISHED CHROME FINISH, INFRARED CONVERGENCE TYPE PROXIMITY SENSOR, ON-DEMAND ACTIVATION WITH A 30 SECONDS RUN TIME, IN-LINE FILTER, PRE-MIXED WATER SUPPLY. INCLUDES 4 "AA" BATTERIES AS BATTERY BACK-UP TO FAUCET DURING POWER OUTAGES. MULTI-JUNCTION BOX FOR 8 FAUCETS. SUPPLIED WITH 85 IN CABLE WIRE (CWB). 4 INCH COVER PLATE. ZURN #P6000-HW6 HARDWIRED POWER CONVERTER 120VAC/7.6 VDC, 2 AMP., CAPABLE OF SUPPLYING FOR 8 FAUCETS OR 8 FLUSH VALVES OR 8 FAUCETS/FLUSH VALVES COMBINED. ZURN #Z8702-9BD 38 MM (1 1/2") CAST BRASS ADJUSTABLE P-TRAP, 38 MM (1 1/2 IN) WITH CLEANOUT, DEEP SEAL FLANGE, POLISHED CHROME FINISH.
S-2	SINGLE BOWL COUNTERMOUNT - STERILIZATION SINK	12ø	12ø	38ø	32ø	NOVANNI #1023AEJ-SH 762 X 508 X 254 MM (30" X 20" X 10")STAINLESS STEEL SINGLE BOWL SINK, 762 X 508 X 254 MM (30 X 20 X 10 IN), TYPE 304, 18 GAUGE, SATIN FINISH, SOUND DEADENING PADS, RIM SEAL PRE-INTALLED, INSTALLATION KIT, 89 MM (3 1/2 IN) REAR CENTERED CRUMB CUP DRAIN ASSEMBLY, PRE-DRILLED AS SPECIFIED. ZURN# Z6920XL-CWB-K-MJ. HARDWIRED ELECTRONIC SENSOR FAUCET, CAST BRASS BODY WITH GOOSENECK SPOUT 137 MM (5 3/8 IN), 3.8 L/MIN. (1.0 USGPM) LAMINAR FLOW SPOUT OUTLET, SINGLE HOLE INSTALLATION, POLISHED CHROME FINISH, INFRARED CONVERGENCE TYPE PROXIMITY SENSOR, ON-DEMAND ACTIVATION WITH A 30 SECONDS RUN TIME, IN-LINE FILTER, PRE-MIXED WATER SUPPLY. INCLUDES 4 "AA" BATTERIES AS BATTERY BACK-UP TO FAUCET DURING POWER OUTAGES. MULTI-JUNCTION BOX FOR 8 FAUCETS. SUPPLIED WITH 85 IN CABLE WIRE (CWB). ZURN #P6000-HW6 HARDWIRED POWER CONVERTER 120VAC/7.6 VDC, 2 AMP.,CAPABLE OF SUPPLYING FOR 8 FAUCETS OR 8 FLUSH VALVES OR 8 FAUCETS/FLUSH VALVES COMBINED. POLYPROPYLENE P-TRAP FOR CORROSIVE PRODUCTS SUPPLIED BY OTHERS.
S-3	SINGLE BOWL COUNTERMOUNT - LABORATORY SINK	12ø	12ø	38ø	32ø	CAN-AQUA #CA-EVP0262614-UN 660 X 660 X 356 MM (26 X 26 X 14") SINGLE BOWL UNDERMOUNT LABORATORY SINK, 10 MM (3/8 IN) THICK, 660 X 660 X 356 MM (26 X 26 X 14 IN), BLACK POLYPROPYLENE, 38 MM (1 1/2 IN) RIM, 38 MM (1 1/2 IN) INTEGRATED DRAIN ASSEMBLY SITUATED CENTER OF BOWL. ZURN #Z826U4-XL-6M HOT AND COLD LABORATORY FAUCET WITH RIGID 152 MM (6 IN) GOOSENECK SPOUT WITH VACUUM BREAKER, SERRATED NOZZLE, CAST BRASS BODY, POLISHED CHROME FINISH, 102 MM (4 IN) VANDAL-RESISTANT COLOR-CODED WRIST BLADE HANDLES, CERAMIC DISC CARTRIDGES, 8.3 L/MIN. (2.2 USGPM) PRESSURE COMPENSATING AERATOR, 10 MM (3/8 IN) STAINLESS STEEL BRAIDED HOSES, SINGLE HOLE INSTALLATION.
S-4	SINGLE BOWL WALL MOUNT - DENTAL SINK	12ø	12ø	38ø	32ø	NOVANNI #8100-10 476 X 495 X 178 MM (18 3/4 X 19 1/2 X 7") WALL HUNG STAINLESS STEEL LAVATORY, TYPE 304, 16/18 GAUGE, 476 X 495 X 178 MM (18 3/4 X 19 1/2 X 7 IN), POLISHED SATIN FINISH, BACKSPLASH 76 MM (3 IN) IN HEIGHT, HANGAR PLATE, INTEGRAL 16 GAUGE LATERAL WALL SUPPORTS, DUPLEX TYPE DRAIN ASSEMBLY WITH GRATE, DRILLED SINGLE HOLE. ZURN #Z6920XL-CWB-K-MJ. HARDWIRED ELECTRONIC SENSOR FAUCET, CAST BRASS BODY WITH GOOSENECK SPOUT 137 MM (5 3/8 IN), 3.8 L/MIN. (1.0 USGPM) LAMINAR FLOW SPOUT OUTLET, SINGLE HOLE INSTALLATION, POLISHED CHROME FINISH, INFRARED CONVERGENCE TYPE PROXIMITY SENSOR, ON-DEMAND ACTIVATION WITH A 30 SECONDS RUN TIME, IN-LINE FILTER, PRE-MIXED WATER SUPPLY. INCLUDES 4 "AA" BATTERIES AS BATTERY BACK-UP TO FAUCET DURING POWER OUTAGES. MULTI-JUNCTION BOX FOR 8 FAUCETS. SUPPLIED WITH 85 IN CABLE WIRE (CWB). P6000-HW6 HARDWIRED POWER CONVERTER 120VAC/7.6 VDC, 2 AMP., CAPABLE OF SUPPLYING FOR 8 FAUCETS OR 8 FLUSH VALVES OR 8 FAUCETS/FLUSH VALVES COMBINED. ZURN #ZH8824XL-LKQ-PC/Z8952-58 (2) LAVATORY EXTRA HEAVY DUTY QUARTER TURN STOPS, LOW LEAD, DN 1/2 IN COMPR. X 3/8 IN COMPR., LOOSE KEY, FLANGES CHROME PLATED FINISH. ZW1070XL THERMOSTATIC MIXING VALVE FOR ONE OR MULTIPLE LAVATORIES OR SINKS, (SEE LIBRARY SPECIFICATION SHEET - MULTIPLE FAUCETS SECTION DIS.303). ZURN #Z8702-9BD 38 MM (1 1/2") CAST BRASS ADJUSTABLE P-TRAP, 38 MM (1 1/2 IN) WITH CLEANOUT, DEEP SEAL FLANGE, POLISHED CHROME FINISH. ZURN #Z1224 CONCEALED WALL HUNG CARRIER, EXTRA-HEAVY DUTY ADJUSTABLE PLATE, STEEL UPRIGHTS WITH WELDED FEET, MOUNTING FASTENER.
EW-1	LEFT SIDED SINK-TOP MOUNTED EYEWASH	12ø	12ø	38ø	32ø	HAWS #7612LH LEFT SIDED SINK-TOP MOUNTED EYEWASH. ANTI-SURGE AXION MSR™ (MEDICALLY SUPERIOR RESPONSE), INVERTED LAMINAR FLOW EYEWASH STREAMS WITH ZERO VERTICAL VELOCITY, STAINLESS STEEL EYEWASH HEAD WITH IMPREGNATED ANTIMICROBIAL PROTECTION WITH WATER PRESSURE ACTIVATED YELLOW PLASTIC POP-OFF DUST COVER, INTEGRAL 14 L/MIN (3.7 USGPM) FLOW CONTROL, CHROME-PLATED BRASS STAY-OPEN BALL VALVE EQUIPPED WITH STAINLESS STEEL BALL AND STEM, SWING-AWAY FEATURE WHEN NOT IN USE, UNIVERSAL SIGN, AND 1/2" O. D. SLIP-JOINT INLET. OPERATING PRESSURE IS 30 - 90 PSI. HAWS 9201EW THERMOSTATIC MIXING VALVE THAT MIXES HOT AND COLD WATER TO SUPPLY TEMPERED WATER TO EMERGENCY EYEWASH FIXTURES REQUIRING FLOW UP TO 37.9 L/MIN. (10 GUSPM) AT A PRESSURE OF 207 KPA (30 PSI). UNIT EMPLOYS A PARAFFIN FILLED THERMOSTATIC MIXING ELEMENT. LOWEST INTERNAL PRESSURE DROP WHERE SUPPLY PRESSURE IS LOW, AND A HIGH COLD WATER BYPASS FLOW RATE OF 14.4 LPM (3.8 GPM). THE MODULAR BRASS DESIGN WITH A ONE PIECE CASTING USES INTERNAL CHECK STOPS, OVERSIZED VALVE SEATS, A SHUTTLE DESIGN THAT ELIMINATES VALVE BINDING, AND A FUNNEL DESIGN TO IMPROVE TEMPERATURE CONTROL WITH BETTER MIXING AT LOW FLOW RATES. LIME AND CALCIUM RESISTANT COMPONENTS ARE USED THROUGHOUT. FACTORY SET AT 29°C (85°F). MAXIMUM OPERATING PRESSURE:
JS	HIGH DENSITY COMPOSITE MOP BASIN	19ø	19ø	75ø	38ø	ZURN #Z1996-24 610 X 610 X 254 MM (24 X 24 X 10") MOLDED HIGH DENSITY COMPOSITE MOP BASIN, 610 X 610 X 254 MM (24 X 24 X 10 PO), 44 X 16 MM (1 3/4 X 5/8 IN) RIM, 76 MM (3 IN) PVC DRAIN BODY WITH STAINLESS STEEL DOME STRAINER/LINT BASKET, NPS 76 MM (3 IN) GASKETED OUTLET. ZURN #Z843M4-XL WALLMOUNT POLISHED CHROME-PLATED CAST BRASS 203MM (8 IN) SINK FAUCET, LOW LEAD, SHORT SWIVEL INLETS, 184 TO 222 MM (7 1/4 TO 8 3/4 IN) ADJUSTABLE CENTERS, INTEGRAL SERVICE STOPS, CERAMIC DISC CARTRIDGES, POLISHED CHROME FINISH, 102 MM (4 IN) VANDAL-RESISTANT COLOR-CODED METAL WRIST BLADE HANDLES, RIGID SPOUT WITH ATMOSPHERIC VACUUM BREAKER, WALL BRACE, PAIL HOOK AND HOSE THREADED OUTLET, OUTLET AT 232 MM (9 1/8 IN) FROM FINISHED WALL. ZURN #Z1996-BS24 STAINLESS STEEL BUMPER GUARD. QUANTITY TO BE DETERMINED. 610 MM (24 IN) IN LENGTH. ZURN #Z1996-HH 16 X 762 MM (5/8 X 30 PO) REINFORCED HOSE FOR INTENSIVE USE 16 X 762 MM (5/8 X 30 IN) IN LENGTH WITH BRASS COUPLING WITH HOSE BRACKET WITH RUBBER GRIP. Z1996-MH 610 X 76 MM (24 X 3") STAINLESS STEEL MOP HANGER, WITH 3 WALL HOOKS. Z1996-WG24 STAINLESS STEEL 2 PANELS WALL GUARD, 610 MM (24") FOR CORNER INSTALLATION, 20 GAUGE, SATIN FINISH, 305 MM (1/2") HIGH, CORNER MOLDING.
FD	FLOOR DRAIN	--	--	100ø	38ø	WATTS #FD-104-C-A5-1 FLOOR DRAIN - EPOXY COATED CAST IRON BODY, REVERSIBLE FLASHING CLAMP WITH PRIMARY AND SECONDARY WEEPHOLES, 4"Ø (102 MM) NO HUB OUTLET WATTS -A5-1 5" (127 MM) DIAMETER, NICKEL BRONZE, ADJUSTABLE ROUND STRAINER.
FFD-1	FUNNEL FLOOR DRAIN	--	--	100ø	38ø	WATTS #FD-104-C-A5-1-G-1 FLOOR DRAIN - EPOXY COATED CAST IRON BODY, REVERSIBLE FLASHING CLAMP WITH PRIMARY AND SECONDARY WEEPHOLES, 4"Ø (102 MM) NO HUB OUTLET WATTS -A5-1-G-1 5" (127 MM) DIAMETER, NICKEL BRONZE, ADJUSTABLE ROUND STRAINER, 4" X 9" (102 MM X 229 MM) OVAL NICKEL BRONZE FUNNEL.
FFD-2	FUNNEL FLOOR DRAIN	--	--	75ø	38ø	WATTS #FD-103-C-A5-1-G-1 FLOOR DRAIN - EPOXY COATED CAST IRON BODY, REVERSIBLE FLASHING CLAMP WITH PRIMARY AND SECONDARY WEEPHOLES, 3"Ø (76 MM) NO HUB OUTLET WATTS -A5-1-G-1 5" (127 MM) DIAMETER, NICKEL BRONZE, ADJUSTABLE ROUND STRAINER, 4" X 9" (102 MM X 229 MM) OVAL NICKEL BRONZE FUNNEL.
TSP	TRAP SEAL PRIMER	12ø	--	--	--	P.P.P. #PT-10 TRAP SEAL PRIMER SERVING TEN DRAINS ACTIVATED BY A 3/4" (19 MM) NORMALLY CLOSED SOLENOID VALVE, DESIGNED TO INTERFACE WITH LOW VOLTAGE ENERGY MANAGEMENT SYSTEMS CONTROL, 3/4" (19 MM) DIAMETER CONNECTION ANTI-SIPHON ATMOSPHERIC VACUUM BREAKER.

SPLIT-SYSTEM SCHEDULE

REF.	MANUFAC.	MODEL	LOCATION	COOLING CAP. (KW)	HEATING CAP. (KW)	AIRFLOW (L/S)	VOLTAGE	MAX BREAKER / MOCP (A)	MCA	WEIGHT (KG)	REMARKS
AC-1	MITSUBISHI	PKA-A36KA7	REF PLANS	10.55	--	333-382-434	208/1/60	30.0	1.00	21.0	REFER TO NOTES BELOW.
AC-2	MITSUBISHI	PKFY-P24NKMU-E2-TH	REF PLANS	7.03	7.90	269-434	208/1/60	--	--	21.0	REFER TO NOTES BELOW.
AC-3	MITSUBISHI	PKFY-P24NKMU-E2-TH	REF PLANS	7.03	7.90	269-434	208/1/60	--	--	21.0	REFER TO NOTES BELOW.
CU-1	MITSUBISHI	PUY-A36NKA7	REF PLANS	10.55	--	--	208/1/60	30.0	25.0	96.0	REFER TO NOTES BELOW.
CU-2	MITSUBISHI	PUMY P48NKMU2	REF PLANS	14.06	15.82	--	208/1/60	44	29.0	121.0	REFER TO NOTES BELOW.

NOTES:
1. ALL INDOOR UNITS SHALL BE EQUIPPED WITH MANUFACTURER SUPPLIED CONDENSATE PUMP & THERMOSTAT.
2. ALL OUTDOOR UNITS SHALL BE EQUIPPED WITH LOW AMBIENT COOLING & MANUFACTURER SUPPLIED STAND..
3. FIRST STARTUP AND COMMISSIONING SHALL BE COMPLETED BY MITSUBISHI TECHNICIAN.
4. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

EXHAUST FAN SCHEDULE

REF.	LOCATION	FUNCTION	MANUFAC.	MODEL	CAP. (CFM)	ESP (INCH)	RPM	MOTOR	WEIGHT (KG)	V/PH/HZ	STARTER	REMARKS
EF-1	UNIVERSAL W/R	WASHROOM EXHAUST	GREENHECK	CSP-A110	85	0.25	950	19.7 (W)	7	120/1/60	TIMER	-C/W DISCONNECT SWITCH, BACKDRAFT DAMPER, VIBRATION ISOLATION, FLEXIBLE DUCT CONNECTION AND TIMER. EXHAUST FAN SHALL RUN 24/7.
EF-2	STERILIZATION ROOM	VENTILATION	GREENHECK	CUE-070	250	0.125	1300	1/60 (HP)	13	120/1/60	TIMER	-C/W ROOF CURB, DISCONNECT SWITCH, BACKDRAFT DAMPER, VIBRATION ISOLATION AND TIMER.
EF-3	KITCHEN 127	VENTILATION	GREENHECK	CSP-A290	285	0.25	1000	102 (W)	10	120/1/60	TIMER	-C/W DISCONNECT SWITCH, BACKDRAFT DAMPER, VIBRATION ISOLATION, FLEXIBLE DUCT CONNECTION AND TIMER. EXHAUST FAN SHALL RUN 24/7.
EF-4	DENTURIST LAB 129	VENTILATION	GREENHECK	CUE-095	440	0.20	1050	1/30 (HP)	18	120/1/60	TIMER	-C/W DISCONNECT SWITCH, BACKDRAFT DAMPER, VIBRATION ISOLATION, FLEXIBLE DUCT CONNECTION AND TIMER. EXHAUST FAN SHALL RUN 24/7.
EF-5	COMPRESSOR ROOM	VENTILATION	GREENHECK	CSP-A110	85	0.25	950	19.7 (W)	7	120/1/60	TIMER	-C/W DISCONNECT SWITCH, BACKDRAFT DAMPER, VIBRATION ISOLATION, FLEXIBLE DUCT CONNECTION AND TIMER. EXHAUST FAN SHALL RUN 24/7.
EF-6	EX WOMENS W/R	WASHROOM EXHAUST	GREENHECK	CSP-A190	150	0.375	1400	55 (W)	7	120/1/60	TIMER	-C/W DISCONNECT SWITCH, BACKDRAFT DAMPER, VIBRATION ISOLATION, FLEXIBLE DUCT CONNECTION AND TIMER. EXHAUST FAN SHALL RUN 24/7.
EF-7	EX MENS W/R	WASHROOM EXHAUST	GREENHECK	CSP-A290	250	0.375	1350	161 (W)	10	120/1/60	TIMER	-C/W DISCONNECT SWITCH, BACKDRAFT DAMPER, VIBRATION ISOLATION, FLEXIBLE DUCT CONNECTION AND TIMER. EXHAUST FAN SHALL RUN 24/7.

1. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

DUCTWORK INSULATION SCHEDULE

APPLICATION	INSULATION TYPE	THICKNESS (MM)	REMARKS
MAIN SUPPLY AIR DUCTWORK IN UNCONDITIONED CEILING SPACE	D-1	38	C/W VAPOUR BARRIER; SEE NOTES BELOW
MAIN RETURN AIR DUCTWORK IN UNCONDITIONED CEILING SPACE	D-1	25	C/W VAPOUR BARRIER; SEE NOTES BELOW
EXHAUST DUCTWORK IN UNCONDITIONED CEILING SPACE	D-1	25	C/W VAPOUR BARRIER; SEE NOTES BELOW
EXHAUST FAN DUCTWORK AS INDICATED ON PLANS.	D-2	25	SEE NOTES BELOW
RTU SUPPLY & RETURN AIR DUCTWORK DOWN FROM RTU TO FIRST FITTING OR TRANSITION UNLESS SHOWN AS OTHERWISE ON PLANS	D-2	25	SEE NOTES BELOW

DUCTWORK INSULATION NOTES:

1. D-1 INSULATION SHALL BE OWENS CORNING RIGID VAPOUR SEAL DUCT INSULATION, JOHNS MANVILLE 814 SPIN-GLAS WITH FSK FACING, MANSON SPIN-GLAS RIGID INSULATING BOARD WITH REINFORCED FOIL FACING, OR KNAUF RIGID INSULATION BOARD WITH FSK FACING. DENSITY SHALL BE NOT LESS THAN 48KG/CUBIC METRE (3LBS./CU.FT.). THERMAL CONDUCTIVITY OF 0.033 W/M-°C (BTU-IN/(HR-CU.FT.-°F). IMPALE ON MECHANICALLY FASTENED PINS LOCATED AT NOT GREATER THAN 300MM (12") CENTRES. SECURE WITH SPEED WASHERS. BUTT JOINTS TIGHTLY TOGETHER AND SEAL WASHERS, BREAKS AND JOINTS WITH SELF-ADHERING 100MM (4") WIDE PLAIN ALUMINUM TAPE, OR ADHERE FOIL WITH CHILDERS CP82 OR BAKELITE 230-39 ADHESIVE.

   D-2 INSULATION SHALL BE JOHNS MANVILLE PERMACOTE LINACOUSTIC RECTANGULAR DUCT LINER MEETING ASTMC 1071 WITH AIR SURFACE COATED WITH ACRLIC COATING TREATED WITH EPA REGISTERED ANTI-MICROBIAL AGENT PROVEN TO RESIST MICROBIAL GROWTH AS DETERMINED BY ASTM G21 AND G22.

2. VAPOUR BARRIER SHALL BE FACTORY APPLIED ALL PURPOSE VAPOUR BARRIER JACKET.

ROOFTOP AIR CONDITIONING/HEATING UNIT SCHEDULE

REF.	MANUFAC.	NOM. TONS	MODEL	COOLING: TOTAL (MBH)	COOLING: ECONOM.	COOLING: STAGES	COOLING: ENT AIR TEMP (DB°F)	COOLING: ENT AIR TEMP (WB°F)	COOLING: LVG AIR TEMP (DB°F)	COOLING: LVG AIR TEMP (WB°F)	HEATING: INPUT (MBH)	HEATING: OUTPUT (MBH)	HEATING: STAGES	SUPPLY FAN: CFM	SUPPLY FAN: E.S.P.	SUPPLY FAN: HP	SUPPLY FAN: RPM	RETURN FAN: CFM	RETURN FAN: E.S.P.	RETURN FAN: HP	MIN. FRESH AIR (CFM)	V/PH/HZ	MIN. CIRCUIT AMPS (A)	MOP (A)	WEIGHT (KG)	EER	MOUNTING ARRANGEMENT	REMARKS
RTU-1	JOHNSON CONTROLS	10.0	ZYG12F2C3AB1B121A2	131.3	YES	2	80.0	67.0	58.2	56.5	250	200	TWO STAGE	4000	1.0	5.25	1096	-	-	-	1200	208/3/60	55.3	70	508	11.50	DOWN DISCHARGE/RETURN	UNIT SHALL BE C/W VFD W/ INTELLISPEED, THERMOSTAT, TEMPERATURE SENSOR, POWER EXHAUST, ECONOMIZER, BAROMETRIC RELIEF, STAINLESS STEEL HEAT EXCHANGER, PHASE MONITOR, ROOF CURB ADAPTER AND DISCONNECT SWITCH.
RTU-2	JOHNSON CONTROLS	8.5	ZJ102S18G2B2BCD2A2	109.2	YES	2	80.0	67.0	59.8	57.5	180	144	FULLY MODULATING (33%-100%)	3600	2.0	5.00	2677	3100	1.20"	2.0	1200	208/3/60	62.8	70	843	12.00	DOWN DISCHARGE/RETURN	UNIT SHALL BE CSAZ317.2 COMPLIANT C/W VFD SUPPLY AND RETURN FAN, BAROMETRIC RELIEF DAMPER, STAINLESS STEEL HEAT EXCHANGER, ROOF CURB ADAPTOR, VAV CONTROLS, ECONOMIZER, DISCONNECT SWITCH, SUPPLY AIR TEMPERING CONTROLS AND PHASE MONITOR
RTU-3	JOHNSON CONTROLS	3.0	ZYG04E2C1AA1B121A3	40.7	YES	2	80.0	67.0	58.6	56.2	112	90	TWO STAGE	1200	0.8	2.40	1231	-	-	-	360	208/3/60	19.6	30	279	12.00	DOWN DISCHARGE/RETURN	UNIT SHALL BE C/W THERMOSTAT, TEMPERATURE SENSOR, POWER EXHAUST, ECONOMIZER, BAROMETRIC RELIEF, STAINLESS STEEL HEAT EXCHANGER, PHASE MONITOR, ROOF CURB ADAPTER AND DISCONNECT SWITCH.

NOTES:
1. UNIT TO COME WITH MANUFACTURER 1 YEAR PLANNED SERVICE AGREEMENT AND 1 YEAR LABOUR WARRANTY C/W NECESSARY SITE VISITS.
2. MANUFACTURER TO PROVIDE START-UP AND JOBSITE SPECIFIC CONDITIONS AS PER PLANS.
3. ALLOW 2 DAYS STARTUP, INTEGRATION AND PROGRAMMING TIME.
4. CONTACT: ISAAC MUI (ISAAC.MUI@JCI.COM) 416-938-9494.
5. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

VAV TERMINAL/VENTURI VALVE SCHEDULE

REF.	LOCATION	FUNCTION	MANUFACTURER	MODEL NO.	UNIT SIZE	HEATER CAPACITY (KW)	HEATER VOLTAGE	MAXIMUM (CFM)	MINIMUM (CFM)	REMARKS
VAV-1	OPERATORY 1	SUPPLY	ANTEC CONTROLS	VFX	110	3.0	208/1/60	570	285	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, PROGRAMMABLE THERMOSTAT, OCCUPANCY SENSOR, DIRECT DIGITAL CONTROLS AND SCR ELECTRIC REHEAT COIL. REFER TO NOTES
VAV-2	OPERATORY 1	RETURN	ANTEC CONTROLS	VFX	110	--	--	510	225	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, AND DIRECT DIGITAL CONTROLS, REFER TO NOTES
VAV-3,5,7,9,11&13	OPERATORY 2,3,4,5,6&7	SUPPLY	ANTEC CONTROLS	VFX	108	1.0	208/1/60	150	100	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, PROGRAMMABLE THERMOSTAT, OCCUPANCY SENSOR, DIRECT DIGITAL CONTROLS AND SCR ELECTRIC REHEAT COIL. REFER TO NOTES
VAV-4,6,8,10,12,&14	OPERATORY 2,3,4,5,6&7	RETURN	ANTEC CONTROLS	VFX	108	--	--	135	85	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, AND DIRECT DIGITAL CONTROLS, REFER TO NOTES
VAV-15	CORRIDOR C02/03	SUPPLY	EH PRICE	SDV	6	1.5	208/1/60	200	200	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, DIRECT DIGITAL CONTROLS, SCR ELECTRIC REHEAT COIL SOUND ATTENUATION & THERMOSTAT. REFER TO NOTES.
VAV-16	CORRIDOR C02/03	RETURN	EH PRICE	SDE	6	--	--	200	200	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, DIRECT DIGITAL CONTROLS & SOUND ATTENUATION. REFER TO NOTES.
VAV-17	RECEPTION/ADMIN	SUPPLY	EH PRICE	SDV	6	--	--	920	300	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, DIRECT DIGITAL CONTROLS, SOUND ATTENUATION & THERMOSTAT. REFER TO NOTES.
VAV-18	RECEPTION/ADMIN	RETURN	EH PRICE	SDE	10	--	--	920	300	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, DIRECT DIGITAL CONTROLS & SOUND ATTENUATION. REFER TO NOTES.
VAV-19	PAN ROOM	SUPPLY	EH PRICE	SDV	6	--	--	280	90	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, DIRECT DIGITAL CONTROLS, SOUND ATTENUATION & THERMOSTAT. REFER TO NOTES.
VAV-20	PAN ROOM	RETURN	EH PRICE	SDV	6	--	--	280	90	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, DIRECT DIGITAL CONTROLS & SOUND ATTENUATION. REFER TO NOTES.
VAV-21	DENTURIST LAB	SUPPLY	EH PRICE	SDV	8	2.0	208/1/60	400	150	UNIT SHALL BE C/W DIRECT DIGITAL CONTROLS, SCR ELECTRIC REHEAT COIL, SOUND ATTENUATION, & THERMOSTAT, REFER TO NOTES
VAV-22	CORRIDOR C06/7	SUPPLY	EH PRICE	SDE	4	1.0	208/1/60	135	135	UNIT SHALL BE C/W DIRECT DIGITAL CONTROLS, SCR ELECTRIC REHEAT COIL, SOUND ATTENUATION, & THERMOSTAT, REFER TO NOTES
VAV-22	CORRIDOR C06/7	SUPPLY	EH PRICE	SDE	4	1.0	208/1/60	135	135	UNIT SHALL BE C/W DIRECT DIGITAL CONTROLS, SCR ELECTRIC REHEAT COIL, SOUND ATTENUATION, & THERMOSTAT, REFER TO NOTES
VAV-24	CORRIDOR C06/7	RETURN	EH PRICE	SDE	6	--	--	270	270	UNIT SHALL BE C/W ANTEC PACE CONTROLLER, AND DIRECT DIGITAL CONTROLS, REFER TO NOTES

NOTES
1. THERMOSTAT FOR OPERATORY 1-7 SHALL BE ANTEC ENVIRONMENT SENSOR. SENSOR SHALL HAVE TEMPERATURE DISPLAY, SETPOINT ADJUSTMENT AND RELATIVE HUMIDITY SENSOR. REFER TO CONTROL SEQUENCES.
2. PRESSURE MONITOR FOR OPERATORY 1-7 SHALL BE ANTEC PMT TOUCH SCREEN PRESSURE MONITOR. REFER TO CONTROL SEQUENCES.
3. CONTRACTOR SHALL BALANCE ALL SUPPLY AND RETURN VALVES/VAVS AFTER ALL WALLS AND CEILINGS HAVE BEEN FULLY CONSTRUCTED.
4. CONTRACTOR SHALL BALANCE ALL SUPPLY AND RETURN VALVES/VAVS TO THE AIR FLOW VALUES SHOWN ON THIS TABLE.
5. WHERE ROOMS ARE REQUIRED TO BE 'POSITIVELY' OR ' NEGATIVELY' PRESSURIZED AS PER THE 'ROOM PRESSURIZATION SCHEDULE'. THE RETURN VALVE/VAV SHALL TRACK THE SUPPLY VALVE/VAV IN ACCORDANCE WITH THE CFM OFFSETS OUTLINED IN THIS TABLE.
6. ANTEC PACE CONTROLLER SHALL BE CONFIGURED FOR FLOW OFFSET CONTROL. REFER TO CONTROL SEQUENCES FOR DETAILED OPERATION OF SUPPLY AND RETURN VALVES/VAVS.
7. CONTACT: DRAZENA TRAVORIC (DTRAVORIC@EHPRICESALES.COM) 905-660-0066 EXT 253
8. EQUIVALENT ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED FOR VALVES, TERMINAL UNITS AND AIRFLOW CONTROL SYSTEM. REFER TO SPECIFICATIONS.

HUMIDIFIER SCHEDULE

UNIT REF.	LOCATION	MANUFA.	MODEL	NOMINAL STEAM CAPACITY LB/HR)	SUPPLY WATER CONNECTION SIZE	STEAM CONNECTION SIZE (MM)	NATURAL GAS INPUT (KW)	THERMAL EFFICIENCY	GAS CONNECTION (MM)	FLUE VENT/INTAKE (MM)	ELECTRICAL CHARACTERISTICS: V/PH/HZ	ELECTRICAL CHARACTERISTICS: RATED INPUT (KW)	ELECTRICAL CHARACTERISTICS: RATED CURRENT (A)	MOUNTING ARRANGMENT	WEIGHT (KG)	REMARKS
H-1	CUSTODIAL	NORTEC	GS-50	50.0	12ø	44.45	18.17	90%	1/2" NPT	50ø	120/1/60	--	2.00	FLOOR MOUNT	83.5	- REFER TO NOTES BELOW

NOTES:
1. HUMIDIFIER H-1 SHALL BE C/W GS-50 COMPACT STAND FOR FLOOR MOUNT APPLICATION.
3. HUMIDIFIERS SHALL BE C/W QTY. NORTEC MINI SAM-E SHORT ABSORPTION STEAM DISTRIBUTION MANIFOLD (SDM-1) C/W INSULATED TUBES, HEADER, MOUNTING FRAME AND INLET KIT.
4. HUMIDIFIERS SHALL BE C/W INTEGRATED CONTROLS TO ALLOW FULL CONFIGURATION AND CONTROL OF UNIT.
5. PROVIDE ALL NECESSARY ACCESSORIES FOR A COMPLETE INSTALLATION INCLUDING QTY. DUCT MOUNTED AIR PROVING SWITCH, HIGH LIMIT SWITCH AND OUTDOOR SENSOR.
6. FOR HUMIDIFIER H-2 PROVIDE NORTEC SELF-ACTUATED DRAIN WATER COOLER PART 1710010.
7. PROVIDE HARTELL MODEL A5X-115 CONDENSATE PUMP 1/2HP, 115V/1/60, 6.0AMPS. INTERLOCK PUMP OPERATION WITH HUMIDIFIER, HIGH WATER LEVEL ALARM SHALL SHUTDOWN HUMIDIFIER OPERATION.
8. HUMIDIFIER SHALL BE INSTALLED AS PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND RECOMMENDED CLEARANCES. START-UP AND PROJECT INSPECTION BY QUALIFIED FACTORY TRAINED REPRESENTATIVE.
9. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

AIR FILTER SCHEDULE

REF.	UNIT	MANUFACTURER	MODEL	FILTER:	FILTER QUANTITY	AIRFLOW (CFM)	INITIAL APD (IN.W.C.)	FINAL APD (IN.W.C.)	REMARKS
FLT-1	RTU-1	AAF FLANDERS	SURESEAL HOUSING SS-2-10H20W-SP2-GM2-LL	VARICEL VXL MERV 14	2	3600 (1800 EACH)	0.3	1.5	- REFER TO NOTES BELOW.

NOTES:

1. FILTER TO BE C/W FACTORY INSTALLED STATIC TAPS AND DWYER MAGNEHELIC GAUGE (0-2"WG). REFER TO SPECIFICATIONS.
2. EQUIVALENT ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED.
3. CONTRACTOR SHALL PROVIDE ALL DUCT CONNECTIONS AND TRANSITIONS REQUIRED TO INSTALL FILTER HOUSING.

BYPASS TERMINAL UNIT SCHEDULE

TAG	INLET DUCT SIZE	MANUF.	MODEL NO.	COOLING: MINIMUM AIRFLOW (CFM)	COOLING: MAXIMUM AIRFLOW (CFM)	REMARKS
BT-1	8"ø	EH PRICE	LGB	210	700	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.
BT-2	6"ø	EH PRICE	LGB	80	260	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.
BT-3	6"ø	EH PRICE	LGB	85	280	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.
BT-4	8"ø	EH PRICE	LGB	200	675	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.
BT-5	8"ø	EH PRICE	LGB	170	560	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.
BT-6	6"ø	EH PRICE	LGB	85	280	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.
BT-7	8"ø	EH PRICE	LGB	170	560	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.
BT-8	6"ø	EH PRICE	LGB	85	280	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.
BT-9	6"ø	EH PRICE	LGB	60	220	BYPASS TERMINAL UNIT SHALL BE C/W ZONE TEMPERATURE SENSOR.

NOTE:

1. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

ELECTRIC HEATER SCHEDULE

REF.	MANUFAC	MODEL	LOCATION	HEAT OUTPUT (KW)	V/PH/HZ	REMARKS
FFH-1	STELPRO	ADRI0281T	VESTIBULE V01	2.0	208/1/60	FOR RECESSED INSTALLATION, COLOUR WHITE C/W BUILT-IN THERMOSTAT & EXTERNAL 24V TRANSFORMER.
FFH-2	STELPRO	ADRI0281T	VESTIBULE V02	2.0	208/1/60	FOR RECESSED INSTALLATION, COLOUR WHITE C/W BUILT-IN THERMOSTAT & EXTERNAL 24V TRANSFORMER.
BBH-1, 2	OUELLET	OFM01008	WAITING AREA 101	1.0	208/1/60	FOR SURFACE MOUNT INSTALLATION. PROVIDE CONTROL WIRING TO SUIT. REFER TO CONTROL SEQUENCES FOR HEATER OPERATION.
BBH-3	OUELLET	OFM0508	UNIVERSAL W/R 105	0.5	208/1/60	FOR SURFACE MOUNT INSTALLATION C/W BUILT-IN THERMOSTAT
BBH-4	OUELLET	OFM0508	CONSULT ROOM 2 106	0.5	208/1/60	FOR SURFACE MOUNT INSTALLATION C/W BUILT-IN THERMOSTAT
BBH-5	OUELLET	OFM1508	OFFICE 1 108	1.0	208/1/60	FOR SURFACE MOUNT INSTALLATION C/W BUILT-IN THERMOSTAT
BBH-6	OUELLET	OFM2508	MEETING ROOM 126	2.0	208/1/60	FOR SURFACE MOUNT INSTALLATION C/W BUILT-IN THERMOSTAT
BBH 7	OUELLET	OFM2508	KITCHEN 127	2.0	208/1/60	FOR SURFACE MOUNT INSTALLATION C/W BUILT-IN THERMOSTAT

1. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

PIPING INSULATION SCHEDULE

APPLICATION	NOMINAL PIPE SIZE (MM): 25 AND LESS	NOMINAL PIPE SIZE (MM): 32 TO 50	NOMINAL PIPE SIZE (MM): 63 TO 100	REMARKS
DCW	12	12	-	TYPE P-1 C/W VAPOUR BARRIER; SEE NOTES BELOW
DHW & DHW-RECIRC.	25	25	-	TYPE P-1; SEE NOTES BELOW
HORIZONTAL COND PIPING	12	12	-	TYPE P-1 C/W VAPOUR BARRIER; SEE NOTES BELOW
REFRIG. PIPING (40°F AND ABOVE)	12	25	-	TYPE P-2 C/W VAPOUR BARRIER; SEE NOTES BELOW
REFRIG. PIPING (BELOW 40°F)	12	25	-	TYPE P-2 C/W VAPOUR BARRIER; SEE NOTES BELOW
STEAM SUPPLY & CONDENSATE PIPING (HUMIDIFIER)	25	25	-	TYPE P-1 C/W VAPOUR BARRIER; SEE NOTES BELOW

PIPING INSULATION NOTES:

1. P-1 INSULATION SHALL BE SECTIONAL MOLDED GLASS FIBER, MINIMUM 48 KG PER CUBIC METER (3.0 LB PER CUBIC FOOT DENSITY), WITH A THERMAL CONDUCTIVITY NOT GREATER THAN 0.035 W/M-°C (0.24 BTU-IN./SQ.FT./°F/HR.) AT MEAN TEMPERATURE RATING OF 52.8 °C (125°F) AND A WHITE FACTORY-APPLIED FLAME-RETARDANT VAPOR BARRIER JACKET OF 0.001" ALUMINUM FOIL LAMINATED TO KRAFT REINFORCED WITH GLASS FIBERS, OR ALL SERVICE JACKET.
2. P-2 INSULATION: INSULATE ALL REFRIGERATION PIPING WITH A FLEXIBLE, CLOSED CELL ELASTOMERIC PIPE INSULATION, AP ARMAFLEX. ADHESIVE SHALL BE ARMAFLEX 520. FLAME SPREAD INDEX OF LESS THAN 25 AND A SMOKE DEVELOPMENT INDEX OF LESS THAN 50. IN ADDITION, THE PRODUCT, WHEN TESTED, SHALL NOT MELT OR DRIP FLAMING PARTICLES, AND THE FLAME SHALL NOT BE PROGRESSIVE.
3. VAPOUR BARRIER SHALL BE FACTORY APPLIED ALL PURPOSE VAPOUR BARRIER JACKET.
4. USE PERFORMED INSULATION ON FITTING AND ELBOWS.
5. RECOVER INSULATION AND INSULATION FINISHES OUTSIDE THE BUILDING OR EXPOSED TO THE WEATHER WITH ALUMINUM JACKET WITH ALUMINUM FITTINGS. BAND ALL TRANSVERSE SEAMS WITH WATERPROOF MASTIC TAPE AND CAULK ALL LONGITUDINAL SEAMS WITH SILICONE CAULKING. SEAL THE ENTIRE COVERING TO ACHIEVE A WATERTIGHT ASSEMBLY.

DIFFUSER AND GRILLE SCHEDULE

REF.	MODEL	FINISH	REMARKS
A	EH RICE MODEL SCD SQUARE CONE DIFFUSER	B-12	600X600 SQUARE CEILING DIFFUSER FOR DRYWALL OR T-BAR LAY-IN. CEILING TYPE, REFER TO PLANS FOR NECK SIZE AND BALANCING.
B	EH PRICE MODEL 80 RETURN GRILLE	B-12	EGG CRATE RETURN GRILLE FOR DUCTED & NON-DUCTED APPLICATION, C/W OPPOSED-BLADE DAMPER WHERE AIR BALANCING IS INDICATED. PROVIDE DUCT CONNECTION FOR DUCTED RETURN APPLICATION. REFER TO PLANS FOR GRILLE SIZE AND BALANCING. RETURN GRILLE FOR T-BAR AND DRYWALL CEILING APPLICATION.
C	EH PRICE MODEL LFD LAMINAR FLOW DIFFUSER	B-12	LAMINAR FLOW DIFFUSER C/W ONE PIECE WELDED PLENUM, ADJUSTABLE INLET DAMPERS AND FACTORY INSTALLED INSULATION. REFER TO PLANS FOR DIMENSIONS, NECK SIZE AND BALANCING.
D	EH PRICE MODEL 510 LOUVERED RETURN GRILLE	B-12	STEEL LOUVERED FACE GRILLE, 0° BLADE DEFLECTION, NARROW FRAME C/ DUCT CONNECTION. REFER TO PLANS FOR GRILLE SIZE AND BALANCING.
E	EH PRICE MODEL STG DOOR GRILLE	--	HEAVY DUTY STEEL CONSTRUCTION, SIGHT PROOF CORE, MOUNTING TYPE BF AND COUNTERSUNK SCREWHOLES. REFER TO PLANS FOR SIZE.

NOTE:

1. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

GAS WATER HEATER SCHEDULE

REF.	MANUFAC. MODEL	CAPACITY (L)	NATURAL GAS INPUT	THERMAL EFFICIENCY	GAS CONNECTION (MM)	FLUE VENT/INTAKE (MM)	VOLTAGE	WEIGHT (DRY KG)	REMARKS
HWT-1	A.O SMITH BTH-120	227	35KW	95%	19ø NPT	75ø	120/1/60	208	TERMINATE RELIEF AND CONDENSATE DRAIN INDIRECTLY AT FLOOR DRAIN. CONDENSATE DRAIN TO BE C/W ACID NEUTRALIZER KIT.

1. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

ELECTRIC WATER HEATER SCHEDULE

REF.	MANUFAC. MODEL	ELEMENT (KW)	CAPACITY (USG)	VOLTAGE	WEIGHT (DRY KG)	REMARKS
HWT-2	A.O SMITH DEL-6	1.5	6	120/1/60	208	TERMINATE TANK RELIEF DRAIN @ NEAREST FLOOR DRAIN.

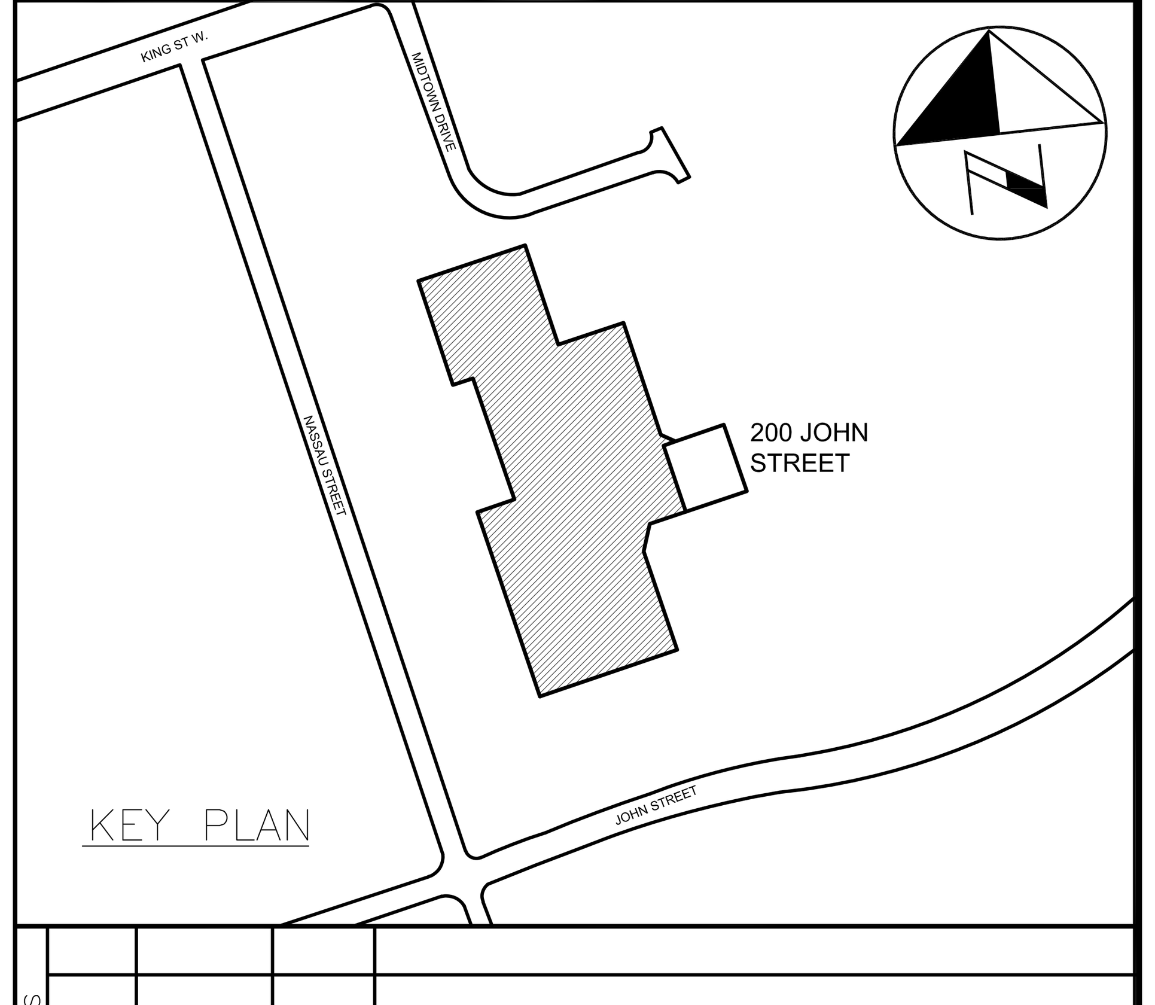
BACKFLOW PREVENTER SCHEDULE

REF.	SERVICE	MANUFAC.	MODEL	TYPE	SIZE	WEIGHT (KG)	REMARKS
BFP-1	DCW	ZURN	375XL	RP	50ø	-	-REFER TO NOTES BELOW. -REFER TO DETAILS. -BFP-1 TO BE PROVIDED FOR PREMISE ISOLATION.
BFP-2	DCW	ZURN	375XL	RP	12ø	-	-REFER TO NOTES BELOW. -BFP-2 TO BE PROVIDED FOR VACUUM PUMP WASH OUT LINES.
BFP-3	DCW	WATTS	LF007	DCVA	12ø	-	-REFER TO NOTES BELOW. -REFER TO DETAILS -BFP-3 TO BE PROVIDED FOR ALL HUMIDIFIER SUPPLY LINES.

NOTES:

1. INSTALL BACKFLOW PREVENTION DEVICES AS PER MANUFACTURER'S INSTALLATION INSTRUCTIONS, LOCAL CODES AND THE AUTHORITIES HAVING JURISDICTION.
2. CONTRACTOR SHALL PROVIDE TEST CERTIFICATES TO OWNER PRIOR TO PROJECT COMPLETION.
3. PRODUCTS FROM ALTERNATIVE MANUFACTURERS WILL BE CONSIDERED, PROVIDED THEY ARE EQUIVALENT AND MEET THE INTENTION OF THE SPECIFICATION.

ALL MEASUREMENTS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE AND ANY DISCREPANCIES ARE TO BE REPORTED BEFORE PROCEEDING WITH THE WORK. THE REGION OF DURHAM ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING SERVICES AS INDICATED ON THIS DRAWING. DO NOT SCALE DRAWINGS.



KEY PLAN

CONSULTANT REVISIONS

NO.	DATE	NAME	REVISIONS
1	APR 22/21	JM	REVISED AS PER ADDM1

PRIME CONSULTANT

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Tel: (905) 265 1911 Fax: (905) 265 1998

DESIGN BY: JM	SCALE NTS
DRAWN BY: JM	DATE: FEB 2021
CHECKED BY: AM	CONSULTANT PROJECT NO. 20-0033
APPROVED BY:	

CONTRACT REVISIONS

NO.	DATE	NAME	REVISIONS
3	MAR 25/21	JM	ISSUED FOR PERMIT/TENDER
2	JAN 13/21	JM	ISSUED FOR 90% CLIENT REVIEW
1	OCT 30/20	JM	ISSUED FOR 90% CLIENT REVIEW

THE REGIONAL MUNICIPALITY OF DURHAM
WORKS DEPARTMENT
DESIGN, CONSTRUCTION & ASSET MANAGEMENT

RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA MECHANICAL SCHEDULES

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-O-07	LEA-O-07-19-01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	M-012	030

SUPPLY AIR & RETURN VAV OPERATION (COOLING ONLY)

SPACE TEMPERATURE CONTROL:

- WHEN THE ZONE TEMPERATURE IS BELOW THE COOLING SETPOINT THE SUPPLY AIR VAV WILL BE AT THE MINIMUM CFM.
- ON A RISE IN ZONE TEMPERATURE ABOVE THE COOLING SETPOINT THE SUPPLY AIR VAV WILL BE AT THE MAXIMUM CFM.

RETURN AIR VAV CONTROL:

- THE AIRFLOW CONTROL SYSTEM WILL CONTROL THE RETURN VAV TO MAINTAIN THE DESIRED AIRFLOW TARGET.
- IF THE ROOM IS REQUIRED TO BE NEUTRAL PRESSURE THE RETURN VAV CFM SHALL MATCH THE SUPPLY VAV CFM. REFER TO 'VAV TERMINAL SCHEDULE'.
- IF THE ROOM IS REQUIRED TO BE POSITIVELY OR NEGATIVELY PRESSURIZED REFER TO 'VAV TERMINAL SCHEDULE' FOR THE REQUIRED AIR FLOW OFFSETS.

SUPPLY AIR & RETURN VAV OPERATION WITH MECHANICAL HEATING

SPACE TEMPERATURE CONTROL:

- WHEN THE ZONE TEMPERATURE IS BETWEEN THE OCCUPIED HEATING AND COOLING SETPOINTS, THE SUPPLY AIR VAV WILL BE AT THE MINIMUM CFM.
- ON A RISE IN ZONE TEMPERATURE ABOVE THE COOLING SETPOINT THE SUPPLY AIR VAV WILL BE AT THE MAXIMUM CFM AND THERE WILL BE NO MECHANICAL HEATING.
- ON A DROP IN ZONE TEMPERATURE BELOW THE HEATING SETPOINT, THE REHEAT COIL/BASEBOARD HEATER WILL MAINTAIN ZONE TEMPERATURE AND THE SUPPLY AIR VAV WILL BE AT THE MINIMUM CFM.

RETURN AIR VAV CONTROL:

- THE AIRFLOW CONTROL SYSTEM WILL CONTROL THE RETURN VAV TO MAINTAIN THE DESIRED AIRFLOW TARGET.
- IF THE ROOM IS REQUIRED TO BE NEUTRAL PRESSURE THE RETURN VAV CFM SHALL MATCH THE SUPPLY VAV CFM. REFER TO 'VAV TERMINAL SCHEDULE'.
- IF THE ROOM IS REQUIRED TO BE POSITIVELY OR NEGATIVELY PRESSURIZED REFER TO 'VAV TERMINAL SCHEDULE' FOR THE REQUIRED AIR FLOW OFFSETS.

SUPPLY & RETURN AIR VAV OPERATION (CORRIDORS)

- SUPPLY AND RETURN AIR VAV SHALL MAINTAIN FIXED CFM AT ALL TIMES.
- ON A DROP IN ZONE TEMPERATURE BELOW THE HEATING SETPOINT THE SUPPLY AIR VAV WILL MAINTAIN A FIXED CFM AND THE ELECTRIC REHEAT COIL WILL TURN ON TO MAINTAIN ZONE TEMPERATURE.

SUPPLY & RETURN AIR VALVE OPERATION (OPERATORY 1-7)

SUPPLY VALVE AIR FLOW CONTROL:

- WHILE IN OCCUPIED MODE, THE AIRFLOW CONTROL SYSTEM WILL TARGET THE MAXIMUM AIR FLOWS.
- WHILE IN UNOCCUPIED MODE, THE AIR FLOW CONTROL SYSTEM WILL TARGET THE MINIMUM AIR FLOWS.
- OCCUPIED MODE IS THE DEFAULT ROOM MODE.

RETURN VALVE AIRFLOW CONTROL:

- THE AIRFLOW CONTROL SYSTEM WILL CONTROL THE RETURN VALVE TO MAINTAIN THE DESIRED AIR FLOW OFFSET.
- REFER TO VAV TERMINAL SCHEDULE FOR THE REQUIRED AIR FLOW OFFSETS.

SPACE TEMPERATURE CONTROL:

SINGLE STAGE REHEAT – STAGE 1: MODULATING REHEAT COIL:

THE AIRFLOW CONTROL SYSTEM WILL MONITOR THE ROOM TEMPERATURE FROM A WALL MOUNTED ROOM TEMPERATURE SENSOR. IN THE FIRST HEATING STAGE, THE REHEAT COIL WILL MODULATE WITHIN THE DISCHARGE AIR TEMPERATURE LIMITS TO MAINTAIN SPACE TEMPERATURE.

ROOM PRESSURE MONITORING:

- A ROOM PRESSURE SENSOR WILL MEASURE THE DIFFERENTIAL PRESSURE BETWEEN THE ROOM AND ADJOINING SPACE. THE PMT WILL DISPLAY THE ROOM PRESSURE LOCALLY.

LOW ROOM PRESSURE ALARM: THE PMT WILL PROVIDE LOCAL VISUAL AND AUDIBLE ALERT WHEN THE ROOM PRESSURE FALLS BELOW THE ADJUSTABLE LOW ROOM PRESSURE ALARM LIMIT.

HIGH ROOM PRESSURE ALARM: THE PMT WILL PROVIDE LOCAL VISUAL AND AUDIBLE ALERT WHEN THE ROOM PRESSURE RISES ABOVE THE ADJUSTABLE HIGH ROOM PRESSURE ALARM LIMIT.

RTU 1 SEQUENCE OF OPERATION

NORMAL OPERATION

- THE RTU WILL RUN CONTINUOUSLY AT ALL TIMES IN ACCORDANCE WITH THE OPERATION OF THE SUPPLY AND RETURN VAV TERMINAL UNITS.
- THE OUTDOOR AIR MINIMUM DAMPER POSITION SHALL BE SET AT 33% OF THE TOTAL SUPPLY AIR CFM.
- THE SUPPLY FAN VFD WILL MODULATE THE FAN SPEED TO MAINTAIN +1" OF DUCT STATIC PRESSURE IN THE MAIN SUPPLY DUCTWORK.
- THE RETURN FAN VFD WILL MODULATE THE FAN SPEED TO TRACK THE SUPPLY FAN VFD.
- WHEN THE UNIT IS RUNNING, THE 2 STAGES OF MECHANICAL COOLING, ECONOMIZER AND MODULATING GAS HEAT WILL CYCLE IN ORDER TO MAINTAIN A CONSTANT SUPPLY AIR TEMPERATURE OF 60°F IN THE SUMMER AND 70°F IN THE WINTER.
- THE UNIT IS EQUIPPED WITH MODULATING GAS HEAT FROM 33%-100% TO MAINTAIN THE REQUIRED DISCHARGE AIR TEMPERATURE.
- SHOULD GAS HEAT FAIL, AND THE SUPPLY AIR TEMP DROP BELOW 55°F, THE OUTDOOR AIR DAMPERS WILL BEGIN TO MODULATE CLOSE AND AN ALARM GENERATED.

CONTACT: ISAAC MUI @ JOHNSON CONTROLS (ISAAC.MUI@JCI.COM, 416-938-9494)

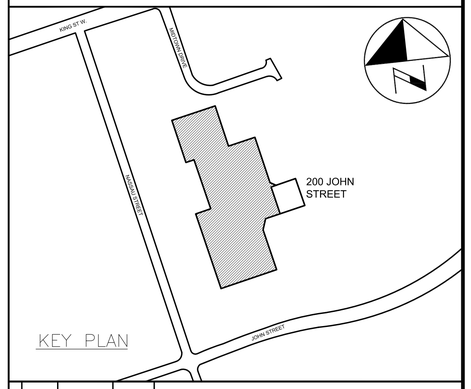
ROOM PRESSURIZATION SCHEDULE

ROOM NAME	ROOM DATA			SERVED BY SYSTEM		
	AREA (SQ.FT)	MIN DIFFERNTIAL PRESSURE (IN.WC)	SPACE PRESSURIZATION (POS, NEG, EQUAL)	SUPPLY	RETURN	EXHAUST
AREAS SERVED BY RTU-2:						
CORRIDOR C06/7	530	--	EQUAL	RTU-2	RTU-2	-
DENTURIST LAB 129	242	0.01	NEG (EXHAUST)	RTU-2	-	EF-4
LOCKERS 128	145	0.01	NEG	RTU-2	RTU-2	-
KITCHEN 127	172	0.01	NEG (EXHAUST)	RTU-2	-	EF-3
MEETING ROOM 126	415	--	EQUAL	RTU-2	RTU-2	-
ADMIN/RECEPTION	552	--	EQUAL	RTU-2	RTU-2	-
WAITING AREA 101	418	0.01	NEG	RTU-2	RTU-2	-
CONSULT ROOM 1	96	--	EQUAL	RTU-2	RTU-2	-
CONSULT ROOM 2	96	--	EQUAL	RTU-2	RTU-2	-
AREAS SERVED BY RTU-1:						
OPERATORY 1	250	0.01	POS	RTU-1	RTU-1	-
OPERATORY 2-5	106	0.01	POS	RTU-1	RTU-1	-
OPERATORY 6-7	110	0.01	POS	RTU-1	RTU-1	-
CORRIDOR C02/3	381	--	EQUAL	RTU-2	RTU-2	-
FAN ROOM	63	--	EQUAL	RTU-1	RTU-1	-
ADMIN/RECEPTION	552	--	EQUAL	RTU-1	RTU-1	-
CONSULT ROOM 1	96	--	EQUAL	RTU-1	RTU-1	-
CONSULT ROOM 2	96	--	EQUAL	RTU-1	RTU-1	-

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
	RIGID DUCTWORK
	FLEXIBLE DUCTWORK
	NEW CONTROL WIRING
	SPIN-ON CONNECTION W/BALANCE DAMPER
	LINEAR SLOT DIFFUSER
A-B/C XX L/S	A – DIFFUSER OR GRILLE TAG; B – DIFFUSER NECK OR GRILLE SIZE; C – LINEAR SLOT DIFFUSER LENGTH; XX – AIRFLOW BALANCE; L/S – LITERS PER SECOND
	SQUARE SUPPLY AIR DIFFUSER
	RETURN / EXHAUST AIR GRILLE
	TRANSFER AIR DUCTWORK WITH ACOUSTIC INSULATION
	DUCT WITH THERMAL INSULATION AND VAPOUR BARRIER
	DUCT WITH ACOUSTIC INSULATION
	DUCT WITH ACOUSTIC OR THERMAL INSULATION AND VAPOUR BARRIER
	SUPPLY AIR DUCTWORK UP OR OUT OF PAGE
	RETURN AIR DUCTWORK UP OR OUT OF PAGE
	SUPPLY AIR DUCTWORK DOWN OR INTO PAGE
	RETURN AIR DUCTWORK DOWN OR INTO PAGE
U/C	UNDERCUT IN DOOR
X	DRAWING NOTE
XX-X	EQUIPMENT TAG
SAN	UNDERGROUND SANITARY DRAINAGE PIPING
SAN	ABOVE GROUND SANITARY DRAINAGE PIPING
V	VENT PIPING
COND	CONDENSATE DRAIN PIPING
P.SAN	PUMPED SANITARY DRAIN
	DOMESTIC COLD WATER PIPING
	DOMESTIC HOT WATER PIPING
	DOMESTIC HOT WATER RECIRCULATION PIPING
STMS	STEAM SUPPLY PIPING
STMC	STEAM CONDENSATE RETURN PIPING
FD,HD	FLOOR DRAIN, HUB DRAIN
CO	BURIED CLEANOUT
CO	ABOVE GROUND CLEAN OUT
	PIPE/DUCTWORK UP
	PIPING DOWN
	CONTINUATION OF PIPE/DUCTWORK
	SANITARY 'P' TRAP
	ISOLATION VALVE
	TEMPERATURE AND PRESSURE RELIEF VALVE
	CHECK VALVE
	3-WAY VALVE
	CONTROL VALVE
CBV	CIRCUIT BALANCING VALVE
W	WATER METER
	BACKFLOW PREVENTOR
T	THERMOSTAT/SENSOR
$	SWITCH
	IN-LINE EXHAUST FAN
	CABINET/CEILING EXHAUST FAN
T	TEMPERATURE GAUGE
P	PRESSURE GAUGE
	PUMP
	DUCT MOUNTED HUMIDIFIER STEAM MANIFOLD
FE	FIRE EXTINGUISHER C/W WALL MOUNT HOOKS
FE	EXISTING FIRE EXTINGUISHER TO BE RELOCATED
	NEW RECESSED PENDENT SPRINKLER HEAD
R	RECESSED PENDENT SPRINKLER HEAD TO BE RELOCATED
RE	RECESSED PENDENT SPRINKLER HEAD TO BE REMOVED
F/A	FRESH AIR
R/A	RETURN AIR
S/A	SUPPLY AIR
E/A	EXHAUST AIR
B/D	BALANCING DAMPER
BDD	BACKDRAFT DAMPER
F/D	FIRE DAMPER
CW	DOMESTIC COLD WATER
HW	DOMESTIC HOT WATER
HWR	DOMESTIC HOT WATER RECIRCULATION
BFP	BACKFLOW PREVENTER
TYP	TYPICAL
FFH	FORCE FLOW HEATER
STM	STEAM DISTRIBUTION MANIFOLD
U/G	UNDERGROUND (I.E. UNDERGROUND SANITARY DRAINAGE)
A / B C	A – HEATER REFERENCE TAG; B – FIN TUBE ELEMENT LENGTH OR HEATER TYPE; C – HEAT OUTPUT
X / XXXX	DRAWING OR DETAIL NUMBER; DIRECTION OF VIEW; SHEET NUMBER
X / XXXX	DRAWING OR DETAIL NUMBER; SHEET NUMBER

ALL MEASUREMENTS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE AND ANY DISCREPANCIES ARE TO BE REPORTED BEFORE PROCEEDING WITH THE WORK. THE REGION OF DURHAM ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OF EXISTING SERVICES AS INDICATED ON THIS DRAWING. DO NOT SCALE DRAWINGS.



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1	APR 22/21	JM	REVISED AS PER ADDM1

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DESIGN BY: JM	SCALE NTS
DRAWN BY: JM	DATE: FEB 2021
CHECKED BY: AM	CONSULTANT PROJECT NO. 20-0033
APPROVED BY:	

CONTRACT REVISIONS

NO.	DATE	NAME	REVISIONS
1	FEB 12/21	JM	ISSUED FOR PERMIT/TENDER

THE REGIONAL MUNICIPALITY OF DURHAM
WORKS DEPARTMENT
DESIGN, CONSTRUCTION & ASSET MANAGEMENT

RELOCATION OF DENTAL CLINIC TO 200 JOHN ST., OSHAWA

CONTROL SEQUENCES, LEGEND & DRAWING LIST

PROPERTY NO.	FACILITY CODE	FACILITIES PROJECT NO.
N/A	LEA-O-07	LEA-O-07-19-01
CONTRACT NO.	DRAWING NO.	SHEET NO.
T-1032-2021	M-015	033

The Regional Municipality of Durham
Works Department
Facilities Design, Construction and Asset Management and Facilities Maintenance and Operations

Building Automation System Design Standards and Guidelines for Facilities Projects

Version 1.0 – January 2019

Table of Contents

1 General

1.1 Introduction

.1 Building Automation Systems play a major part in the daily maintenance and operation of the Region of Durham facilities. As a Consultant, or Contractor, retained by the Region of Durham, it is important you use the following guideline when designing and installing equipment related to the Building Automation systems for each building.

1.2 Codes and Standards

.1 The following codes and standards intended to apply as applicable as not all will apply to all installations. Current and applicable Codes are inserted as required.

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) - 90.1 Energy Standards and 62.1 Ventilation Standards

.2 ASHRAE 135-2004: BACNET - A Data Communication Protocol for Building Automation and Control Networks. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 2004 including Addendums A through E

1.3 Baseline Protocol for all future projects

.1 The purpose of having a baseline protocol is to create a level playing field for all future HVAC, Fire and Electrical upgrades.

.2 This protocol will be open source, meaning that products, programming tools, training and support provide a level of access that is in conformance with current ASHRAE, industry standards and that multiple vendors can provide connection of new equipment to the BAS system.

.3 This standard applies to all BAS projects - new buildings, renovations, retrofits, BAS upgrades, new BAS which shall all conform entirely to these BAS Design Standards. Any deviation from these Standards, or the intent, can only be implemented with written approvals from the Region of Durham.

.4 The BAS contractor shall provide the design, products, installation, programming, supervision, commissioning and training to ensure and warrant a complete and fully operational BAS that meets or exceeds these Standards.

.5 Systems i.e., chillers, boilers, cooling towers, VFD's and energy recovery units that are equipped with manufacturer furnished controls shall use controllers that follow these Standards.

.6 All facilities must be provided with two (2) Outdoor Air Temperature sensors and two (2) Outdoor Air Humidity Sensors. The connection to the BAS must ensure that if one sensor fails, the other sensor acts as backup.

.7 New HVAC system installations must include fire alarm disconnect relays directly connected to the fire alarm panels. BAS connections are for status only.

.8 Critical applications (server rooms, etc.) which have a lead lag application for HVAC equipment, must have separate controllers.

.9 All buildings with Fire alarm panels must ensure fire alarm and trouble points are available for connection to the BAS.

.1 All fire alarm points must be identified on the BAS.

.10 VFD modulation on fans and pumps must be represented as follows;

.1 0% = minimum operating speed

.2 100% = maximum speed (60hz)

.11 All damper and valve status must be represented by % open and as follows;

.1 0% = Valve/Damper closed

.2 100%= Valve/Damper Open

.12 Units of measurement

.1 All pressure measurement shall be represented in metric Pascals

.2 All airflow measurement must be represented in metric L/S.

.3 All thermostats and temperature sensors must be represented in metric units (ºC).

.4 Relative humidity should be represented in %RH.

.13 Stand alone systems

.1 Any new stand-alone equipment, which is not connected to the BAS, must:

.1 Be networked together (Daisy Chained)

.2 Contain a BACnet card.

.14 BAS Graphics

.1 When building graphics Contractors must follow naming conventions, colours, symbols, tag name nomenclature, units and layouts identified on the graphics provided in the Visio files and screenshots in Appendix B.

.15 BAS Programming

.1 Tag names must follow the examples outlined in Appendix D and be identified on the graphics for all components.

.2 BAS Alarms must be provided on all projects. Alarms must follow alarm tag naming conventions outlined in Appendix D.

.16 Trends

.1 When trends are requested, trend sampling shall be taken at 30 minute intervals for a 3 day period.

.17 Labelling

.1 Thermostats must be labelled to match what is identified on the BAS Graphic floor plans.

.2 Locations of controllers must be identified with green coloured dots and system names on T-Bar ceilings.

All new field controllers, central controllers and equipment must be BACnet open protocol conforming to ASHRAE 135 (Latest Edition).

1.4 Optimum energy efficient design and Implementation.

.1 The Region of Durham is committed to efficient, cost effective and sustainable designs for all of its facilities. The BAS design shall present the best use of technologies and sequences of operation for consideration by the Consultant Design Team before the final version is submitted for tender or implementation.

.2 The BAS shall be capable of implementing the latest in energy conserving sequences of operation such as those described in ASHRAE 90.1 or other industry recognized sequences.

.3 The BAS design shall be capable of preparing and presenting performance metrics that illustrate energy use at the BAS and EMRS and/or sharing the data with energy reporting tools as used by the Region of Durham.

.4 Demand level control shall be the basis of design for HVAC+L control and integrated into the BAS. In particular, the BAS will use actual occupancy loads (people counts) for the control of HVAC+L equipment to minimize overventilation/ lighting while still meeting the minimums of ASHRAE 62.1 and 90.1.

2 Steps to preparing Building Automation System (BAS) Specifications for Region of Durham (ROD) Projects, for Consultants.

.1 Contact the Region of Durham Facilities DCAM Specifications and Support Services division to receive the most up to date BAS specification.

.2 Contact the Region of Durham Facilities Operations and Maintenance department to discuss the controls strategy for the project.

.1 Request Visio template graphics from Facilities Maintenance and operations to begin construction of new or modified BAS graphics.

.3 Ensure all new equipment specified is compatible with the ROD projects and meets this standard.

3 Existing systems

.1 The Region of Durham currently utilizes a Metasys ADX Server (Johnson Controls v8.0.0.0449) virtual server, located at the Durham Regional Headquarters, 605 Rossland Road, East. Whitby.

The following is a list of systems currently connected to the Region of Durham's ADX Server and possible connection requirements.

.1 City of Pickering

.1 Pickering EMS.

.2 Town of Ajax

.1 Ajax Water Supply Plant

.2 Ajax Depot

.3 Town of Whitby

.1 Durham Regional Headquarters

.2 Traffic – Health – 101 Consumers

.3 Whitby Water Treatment Plant

.4 Whitby EMS.

.4 City of Oshawa

.1 Hillsdale Terraces LTC

.2 Oshawa Depot

.3 North Oshawa EMS

.4 South Oshawa EMS

.5 Oshawa Water Treatment Plant

.5 Municipality of Clarington

.1 Courtice Water Pollution Control Plant

.2 Courtice EMS

.3 Bowmanville Water Sewage Plant

.6 Township of Brock

.1 Brock Water Treatment Plant

.2 Existing systems maintained by FMO but not connected to the Metasys ADX.

.1 The Region

.1 DRT East – Farewell – Johnson FX – Not connected.

.2 Municipality of Clarington

.1 Port Darlington WPCP - Honeywell Spider

.2 Edna Thompson Child Care – Honeywell

.3 Orono Depot – Honeywell Spider

.4 Hillsdale Estates – LTC - Metasys – Not connected.

.5 DRT – West – Metasys – Not connected.

.6 Fairview Lodge – Metasys – Not connected.

.7 Lakeview Manor - Metasys – Not connected.

.8 Duffin Creek.

4 Design Considerations

.1 Equipment Selection.

.1 The following must be considered when selecting equipment (where possible) for new or replacement projects throughout the ROD facilities.

.1 New and replacement Air Handling units must have factory installed BACnet MSTP or BACnet IP controllers.

.2 New and replacement Boilers must have factory installed BACnet IP controllers.

.3 New and replacement Make up Air Units must have factory installed BACnet MSTP controllers.

.4 New and replacement Chillers must have factory installed BACnet IP controllers.

.5 New and replacement CO and NO_2 systems must be provided with a BACnet IP communication card.

.6 New and replacement Dehumidifiers must have factory installed BACnet IP controllers.

.7 New and replacement lighting systems must be provided with a BACnet IP communication card.

.2 Field Controllers

.1 All field controllers must be BACnet MSTP.

.2 In existing facilities, where installed existing field controller brands are compatible, Contractors must, where possible, match existing controller manufacturers.

.1 If a different manufacturer than the existing manufacturer is selected, a BACnet IP Controller or new supervisory controller must be provided and connected to the IT Switch directly.

.3 Supervisory Network Controllers

.1 Any NAE Supervisory devices must not exceed more than 80% capacity, without approval from ROD FMO.

.2 When capacity is reached on an existing NAE, the ROD requires that a new NAE is installed in its place with sufficient capacity.

.3 All existing NAEs that have been replaced must be turned over to the ROD.

.4 Where a UPS is not already provided, provide a new 250Va UPS for all new and replacement NAEs.

.5 Refer to Appendix C for schematic diagrams on installation UPS, NAE and transformers.

.4 All HVAC equipment which contains a fan or coil must have a SAT sensor installed at the discharge.

.5 Network devices.

.1 I.T. Switches.

.1 Switches should have sufficient capacity to accept new BACnet IP connections on new and replacement projects. Consultants or Contractors must contact the Region of Durham's CS-IT Department to confirm capacity.

.6 Boilers

.1 Package Controllers

.1 Boilers should be supplied with factory installed points for the following;

.1 General Alarm

.2 Running status

.3 Trouble alarm

.4 Hot water supply temperature

.5 Hot water return temperature

.6 Hot water recirculation temperature

.7 Pump Status

.8 Flame failure

.9 Outdoor air temperature

.7 Chillers

.1 Package Controllers

.1 Chillers should be supplied with factory installed points for the following;

.1 General Alarm

.2 Running status

.3 Trouble alarm

.4 Chilled water supply temperature

.5 Chilled water return temperature

.6 Outdoor air temperature

.7 Pump Status

.8 Flame failure

.8 Air Handling units

.1 Package Controllers

.1 Air Handling Units should be supplied with factory installed points for the following;

.1 General Alarm

.2 Running status

.3 Trouble alarm

.4 Supply air temperature

.5 Return air temperature

.6 Flame failure

.7 Damper positions

.9 Pumps

.1 Package Controllers

.1 Pumps should be supplied with factory installed points for the following;

.1 General Alarm

.2 Running status

.3 Trouble alarm

.4 Water Supply temperature

.5 Water Return temperature

.6 Pump Status

.10 VAV

.1 Package Controllers

.1 VAV should be supplied with factory installed points for the following;

.1 General Alarm

.2 Running status

.3 Trouble alarm

.4 Supply air temperature

.5 Room air temperature

.6 Supply flow set point

.7 Min / Max

.8 Auto Zero

.11 Generators

.1 Package Controllers

.1 Generators should be supplied with factory installed points for the following;

.1 General Alarm

.2 Running status

.3 Trouble alarm

.4 If the fuel tank is integrated with the generator, include the following;

.1 High tank alarm.

.2 High high tank alarm.

.3 Low tank alarm.

.4 Integrated Fuel Measurement system.

.5 Fuel Leak alarm

.5 Diesel Generator battery alarm

.2 Generators, main tanks, pumps, ventilation and all associated equipment must be on a dedicated field controller.

.1 All dedicated field controllers must be connected to emergency power and be UPS connected.

.2 Fuel Measurement

.1 All new main tanks shall come with a fuel measurement device capable of sending a 0-10 VDC signal or 4-20 mA to the BAS filed controller.

.3 Main tank

When main tank(s) are required for a facility, provide the following points and status on the BAS.

.1 Pumps

.1 Running status

.2 Overload alarm

.2 Over fill protections

.1 High tank alarm.

.2 High high tank alarm.

.3 Low tank alarm.

.3 Leak detection

.4 Day tank

.1 When a day tank is required for a facility, provide the following points and status on the BAS.

.1 High tank alarm.

.2 Low tank alarm.

.5 Ventilation system

.1 Room temperature sensor

.2 OAT Sensor

.3 Damper status on OA combustion damper

.4 Fan status

5 Appendices

5.1 Appendix A – BAS Network Diagram.

5.2 Appendix B – Graphical User Interface standards.

5.2.1. – Typical approved screen shots of acceptable systems.

5.3 Appendix C – Equipment Installation diagrams.

5.4 Appendix D – BAS Alarm Tag Naming and Configuration

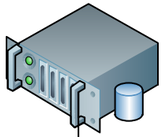
Building Automation System Network Architecture
City of

PICKERING

Metasys ADX Server (Johnson Controls v8.0.0.0449)
(Virtual Server)
WH-HQ-BAS-P1
IP 172.24.220.103

DNS 172.24.100.15
172.24.100.16

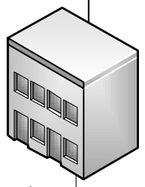
Located at
Durham Regional Headquarters
605 Rossland Rd. E.



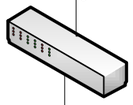
I.T. Switch

WAN

Pickering EMS
1103 Kingston



Johnson Controls



I.T. Switch

LAN

Current # of Objects: 476

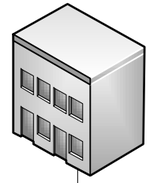
PICEMS-NAE1
MS-NCE2560-0
v8.0.0.0449

Comm Protocol: BACnet MSTP

IP: 10.231.24.10
IP Mask: 255.255.255.0
IP Router Add: 10.231.24.1
DNS1: 0.0.0.0

(Currently Not Connected to the Region's ADX Server)
Separate Diagram

Duffin Creek
McKay Road



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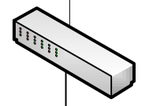
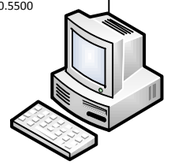


I.T. Switch

LAN

Metasys ADS Server
DUFFIN-ADS1
V6.5.0.5500



16 NAEs

Comm Protocol: BACnet MSTP

IP 192.168.166.100

Building Automation System Network Architecture

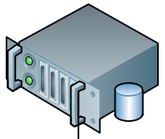
Town of

AJAX

Metasys ADX Server (Johnson Controls v8.0.0.0449)
(Virtual Server)
WH-HQ-BAS-P1
IP 172.24.220.103

DNS 172.24.100.15
172.24.100.16

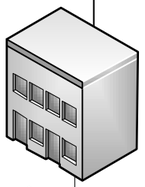
Located at
Durham Regional Headquarters
605 Rossland Rd. E.



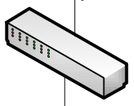
I.T. Switch

WAN

Ajax Water Supply Plant
75 Lake Driveway East



Johnson Controls



I.T. Switch

LAN

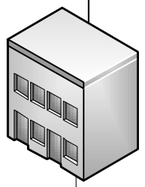
Current # of Objects: 1515

AJAX-WSP-NAE1
MS-NAE3510-2
v8.0.0.0449

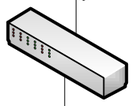
Comm Protocol: BACnet MSTP

IP: 192.168.50.85
IP Mask: 255.255.255.0
IP Router Add: 192.228.24.1
DNS1: 172.24.100.15
DNS1: 172.24.100.16

Ajax Depot
2020 Salem Road North



Johnson Controls



I.T. Switch

LAN

Current # of Objects: 983

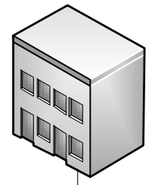
APD-NAE1
MS-NCE3514-1
v8.0.0.0449

Comm Protocol: BACnet MSTP

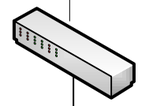
IP: 192.168.18.79
IP Mask: 255.255.255.0
IP Router Add: 192.168.18.100
DNS1: 0.0.0.0

(Currently Not Connected to the Region's ADX Server)

Durham Transit West
110 Westney Road South



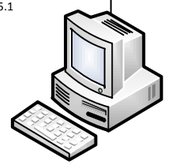
Johnson Controls



I.T. Switch

LAN

Metasys ADS Server
V5.1



IP: 192.168.61.79

NAE1
MS-NAE45
V5.1

Comm Protocol: BACnet MSTP

NAE2
MS-NAE45
V5.1

Comm Protocol: BACnet MSTP

NAE3
MS-NAE45
V5.1

Comm Protocol: BACnet MSTP

NAE4
MS-NAE45
V5.1

Comm Protocol: BACnet MSTP

Building Automation System Network Architecture
Town of
WHITBY

Metasys ADX Server (Johnson Controls v8.0.0.0449)
(Virtual Server)
WH-HQ-BAS-P1
IP 172.24.220.103

DNS 172.24.100.15
172.24.100.16

Located at
Durham Regional Headquarters
605 Rossland Rd. E.

I.T. Switch

WAN

Durham Regional Headquarters
605 Rossland Rd. E.

Johnson Controls/ Microtech II

I.T. Switch

LAN

Current # of Objects: 4762
NAE1
MS-NAE5510-2
v8.0.0.0449
Comm 1 Protocol: N2
Comm 2 Protocol: N2
IP 10.124.24.11

Current # of Objects: 2923
NAE2
MS-NAE5510-2
v8.0.0.0449
Comm 1 Protocol: N2
Comm 2 Protocol: N2
IP 10.124.24.12

Current # of Objects: 2684
NAE3
MS-NAE5510-2
v8.0.0.0449
Comm 1 Protocol: N2
Comm 2 Protocol: N2
IP 10.124.24.13

Current # of Objects: 2431
NAE4
MS-NAE5510-2
v8.0.0.0449
Comm 1 Protocol: N2
Comm 2 Protocol: N2
Comm 3 Protocol: BACnet IP
IP 10.124.24.14

IP Mask: 255.255.255.0
IP Router Add: 10.124.24.1
DNS1: 172.24.100.15
DNS2: 172.24.100.16

CHLR1
MTII
CHLR2
MTII
Protocol: Bacnet IP
IP 10.124.24.15 IP 10.124.24.16
(Points routed via NAE4)

Traffic – Health
101 Consumers Rd.

Johnson Controls

I.T. Switch

LAN

Current # of Objects: 2293
NAE35
MS-NAE3510-2
v8.0.0.0449
Comm Protocol: N2

IP: 10.144.24.10
IP Mask: 255.255.255.0
IP Router Add: 10.144.24.1
DNS1: 172.24.100.15
DNS2: 172.24.100.16
DNS3: 172.24.129.229

Whitby WTP
289 Water St.

Johnson Controls

I.T. Switch

LAN

Current # of Objects: 827
NAE55
MS-NAE5501
V4.0.0.3400
Comm 1 Protocol: N2
Comm 2 Protocol: N2

IP: 192.168.21.72
IP Mask: 255.255.255.0
IP Router Add: 192.168.21.100
DNS1: 172.24.100.15
DNS2: 172.24.100.16

Whitby EMS
4040 Anderson St.

Johnson Controls

I.T. Switch

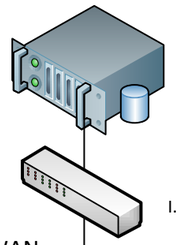
LAN

Current # of Objects: 1615
NAE35
MS-NAE3511-1
v8.0.0.0449
Comm Protocol: N2

IP: 10.224.24.10
IP Mask: 255.255.255.0
IP Router Add: 10.224.24.1
DNS: 192.168.1.1

Building Automation System Network Architecture
City of
OSHAWA

Located at
Durham Regional Headquarters
605 Rossland Rd. E.



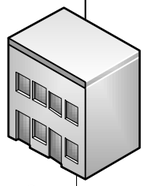
Metasys ADX Server (Johnson Controls v8.0.0.0449)
(Virtual Server)
WH-HQ-BAS-P1
IP 172.24.220.103

DNS 172.24.100.15
172.24.100.16

I.T. Switch

Regional WAN

Hillsdale Terraces
600 Oshawa Blvd. North



Johnson Controls

I.T. Switch

LAN

Current # of Objects: 3639
HT-NAE45-1
MS-NAE4510-2
v8.0.0.0449
Comm Protocol: N2

IP: 10.220.24.10

Current # of Objects: 2728
HT-NAE45-2
MS-NAE4510-2
v8.0.0.0449
Comm Protocol: N2

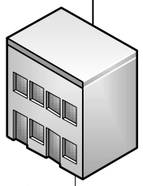
IP: 10.220.24.11

Current # of Objects: 2609
HT-NAE45-3
MS-NAE4510-2
v8.0.0.0449
Comm Protocol: N2

IP: 10.220.24.12

IP Mask: 255.255.255.0
IP Router Add: 10.220.24.1
DNS1: 0.0.0.0
DNS2: 0.0.0.0

Oshawa Depot
125 Conlin Rd.



Johnson Controls

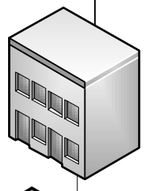
I.T. Switch

LAN

Current # of Objects: 1155
OWDepot-NAE-1
MS-NAE3510-2
v8.0.0.0449
Comm Protocol: N2

IP: 10.164.24.10
IP Mask: 255.255.255.0
IP Router Add: 10.164.24.1
DNS1: 172.24.100.15
DNS2: 172.24.100.16

North Oshawa EMS
1260 Wilson Rd. North



Johnson Controls

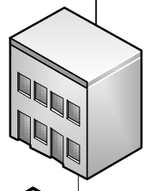
I.T. Switch

LAN

Current # of Objects: 287
NAE00108D045305
MS-NCE2567-0
V6.0.0.9000
Comm Protocol: BACnet MSTP

IP: 10.234.24.5
IP Mask: 255.255.255.0
IP Router Add: 10.234.24.1
DNS1: 172.24.100.15
DNS2: 172.24.100.16

South Oshawa EMS
497 Bloor St. East



Johnson Controls

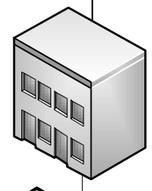
I.T. Switch

LAN

Current # of Objects: 359
NAE35B-NAE1
MS-NAE3510-2
v8.0.0.0449
Comm Protocol: BACnet MSTP

IP: 10.230.24.10
IP Mask: 255.255.255.0
IP Router Add: 10.230.24.1
DNS1: 172.24.100.15
DNS2: 172.24.100.16

Oshawa WTP
1540 Ritson Rd. South



Johnson Controls

I.T. Switch

LAN

Current # of Objects: 632
OshawaWT P-NAE1
MS-NAE3510-1
V5.2.0.5400
Comm Protocol: N2

IP: 10.188.24.10
IP Mask: 255.255.255.0
IP Router Add: 10.188.24.10
DNS1: 172.24.100.15
DNS2: 172.24.100.16

OshawaWT P-NAE2
MS-NAE3510-2
v8.0.0.0449
Comm Protocol: MSTP

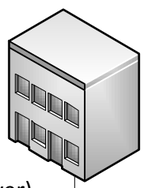
IP xx.xxx.xx.xx

NEW

New Boiler
Comm Protocol: BACnet IP
IP xx.xxx.xx.xx
(Points routed via OshawaWTP-NAE2)

INCIDENT #00046417 (Allan) In Early 2018

Durham Transit East
715 Farewell St.



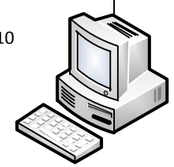
Johnson Controls Facility Explorer

(Currently Not Connected to the Region's ADX Server)

I.T. Switch

LAN

IP 10.155.24.10



AX Niagara JACE
Comm Protocol: BACnet MSTP

Building Automation System Network Architecture
Municipality of

CLARINGTON

Located at
Durham Regional Headquarters
605 Rossland Rd. E.

Metasys ADX Server (Johnson Controls v8.0.0.0449)
(Virtual Server)
WH-HQ-BAS-P1
IP 172.24.220.103

DNS 172.24.100.15
172.24.100.16

I.T. Switch

WAN

Courtice WPCP
100 Osbourne Rd.

Johnson Controls

I.T. Switch

LAN

Current # of Objects: 622	Current # of Objects: 375	Current # of Objects: 200	Current # of Objects: 134	Current # of Objects: 563	Current # of Objects: 189	Current # of Objects: 221	Current # of Objects: 249
NAE-AD-1001 MS-NAE3510-1 v8.0.0.0449	NAE-BS-1001 MS-NAE3510-1 v8.0.0.0449	NAE-CA-1001 MS-NAE3510-1 v8.0.0.0449	NAE-DG-1001 MS-NAE3510-1 v8.0.0.0449	NAE-EN-1001 MS-NAE3510-1 v8.0.0.0449	NAE-HW-1001 MS-NAE3510-1 v8.0.0.0449	NAE-PG-1001 MS-NAE3510-1 v8.0.0.0449	NAE-SG-1001 MS-NAE3510-1 v8.0.0.0449
Comm Protocol: N2	Comm Protocol: N2	Comm Protocol: N2	Comm Protocol: N2	Comm Protocol: N2	Comm Protocol: N2	Comm Protocol: N2	Comm Protocol: N2
IP 192.168.58.56	IP 192.168.58.57	IP 192.168.58.52	IP 192.168.58.54	IP 192.168.58.53	IP 192.168.58.55	IP 192.168.58.50	IP 192.168.58.51

IP Mask: 255.255.255.0
IP Router Add: 192.168.58.100
DNS1: 172.24.100.15
DNS2: 172.24.100.16

Courtice EMS
2701 Courtice Rd.

Johnson Controls

I.T. Switch

LAN

Current # of Objects: 583

CRTEMS-NAE1
MS-NCE2560-0
v8.0.0.0449

Comm Protocol: BACnet MSTP

IP: 10.228.24.10
IP Mask: 255.255.255.0
IP Router Add: 10.228.24.1
DNS1: 0.0.0.0

Bowmanville WSP
124 Darlington Rd.

Johnson Controls

I.T. Switch

LAN

Current # of Objects: 239

BWSP-NAE-1
MS-NAE3510-2
v8.0.0.0449

Comm Protocol: N2

IP: 192.168.54.50
IP Mask: 255.255.255.0
IP Router Add: 192.168.54.100
DNS1: 172.24.100.15
DNS2: 172.24.100.16

Port Darlington WPCP
130 Port Darlington Road

Honeywell EBI Building Automation System

(Currently Not Connected to the Region's ADX Server)
Not Integrated

I.T. Switch

LAN

IP ???

???
Supervisory Controllers

Comm Protocol: BACnet MSTP

Building Automation System Network Architecture

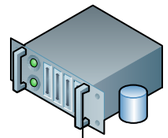
Township of

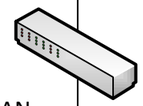
BROCK

Metasys ADX Server (Johnson Controls v8.0.0.0449)
(Virtual Server)
WH-HQ-BAS-P1
IP 172.24.220.103

DNS 172.24.100.15
172.24.100.16

Located at
Durham Regional Headquarters
605 Rossland Rd. E.

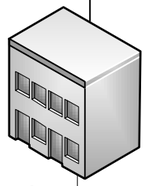




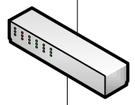
I.T. Switch

WAN

BWTP-NAE
35 Simcoe Street



Johnson
Controls



I.T. Switch

LAN

Current # of
Objects: 983

BWTP-NAE
MS-NAE3511-1
v8.0.0.0449

Comm Protocol: N2

IP: 10.231.24.10
IP Mask: 255.255.255.0
IP Router Add: 10.231.24.1
DNS1: 172.24.100.15
DNS1: 172.24.100.16

Building Automation System Network Architecture (Partial)

Duffin Creek

Network Information Required

Metasys ADS Server (Johnson Controls)
Duffin Creek

I.T. Switch

LAN

Admin Building

I.T. Switch

LAN

IP (to be assigned by CS-IT)

Bacnet IP Card

CRAC1

CRAC2

Protocol: Bacnet IP

NAE

(New Optional NAE)

Existing Siemens Controls

(Currently Not Connected to the Region's ADX Server)

Duffin Creek
McKay Road

Johnson Controls

I.T. Switch

LAN

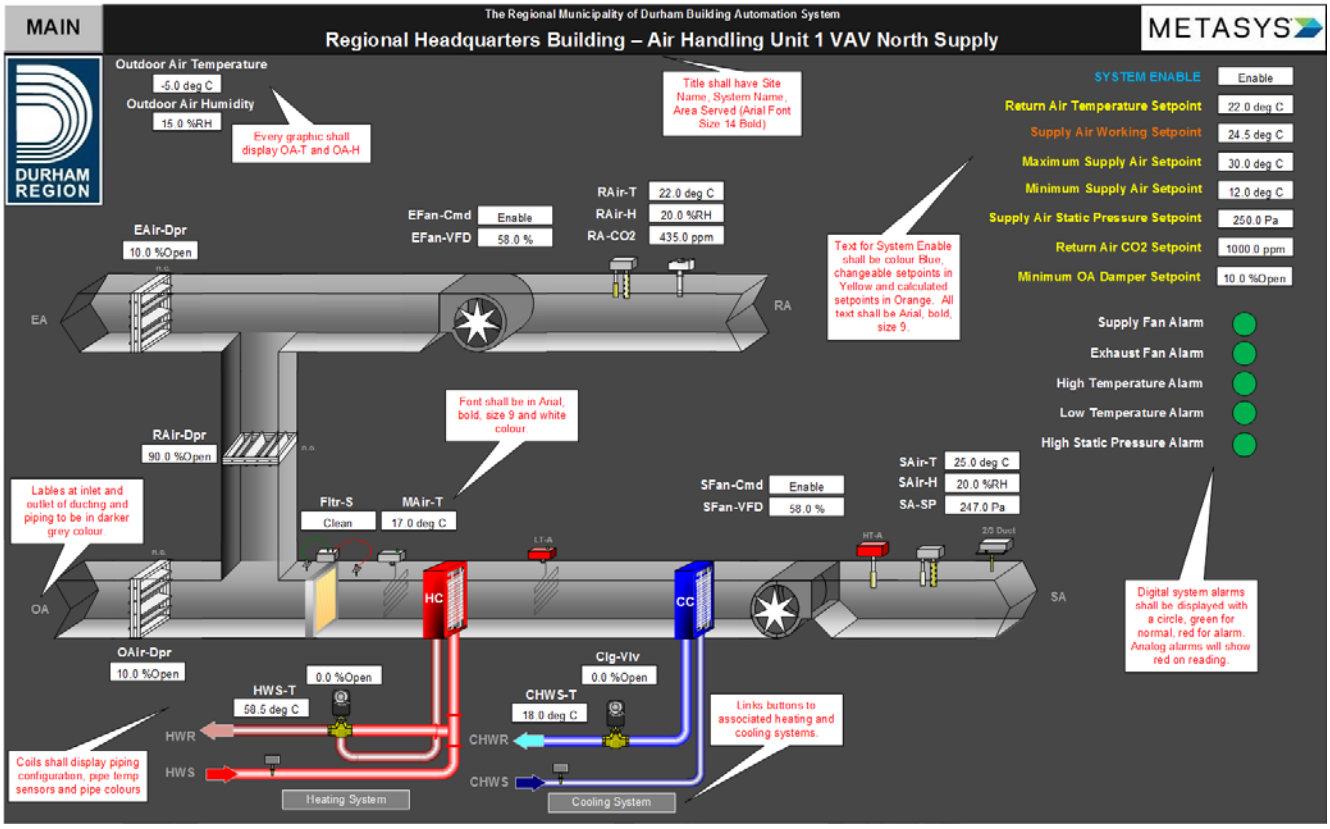
Metasys ADS Server
DUFFIN-ADS1
V6.5.0.5500

IP 192.168.166.100

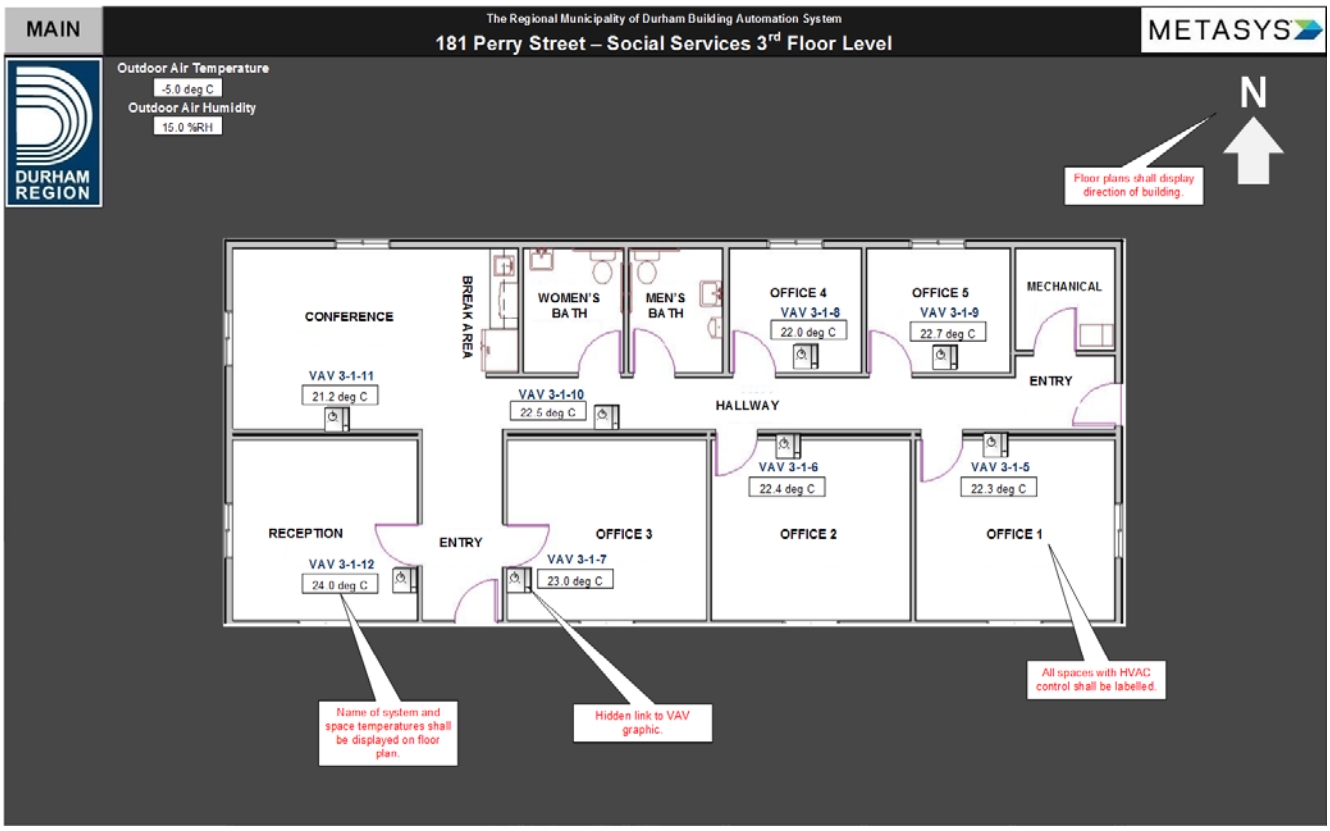
16 NAEs

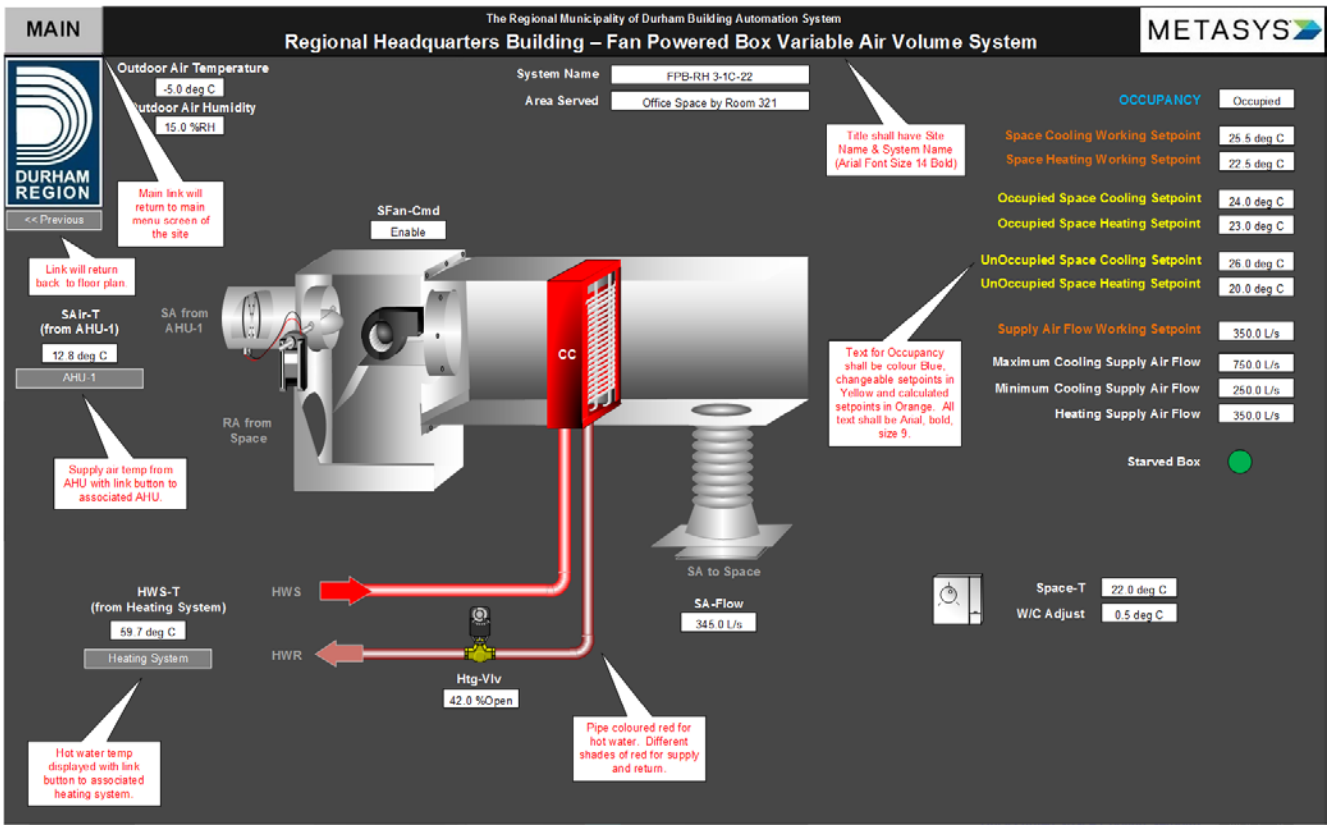
Comm Protocol: BACnet MSTP

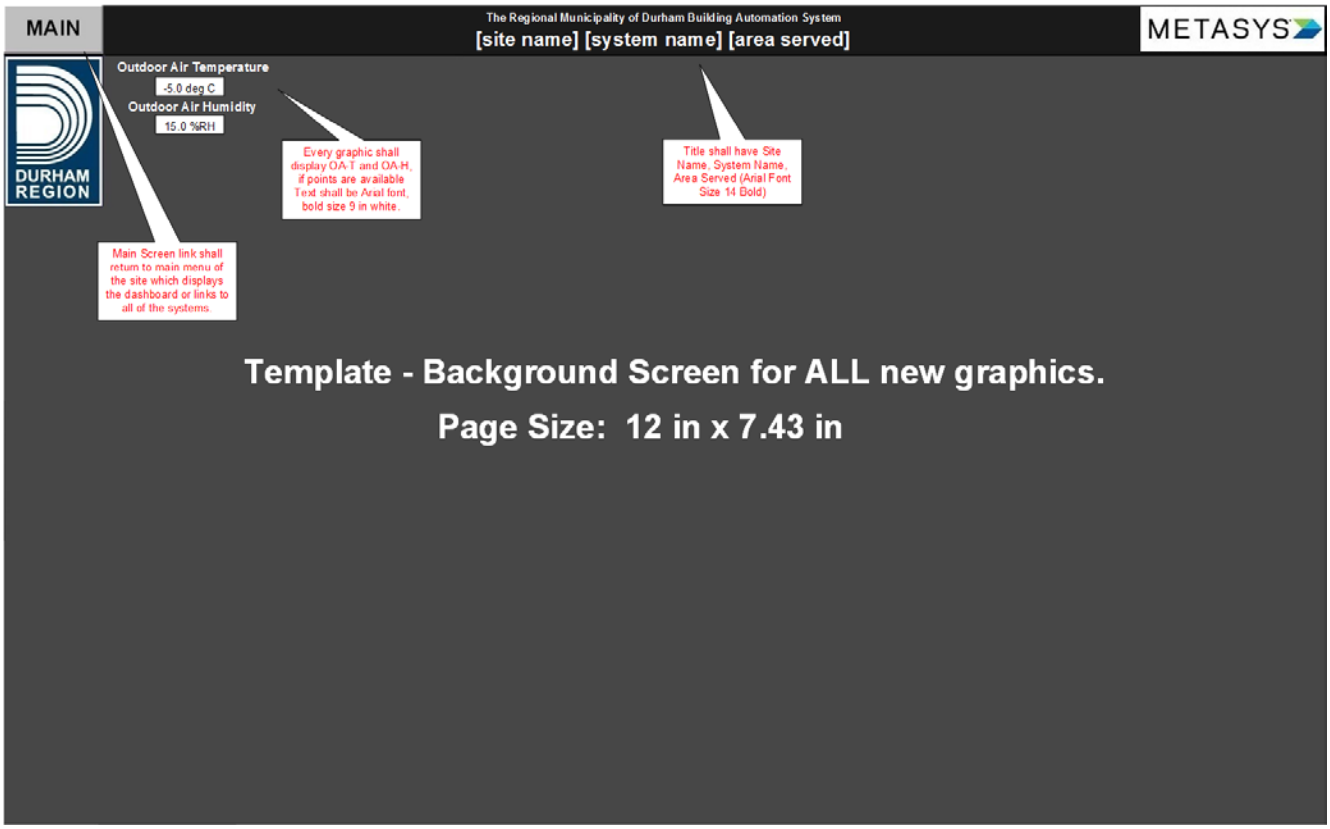
Appendix B


MAIN
The Regional Municipality of Durham Building Automation System
Regional Headquarters Building – Air Handling Unit 1 VAV North Supply
METASYS
DURHAM REGION
Outdoor Air Temperature
-5.0 deg C
Outdoor Air Humidity
15.0 %RH
Every graphic shall display OA-T and OA-H
Title shall have Site Name, System Name, Area Served (Arial Font Size 14 Bold)
SYSTEM ENABLE
Enable
Return Air Temperature Setpoint
22.0 deg C
Supply Air Working Setpoint
24.5 deg C
Maximum Supply Air Setpoint
30.0 deg C
Minimum Supply Air Setpoint
12.0 deg C
Supply Air Static Pressure Setpoint
250.0 Pa
Return Air CO2 Setpoint
1000.0 ppm
Minimum OA Damper Setpoint
10.0 %Open
Supply Fan Alarm
Exhaust Fan Alarm
High Temperature Alarm
Low Temperature Alarm
High Static Pressure Alarm
EAir-Dpr
10.0 %Open
EFan-Cmd
Enable
EFan-VFD
58.0 %
RAir-T
22.0 deg C
RAir-H
20.0 %RH
RA-CO2
435.0 ppm
EA
RA
Text for System Enable shall be colour Blue, changeable setpoints in Yellow and calculated setpoints in Orange. All text shall be Arial, bold, size 9.
Font shall be in Arial, bold, size 9 and white colour.
RAir-Dpr
90.0 %Open
Lables at inlet and outlet of ducting and piping to be in darker grey colour.
Fltr-S
Clean
MAir-T
17.0 deg C
SFan-Cmd
Enable
SFan-VFD
58.0 %
SAir-T
25.0 deg C
SAir-H
20.0 %RH
SA-SP
247.0 Pa
OA
HC
CC
SA
Digital system alarms shall be displayed with a circle, green for normal, red for alarm. Analog alarms will show red on reading.
OAir-Dpr
10.0 %Open
HWS-T
58.5 deg C
0.0 %Open
Clg-Vlv
0.0 %Open
CHWS-T
18.0 deg C
Links buttons to associated heating and cooling systems.
HWR
HWS
CHWR
CHWS
Coils shall display piping configuration, pipe temp sensors and pipe colours
Heating System
Cooling System

▪

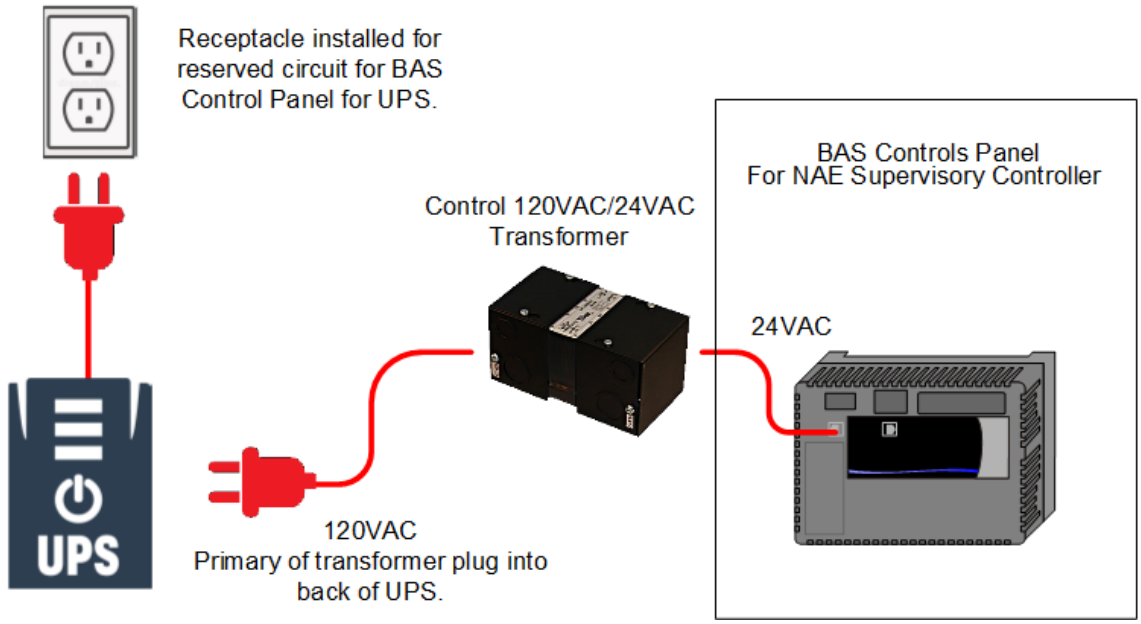

MAIN
The Regional Municipality of Durham Building Automation System
181 Perry Street – Social Services 3rd Floor Level
METASYS
DURHAM REGION
Outdoor Air Temperature
-5.0 deg C
Outdoor Air Humidity
15.0 %RH
N
Floor plans shall display direction of building.
CONFERENCE
VAV 3-1-11
21.2 deg C
BREAK AREA
WOMEN'S BATH
MEN'S BATH
OFFICE 4
VAV 3-1-8
22.0 deg C
OFFICE 5
VAV 3-1-9
22.7 deg C
MECHANICAL
ENTRY
VAV 3-1-10
22.5 deg C
HALLWAY
VAV 3-1-6
22.4 deg C
VAV 3-1-5
22.3 deg C
RECEPTION
VAV 3-1-12
24.0 deg C
ENTRY
OFFICE 3
VAV 3-1-7
23.0 deg C
OFFICE 2
OFFICE 1
All spaces with HVAC control shall be labelled.
Name of system and space temperatures shall be displayed on floor plan.
Hidden link to VAV graphic.


MAIN
The Regional Municipality of Durham Building Automation System
Regional Headquarters Building – Fan Powered Box Variable Air Volume System
METASYS
DURHAM REGION
Outdoor Air Temperature
-5.0 deg C
Outdoor Air Humidity
15.0 %RH
<< Previous
Main link will return to main menu screen of the site
Link will return back to floor plan
System Name
FPB-RH 3-1C-22
Area Served
Office Space by Room 321
Title shall have Site Name & System Name (Arial Font Size 14 Bold)
OCCUPANCY
Occupied
Space Cooling Working Setpoint
25.5 deg C
Space Heating Working Setpoint
22.5 deg C
Occupied Space Cooling Setpoint
24.0 deg C
Occupied Space Heating Setpoint
23.0 deg C
UnOccupied Space Cooling Setpoint
26.0 deg C
UnOccupied Space Heating Setpoint
20.0 deg C
Supply Air Flow Working Setpoint
350.0 L/s
Maximum Cooling Supply Air Flow
750.0 L/s
Minimum Cooling Supply Air Flow
250.0 L/s
Heating Supply Air Flow
350.0 L/s
Starved Box
Text for Occupancy shall be colour Blue, changeable setpoints in Yellow and calculated setpoints in Orange. All text shall be Arial, bold, size 9.
SFan-Cmd
Enable
SAir-T
(from AHU-1)
12.8 deg C
AHU-1
SA from AHU-1
RA from Space
CC
Supply air temp from AHU with link button to associated AHU.
SA to Space
SA-Flow
345.0 L/s
Space-T
22.0 deg C
W/C Adjust
0.5 deg C
HWS-T
(from Heating System)
59.7 deg C
Heating System
HWS
HWR
Htg-Vlv
42.0 %Open
Hot water temp displayed with link button to associated heating system.
Pipe coloured red for hot water. Different shades of red for supply and return.


MAIN
The Regional Municipality of Durham Building Automation System
[site name] [system name] [area served]
METASYS
DURHAM REGION
Outdoor Air Temperature
-5.0 deg C
Outdoor Air Humidity
15.0 %RH
Every graphic shall display OA-T and OA-H, if points are available Text shall be Arial font, bold size 9 in white.
Title shall have Site Name, System Name, Area Served (Arial Font Size 14 Bold)
Main Screen link shall return to main menu of the site which displays the dashboard or links to all of the systems.
Template - Background Screen for ALL new graphics.
Page Size: 12 in x 7.43 in

Appendix C

UPS Installation for NAE Supervisory Controller



Appendix D

1 BAS Alarm Tag Naming and Configuration

1.1 Alarm Description

.1 To effectively identify an alarm from the Region's Metasys ADX BAS, the following format is recommended:

[Region/Site Name – System – Area Served (or Equipment Location) – Alarm Item]

This is configured under the Name & Description Fields in the Alarm Tab.*
Examples:

- **Ajax Depot - MUA1-South Vehicle Storage Bay–Supply Fan Alarm**

  or

- **Ajax Depot - MUA1-South Vehicle Bay-High CO Level Alarm**

  or

- **RHQ – CS-IT AC Unit 1 – Server Room – High Discharge Temp**

**Description field only has a limit of 64 characters.*

1.2 Alarm Message Text

.1 The Alarm Message Text field should convey specific instruction on what actions to take, who to contact (if applicable), etc. Most problems can be easily dealt with in a timely manner if a user or an operator sees instructions for an alarm on what to look for or what needs to be done or who to contact in case of equipment failure or critical readings of alarm levels, etc.

Examples:

- **Confirm supply fan operation. Check power at main & remote disconnect, fuses, high/low safety limits, belt, fire alarm contacts and controls (fan relay & current sensor).**

  or

- **Turn off any vehicles or gas-powered equipment running in the service bay and check ventilation system operation. Temporarily open garage door.**

  or

- **On the display of the AC Unit, take note of the alarm. Reset unit by pressing the 'Clear Alarm' button. Wait for alarm to clear and ensure good operation. Contact Facilities if alarm will not clear.**

1.3 Priority Levels (Current Configuration)

1 = Most Critical – Alarms at this priority should email Facility Maintenance, Site Managers, On-Call Personnel. These alarms are configured for critical equipment stoppage or failure or critical alarm level readings that will cause interruption or downtime to operations, loss of productivity or potential to damage property.

2 = (found some critical alarms configured to this)

3 = (found some critical alarms configured to this)

4 = (Undefined)

5 = (Undefined)

6 = (Undefined)

7 = (Undefined)

8 = RHQ Load Shed Status (Email to certain recipients)

9 = RHQ Bldg Recirc Mode (Email to certain recipients)

10 = RHQ Preventative Maintenance Notification

70 = System Default Alarm Priority (no email)

120 = System Default Warning Priority (no email)

200 = System Default Normal Priority (no email)

Regional Municipality of Durham

Network Standards

1.0 - Introduction

1.1 – Overview

The purpose of this document is to provide guidelines for network closet setup for the Region of Durham network and associated applications. The intent is to minimize the potential exposure to the Region of Durham from damages that may result from the incorrect installation of, and unauthorized use of Information Technology resources. Damages include the interruption of communications, loss of sensitive data, damage to public image, damage to critical Region of Durham computer systems, etc.

1.2 – Scope

This policy applies to all Region of Durham employees, contractors, consultants, temporary workers, and personnel affiliated with third parties utilizing network connectivity to access the Region of Durham network and systems for business purposes only.

1.3 – Audience

The information contained within this document is considered to be confidential and should only be disclosed to employees, partners and consultants who are involved in network closet construction activities.

2.0 - Definition and Implementation

2.1 – General

The data network is available to Region of Durham employees to provide access to perform business functions and for site-to-site communications.

2.1.1 All copper cabling installed will come with a minimum of 10 years manufacturer warranty, fibre optics and other miscellaneous equipment will have a minimum of 1 years manufacturer warranty

2.1.2 Unless otherwise specified, all equipment purchased must be brand new and in perfect condition

2.2 – Data Room requirements

2.2.1 Walls must be covered with fire retardant paint, or fire-resistant boards to be used

2.2.2 All concrete flooring must be sealed to prevent dust buildup

2.2.3 Minimum of 3 foot clearance on all sides of network racking equipment is required. Additional room may be required as per racking specification.

2.2.4 Entrance to room must be locked with security card access available. CS-IT staff only to be permitted access to room.

2.2.5 After construction work is completed, rooms will be cleaned and made free of dust, debris, and construction waste.

2.2.6 Any HVAC setpoints to be 21 degrees Celsius with approximately 50% humidity

2.3 – Data Racking Requirements

2.3.1 Option 1 – Full Cabinet

2.3.1.1 For use in scenarios where there will be multiple network switches, servers, VoIP equipment, firewalls or other security equipment, or if there are any other IT requirements indicated by CS-IT.
2.3.1.2 Cabinet model will be Tripp-Lite SR42UBWD
2.3.1.2.1 Doors front and back will use uniform key
2.3.1.2.2 Blanking plates will be used to cover all unused spaces and ensure air flow
2.3.1.2.3 M6 cage nuts to be installed in top and bottom hole per rack unit (center hole left empty)
2.3.1.3 Data room must be minimum 11’ lengthwise, 9’ widthwise in size
2.3.1.3.1 Additional racks must extend the width by 3’ per rack
2.3.1.4 Climate control is mandatory for this installation, to be determined by contractor with setpoints indicated as per item 2.2.6
2.3.1.5 Power:

~~2.3.1.5.1 2x 30 amp 208 v outlets to be provided with NEMA L6-3R outlets, as well as 2x APC AP8841 power distribution units~~

2.3.1.5.2 2x 20 amp 120v power outlets to be provided with NEMA 5-20R outlets, as well as 2x Tripp-Lite PDUMV20NET power distribution units

2.3.1.5.3 All power outlets to be mounted above the racks, no power cabling or their runs are to be mounted within the rack

2.3.1.6 Entrance to room must be locked with security card access available. CS-IT staff only to be permitted access to room.

2.3.2 Option 2 – Wall mount Rack

2.3.2.1 For use in scenarios where there are basic requirements for rackmountable equipment

2.3.2.2 Wall-mount rack unit will be Tripp-Lite SRW12US33 or Triplite SRW10US, (where server depth is not required)

2.3.2.3

2.3.2.4 Doors and Panels will use a uniform key

2.3.2.5 Blanking plates will be used to cover all unused spaces and ensure air flow

2.3.2.6 Data room must be 7’ lengthwise and 7’ widthwise in size

2.3.2.7 Wall mount must not be placed more than 4 feet off the ground for service access

2.3.2.8 Wall mount must be placed in such a way that it is able to swing open to its fullest extent

2.3.2.9 Climate control is mandatory for this installation, to be determined by contractor with setpoints indicated as per item 2.2.6

2.3.2.10 Two duplex receptacles or a single quad receptacle power outlet to be provided, with a total of 4x NEMA 5-15 plugs providing 120v 15a power service. The power outlet must be mounted on the wall beside the rack in such a way that it does not impede the rack when the rack is swung open.

2.3.2.11 Entrance to room must be locked with security card access available. CS-IT staff only to be permitted access to room.

2.3.3 Option 3 – Sundry

2.3.3.1 For use in scenarios where RoD is not the owner of the room. Location will have minimal requirements for rackmountable equipment.

2.3.3.2 Rack model will be R.F. Mote RFM-1911-WMB-22

2.3.3.3 Rack will not be mounted more than 4 feet off the ground

2.3.3.4 Will require floor space of 7’ lengthwise, 6’ widthwise

2.3.3.5 One duplex receptacle power outlet to be provided, with 2x NEMA 5-15 plugs providing 120v 15a power service. The power outlet must be mounted on the wall beside the rack.

2.3.4 Contractor Responsibilities

2.3.4.1 Contractor to follow the CS-IT racking design as issued

2.3.4.2 Contractor must install all cage nuts into rails

2.3.4.3 Contractor will mount cabling and patch panels into racks

2.3.4.4 Contractor to install miscellaneous equipment

2.3.4.5 Contractor to remove all left over equipment, dispose of any waste and ensure room is free of dust and debris

2.4 – Singlemode Cabling requirements

2.4.1 All singlemode cabling shall be fibre optic cable 9/125um OS2 and constructed with Belden optical fibre.

2.4.2 Outdoor cables shall be loose tube CMR (FT4) outdoor rated fibre optic cable.

2.4.3 Intra-building singlemode fibre optic backbone cables from the Building Entrance Facility (BEF) to the Telecommunications Room (TR) shall be a minimum twelve (12) strand cable unless otherwise specified by CS-IT.

2.4.4 Cable to be formed into groups of 12 fibres. Groups and individual fibres shall be identified in accordance with ANSI/EIA/TIA-598-A

2.4.5 Fiber optic cable groups shall be assembled to form a single compact core and covered by a protective sheath. The sheath shall consist of an overall jacket and one or more layers of dielectric material applied over the core.

2.4.6 The fibre optic connectors must be field installable connectors. The connectors shall be LC style UPC for both inter-building backbone cables and intra-building backbone cables.

2.4.7 All connectors are to meet ANSI/EIA/TIA and IEC standards for repeatability.

2.4.8 The connector shall be capable of terminating on either 900 micron tight-buffered cable, 3.0 mm jacketed fibres or 250 micron loose tube fibres. The connector shall also have a zirconia ceramic ferrule for both multimode and singlemode connectors and must have a locking feature to the coupler.

2.4.9 The connector shall provide a strain relief mechanism for installation on a single fibre.

2.4.10 The fibre within the body of the connector shall be isolated mechanically from cable tension bending and twisting as per ANSI/TIA-568-C.3.

2.4.11 Fibre optic patch panel manufactured by Belden to be provided where possible and shall be rack mountable in a 19” rack and black in colour.

2.4.12 The panels shall comply with ANSI/TIA-568-C.3 (connecting hardware section).

2.4.13 The fibre optic patch panel shall have a slide out shelf or swing out drawer for access to the fibre terminations, adapter panels for patching.

2.4.14 The fibre optic patch panel shall provide for bend radius control and use a strain relief to accommodate the fibre optic cables.

2.4.15 The fibre optic patch panel shall be capable of terminating tight buffered and loose tube multimode or singlemode fibre optic cables.

2.4.16 Belden dual fibre optic patch cords are to be singlemode 9/125um. Connector types on ends of patch cords to be determined by CS-IT.

2.4.17 Patch cords to be factory assembled and verified. Fiber patch cords shall comply with ANSI/TIA-568-C.3

2.4.18 The colour of the singlemode patch cords will be yellow. The length of the patch cords will be ten (10) feet or three (3) meters unless otherwise specified.

2.4.19 Fibre runs shall be labeled on both ends of patch panel with a general indication of where the fibre is terminated.

2.4.20 All cabling must be fully tested. Full test report must be provided to CS-IT.

2.5 – Multimode Cabling requirements

2.5.1 All multimode cabling shall be fibre optic cable 50/125um OM4 and constructed with Belden optical fibre.

2.5.2 Outdoor cables shall be loose tube CMR (FT4) outdoor rated fibre optic cable.

2.5.3 Intra-building singlemode fibre optic backbone cables from the Building Entrance Facility (BEF) to the Telecommunications Room (TR) shall be a minimum twelve (12) strand cable unless otherwise specified by CS-IT.

2.5.4 Cable to be formed into groups of 12 fibres. Groups and individual fibres shall be identified in accordance with ANSI/EIA/TIA-598-A

2.5.5 Fiber optic cable groups shall be assembled to form a single compact core and covered by a protective sheath. The sheath shall consist of an overall jacket and one or more layers of dielectric material applied over the core.

2.5.6 The fibre optic connectors must be field installable connectors. The connectors shall be LC style UPC for both inter-building backbone cables and intra-building backbone cables.

2.5.7 All connectors are to meet ANSI/EIA/TIA and IEC standards for repeatability.

2.5.8 The connector shall be capable of terminating on either 900 micron tight-buffered cable, 3.0 mm jacketed fibres or 250 micron loose tube fibres. The connector shall also have a zirconia ceramic ferrule for both multimode and singlemode connectors and must have a locking feature to the coupler.

2.5.9 The connector shall provide a strain relief mechanism for installation on a single fibre.

2.5.10 The fibre within the body of the connector shall be isolated mechanically from cable tension bending and twisting as per ANSI/TIA-568-C.3.

2.5.11 Fibre optic patch panel manufactured by Belden to be provided where possible and shall be rack mountable in a 19” rack and black in colour.

2.5.12 The panels shall comply with ANSI/TIA-568-C.3 (connecting hardware section).

2.5.13 The fibre optic patch panel shall have a slide out shelf or swing out drawer for access to the fibre terminations, adapter panels for patching.

2.5.14 The fibre optic patch panel shall provide for bend radius control and use a strain relief to accommodate the fibre optic cables.

2.5.15 The fibre optic patch panel shall be capable of terminating tight buffered and loose tube multimode or singlemode fibre optic cables.

2.5.16 Belden dual fibre optic patch cords are to be multimode 50/125um. Connector types on ends of patch cords to be determined by CS-IT.

2.5.17 Patch cords to be factory assembled and verified. Fiber patch cords shall comply with ANSI/TIA-568-C.3

2.5.18 The colour of the multimode patch cords will be Erika Violet. The length of the patch cords will be ten (10) feet or three (3) meters unless otherwise specified.

2.5.19 Fibre runs shall be labeled on both ends of patch panel with a general indication of where the fibre is terminated.

2.5.20 All cabling must be fully tested. Full test report must be provided to CS-IT.

2.6 Ethernet Cable Specifications

2.6.1 The installed cabling system must be a Belden Certified Network System and receive applicable warranty from manufacturer

2.6.2 All cabling shall confirm to transmission standards ANSI/EIA/TIA-568-C.2 and ANSI/EIA/TIA-568-C.3

2.6.3 Following Ethernet copper cabling to be used:

2.6.3.1 Belden 4813 Multi-Conductor - Enhanced Category 6 Nonbonded-Pair Cable, CAT6+ (400MHz), 4-Pair, U/UTP-Unshielded, Plenum-CMP, Premise Horizontal Cable, 23 AWG Solid Bare Copper Conductors, Dual FRPO/FEP insulation, X-Spline, Ripcord, Flamarrest® Jacket

2.6.4 A 3 meter service loop is required on both ends of any cable run

2.6.5 No individual cable run shall exceed 75 metres

2.6.6 All cabling shall be run in existing building cabling trays

2.6.7 Velcro cable ties shall be used. When used in areas considered environmental space, all bundling materials must be appropriately listed and plenum (FT6) or riser rated as per Ontario Building Code.

2.6.8 Following patch panel to be used where patch panels are necessary

2.6.8.1 Belden AX103253 Patch Panel

2.6.9 Client work area outlets must be installed at minimum 3 feet off of the ground unless specified by CS-IT

2.6.10 Wireless access points will be terminated in ceiling with Belden MDVO A0645271, surface mount

2.6.11 For data drops, the following modular jack will be used:

2.6.11.1 Belden AX101071 GIGAFLEX CAT6+ Modular Jack, RJ45, MDVO style, Blue

2.6.12 For wireless access points, the following modular jack will be used:

2.6.12.1 Belden AX101065 CAT6+ Modular Jack, RJ45, MDVO style, White

2.6.13 One data port shall be terminated at each desk/workstation unless otherwise requested

2.6.14 All patch cabling to be provided by contractor:

2.6.14.1 One Belden C601106001 (1 foot blue patch cable) to be provided for every data port terminated in data room

2.6.14.2 One Belden C601105004 (4 foot green patch cable), one C601105007 (7 foot green patch cable) to be provided for every data port terminated at a desk

2.6.14.3 One Belden C601105010 (10 foot green patch cable) to be provided for every port in work areas not located at a desk

2.6.14.4 Two Belden C601109001 (1 foot white patch cable) to be provided for every cable run installed for wireless access points

2.6.15 Ethernet drops to be labeled on both the patch panel and in the work area as follows:

2.6.15.1 In locations where there are multiple data rooms, the first character will indicate the floor number, the second character to indicate the cardinal direction of the network closet in comparison to the centre of the building, the third character being a dash, and the fourth through sixth characters indicating a cable number which increments per drop run. If there are existing cable numbers in the network closet, the label must start at the highest current existing number.

2.6.15.2 In locations where there is only a single data room, the first through third character will indicate a cable number which increments per drop run.

2.6.15.3 Hand written labels will not be accepted.

2.6.15.4 Cabling labels shall be made of materials designed to outlast the cabling elements to which they attach. Office quality labels will not be accepted.

2.6.16 All copper cabling must be fully tested to satisfy Category 6 copper requirements as per ANSI/TIA 568 C.2 specification. Full test report must be provided to CS-IT.

2.7 Wireless Access Points

2.7.1 All wireless access point cabling shall be performed as per Ethernet cable specification in 2.6

2.7.2 Access points are to be installed in the ceiling and not side-mounted on walls unless otherwise specified by CS-IT

2.7.3 Access points are not to be installed in locations where they are shadowed by metal structures, including HVAC or venting

2.7.4 Access point mounting equipment to be provided by CS-IT

3.0 - Responsibilities/Parties Involved

3.1 – Policy Content Owner

The Manager of Enterprise Technology is the content owner, and is responsible for the creation and on-going maintenance of this document.

3.2 – Compliance

- Individuals involved with network setup, data cabling, and data room construction are expected to familiarize themselves with this policy and consistently comply with it throughout their daily business activities.
- CS-IT will review work completed and report any compliance violations for remediation.

4.0 - Waivers

Waivers to any provision of this document must be approved by the Manager of Enterprise Technology and the requesting department's management.

5.0 - Review Process

This policy and any associated procedures and standards will be reviewed annually. A detailed report which includes the relevance of the policy and compliance to the provisions of the policy will be generated. Such a review should verify that the policy is consistent with Regional practices and that it is achieving its intended purpose.

Regional Municipality of Durham
Corporate Policy and Procedures Manual

Title: Security Services Installation and Security System Standards	**Guideline #: 1.01**
Approved By: Security Services Supervisor	**Page #: 1 (of 5)**
Issued: May 10, 2019	**Revised: December 16, 2019**
Responsibility: Facilities Maintenance and Operations	**Section: Security Services**

1. Purpose

To provide a detailed guideline for the installation of security systems and a set of standards for the equipment to be used in the installation of security systems in Regional facilities.

2. Technical Abbreviations

AC	Alternating Current
AMP	Ampere
CAD	Computer Aided Drawing
CCTV	Closed Circuit Television
CRI	Color Rendering Index
DVR	Digital Video Recorder
EOL	End of Line
GSM	Global System for Mobile
HSCIP	High Security Communication Internet Protocol
IP	Internet Protocol
LCD	Liquid Crystal Display
MAC	Media Access Control
NAR	Nuisance Alarm Rates
NC	Normally Closed
NO	Normally Open
PD	Probability of Detection
PPS	Physical Protection System
PSS	Physical Security System
SMTP	Simple Mail Transfer Protocol

UPS	Uninterruptable Power Supply
WAN	Wide Area Network

3. General Guidelines

Product Selection

Where products are not specified, proposed products must be confirmed with Security Services for suitability and compatibility prior to procurement. Proposed products should be high quality, industry standards with a proven track record of reliability and be quickly and easily obtainable from multiple sources to reduce downtime in the event repairs. They need to minimize nuisance alarm rates (NAR) while maintaining a high probability of detection (PD). Any quality manufacturer should have PD and NAR rates readily available for all their sensor products.

Existing Security System

Any addition or renovation to a facility that has a pre-existing security system needs to ensure compatibility and tie-in with the existing system. If the existing system is not compatible due to the age of the system, upgrading of the existing system needs to be coordinated with the new project.

Cabling

Controllers and devices should be wired neatly. Cables should have enough slack to allow for restriping and terminating the cables in the event of hardware changes while not leaving so much slack as to overburden the enclosure. Cables should be run at 90 degrees with an appropriate amount of cable tie-down points. Care should be taken to not “drape” cables across control boards.

Cable run through ceilings should be in conduit or in a cable tray. If that is not possible, then the cable must be plenum-rated and suspended so it does not lie on the ceiling. The method of suspension cannot affect the ability to pull new cable (i.e. “J” hooks are acceptable; tie-wrapping cable to drop ceiling support wires is not).

All devices should be installed and wired as per manufacturer’s specification. All cable should be supplied, installed and terminated according to manufacturer’s specification.

Any cable run through a new, or existing, fire separation must be sealed as per current fire code.

Cable run outside of the data room needs to be protected from tampering using metal conduit, PVC conduit, cable armoring, etc.

Hardware

Enclosures containing major components should have all components labeled. The label should contain the type of equipment, serial number, and zone range, if applicable. The label

should be made of laminated plastic 1/8" thick, white with a black centre core. They should be a minimum of 1" X 3" with minimum ¼" high engraved block lettering.

Ladders

Access ladders should be enclosed below 12 feet to prevent climbing by unauthorized personal. Ladder covers should be monitored with contacts to notify Regional staff in the event of unauthorized access. Care should be taken to not run other services near the ladder to prevent individuals from bypassing the enclosure.

Door Hardware

Door hardware appropriate for the specific environment must be used. This is especially important in areas where the hardware will be exposed to chemicals that will accelerate the corrosion process.

Network Connection

Any device that will be connected to the Region of Durham network needs to be coordinated well in advance with Corporate Services – Information Technology (CS-IT). Typically, they require **30 days' notice**, need media access control (MAC) addresses for all the hardware to be installed on site and will provide the range of IP addresses to be used.

Warranty

The warranty period for all items should be 2 years, inclusive of parts and labour.

4. Access Control and Intrusion System

Power

All AC power should be hard-wired on a dedicated 15 Amp circuit, no additional cord and plug connected device(s) should be allowed.

Backup batteries for both main control panels and access door controllers should be 12V 7Ah and be labeled with the month and year of installation.

All devices in the field should have a numerical label indicating the zone number or door number.

Security System

The Region of Durham currently uses Verex Director to control and program our sites. Verex Director is an Interlogix product. Interlogix has discontinued the Verex product line as of January 1st, 2020. Many integrators have stock piled parts for these systems and Verex continues to support the product line. If a winning bidder has available Verex products the standard process should be followed. If parts are not available refer to the section after standard installation.

Standard Installation

The security integrator will be responsible for testing the complete system on site using test users which they will program locally. Once the local testing is complete the security integrator will supply a complete system configuration file (in Excel spreadsheet or similar format) to Security Services, who will program the site in the Regional server.

The main control panel must be an Interlogix Verex Monitor XL panel with feature expansion board and worldwide modem running the most recent firmware version.

For connection back to headquarters for programming a high security communicating IP module is required where there is an available Region of Durham wide area network (WAN) connection. Where no WAN is available a Cisco cellular router should be installed to facilitate the connection. These routers can be ordered through the Region of Durham procurement contracts. Telephony and CSIT will need to be involved to properly setup the device prior to installation on site.

If the site is to be monitored, a global system for mobile (GSM) unit needs to be installed for backup communications. The current GSM unit is model #DSC 3G4010, a newer model should be installed if available.

Non-Standard Installation

In the event a winning bidder cannot provide the required Verex Interlogix parts to make a functional system, they may propose an alternate product. Alternate products need to fulfill the following functional requirements:

Main Control Panel

- Minimum 240,000 cardholder capacity
- Minimum 50,000 transaction buffer
- Networked for programming and monitoring
- Support of RS-485 for communications BUSS
- Support of 36bit and 40bit Wiegand, up to 64bit cardholders
- Minimum support of 500 inputs and 500 outputs
- Minimum support for 64 individual reader devices
- Anti-pass back support
- Must be an industry standard off-the-shelf product
- Must be ULC Certified

- Input points must be capable of being configured in all industry standard formats, including use of end-of-line resistors

Control Software

- Control Software must run in a Virtual Server Environment
- Must be an enterprise level solution
- Must be an industry standard off-the-shelf solution
- Must support customizable access groups with the ability to add individual access points in addition to the standard set, as required
- Must use a unified database for the access control and intrusion sensors
- Must support individual user identification as well as personal identification numbers
- System must support silent duress notification
- Client software must run in a Windows 10 environment
- Must support Boolean logic statement design for custom event management
- Mobile app support for alarm notification and system control
- Full reporting options including the option to export into an excel spreadsheet format
- Must use a master user system, where different site authorities are assigned to the user, it can NOT use the old system of individually adding users to every different site

Door Controllers, Modules, Readers and Keypads

Standard Installation

Access control doors should use Interlogix Verex Monitor XL door controllers in appropriately sized enclosures with hard-wired power, running the latest firmware.

Point expansion modules must be Interlogix Verex Monitor XL Enhanced I/O Expander with VBUS I/O running the most recent firmware.

Sites that require elevator floor control must use the Interlogix Verex Monitor XL Elevator Control Package in an appropriately sized enclosure running the most recent firmware.

Card readers should be Interlogix Verex G-Prox III, non-proprietary. They can be switch-plate or mullion mount, standard reader or arming station.

LCD Keypads are required to be Interlogix Verex Monitor XL LCD Keypad Plus, gray in colour.

Non-Standard Installation

- Door controllers should be appropriate for the main control panel specified
- Readers and Arming Station must be able to read 36bit and 40bit Wiegand access credentials
- Keypads should be LCD keypads appropriate for the control panel specified

Contacts and Motion Detection

Concealed door contacts should be 1” diameter 3-wire, capable of being wired as normally closed (NC) or normally open (NO) with an end of line (EOL) resistor. It should be installed in the field NO with the EOL resistor at the device. Gap distance in a steel frame should be no more than ½” and in a wooden frame, no more than 1”. In a steel door with a recessed trough on the top edge, it is acceptable to use a rare earth magnet in compression housing. If the door has access control, the contact should be wired back to the door controller.

Surface contacts should be capable of being wired as NC or NO with an EOL resistor. It should be installed in the field NO with the EOL resistor at the device. Gap distance should be no more than ¾”.

Overhead door contacts should be capable of being wired as NC or NO with an EOL resistor. It should be installed in the field NO with the EOL resistor at the device. Gap distance should be between 2” and 6”. Ideally, they should be installed on top of the door, but may be floor mounted if necessary due to door design. The tail on the overhead door contact must be armored.

Motion detectors should be dual-tech at a minimum, using passive infra-red and microwave detection. The sensors should have the pet immunity and tamper detection functions available. They should be able to be wired NC or NO/EOL. It should be installed in the field NO/EOL with the resister at the device and running through the tamper loop. Care should be taken when selecting the mounting location to reduce the risk of false alarm from heat sources.

Glassbreak detectors should have sensitivity adjustments to account for room acoustics and be adequate for the area to be covered. They should be able to be wired NC or NO/EOL and have tamper detection. It should be installed in the field NO/EOL with the resister at the device and running through the tamper loop.

Door Strikes and Locks

Electric door strikes (mortise or RIM type) should be fail-secure by default. Fail-safe strikes should only be used where they are placed in an evacuation route which requires the door to be swung in. If the door swings out, a fail-secure strike shall be used with free egress door

hardware. If a fail-safe device is used it must not be hooked up to backup battery power and should have a current limiting device to reduce heat. They should operate on 12V DC power. In-rush current should not exceed one ampere (1A) and holding current should not exceed 500 milliampere (mA). The actuating solenoid should move from the fully secure position to the fully open position in not more than 500 milliseconds (ms). The strike selected should be appropriate for the size and weight of the door and the mechanism should be encased in a hardened guard barrier to deter forced entry.

Electromagnetic locks should be avoided where possible. If required for a specific application, it should contain no moving parts and generate at least 1,200 lbs. (544 kgs) of holding force. It must release in the event of a power failure or fire-alarm and should have no back-up power. It should operate on 12V DC power and contain internal circuitry to eliminate residual magnetism and inductive kickback. It should not dissipate more than 12 watts and the holding current should be no greater than 500mA. It should go from the fully secure to fully released state in no greater than 300ms. The electromagnetic locking mechanism should be encased in a hardened guard barrier to deter forced entry. Installation shall follow the local jurisdiction having authority.

Panic/Holdup Devices

Bell or Alarm boxes should be mounted in a highly visible area high enough to be out of easy reach. The enclosure should be monitored for tampering with a supervised tamper switch.

Panic/Holdup buttons should be Potter momentary buttons (part # HUB-M) wired NO with an EOL resistor at the device.

Door release buttons should be RCI rocker switches (part # 909S-MO) wired NO with an EOL resistor at the device.

Automatic request to exit devices should be motion activated with adjustable detection area, adjustable sensitivity and built in LED indicators. It should have tamper protection, run on 12V DC and have an adjustable relay timer. The device should be wired NO with an EOL resistor at the device.

Wireless panic/holdup receivers should be Visonic (part # mcr-304). When installed the device should be wired to monitor low battery and tamper alarms.

Wireless panic/holdup pendants should be Visonic (part # mct-201-wp).

This is by no means a complete list of all possible devices but covers standard installation products. Specialized products or applications need to be reviewed on a case by case basis.

5. Video Surveillance System

The Region of Durham uses the Digital Watchdog Spectrum Video Management System (VMS), which is a scalable system. The camera load at a specific facility will determine the type and size of recording and control hardware.

All network cable used for the video surveillance system needs to be RED Cat6 FT6 cable labeled at both ends. All connectors should have flexible rubber boots. Excess cable at the head end should be kept to a minimum, with enough cable left for routing and re-terminating if necessary. Coils of spare cable should not be left behind unless specifically requested.

All video network connections should terminate on dedicated video switches. Systems that have 6 cameras or less should have Vivotek AW-GEV-104A-130 switches (or most recent model). Systems that have greater than 6 cameras should have Vivotek AW-GEV-264A-370 switches (or most recent model).

The uninterruptable power supply (UPS) installed should be capable of handling the load from the switches and NVR for a period of no less than 30 minutes. The UPS needs to be able to transmit simple mail transfer protocol (SMTP) notification from its own on-board network interface card and be able to have its batteries services while in operation. UPS shall be an Xtreme Power P80 1500VA model with optional simple network management protocol (SNMP) notification card.

Equipment

Head-end equipment (NVR, Switches, UPS, Local Monitors, etc.) should be housed in an appropriately-sized lockable rack with proper venting.

All devices shall be programmed with user names and passwords supplied by the Security Services department. No devices shall have default login and passwords left enabled.

The system will need to record all cameras 24 hours per day, at 10 frames per second for 30 days. The system will also need to handle an additional 50% camera load for future expansion, no system should be installed running at maximum capacity.

Cameras

- Spot monitors required for up to 16 cameras to be displayed should use the Senstar Thin Clint 10D or equivalent. If more than 16 cameras need to be displayed on a spot monitor an independent client computer should be used.

- Standard interior fixed view camera should be Vivotek FD9167-HT (or most current version), or equivalent running the most recent firmware.

- Standard exterior fixed camera should be Vivotek FD9367-HTV (or most current version), or equivalent running the most recent firmware.

- Standard 180’ fisheye camera should be Vivotek CC8370-HV (or most recent version), or equivalent running the most recent firmware.

- Standard PTZ camera should be Vivotek SD9364-EHL (or most recent version), or equivalent running the most recent firmware.

- Standard 360’ camera should be Vivotek FE9382-EHV (or most recent version), or equivalent running the most recent firmware.

Mounting hardware for all exterior cameras needs to be sized appropriately in order to account for maximum wind and ice loads expected at the site.

Cameras should be configured with appropriate annotations. The NVR should be configured with required cameras layouts and any required camera tours.

All cameras should be properly focused and aimed to provide required views.

6. High Security Locks & Keys

The Region of Durham uses the Mul-T-Lock 3-in-1 high security lock system and owns its own patented keyway. The constructor can use one of our authorized lock installers to perform the work or their own certified Mul-T-Lock installer. If they are going to use their own installer the lock and key order has to be authorized by the Security Services Department before Mul-T-Lock will release the product.

The consultant or project manager will provide layout drawings and door hardware schedules to the Security Services Department who will determine the lock coding for each door and keys required (2 per cylinder). An e-mail will be sent to the locksmith and Mul-T-Lock representative, authorizing release of the indicated products.

Once the locksmith receives the keys and hardware, the products will be turned over to Security Services for distribution prior to scheduling the lock installation.

Offices should be keyed to the Region’s standard Schlage office key system.

If a high-security key cabinet is required it shall be the Morse Watchmans KeyWatcher Touch system with card reader access control, large cabinet enclosure with enough internal key control modules.

7. Timelines for System Integration and Programming

High security locks and keys from Mul-T-Lock take an average of 8 weeks to arrive once the order has been authorized. Additional distribution and programming of the key database means these items should be **ordered at least 3 months prior to occupancy**.

The security system configuration files from the integrator should be received by Security Services no less than **30 days prior to occupancy** for programming.

Information required for monitoring, including special alarm response instruction and call lists need to be provided to Security Services **no less than 14 days prior to occupancy**.

Network devices need to be active and correctly programmed on site for Security Services to program the systems. Delays due to coordination issues with CS-IT will result in the system not being functional.

8. Project Close Out

Camera views and all security system components must be confirmed by Security Services during project close out. The warranty period for any installed items shall not commence until Security Services has signed the Security Services Installation Checklist, acknowledging security system functionality.

9. Inquiries

For further information regarding this guideline, contact Security Services.

Project: DURHAM DENTAL #20104

Panelboard: RP-A
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
1	LIGHTING	20	1		2	HUMIDIFIER H-1	30	3
3	LIGHTING	20	1		4			
5	MAINTENANCE GFI RECEPTACLE (RM)	20	1		6			
7	HOUSEKEEPING	20	1		8	HWT-2	20	1
9	EF-3/4/6/7	15	1		10			
11					12			
13	MOJAVE V5	30	2		14	COMPRESSOR ROOM FRIDGE	20	1
15					16	O&N CLOSET RECEPTACLE	20	1
17	AS50	30	2		18	O&N CLOSET RECEPTACLE	20	1
19					20			
21	AS30	20	2		22			
23					24			
25	ASTA-5	15	2		26	CUSTODIAL GFI RECEPTACLE	20	1
27					28	HWT-1	15	1
29					30	HUMIDIFIER H-2	15	1
31	VAV-33	15	2		32	WOMEN'S W/R SINK SENSOR	15	1
33					34	WOMEN'S W/R TOILET SENSOR	15	1
35	MEETING ROOM OFFICE GROUP	20	1		36	WOMEN'S W/R GFI RECEPTACLE	20	1
37	MEETING ROOM OFFICE GROUP (PL)	20	1		38	MEN'S W/R GFI RECEPTACLE	20	1
39	MEETING ROOM OFFICE GROUP	20	1		40	MEN'S W/R SINK SENSOR	15	1
41	MEETING ROOM OFFICE GROUP (PL)	20	1		42	MEN'S W/R TOILET/URINAL SENSOR	15	1

Project: DURHAM DENTAL #20104

Panelboard: RP-A
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
43	MEETING ROOM FLOOR GROUP	20	1		44			
45	MEETING ROOM FLOOR GROUP (PL)	20	1		46			
47	MEETING ROOM TV	20	1		48			
49	BBH-7	15			50	DISHWASHER	40	
51			2		52			2
53	BBH-8/BBH-9	20			54	KITCHEN GFI RECEPTACLE	20	1
55			2		56	KITCHEN GFI RECEPTACLE	20	1
57	FFH-2	15			58	KITCHEN GFI RECEPTACLE	20	1
59			2		60	KITCHEN GFI RECEPTACLE	20	1
61	VESTIBULE V02 DOOR OPERATOR	15	1		62	KITCHEN GFI RECEPTACLE	20	1
63					64	DRYER	30	
65					66			2
67					68	WASHER	20	1
69					70	VAV-30	15	
71					72			2
73	SPARE	15	1		74			
75	SPARE	15	1		76	CONTROLS	15	1
77	SPARE	15	1		78	CONTROLS	15	1
79	SPARE	20	1		80	CONTROLS	15	1
81	SPARE	20	1		82	CONTROLS	15	1
83	SPARE	20	1		84	CONTROLS	15	1

Project: DURHAM DENTAL #20104

Panelboard: RP-B
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
1					2	OPERATORY 1 AIR PURIFIER	20	1
3	DOOR OPERATOR	15	1		4	OPERATORY 1 MISC.	20	1
5	MAINTENANCE GFI RECEPTACLE (RM)	20	1		6	OPERATORY 1 CHAIR	20	1
7					8	OPERATORY 1 X-RAY MACHINE	20	1
9	AC-2/AC-3	15			10	OPERATORY 1 COUNTER RECEPTACLES	20	1
11			2		12	OPERATORY 1 CHAIR LIFT	15	1
13	VAV-15	15			14	VAV-13	30	
15			2		16			2
17					18			
19					20	OPERATORY 2 / 3 MISC.	20	1
21					22	OPERATORY 2 CHAIR	20	1
23					24	OPERATORY 2 X-RAY MACHINE	20	1
25					26	OPERATORY 2 COUNTER RECEPTACLES	20	1
27					28	OPERATORY 2 AIR PURIFIER	20	1
29					30			
31					32	VAV-17	15	
33	CONTROL CCT	15	1		34			2
35	CONTROL CCT	15	1		36	OPERATORY 3 AIR PURIFIER	20	1
37	CONTROL CCT	15	1		38	OPERATORY 3 CHAIR	20	1
39	CONTROL CCT	15	1		40	OPERATORY 3 X-RAY MACHINE	20	1
41	CONTROL CCT	15	1		42	OPERATORY 3 COUNTER RECEPTACLES	20	1

Project: DURHAM DENTAL #20104

Panelboard: RP-B
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
43	OPERATORY 4 COUNTER RECEPTACLES	20	1		44	OPERATORY 7 COUNTER RECEPTACLES	20	1
45	OPERATORY 4 / 5 MISC.	20	1		46	OPERATORY 7 X-RAY MACHINE	20	1
47	OPERATORY 4 X-RAY MACHINE	20	1		48	OPERATORY 7 CHAIR	20	1
49	OPERATORY 4 CHAIR	20	1		50	OPERATORY 7 AIR PURIFIER	20	1
51	OPERATORY 4 AIR PURIFIER	20	1		52	VAV-25	15	2
53	VAV-19	15			54			
55			2		56			
57	VAV-21	15			58			
59			2		60	PAN. 116 X-RAY MACHINE	20	3
61	OPERATORY 5 X-RAY MACHINE	20	1		62			
63	OPERATORY 5 COUNTER RECEPTACLES	20	1		64			
65	OPERATORY 5 CHAIR	20	1		66	PAN. 116 OFFICE GROUP	20	1
67	OPERATORY 5 AIR PURIFIER	20	1		68	PAN. 116 OFFICE GROUP	20	1
69	VAV-23	20			70	EF-5	15	1
71			2		72			
73	OPERATORY 6 / 7 MISC.	20	1		74			
75	OPERATORY 6 X-RAY MACHINE	20	1		76			
77	OPERATORY 6 COUNTER RECEPTACLES	20	1		78	HOUSEKEEPING	20	1
79					80	SPARE	20	1
81	OPERATORY 6 CHAIR	20	1		82	SPARE	20	1
83	OPERATORY 6 AIR PURIFIER	20	1		84	SPARE	20	1

Project: DURHAM DENTAL #20104

Panelboard: RP-C
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
1	LIGHTING	20	1		2	DOOR OPERATOR	15	1
3	LIGHTING	20	1		4	DOOR OPERATOR	15	1
5					6			
7					8	UNIVERSAL W/R DURESS/LOCK/DOOR OPERATOR	15	1
9					10	UNIVERSAL W/R EF-1 / EF-2	15	1
11	WAITING AREA TV	20	1		12	UNIVERSAL W/R GFI RECEPTACLE	20	1
13	WAITING AREA TV	20	1		14	UNIVERSAL W/R CHANGE TABLE	20	1
15	FFH-1	15			16			
17			2		18			
19	BBH-1/BBH-2/BBH-3	20			20			
21			2		22			
23	BBH-4/BBH-5/BBH-6	20			24			
25			2		26	ADMINISTRATION 104 OFFICE GROUP	20	1
27					28	ADMINISTRATION 104 OFFICE GROUP	20	1
29					30	ADMINISTRATION 104 OFFICE GROUP	20	1
31	RECEPTION BACK WALL	20	1		32	ADMINISTRATION 104 OFFICE GROUP	20	1
33	RECEPTION DESK	20	1		34	CONSULT ROOM 1	20	1
35	RECEPTION DESK	20	1		36	CONSULT ROOM 2	20	1
37	AED	20	1		38	OFFICE 3	20	1
39					40	OFFICE 1	20	1
41	COPY AREA RECEPTACLE	20	1		42	OFFICE 2	20	1

Project: DURHAM DENTAL #20104

Panelboard: RP-C
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
43	COPY AREA RECEPTACLE (PL)	20	1		44			
45	COPY AREA RECEPTACLE (PL)	20	1		46	AREA 111 WORKSTATIONS	15	1
47	COPY AREA RECEPTACLE	20	1		48	AREA 111 WORKSTATIONS	15	1
49	AREA 111 PRINTER	20	1		50	AREA 111 WORKSTATIONS	15	1
51	AREA 111 WORKSTATIONS	15	1		52	AREA 111 WORKSTATIONS	15	1
53	AREA 111 WORKSTATIONS	15	1		54			
55					56	AREA 111 WORKSTATIONS	15	1
57	AREA 111 WORKSTATIONS	15	1		58	AREA 111 WORKSTATIONS	15	1
59	AREA 111 WORKSTATIONS	15	1		60			
61	AREA 111 WORKSTATIONS	15	1		62	AREA 111 WORKSTATIONS	15	1
63	AREA 111 WORKSTATIONS	15	1		64	AREA 111 WORKSTATIONS	15	1
65					66			
67					68	PHONE RM 1 & 2 OFFICE GROUP	20	1
69	AREA 111 WORKSTATIONS	15	1		70			
71	AREA 111 WORKSTATIONS	15	1		72			
73	AREA 111 WORKSTATIONS	15	1		74			
75	AREA 111 WORKSTATIONS	15	1		76	HOUSEKEEPING	20	1
77					78	HOUSEKEEPING	20	1
79	SPARE	15	1		80	SPARE	20	1
81	SPARE	15	1		82	SPARE	20	1
83	SPARE	15	1		84	SPARE	20	1

Project: DURHAM DENTAL #20104

Panelboard: RP-D
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
1	STERILIZATION ROOM RECEPTACLE	20			2	DENTURIST COUNTER RECEPTACLE	20	1
3			2		4	DENTURIST COUNTER RECEPTACLE	20	1
5	STERILIZATION ROOM RECEPTACLE	20			6	DENTURIST COUNTER RECEPTACLE	20	1
7			2		8	DENTURIST COUNTER RECEPTACLE	20	1
9	STERILIZATION ROOM RECEPTACLE	20			10	DENTURIST COUNTER RECEPTACLE	20	
11			2		12			2
13	STERILIZATION ROOM RECEPTACLE	20			14	DENTURIST COUNTER RECEPTACLE	20	1
15			2		16	DENTURIST COUNTER RECEPTACLE	20	1
17	STERILIZATION ROOM RECEPTACLE	20			18	DENTURIST COUNTER RECEPTACLE	20	1
19			2		20	DENTURIST COUNTER RECEPTACLE	20	1
21	STERILIZATION ROOM RECEPTACLE	20			22	DENTURIST COUNTER RECEPTACLE	20	1
23			2		24	DENTURIST COUNTER RECEPTACLE	20	
25	STERILIZATION ROOM RECEPTACLE	20	1		26			2
27	STERILIZATION ROOM RECEPTACLE	20	1		28	DENTURIST MISC.	20	1
29	STERILIZATION ROOM RECEPTACLE	20	1		30	DENTURIST MISC.	20	1
31	STERILIZATION ROOM RECEPTACLE	20	1		32			
33	STERILIZATION ROOM RECEPTACLE	20	1		34			
35	STERILIZATION ROOM RECEPTACLE	20	1		36			
37	STERILIZATION ROOM RECEPTACLE	20	1		38	DC BATTERY/NIGHT LIGHTING	15	1
39					40			
41					42			

Project: DURHAM DENTAL #20104

Panelboard: RP-D
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
43	TIME CLOCK - EF	15	1		44	C01 RECEPTACLE	20	1
45					46	C01 RECEPTACLE	20	1
47					48	C02 RECEPTACLE	20	1
49					50	C02 RECEPTACLE	20	1
51					52	ELEC/IT ROOM MISC	20	1
53					54	ELEC/IT ROOM SECURITY	20	1
55					56	ELEC/IT ROOM SECURITY	20	1
57					58	BBH-10	15	
59					60			1
61					62	Intrusion System	15	1
63					64			
65					66			
67					68			
69					70			
71					72			
73					74			
75					76			
77					78			
79					80			
81					82			
83					84			