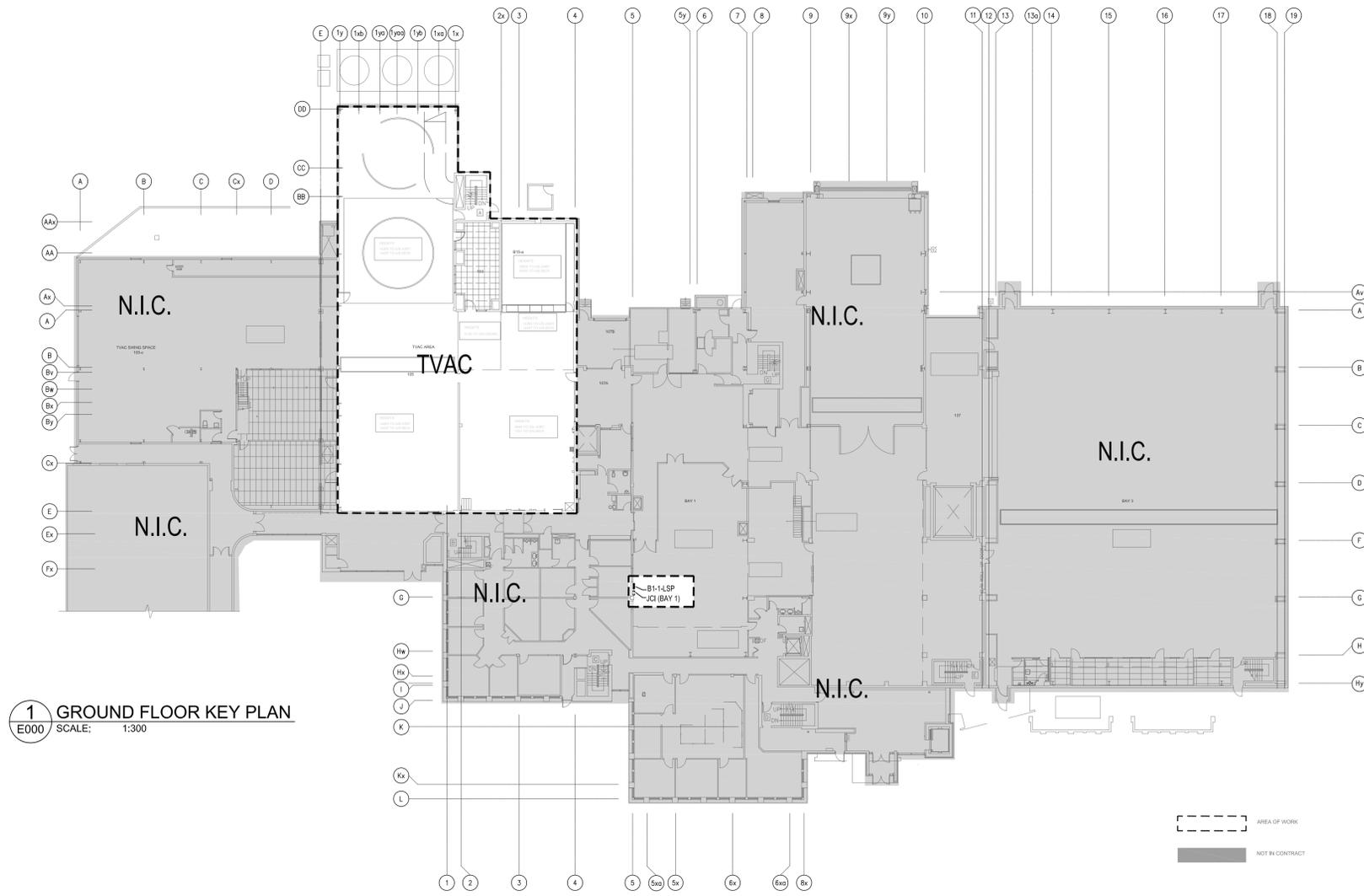


**ISSUED FOR TENDER**  
**JULY 2016**

**DAVID FLORIDA LABORATORY**  
**LIGHTING ENERGY EFFICIENCY UPGRADE**  
**PHASE II - TVAC GROUND FLOOR**  
**BUILDING 65, SHIRLEY'S BAY**

JOSÉE BERGERON  
Director, Security & Facilities

M. FARID, P. Eng.  
Manager, Building Operations & Security



**1** GROUND FLOOR KEY PLAN  
E000 SCALE: 1:300

DRAWING LIST	
ELECTRICAL	
DRAWING #	DRAWING TITLE
E000	TITLE, KEY PLAN, LEGEND AND DRAWING LIST
E001	SPECIFICATIONS
E002	DEMOLITION AND NEW LIGHTING AND CONTROLS LAYOUT
E003	DEMOLITION AND NEW POWER LAYOUT AND SCHEDULES
E004	CONTROL DETAILS

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No.	Revision	Date
1.	ISSUED FOR TENDER	JULY 2016

PROFESSIONAL STAMP

LICENCED PROFESSIONAL ENGINEER  
M. MANSOUR  
100138114  
PROVINCE OF ONTARIO

PROJECT IDENTIFICATION

A: detail no., no. du détail  
B: location drawing no., sur dessin no.  
C: drawing no., dessin no.

**ELECTRICAL LEGEND**

- LIGHTING LEGEND**
- EXISTING HID HI-BAY FIXTURE
  - EXISTING FLUORESCENT HI-BAY FIXTURE
  - EXISTING FLUORESCENT FIXTURE, SURFACE-MOUNTED
  - EXISTING FLUORESCENT FIXTURE, SUSPENDED
  - EXISTING FLUORESCENT FIXTURE, WALL-MOUNTED
  - EXISTING 610 X 1220mm FLUORESCENT FIXTURE, RECESSED (LAY-IN TILE)
  - EXISTING 610 X 610mm FLUORESCENT FIXTURE, RECESSED (LAY-IN TILE)
  - EXISTING EXIT LIGHT
  - EXISTING EXIT LIGHT WITH INTEGRAL BATTERY AND DOUBLE HEADS

- LIGHTING LEGEND (CONT'D)**
- NEW LED HI-BAY FIXTURE, 6-BARS
  - NEW LED HI-BAY FIXTURE, 4-BARS
  - NEW LED HI-BAY FIXTURE, 3-BARS
  - NEW LED FIXTURE, WALL-MOUNTED
  - NEW LED FIXTURE, RECESSED (LAY-IN TILE TYPE)
  - NEW EXIT LIGHT
  - NEW BATTERY AND DOUBLE REMOTE HEADS

REFER TO FIXTURE SCHEDULE

**LIGHTING CONTROLS LEGEND**

- EXISTING LINE VOLTAGE TOGGLE SWITCH
- EXISTING LINE VOLTAGE 3-WAY TOGGLE SWITCH
- EXISTING LOW VOLTAGE SWITCH
- EXISTING LINE VOLTAGE SENSOR SWITCH
- NEW LOW VOLTAGE, 2-BUTTON SCENE SWITCH
- NEW LOW-VOLTAGE, 5-BUTTON SCENE SWITCH
- NEW LOW VOLTAGE OCCUPANCY SENSOR
- NEW 0-10V DIMMING LIGHTING CONTROLLER
- EXISTING JCI (JOHNSON CONTROLS INC.) BOX

**DISTRIBUTION LEGEND**

- 347/600V 3Ø/4W DISTRIBUTION PANEL
- 120/208V 3Ø/4W DISTRIBUTION PANEL
- JUNCTION BOX
- DISCONNECT
- DRY-TYPE TRANSFORMER

**ABBREVIATIONS**

- AFF ABOVE FINISHED FLOOR
- C/W COMPLETE WITH
- N NEW
- R INDICATES ITEM TO BE REMOVED/DEMOLISHED
- U/S UNDERSIDE
- EMERG. INDICATES UNSWITCHED NIGHTLIGHTING FIXTURE

**GENERAL SYMBOLS LEGEND**

- DRAWING NOTE REFERENCE

**IDENTIFICATION LEGEND**

- ZONE 1 LIGHT FIXTURE IDENTIFICATION
- ZONE IDENTIFICATION
- FIXTURE TYPE
- ZONE 3 LIGHTING ZONE IDENTIFICATION
- ZONE NUMBER
- ZONE DESCRIPTION
- SOURCE PANEL AND CIRCUIT NUMBER
- OUTLINE OF CONTROL ZONE
- LOW VOLTAGE SWITCH IDENTIFICATION
- ZONE CONTROLLED BY SWITCH
- SWITCH TYPE (NO NUMBER INDICATES SINGLE BUTTON)
- LINE VOLTAGE SWITCH IDENTIFICATION
- SOURCE PANEL AND CIRCUIT NUMBER
- INDICATES 3-WAY (BLANK INDICATES STANDARD)
- SCHEMATIC LINE - INDICATES FIXTURES CONTROLLED BY SWITCH

**LINE TYPE LEGEND**

- EXISTING
- EXISTING TO BE REMOVED
- NEW
- LOW VOLTAGE CONTROLS WIRING

project  
DAVID FLORIDA LABORATORY  
BUILDING No. 65, SHIRLEY'S BAY, ONTARIO  
LIGHTING ENERGY EFFICIENCY UPGRADE  
PHASE II - TVAC GROUND FLOOR

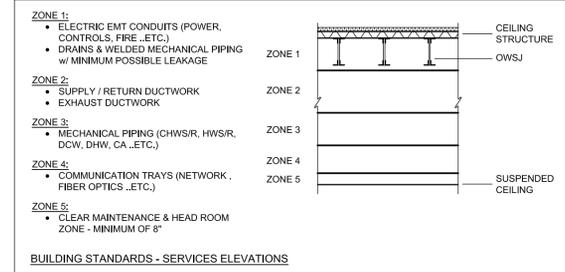
drawing design  
**TITLE, KEY PLAN, LEGEND AND DRAWING LIST**

designed	M. MANSOUR	concu
date	SEPT 2015	
drawn	M. MANSOUR	dessine
date	SEPT 2015	
reviewed	AG	examine
date	SEPT 2015	
approved	M. FARID	approve
date	SEPT 2015	
scale	AS INDICATED	
project no.	CSA15-E3b	no. du projet
drawing no.	E000	no. du dessin

## GENERAL DFL NOTES, SPECS & PROCEDURES:

- THE GENERAL CONTRACTOR SHALL ARRANGE AND PAY FOR ALL NECESSARY PERMITS, INSPECTIONS & RE-INSPECTIONS REQUIRED BY LOCAL AUTHORITIES HAVING JURISDICTION INCLUDING INSPECTION AND TESTING EXCEPT FOR BUILDING PERMIT TO THE CITY OF OTTAWA WHICH WILL BE APPLIED FOR BY OWNER. TURN OVER TO THE OWNER ALL ORIGINAL APPROVAL DOCUMENTATION & CERTIFICATES.
- CONTRACTOR TO BE RESPONSIBLE FOR THE PROVISION (SUPPLY AND INSTALLATION) OF ALL MATERIALS, EQUIPMENT & SERVICES SHOWN ON THE PROJECT DRAWINGS & SPECIFICATIONS AS REQUIRED FOR A FULLY OPERABLE SYSTEM, UNLESS CHANGED OR REPLACED BY REVISED DRAWINGS, SPECIFICATIONS OR ADDENDA.
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING & FIRE PROTECTION WORK, BE RESPONSIBLE FOR ALL FLOOR CUTTING, CORE DRILLING, ALL CHASES, OPENINGS AND PATCHING AS MAY BE REQUIRED BY ALL SUB TRADES WHO MAY OR MAY NOT BE UPDERS HIS CONTRACT AGREEMENTS.
- DRAWINGS ARE NOT INTENDED TO SHOW THE DETAILS & ROUTE OF EACH COMPONENT TO BE INSTALLED OR REMOVED. THEY ARE ONLY PROVIDING A GENERAL OVERVIEW OF THE PROJECT SCOPE. THE CONTRACTOR SHALL BE RESPONSIBLE TO REVIEW THE SITE CONDITIONS DURING THE TENDER PERIOD AND EXAMINE THE EXTENT OF THE DEMOLITION, REMOVALS & NEW INSTALLATIONS TO INCLUDE IN THE TENDER PRICE ALL NECESSARY LABOR AND MATERIAL REQUIRED FOR A FULLY OPERABLE SYSTEM AS INTENDED.
- ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT CODES, BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES WHERE VARIED BY THE PROJECT SPEC.
- ALL DIMENSIONS TO BE VERIFIED ON SITE. EXACT LOCATION & ELEVATION OF EQUIPMENT IS SUBJECT TO SITE MEASUREMENTS.
- CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR ALL MATERIAL, EQUIPMENT & FIXTURES TO ENGINEER FOR APPROVAL BEFORE COMMENCING INSTALLATION OR ORDERING. ALL SAMPLES TO BE PROVIDED UPON CSA REQUEST AT NO ADDITIONAL COST.
- ALL SUPPLIED MATERIALS, FIXTURES & EQUIPMENT TO BE NEW, FREE FROM DEFECTS, CERTIFIED & APPROVED BY CODE. REUSE OF ANY EXISTING PARTS IS NOT PERMITTED UNLESS APPROVED BY OWNER.
- CSA SHALL BE GIVEN THE OPTION OF RETAINING ANY REMOVED OR DEMOLISHED COMPONENTS OR EQUIPMENT, COORDINATE AND HAND OVER TO CSA PROJECT MANAGER AS REQUIRED. DISPOSE OF ANY REMAINING OR UNWANTED EQUIPMENT OR SERVICES AND REMOVE OFF SITE IN A LEGAL MANNER AND COMPLY WITH THE ENVIRONMENTAL PROTECTION ACT, ONTARIO REGULATIONS FOR WASTE MANAGEMENT PROGRAM, CERTIFICATE OF DISPOSAL TO BE HANDED OVER TO OWNER AFTER WORK IS DONE.
- INSTALL ALL EQUIPMENT IN FULL ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS & RECOMMENDATIONS.
- ALL TRADES SHOULD BE LICENSED TO PERFORM ALL WORK SHOWN ON THE DRAWINGS INCLUDING REMOVALS & DEMOLITION.
- DO NOT DAMAGE EXISTING FIRE SEPARATIONS AND FIRE PROTECTIONS IN THE PROJECT AREAS. ANY DAMAGES INCURRED TO EXISTING FIRE SEPARATIONS AND PROTECTIONS SHALL BE RESTORED TO APPROVED CONDITIONS TO MEET REQUIRED RATINGS AND CODES AT NO ADDITIONAL COSTS TO THE PROJECT.
- UNDER ANY CIRCUMSTANCES, DO NOT BLOCK REQUIRED ACCESS TO EXITS AND FIRE ESCAPE ROUTES DURING THE PROJECT DURATION. ALL EXISTING LIFE SAFETY SYSTEMS AND INDICATORS SHALL BE OPERATIONAL AT ALL TIMES.
- SMOKE EATERS & POWVERED EXHAUST FANS VENTED TO OUTSIDE OF BUILDING MUST BE USED DURING ALL BRAZING / WELDING / SOLDERING / CUTTING / GRINDING ACTIVITIES TO MINIMIZE CONTAMINATION & OODR TO ADJACENT AREAS PARTICULARLY IN CLEAN ROOMS. PROVIDE 72 HOUR NOTICE TO CSA TO ARRANGE FOR HOT WORK PERMITS.
- CONTRACTOR TO PROTECT ALL ARCHITECTURAL FINISHES & FLOORING DURING CONSTRUCTION. BE RESPONSIBLE FOR RESTORING SURFACES TO ORIGINAL CONDITION FROM ALL PROJECTS WORK. THE CONTRACTOR SHALL MAKE GOOD ALL DAMAGED SURFACES INCLUDING ANY PAINT TOUCH-UPS REQUIRED, REPAIR ALL WALLS, FLOORS & CEILING IN CORE AREA WHERE MECHANICAL & ELECTRICAL SERVICES PASS THROUGH.
- EXACT TRAFFIC LIMITS AND ACCESS ROUTES TO BE DETERMINED ON SITE IN COORDINATION WITH CSA PROJECT MANAGER.
  - ALL TARPS TO BE NEW HEAVY DUTY POLYETHYLENE, WATER / MILDWE / TEAR RESISTANT, WHITE, TIGHT SEALED FROM DECK TO FLOOR, CONTRACTOR TO PROVIDE ACCESS ZIPPERS OR DOORS AS REQUIRED BY CSA. USE METAL STUDS AS FRAMING SUPPORTS, NO WOOD MATERIALS TO BE USED IN TARPS CONSTRUCTION UNLESS APPROVED BY CSA.
  - APPROVED METHODS TO ATTACH STUDS / TARPS TO BUILDING AS FOLLOWS:
    - ON FLOORS: HEAVY DUTY COMMERCIAL DOUBLE SIDED TAPE TO SECURE METAL STUDS TO FLOORS. USE OF SCREWS OR TAPCONS ARE NOT PERMITTED.
    - ON DRY WALLS / MASONRY / METAL SIDING WALLS: DUCT OR TUCK TAPE IS NOT ALLOWED DIRECTLY ON BUILDING FINISHES AS IT WILL DAMAGE THEM WHEN REMOVED; APPLY MASKING PAINT GREEN TAPE FIRST AND THEN DUCT / TUCK TAPE ON TOP OF IT. STUDS CAN BE SCREWED TO DRY WALL / MASONRY WALLS GIVING THAT ALL HOLES WILL BE PATCHED & PAINTED (WHOLE WALL / AREA TO BE PAINTED, SMALL / LOCAL PAINT PATCHES ARE NOT PERMITTED).
    - TARPS COULD BE HANGED OFF BUILDING STEEL STRUCTURAL USING HIGH STRENGTH CABLE TIES. PROVIDE HEAVY GAUGE UNISTRUTS AS NEEDED FOR CROSS RUNS OR TO DISTRIBUTE TARPS LOAD.
    - HANGING TARPS FROM BUILDING SERVICES (DUCTWORK, CONDUITS, PIPES, SUPPORTS, HANGERS ... ETC.) IS NOT PERMITTED.
    - CONTRACTOR IS RESPONSIBLE FOR CLEANING, PATCHING, REPAIRING & PAINTING ALL DAMAGED SURFACES & TAPE MARKS AFTER REMOVING TARPS.
- PROVIDE FLOOR PROTECTION TO ENTIRE PROJECT AREAS BEFORE ANY WORK STARTS AS FOLLOWS:
  - FLOOR TO BE WIPED CLEAN FROM ANY DEBRIS OR DUST PARTICLES.
  - PROVIDE MIN. 1/8" FOAM LAYER DIRECTLY ON ALL FLOORINGS.
  - PROVIDE HARD SHEETS ON TOP OF FOAM LAYER. ALL SHEETS SEAMS TO BE DUCT-TAPED TO PREVENT DEBRIS / DUST FROM GETTING TRAPPED UNDER THE PROTECTION SHEETS. USE OF OSB SHEETS IS NOT PERMITTED.
- PROVIDE FURNITURE AND EQUIPMENT PROTECTION AS FOLLOWS:
  - OFFICE / LAB FURNITURE AND EQUIPMENT TO BE COMPLETELY COVERED AND WRAPPED WITH NEW HEAVY DUTY CLEAR PLASTIC ROLL SHEETS.
  - SENSITIVE LAB TESTING EQUIPMENT: TO BE COMPLETELY COVERED AND WRAPPED WITH NEW HEAVY DUTY CLEAR PLASTIC ROLL SHEETS. CLEAN SCAFFOLDING TO BE ERECTED ON TOP OF ALL LAB EQUIPMENT TO PROTECT FROM POSSIBLE FALLING OBJECTS.
- CONTRACTOR TO PROVIDE BILINGUAL CONSTRUCTION, ACCESS & SAFETY SIGNS. SIGNS TO BE POSTED ON ALL PROJECT FENCES & ENTRANCES AT THE START OF PROJECT AND BEFORE COMMENCING ANY WORK.
- ACCESS TO THE SITE FOR MATERIAL, PUMP FORCES AND FOR WASTE REMOVAL IS TO BE COORDINATED WITH CSA PROJECT MANAGER. USE ONLY ELEVATORS DESIGNATED BY CSA AND PROTECT THEM FROM DAMAGE.
- WHEN TESTING ACTIVITIES ARE NOT UNDERWAY, LARGE OR SMALL LOADING DOCKS CAN BE USED TO MOVE MATERIALS IN AND OUT OF THE BUILDINGS FROM 7:30 AM TO 8:00 AM WITHOUT CSA NEEDING TO PROVIDE NOTICE TO BUILDING STAFF. IF ACCESS IS REQUIRED AFTER THIS TIME OR FOR LONGER PERIODS, 72 HOUR NOTICE MUST BE PROVIDED TO CSA TO CONFIRM AVAILABILITY AND ARRANGE FOR PROPER NOTICES.
- SANITARY FACILITIES WILL BE ASSIGNED FOR CONTRACTORS' PERSONNEL. OTHERS SHALL NOT BE USED. KEEP FACILITIES CLEAN.
- ONLY DESIGNATED AREAS ARE TO BE USED FOR LUNCH AND BREAK TIME. ALL OTHER AREAS ARE OFF LIMITS INCLUDING CAMPUS CAFETERIA.
- CONTRACTOR TO RESPECT ALL BUILDING FLOOR LOADING LIMITATIONS, COORDINATE AND CONFIRM WITH CSA PROJECT MANAGER PRIOR TO BRING IN ANY HEAVY TOOLS, EQUIPMENT AND LIFTS.
- GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO KEEP THE OWNER'S ACCESS AREAS AND CORRIDORS CLEAN AT ALL TIMES.
  - CLEAN AND REMOVE ALL DEMOLITION AND CONSTRUCTION WASTE FROM PROJECT SITE ON DAILY BASIS AND UPON COMPLETION OF PROJECT.
  - TRANSPORT ALL LOOSE MATERIALS IN / OUT OF BUILDING IN CLEAN COVERED CONTAINERS.
  - DO NOT USE CSA WASTE CONTAINERS. AN AREA WILL BE DESIGNATED FOR LOCATING CONTRACTOR WASTE BINS UPON REQUEST.
  - CONTRACTOR TO PROVIDE ALL CLEANING EQUIPMENT & SUPPLIES. USE OF BUILDING CLEANING EQUIPMENT OR SUPPLIES ARE NOT PERMITTED.
- DO NOT SUBJECT ANY PART OF THE BUILDING TO ANY NOISE, DUST OR ANY OTHER UNACCEPTABLE ENVIRONMENTAL CONDITIONS DURING THE COURSE OF THE PROJECT. ANY NOISY / DUSTY / SMELLY ACTIVITIES SHALL BE DONE AFTER HOURS OF WORKING HOURS OR WEEKENDS. COORDINATE WITH CSA PROJECT MANAGER WITH A MINIMUM NOTICE OF 72 HOURS.
- ALL PENETRATIONS THROUGH WALLS AND FLOORS SHALL BE SAW-CUT OR CORE DRILLED. JACK HAMMERING IS NOT PERMITTED. ALL WALLS, FLOORS & CEILING PENETRATIONS TO BE SEALED BY CONTRACTOR IN ACCORDANCE WITH APPLICABLE CODES & THE ENGINEER'S REQUIREMENTS. USE OF POWDER ACTUATED TOOLS USING EXPLOSIVES IS NOT PERMITTED.
- PARTS NOT TO BE SUPPLIED BY OWNER SHALL BE FULLY INSTALLED & SUPPORTED BY CONTRACTOR AT NO ADDITIONAL COST.
- PROJECTS MAY TAKE PLACE IN A CLEAN ROOM ENVIRONMENT. MANDATING SPECIAL MEASURES BE TAKEN TO REDUCE LABORATORY DISRUPTION. CLASS 8 CLEANROOM STANDARDS ARE TO BE MET FOR THE AREA SURROUNDING CONSTRUCTION AT ALL TIMES AND ARE SUBJECT TO VERIFICATION.
- ALL PERSONNEL MUST ATTEND MANDATORY DFL BRIEFING ON THE FIRST DAY OF PROJECT AND BEFORE STARTING ANY WORK. ADHERE TO THE INFORMATION PRESENTED AT ALL TIMES. ANY PERSON WHO DID NOT ATTEND THIS BRIEFING WILL NOT BE ALLOWED TO WORK ON SITE - NO EXCEPTIONS
- IMPROPER / UNCLEAN / RIPPED CLOTHING, FOUL LANGUAGE, IMPROPER BEHAVIOR, SMOKING IN UNDESIGNATED AREAS INCLUDING E-CIGARETTES WILL NOT BE TOLERATED AND WORKER WILL BE ESCORTED OFF CAMPUS IMMEDIATELY - NO EXCEPTIONS.
- CSA, AT THEIR DISCRETION, MAY REQUEST A WORKER TO LEAVE THE SITE IF THERE IS DEMONSTRATED IMPAIRED MENTAL OR PHYSICAL CAPABILITY AFFECTING HIS/HER WORK PERFORMANCE AND POSSIBLY PUTTING OTHERS AT RISK DUE TO CONSUMPTION OF ALCOHOL OR LEGAL SUBSTANCES.
- DFL IS A HIGH PROFILE OCCUPIED BUILDING. USE OF MUSIC OR RADIO ON SITE IS NOT PERMITTED AT ALL TIMES.

- ALL GC & SUB-TRADES WORKERS HAVE TO BE ESCORTED AT ALL TIMES WHILE IN BUILDING AND ON CAMPUS.
  - CSA WILL PROVIDE SECURITY COMMISSIONAIRES TO ESCORT.
  - PRIOR TO PROJECT START, GC TO PROVIDE A FULL LIST OF ALL PERSONNEL WORKING ON THE PROJECT AS WELL AS ENGINEERS, SUPPLIERS & INSPECTORS IF POSSIBLE TO ISSUE NECESSARY FORMS FOR SITE AND BUILDING ACCESS.
  - PROVE AT LEAST 72 HOUR NOTICE FOR ANY ADDITIONAL NAMES OR FOR AFTER HOURS OR WEEKEND WORK.
  - NOTIFY CSA IMMEDIATELY OF ANY CHANGE IN SCHEDULE THAT AFFECTS THE NEED FOR SECURITY ESCORTS.
  - INDIVIDUALS WHO ARE NOT ON THAT LIST WILL BE DENIED ACCESS WITH NO EXCEPTIONS.
- GENERAL CONTRACTOR REPRESENTATIVE HAS TO BE PRESENT ON SITE AT ALL TIMES AND ACCOMPANY ALL SUB-TRADE WORKERS; SUB-TRADES ARE NOT ALLOWED TO BE ON SITE OR TO WORK WITHOUT THE PRESENCE OF APPROVED DESIGNATED GC REPRESENTATIVE - NO EXCEPTIONS.
- WEEKEND AND/OR AFTER-HOURS SHUTDOWNS TO BE SCHEDULED IN AGREEMENT WITH CSA PROJECT MANAGER. PROVIDE AT LEAST 72 HOUR NOTICE IN ADVANCE.
- CSA IS COMMITTED TO ENSURING A HEALTHY AND SAFE ENVIRONMENT FOR ITS EMPLOYEES, CONTRACTORS AND VISITORS AND WILL ALIGN ITSELF WITH CONTRACTORS WHO SHARE IN THIS VISION.
  - THE REQUIREMENTS OUTLINED BELOW ARE PROVIDED AS REFERENCE AND ARE THERE TO ASSIST THE CONTRACTING COMPANY WHO PERFORMS THE WORK AND ACCEPTS THIS COMMITMENT COMPLETELY:
    - ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT: [HTTP://WWW.HI-LAWS.GOV.ON.CA](http://www.hi-laws.gov.on.ca)
    - INFRASTRUCTURE HEALTH AND SAFETY ASSOCIATION 'GUIDE TO DEVELOPING HEALTH AND SAFETY POLICIES AND PROGRAMS IN CONSTRUCTION' A COMPREHENSIVE GUIDE GEARED TO MID- TO LARGE-SIZED GENERAL CONTRACTORS FOR DEVELOPING AND IMPLEMENTING AN EFFECTIVE HEALTH AND SAFETY PROGRAM: [HTTP://WWW.HHSA.CA](http://www.hhsa.ca)
    - INFRASTRUCTURE HEALTH AND SAFETY ASSOCIATION 'CONSTRUCTION HEALTH AND SAFETY MANUAL: GUIDANCE ON HAZARD CONTROLS FOR ONTARIO CONTRACTORS: [HTTP://WWW.HHSA.CA](http://www.hhsa.ca)
  - THE GENERAL CONTRACTOR WILL BE REQUIRED TO PREPARE AND SUBMIT TO THE CSA PROJECT MANAGER A FULL SITE SPECIFIC PROJECT HEALTH AND SAFETY PLAN, HEREIN CALLED PHSP, PRIOR TO THE COMMENCEMENT OF ANY WORKS AND WITHIN 2 WEEKS OF CONTRACT AWARD. PLAN TO BE REVIEWED & APPROVED BY CSA BEFORE STARTING ANY WORK.
  - THE GENERAL CONTRACTOR SHALL PROVIDE CSA PROJECT MANAGER A COPY OF ALL NOTICES OR OTHER WRITTEN CORRESPONDENCE PROVIDED TO OR RECEIVED BY THE ONTARIO MINISTRY OF LABOR (OML) FOR THE DURATION OF THE CONTRACT.
  - THE GENERAL CONTRACTOR SHALL FULLY IMPLEMENT THE PHSP FOR THE FULL DURATION OF THE CONTRACT.
  - A COPY OF ALL APPLICABLE TRAINING CERTIFICATES MUST BE PROVIDED PRIOR TO COMMENCING ANY WORK. CERTIFICATES MUST SHOW EXACT COMPANY NAME AND ADDRESS THAT PROVIDED THE TRAINING. CSA RESERVES THE RIGHT TO REQUEST THE COURSE OUTLINE FROM THE COMPANY THAT PROVIDED THE TRAINING. IF THE PROOF OF TRAINING DOES NOT DEMONSTRATE THE WORKER AS BEING COMPETENT OPERATORS, FURTHER TRAINING MAY BE REQUESTED BY THE CSA PRIOR TO COMMENCING ANY WORK AT NO ADDITIONAL COST.
- GC TO PROVIDE A MINIMUM OF 48 HOUR NOTICE TO CSA PRIOR FOR ANY DELIVERIES. GENERAL CONTRACTOR MUST BE ON SITE TO RECEIVE THE SHIPMENT. IF THE DELIVERY PERTAINS TO LIFTING EQUIPMENT, ONE OF THE QUALIFIED CONTRACTORS SCHEDULED TO USE THE EQUIPMENT MUST INSPECT AND RECEIVE THE LIFT FROM THE RENTAL COMPANY.
- GC AND ALL HIS SUB-TRADES ARE RESPONSIBLE TO PROVIDE ALL LADDERS, SCAFFOLDING, LIFTS, CRANES AND ALL OTHER EQUIPMENT & TOOLS REQUIRED FOR PROJECT SCOPE INCLUDING INSTALLING & REMOVING TARPS & PROTECTION MATERIALS. USE OF BUILDING TOOLS, EQUIPMENT, TROLLEYS, FORKLIFTS, SKIDS, LADDERS, LIFTS, CRANES ... ETC. ARE NOT PERMITTED.
- ONLY THE USE OF CLEAN ELECTRICAL LIFTS IS PERMITTED ANYWHERE INSIDE THE BUILDING. USE OF PROPANE / DIESEL / GAS POWERED LIFTS ARE NOT PERMITTED EXCEPT WHEN USED OUTSIDE THE BUILDING.
- GENERAL CONTRACTOR AND ALL TRADES TO STRICTLY FOLLOW CAMPUS, CLEANROOMS & CSADFL PROCEDURES AT ALL TIMES. GC IS RESPONSIBLE TO DISTRIBUTE ALL PROCEDURES TO ALL HIS WORKERS & SUB-TRADES.
- ALL TRADES TO FOLLOW BUILDING SERVICE ELEVATIONS STANDARD AS FOLLOWS:



## GENERAL CAMPUS PROCEDURES :

- ACCESS & SECURITY:**
  - CONTRACTORS MUST SIGN-IN TO RECEIVE AN ACCESS BADGE AT THE GUARDBOUSE.
  - CONTRACTORS MUST SIGN-IN AT DFL CONTRACTOR'S STATION IN THE BASEMENT.
  - ALL COST BADGES MUST BE RETURNED TO DFL COMMISSIONAIRE OR NOTIFICATION TO THE GUARDBOUSE.
  - CONTRACTORS MUST BE ESCORTED AT ALL TIMES BY EITHER A DFL COMMISSIONAIRE OR CLEARED DFL PERSONNEL RESPONSIBLE FOR THE CONTRACTOR.
  - NORMAL WORKING HOURS ARE FROM 07:00 TO 15:30, ANY HOURS BEFORE OR AFTER ARE CONSIDERED 'AFTER-HOURS' AND WORK REQUIRED DURING AFTER-HOURS MUST HAVE 72 HOURS NOTIFICATION WITH THE NAMES OF ALL WORKERS TO BE PROVIDED TO THE DFL REPRESENTATIVE, AS SILENT HOUR ACCESS REQUESTS NEEDS TO BE RECEIVED AT GUARDBOUSE.
- SITE FACILITIES:**
  - NO LARGE STORAGE AVAILABLE ON SITE. STORAGE OF SMALL ITEMS MUST HAVE PREVIOUS ARRANGEMENT IN PLACE.
  - CONSTRUCTION ACTIVITIES MUST REMAIN WITHIN THE PREDEFINED BOUNDARIES UNLESS OTHERWISE PERMITTED IN WRITING.
- CLEAN ROOM RULES:**
  - WHEN WORKING IN THE CLEANROOM, PROPER ATTIRE MUST BE WORN AT ALL TIMES. ATTIRE TO BE PROVIDED BY DFL.
  - DUST MUST BE KEPT AT A MINIMUM.
  - EQUIPMENT MUST BE COVERED IN PLASTIC WHEN TRANSPORTING FOR LOADING DOCK TO CLEANROOM.
  - SCHEDULE FOR CLEANROOM DECOMMISSIONING MUST BE PROVIDED WELL IN ADVANCE.
- COMMUNICATION & PHOTOGRAPHY:**
  - NO CELLULAR PHONES PERMITTED IN CLEANROOMS, MINIMAL USAGE INSIDE THE BUILDING. 2-WAY RADIOS PERMITTED BUT MAY HAVE PERIODIC INTERRUPTIONS.
  - PHONE AT THE COMMISSIONAIRE'S STATION OR BASEMENT IS PERMITTED FOR USE.
  - NO CAMERAS PERMITTED ON SITE; ANY REQUIREMENT FOR PICTURES WILL COME AS A REQUEST TO PROJECT MANAGER FOR THE SITE PHOTOGRAPHER SERVICES.
- HOT WORK PERMITS:**
  - ANY WORK THAT WILL CREATE SMOKE, DUST OR HEAT MUST BE COORDINATED AT A MINIMUM OF 72-HOURS IN ADVANCE TO DFL PROJECT MANAGER FOR THE ISSUANCE OF A HOT WORK PERMIT, FOR EACH DAY REQUIRED.
- WORKMANSHIP & ETHICS:**
  - CLEANLINESS IS OF THE UTMOST IMPORTANCE. IT IS EXPECTED THAT CONSTRUCTION CLEANUP WILL BE AT THE END OF EACH DAY.
  - FOUL LANGUAGE OR IMPROPER BEHAVIOR WILL NOT BE TOLERATED.
  - PROPER BUILDING PROTECTION MUST BE PROVIDED AT ALL TIMES.
  - HEALTH AND SAFETY PRACTICES MUST BE STRICTLY OBSERVED ON SITE AT ALL TIMES.

## CLEANROOM PROCEDURES :

- CLEANROOM REGULATIONS AND CLOTHING REQUIREMENTS**
  - CLEAN ROOMS ARE ALL AREAS WITHIN THE AIR SHOWERED ROOMS, EXCEPT THE LOADING DOCK(S) AND CHANGE ROOMS.
  - ALL OTHER AREAS ARE NOT CONSIDERED AS "CLEAN ROOMS"
- CLEAN ROOM ENTRY & EXIT PROCEDURES**
  - PERSONNEL MUST REMOVE ALL WEATHER PROTECTION CLOTHING (COATS, BOOTS ETC.) PRIOR TO ENTERING ANY CLEAN ROOM
  - SHOES MUST BE CLEANED USING THE SHOE CLEANER
  - NOTE: SHORT CLOTHING ARE NOT INTENDED FOR USE ON HEAVILY SOLED FOOTWEAR
  - ALL PERSONNEL MUST USE THE AIR SHOWER PRIOR TO ENTERING THE CHANGE ROOM
  - PERSONNEL MUST WALK ON THE "DYCEM" MATS PRIOR TO ENTERING THE CLEAN ROOM
  - EXIT FROM ANY CLEAN ROOM WILL BE EITHER THROUGH THE AIR SHOWER (WHICH DOES NOT OPERATE ON EXIT), OR VIA DIRECT EXIT DOOR
- WORKING WITHIN THE CLEAN ROOMS**
  - WHEN WORKING WITHIN THE CLEAN ROOMS, ALL PERSONNEL WILL:
    - WEAR A CLEAN ROOM COAT (CLOTH OR DISPOSABLE), COMPLETELY FASTENED
    - WEAR DISPOSABLE HAT ENSURING ALL HAIR IS COVERED BY THE HAT
    - ENSURE FOOTWEAR IS CLEAN
    - ANY DRILLING, CUTTING, GRINDING, FILING OR OTHER JOBS CREATING SWAF OR DEBRIS MUST BE DONE WITH A HEPA VACUUM RUNNING AT ALL TIMES TO COLLECT ALL DEBRIS GENERATED
- CLEAN ROOM CONTAINERS**
  - CONTAINERS MUST BE CONSTRUCTED FROM METAL, PLASTIC OR SMOOTHLY FINISHED WOOD, AND MUST BE SEALED WITH URETHANE OR OIL BASED PAINT
  - INSULATION, EITHER FIXED OR REMOVABLE MUST BE SEALED TO PREVENT SHEDDING
  - CONTAINERS BROUGHT INTO THE CLEAN ROOM FROM THE OUTSIDE MUST BE THOROUGHLY CLEANED PRIOR TO ENTRY
  - NO CARDBOARD BOXES OR WOOD ARE PERMITTED IN THE CLEAN ROOMS
  - INTERIOR LOADING DOCK DOORS MUST NOT BE OPENED WHILE THE EXTERIOR LOADING DOCK DOOR IS OPEN
- PROHIBITED CLEAN ROOM PRACTICES**
  - WEARING CLEAN ROOM CLOTHING OUTSIDE DESIGNATED CLEAN ROOMS AND CONTROLLED AREAS
  - WEARING STREET CLOTHES IN DESIGNATED AND CLEAN ROOMS AND CONTROLLED AREAS
  - GROOMING, EATING, DRINKING OR SMOKING WITHIN ANY DESIGNATED CLEAN ROOM OR CONTROLLED AREA
  - PAINTING OR LEAVING CHEMICAL CONTAINERS AND CONTAMINANTS OPEN OR EXPOSED IN ANY DESIGNATED CLEAN ROOM OR CONTROLLED AREA
  - FAILING TO CLEAN JOB SITES AT THE COMPLETION OF A JOB OR AT THE END OF A SHIFT
  - ADMITTING UNAUTHORIZED PERSONNEL INTO THE DFL SERVICE AREAS WITHOUT AUTHORIZATION

## ELECTRICAL SPECIFICATION NOTES:

### 1.0 GENERAL

- DO COMPLETE INSTALLATION IN ACCORDANCE WITH THE FOLLOWING: ONTARIO BUILDING CODE, ONTARIO ELECTRICAL CODE, AMENDMENTS AND APPLICABLE LOCAL REGULATIONS C/W INSPECTION CERTIFICATE.
- PATCH, SAND, PRIME AND PAINT AFFECTED AREAS TO MATCH EXISTING. REPAIR AND MAKE GOOD ALL WALLS, CEILING, ETC. CUT UNDER THIS DIVISION.
- PRIOR TO TENDER, CONFIRM SITE CONDITIONS AND LOCATION OF EXISTING SERVICES.
- DRAWINGS INDICATE GENERAL LOCATION, QUANTITY AND TYPE OF OUTLETS FOR ELECTRICAL SERVICES ONLY. DO NOT SCALE.
- SUBMIT ALL PLANS REQUIRED BY THE INSPECTION AUTHORITY FOR APPROVAL. FURNISH INSPECTION CERTIFICATE, PRIOR TO FINAL PAYMENT. TO SHOW INSTALLED WORK CONFORMS WITH SPECIFICATION AND REGULATIONS. PAY ALL FEES AND PERMIT COSTS.
- SUBMIT COPY OF SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL. PROVIDE SHOP DRAWINGS OF ALL EQUIPMENT AND DEVICES.
- UPON COMPLETION OF WORK, PROVIDE MARKUP PRINTS DESCRIBING ASBUILT CONDITIONS AND 1 COPY OF MAINTENANCE MANUALS.
- ALLOW FOR RELOCATION OF OUTLETS UP TO 300mm PRIOR TO INSTALLATION AT NO EXTRA COST.
- ALL WIRING DEVICES TO BE SPECIFICATION GRADE.
- INSTALL ELECTRICAL EQUIPMENT AT THE FOLLOWING HEIGHTS UNLESS OTHERWISE INDICATED OR DIRECTED OTHERWISE.
  - LOCAL SWITCHES AND DIMMER SWITCHES: 1220mm
  - GENERAL RECEPTACLES: 400mm
  - RECEPTACLES ABOVE COUNTER: 175mm ABOVE BACKSPASH
  - PANELBOARDS: 1800mm FROM THE TOP OF PANELBOARD TO FLOOR
  - TELECOM AND CABLE TV OUTLETS: 400mm
  - FIRE ALARM PULL STATIONS: 1200mm
  - WALL MOUNTED FIRE ALARM BELL, HORNS OR STROBES: 2400mm
  - EMERGENCY LIGHTING BATTERY UNITS AND REMOTE HEADS: 2400mm
  - CARD READERS, KEYPADS AND SECURITY DEVICES: 1220mm
  - DOOR CONTACTS: TOP OF DOOR FRAME
- SCAN ALL AFFECTED SHAFT WALLS, BLOCK WALLS, FLOORS OR OTHER SUCH ASSEMBLIES PRIOR TO ANY CORE DRILLING OR SAW-CUTTING.
- PROVIDE APPROPRIATE FIRESTOPPING FOR ALL PENETRATIONS THROUGH FIRE-RATED ASSEMBLIES.
- BE RESPONSIBLE FOR REMOVAL AND REINSTATING CEILING AS NECESSARY.
- ALL NEW & EXISTING SUSPENDED LIGHT FIXTURES, FANS ... ETC. SHALL BE PROVIDED WITH SECURITY CHAINS TO MEET CODE.
- CONTRACTOR TO BALANCE ELECTRICAL LOAD ON THE THREE-PHASE SUPPLY. MEASUREMENTS TO BE SUBMITTED FOR APPROVAL BEFORE FINAL INSPECTION BE CARRIED OUT.
- USE OF TIE WRAPS, TIE WIRE, PERFORATED BAND, WIRE CHAIN OR SOLID RING TYPE HANGERS IS NOT PERMITTED.
- USE OF C-CLAMPS ON BEAMS IS NOT PERMITTED. ALWAYS USE BEAM CLAMP TO SUPPORT THREADED RODS FROM BEAMS OR OWSJ.

### 2.0 WIRING METHOD

- USE ELECTRICAL METALLIC TUBING (EMT) FOR ALL WORK EXCEPT FOR THE FOLLOWING USAGE:
    - USE FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO FLUORESCENT FIXTURES.
  - CONDUITS & JUNCTION BOXES SHALL NOT BE LOADED MORE THAN 60% OF ITS MAXIMUM RATED CAPACITY.
  - ALL CONNECTORS & COUPLINGS SHALL BE STEEL WITH INSULATED THROATS.
  - ALL CONDUITS TO BE EMT, MINIMUM OF 3/4" UNLESS OTHERWISE STATED. ARMORED CABLE IS NOT A CONDUIT & PROJECT MANAGER MUST APPROVE THE USE OF IT.
  - PROVIDE IN ALL CONDUITS AN INSULATED GREEN GROUNDING CONDUCTOR (NO.12 AWG), RUN WITH CIRCUIT CONDUCTORS AN TO ALL ENCLOSURES.
  - PROVIDE PULL STRINGS IN ALL EMPTY CONDUIT.
- 4.0 CONDUCTOR MATERIAL (WIRE IN CONDUIT) - ANNEALED COMMERCIAL GRADE, 98% CONDUCTIVITY, COPPER, NO.14 TO NO.10 AWG - SOLID; NO.8 AND LARGER - STRANDED.
- RW90, UNLESS OTHERWISE NOTED, PROVIDE 600V RATED FOR 347/600V AND 120/208V WIRING. SIZES NO.12 AND NO.10 AWG.
- RWU90, NO.8 AND LARGER, 1000V RATED FOR 347/600V AND 120/208V WIRING.
- ALL WIRING TO BE MINIMUM #12 AWG COPPER STRANDED WIRES UNLESS OTHERWISE STATED.
- FOR BRANCH CIRCUITS OVER 23M (75') IN LENGTH, USE NO.10 AWG FOR ENTIRE LENGTH.
- PROVIDE SEPARATE NEUTRAL CONDUCTOR FOR ALL COMPUTER BRANCH CIRCUITS (SIZE TO MATCH HOT WIRE).
- IN FINISHED AREAS RUN CONDUIT CONCEALED, PARALLEL TO BUILDING LINES.
- ALL CONDUIT RUNS ARE TO FOLLOW THE BUILDING SERVICE ELEVATION STANDARD, FOR ALL DEVICES IDENTIFIED AT A SPECIFIC MOUNTING HEIGHT, CONTRACTOR TO ALLOW FOR VERTICAL DROP OF CONDUIT AND WIRE FOR EACH DEVICE.
7. ALL CONDUIT TO BE PAINTED TO MATCH EXISTING WALL OR CEILING COLOUR FINISH.

### 3.0 GROUNDING

- GROUNDING EQUIPMENT TO CSA C22.2 NO. 41. COPPER GROUNDING CONDUCTORS TO CSA C22.1, SECTION 10 (LATEST EDITION). INSULATED GROUNDING CONDUCTORS AS HEREIN SPECIFIED.
- NON-CORRODING ACCESSORIES NECESSARY FOR GROUNDING SYSTEM, TYPE, SIZE, MATERIAL AS INDICATED, INCLUDING BUT NOT NECESSARILY LIMITED TO:
  - GROUNDING AND BONDING BUSHINGS: PROTECTIVE TYPE CLAMPS; BOLTED TYPE CONDUCTOR CONNECTORS; THERMIT WELDED TYPE CONDUCTOR CONNECTORS; BONDING JUMPERS AND STRAPS; PRESSURE WIRE CONNECTORS.
- INSTALL COMPLETE PERMANENT, CONTINUOUS, SYSTEM AND CIRCUIT GROUNDING SYSTEMS, INCLUDING ELECTRODES, CONDUCTORS, CONNECTORS AND ACCESSORIES. TO CONFORM TO REQUIREMENTS OF ARCHITECT/ENGINEER AND LOCAL AUTHORITY HAVING JURISDICTION OVER INSTALLATION.
- MAKE GROUNDING CONNECTIONS IN RADIAL CONFIGURATION ONLY, WITH ALL CONNECTIONS TERMINATING AT SINGLE GROUNDING POINT. AVOID LOOP CONNECTIONS. ENSURE UNIFORMITY OF GROUNDING PRACTICES THROUGHOUT INSTALLATION. INSTALL SYSTEM AND CIRCUIT GROUNDING CONNECTIONS TO THE NEUTRALS OF THE SECONDARY SYSTEMS.
- FOR STANDARD DUPLEX RECEPTACLES PROVIDE INSULATED GROUND CONDUCTOR. SIZE FOR EQUIPMENT GROUND IN ACCORDANCE WITH ELECTRICAL CODE. MINIMUM CONDUCTOR SIZE #12 WITH GREEN INSULATION. GROUND CONDUCTOR TO BE CONNECTED UNDER A BONDING SCREW TO OUTLET BOX(ES) AND PANELBOARD.
- FOR ISOLATED GROUND DUPLEX RECEPTACLES PROVIDE EQUIPMENT GROUNDING CONDUCTOR AS FOR STANDARD RECEPTACLES, AND SEPARATE INSULATED GROUND CONDUCTOR. SIZE TO MATCH LINE CONDUCTORS WITH GREEN INSULATION AND YELLOW STRIP. ISOLATED GROUND CONDUCTOR TO BE CONNECTED TO ISOLATED GROUND TERMINAL STRIP PROVIDED IN PANEL.
- IN PANELBOARD, ISOLATED GROUND BUS AND EQUIPMENT GROUND BUS TO BE TIES TOGETHER WITH #10 INSULATED CONDUCTOR.
- INSTALL SEPARATE 'GREEN' GROUND CONDUCTOR IN SAME CONDUIT WITH CIRCUIT (POWER WIRING) CONDUCTORS. BOND SECURELY TO GROUND SCREW IN EACH OUTLET, JUNCTION, PULL BOX AND EQUIPMENT ENCLOSURE. GROUND CONDUCTOR EQUAL IN AMPACITY TO SIZE OF CIRCUIT AMPACITY OR IN ACCORDANCE WITH CODE FOR EQUIPMENT GROUNDING.

### 4.0 IDENTIFICATION

- IDENTIFY SOURCE, VOLTAGE AND LOAD ON ALL JUNCTION BOXES. USE OF INDELEBIL MARKER FOR THESE LOCATIONS IS ACCEPTABLE.
- ALL CONDUCTORS TO BE COLOUR CODED IN ACCORDANCE WITH CSA 22.1 - SECTION 4. 036 AND EXISTING BUILDING WIRE COLOUR CODE SYSTEM.
- ALL CONDUIT RUNS SHALL BE COLOR CODED TO BUILDING COLOR CODE. ALL CONDUITS TO BE MARKED AT THE START AND END OF EACH RUN & AT BOTH SIDES OF ANY WALL. STANDARD ELECTRIC TAPE IS TO BE USED FOR MARKING.
  - 120/208V : BLUE
  - 120/240V : GREY
  - 277/480V : BLACK
  - 347/600V : PURPLE
  - BUILDING AUTOMATION & LAB CONTROL'S: ORANGE
  - SECURITY ACCESS & CAMERA: YELLOW
  - GROUNDING: BROWN
  - TELEPHONE / DATA: GREEN
  - PA FIRE SAFETY: PINK
  - FIRE ALARM: RED
  - SPECIAL COMMUNICATION: WHITE
- UPDATE ALL PANELBOARD SCHEDULES AS REQUIRED.
- PROVIDE LAMICOID IDENTIFICATION LABELS ON ALL EQUIPMENT.
- MARK ALL CIRCUIT NUMBERS ON RECEPTACLES, DOWNFEED SERVICE POLES, ETC. WITH BLACK LETTERS ON CLEAR P-TOUCH LABELS.

### 5.0 TRANSFORMERS

- THREE PHASE STEP-DOWN TRANSFORMERS SHALL BE 600V DELTA CONNECTED PRIMARY (HIGH VOLTAGE) AND 120/208V WYE CONNECTED SECONDARY (LOW VOLTAGE) WINDINGS.
- WYE POINT OF THE SECONDARIES SHALL BE BROUGHT OUT TO THE TERMINAL BOARD FOR CONNECTION OF THE FOURTH WIRE (GROUNDED NEUTRAL) OF THE 3 PHASE, 4 WIRE SYSTEM.
- ALL TRANSFORMERS SHALL BE DISTRIBUTION CLASS AND SHALL COMPLY WITH THE FOLLOWING PARAMETERS:
  - TYPE: ANN.
  - CSA: C9-M1981, C22.2 NO. 19, 47-1977, C-802.
- INSULATION: CLASS 1F.
- DESIGN: 150°C (302°F) DESIGN TEMPERATURE RISE BY RESISTANCE.
- KVA RATING: AS INDICATED.
- BL RATING: 10kV.
- CORE AND COILS : SEPARATE COPPER COIL ASSEMBLIES, EACH WOUND ON A SEPARATE CORE LEG.
- MAGNETIZING INRUSH: MAXIMUM - 12 TIMES RMS F.L. VALUE.
- TAPS: 4 - 2 1/2% (2FCN, 2FCBN).
- SOUND LEVEL: 225kVA - 55db MAXIMUM; 75kVA AND LOWER - 45db MAXIMUM.
- IMPEDANCE: ABOVE 75kVA - 3% TO 4%.
- FINISH: ASA 61 GREY AIR DRY.
- MOUNTS: ANTI-VIBRATION BETWEEN CORE COIL FRAME AND THE ENCLOSURE FRAME.
- MAKE PRIMARY AND SECONDARY CONNECTIONS SHOWN ON DRAWINGS WITH FLEXIBLE METAL CONDUITS.
- FLOOR MOUNTED TRANSFORMERS SHALL BE MOUNTED ON VIBRATION ISOLATORS.
- CEILING MOUNTED TRANSFORMERS SHALL BE PROVIDED WITH A SEISMIC SYSTEM, RETAIN THE SERVICES OF A STRUCTURAL ENGINEER AND PROVIDE APPROVED DETAILED SHOP DRAWINGS.
- STANDARD OF ACCEPTANCE: HAMMOND, MARCUS, SQUARE D OR EQUIVALENT.

### 6.0 PANELBOARDS

- PANELBOARDS: TO CSA C22.2 NO. 19 WITH THE FOLLOWING FEATURES:
  - 250V AND 600V PANELBOARDS: BUS AND BREAKERS RATED FOR SYMMETRICAL INTERRUPTING CAPACITY AS INDICATED, OR TO MATCH EXISTING, IF HIGHER. SERVICE ENTRANCE TYPE AS REQUIRED.
  - FLOOR MOUNTED TRANSFORMERS SHALL BE MOUNTED ON VIBRATION ISOLATORS.
  - CEILING MOUNTED TRANSFORMERS SHALL BE PROVIDED WITH A SEISMIC SYSTEM, RETAIN THE SERVICES OF A STRUCTURAL ENGINEER AND PROVIDE APPROVED DETAILED SHOP DRAWINGS.
  - STANDARD OF ACCEPTANCE: HAMMOND, MARCUS, SQUARE D OR EQUIVALENT.
- PANELBOARDS: TO CSA C22.2 NO. 14 WITH THE FOLLOWING FEATURES:
  - 250V AND 600V PANELBOARDS: BUS AND BREAKERS RATED FOR SYMMETRICAL INTERRUPTING CAPACITY AS INDICATED, OR TO MATCH EXISTING, IF HIGHER. SERVICE ENTRANCE TYPE AS REQUIRED.
  - MAINS, NUMBER OF CIRCUITS, AND NUMBER AND SIZE OF BRANCH CIRCUIT BREAKERS AS INDICATED.
  - TIN-PLATED COPPER BUS WITH FULL SIZE NEUTRAL.
  - EQUIPMENT GROUND BUS TO MATCH NEUTRAL BUS. BOLTED DIRECTLY TO PANELBOARD ENCLOSURE.
  - FINISH: TRIM AND DOOR - BAKED GREY ENAMEL.
  - MOUNT PANELBOARDS TO 1981mm (6'-6") TO TOP.
  - CONNECT LOADS TO CIRCUITS AS INDICATED.
  - CONNECT NEUTRAL CONDUCTORS TO COMMON NEUTRAL BUS WITH RESPECTIVE CIRCUIT(S) IDENTIFIED.
  - SPRINKLER-PROOF ENCLOSURE.
- STANDARD OF ACCEPTANCE: SQUARE D

### 7.0 MOULDED CASE CIRCUIT BREAKERS

- PROVIDE MOULDED CASE CIRCUIT BREAKERS TO CSA 22.2 NO. 5.1, WITH THE FOLLOWING FEATURES:
  - PROVIDE AUTOMATIC MOULDED CASE CIRCUIT BREAKERS IN PANELBOARDS AS INDICATED. BREAKER SIZES AND TRIPS AS SCHEDULED, OR INDICATED ON THE ONE-LINE DIAGRAM.
  - USE BOLT-ON MOULDED CASE CIRCUIT BREAKERS, QUICK-MAKE, QUICK-BREAK TYPE FOR MANUAL AND AUTOMATIC OPERATION WITH TEMPERATURE COMPENSATION FOR 40°C (104°F) AMBIENT.
  - BREAKERS SHALL BE COMMON TRIPS WITH SINGLE HANDLE FOR MULTI-POLE APPLICATION.
  - IN PANELBOARDS, MOULDED CASE CIRCUIT BREAKERS TO OPERATE AUTOMATICALLY BY MEANS OF THERMAL AND MAGNETIC TRIPPING DEVICES TO PROVIDE INVERSE TIME CURRENT TRIPPING UNDER OVERLOAD CONDITIONS, AND INSTANTANEOUS MAGNETIC TRIPPING FOR CIRCUIT PROTECTION.
  - MAGNETIC INSTANTANEOUS TRIP ELEMENTS TO OPERATE ONLY WHEN THE VALUE OF CURRENT REACHES 10 TO 12 TIMES THE BREAKER TRIP SETTING.
  - BREAKER MINIMUM INTERRUPTING CAPACITY (SYMMETRICAL RMS VALUES) SHALL BE NOT LESS THAN THE FOLLOWING: 600V - 25kA; 240V - 14kA.
  - MOTOR CONTROL MAGNETIC STARTERS SHALL BE PROVIDED WITH MOTOR CIRCUIT INTERRUPTER BREAKERS - 600V, 3 POLE, 25kA INTERRUPTING CAPACITY, MAGNETIC TRIP ONLY, ADJUSTABLE (8 SETTINGS), WITH LOCKING PIN.
  - BREAKERS FEEDING EMERGENCY AND EXIT SYSTEM SHALL BE PAINTED RED AND PROVIDED WITH MECHANICAL LOCKS.
- STANDARD OF ACCEPTANCE: CSA APPROVED FOR PANELBOARD.

### 8.0 WIRING DEVICES

- MANUALLY OPERATED GENERAL PURPOSE AC SWITCHES TO CSA C22.2 NO. 111.
- SNAP SWITCHES TO CSA C22.2 NO. 55-M1986 (R2003).
- RECEPTACLES, PLUGS AND SIMILAR DEVICES TO CSA C22.2 NO. 42-99 (R2004).
- COVERPLATES TO CSA C22.2 NO. 42.1-00 (R2004).
- SWITCHES:
  - 15A, 120V SINGLE POLE, THREE-WAY, FOUR-WAY SPECIFICATION GRADE SWITCHES AS INDICATED.
  - TOGGLE OPERATED, FULLY RATED FOR TUNGSTEN FILAMENT AND FLUORESCENT LAMPS, AND UP TO 80% OF RATED CAPACITY OF MOTOR LOADS.
  - SWITCHES OF ONE MANUFACTURER THROUGHOUT PROJECT. EQUAL TO HUBBELL 1200 SERIES FOR 120V, AND HUBBELL 1800 SERIES FOR 347V.
- INSTALL SINGLE THROW SWITCHES WITH HANDLE IN THE 'UP' POSITION WHEN SWITCH IS CLOSED.
- INSTALL SWITCHES IN GANG TYPE OUTLET BOX WHEN MORE THAN ONE SWITCH IS REQUIRED IN ONE LOCATION.
- COVERPLATES:
  - PROVIDE STAINLESS STEEL COVERPLATES FOR ALL WIRING DEVICES.
- FIXTURE TYPES:
  - REFER TO FIXTURE SCHEDULE.
- CONTRACTOR TO PROCURE ALL FIXTURES ON THE FIXTURE SCHEDULE AS INDICATED. PROCUREMENT TO INCLUDE F.O.B. AND UNLOADING

### 10.0 EXIT LIGHTS

- EXIT SIGNS TO CSA C22.2 NO. 141-02 AND CSA C860-01.
- DESIGN FEATURES:
  - WALL, END-TO-WALL OR CEILING MOUNTING AS INDICATED. FIELD ADAPTABLE, UNIVERSAL MOUNT.
  - SINGLE OR DOUBLE FACED AS INDICATED. FACEPLATE TO REMAIN CAPTIVE FOR MAINTENANCE.
  - STEM HANGER COMPLETE WITH BALL ALIGNER TO AVOID OBSTRUCTIONS AND TO ASSURE VISIBILITY IN MECHANICAL AREAS.
  - HOUSING TO BE EXTRUDED ALUMINUM - WHITE IN COLOUR, OPTICAL DIFFUSER FOR EVEN ILLUMINATION.
  - SOLID-STATE DESIGN, LONG LIFE, NON-PROTRUDING, HIGH BRIGHTNESS LED'S, MINIMUM 25 YEAR LIFE. MAXIMUM OF 5 WATTS PER UNIT (DOUBLE FACED). ACRYLIC BARRIER TO PROTECT LED'S.
- STANDARD OF ACCEPTANCE: AIMLITE RPEL-U-BSH-HDC-CWCH

### 11.0 EMERGENCY LIGHTING

- EMERGENCY LIGHTING BATTERY UNITS SHALL COMPLY WITH AND BE CERTIFIED TO CONFORM WITH CSA C22.2 NO. 141. BATTERY UNITS SHALL HAVE THE FOLLOWING FEATURES:
  - SUPPLY VOLTAGE - 120V AC; OUTPUT VOLTAGE - 12V DC; CAPACITY - WATT CAPACITY FOR 30 MINUTES.
  - BATTERY - SEALED RECOMBINANT LEAD CALCIUM, 10 YEAR LIFE, MAINTENANCE FREE, IN POLYPROPYLENE, LEAK-PROOF CONTAINER, 3 YEAR FULL REPLACEMENT WARRANTY.
  - CHARGER: SOLID STATE, MULTI-RATE, VOLTAGE/CURRENT REGULATED, INVERSE TEMPERATURE COMPENSATED, AND SHORT CIRCUIT PROTECTED.
  - LOW VOLTAGE DISCONNECT - SOLID STATE, MODULAR, OPERATIONAL AT 80% BATTERY OUTPUT VOLTAGE.
  - INDICATOR LIGHTS - LED TYPE FOR AC POWER ON AND 'HIGH CHARGE'.
  - CABINET - SUITABLE FOR SHELF MOUNTING TO WALL AND COMPLETE WITH KNOCKOUTS FOR CONDUITS, TAN FINISH.
  - AUXILIARY EQUIPMENT - LAMP DISCONNECT SWITCH; TEST SWITCH; BATTERY DISCONNECT DEVICE; AC INPUT AND DC OUTPUT TERMINAL BLOCKS INSIDE CABINET; MOUNTING SLUG; CAP AND PLUG CONNECTION FOR 120V AC, 3 WIRE CABTIRE CORD WITH 3 PRONG PLUG; RFI SUPPRESSORS.
- STANDARD OF ACCEPTANCE: LUMACELL, EXIDE, LUMAD OR EQUAL.
- REMOTE LAMP HEADS:
  - REMOTE LAMP HEADS TO BE SAME MANUFACTURER AS BATTERY UNIT, WITH THE FOLLOWING FEATURES:
    - 12V DC OPERATION, 5W LED LAMPS.
    - PLASTIC/COMPOSITION BODY AND PLATE, ADJUSTABLE MOUNTING, SWIVEL TYPE COMPLETE WITH TUNGSTEN COMPOSITE LAMP. SUITABLE FOR MOUNTING ON SURFACE MOUNTED OCTAGON BOX.
- MAKE: LUMACELL MODEL: MQM2N-L

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Director, Security & Facilities

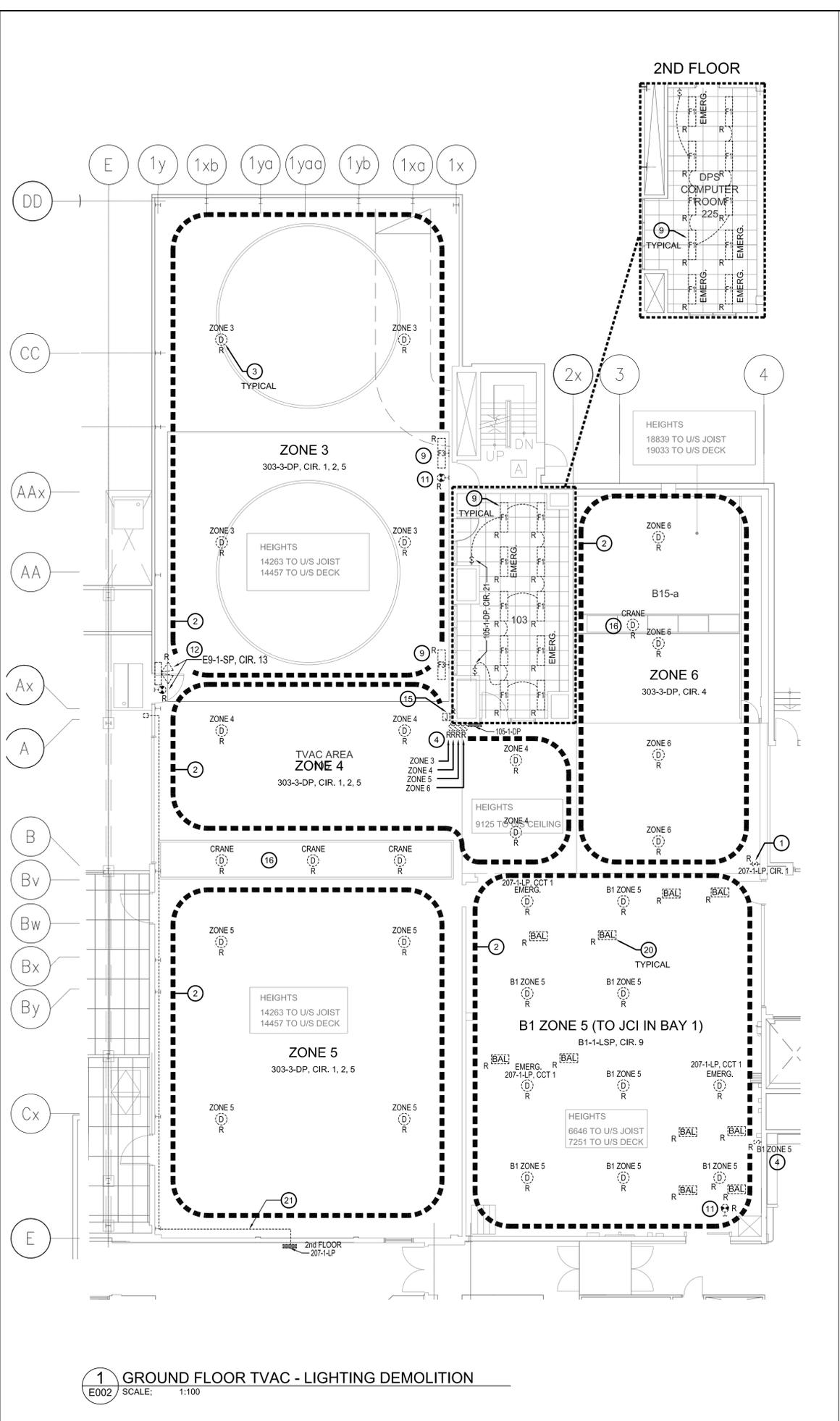
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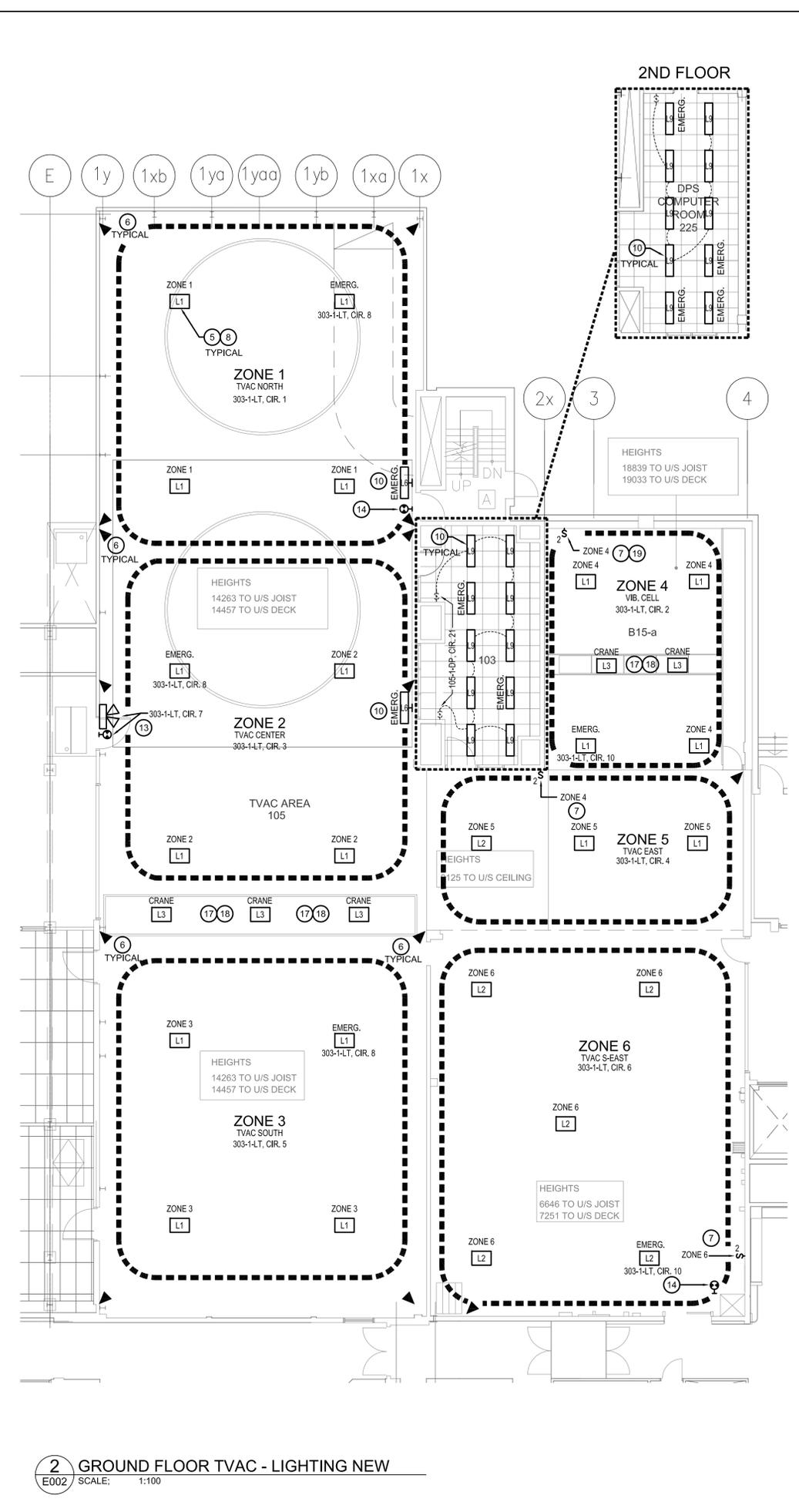
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**1** GROUND FLOOR TVAC - LIGHTING DEMOLITION  
E002 SCALE: 1:100



**2** GROUND FLOOR TVAC - LIGHTING NEW  
E002 SCALE: 1:100

- GENERAL NOTES**
- CONTRACTOR TO PROVIDE EQUIPMENT TARPING AND FLOOR PROTECTION FOR THE ENTIRE CONSTRUCTION AREA IN ACCORDANCE WITH CSA-DFL STANDARD. REFER TO "GENERAL DFL NOTES" NO. 15-18 ON DRAWING E001.
- DRAWING NOTES**
- REMOVE EXISTING KEYSWITCH LIGHT SWITCH C/W CONDUIT AND WIRING BACK TO PANEL 207-1-LP IN ROOM 207.
  - EXISTING LIGHTING ZONE TO BE MODIFIED TO SUIT NEW FIXTURE LAYOUT. REFER TO DETAIL 2 ON THIS DRAWING FOR NEW ZONES.
  - REMOVE CEILING MOUNTED HIGH-BAY LIGHT FIXTURE C/W WIRING AND CONDUIT BACK TO SOURCE. PATCH SAND PRIME AND PAINT CEILING TO A WHITE COLOUR FINISH. REMOVE LOW VOLTAGE LIGHTING CONTROLS FROM EACH FIXTURE C/W CONDUIT AND WIRING BACK TO JOHNSON CONTROLS PANEL (JCI) IN ROOM M3.
  - REMOVE EXISTING LOW VOLTAGE SWITCH C/W CONDUIT AND WIRING BACK TO JOHNSON CONTROLS PANEL (JCI) IN ROOM M3. EXISTING FIXTURES IN LIGHTING CONTROL ZONE 'B1 ZONE 5' ARE CONTROLLED BY JCI BOX IN BAY 1 (REFER TO DRAWING E001). SOURCE PANEL FOR THESE FIXTURES IS IN BAY 1. REMOVE EXISTING WALL LAMINACOID NAMEPLATE.
  - PROVIDE CEILING MOUNTED LIGHTING FIXTURE. PROVIDE NEW CONDUIT AND WIRING AS INDICATED.
  - PROVIDE WALL MOUNTED PASSIVE INFRARED OCCUPANCY SENSOR. SENSOR TO BE WALL MOUNTED AT 3000mm AFF. EXACT LOCATION OF SENSOR TO BE DETERMINED ON SITE WITH DEPARTMENTAL REPRESENTATIVE. PROVIDE CONDUIT AND WIRING BACK TO WATTSTOPPER CONTROL SYSTEM. SENSORS MAY BE DAISY CHAINED.
  - PROVIDE LOW VOLTAGE SCENE SWITCH. LABEL ZONES WITH CLEAR P-TOUCH LABELS WITH BLACK LETTERING ON COVERS. PROVIDE CONDUIT AND WIRING BACK TO NEW WATTSTOPPER LIGHTING CONTROLS SYSTEM.
  - PROVIDE NEW 0-10V CLASS 2 CONTROL WIRING FOR DIMMING CONTROL IN CONDUIT FROM NEW WATTSTOPPER CONTROL SYSTEM TO EACH NEW TYPE L1/L2/L3 LIGHT FIXTURE. WIRING SHALL BE DAISY CHAINED FOR ALL LIGHTS WITHIN EACH CIRCUIT. EACH CIRCUIT SHALL HAVE ONE (1) HOME RUN TO THE LIGHTING CONTROL SYSTEM.
  - REMOVE EXISTING 120V LIGHT FIXTURE. PATCH, SAND, PRIME, AND PAINT WALL TO MATCH EXISTING. MAINTAIN EXISTING CONDUIT AND WIRING FOR CONNECTION OF NEW FIXTURE.
  - PROVIDE NEW 120V LIGHT FIXTURE AND DIMMABLE CONTROL WIRING. MODIFY/EXTEND CONDUIT AND WIRING AS REQUIRED TO SUIT NEW FIXTURE INSTALLATION. MAINTAIN EXISTING CIRCUITING.
  - REMOVE EXISTING EXIT LIGHT. MAINTAIN EXISTING CIRCUIT FOR CONNECTION TO NEW RUNNING MAN EXIT LIGHT.
  - REMOVE EMERGENCY 347V EXIT LIGHT AND BATTERY UNIT WITH REMOTE HEADS. REMOVE WIRING AND CONDUIT BACK TO SOURCE.
  - PROVIDE NEW RUNNING MAN EXIT LIGHT AND EMERGENCY BATTERY UNIT WITH REMOTE HEADS. PROVIDE WIRING AND CONDUIT AND CIRCUIT AS INDICATED. MOUNTING, ORIENTATION, FACES, CHEVRONS, AND ACCESSORIES TO MATCH EXISTING.
  - PROVIDE NEW RUNNING MAN EXIT LIGHT. CONNECT TO EXISTING CIRCUIT. MODIFY/EXTEND CONDUIT AND WIRING AS REQUIRED. MOUNTING, ORIENTATION, FACES, CHEVRONS, AND ACCESSORIES TO MATCH EXISTING.
  - REMOVE EXISTING JUNCTION BOX. WIRING AND CONDUIT ASSOCIATED 347V HIGH-BAY LIGHTING.
  - REMOVE HIGH-BAY LIGHT FIXTURE MOUNTED ON UNDERSIDE OF CRANE. TURN FIXTURE OVER TO DEPARTMENTAL REPRESENTATIVE. CONTRACTOR SHALL MAINTAIN CONDUIT, WIRING AND CONTROLS FOR REPLACEMENT OF THESE FIXTURES WITH NEW LED FIXTURES AS INDICATED ON DETAIL 2 ON THIS DRAWING.
  - PROVIDE NEW LIGHT FIXTURE. MOUNT TO UNDERSIDE OF BRIDGE CRANE ON EXISTING SUPPORTS. MODIFY SUPPORTS AS REQUIRED TO SUIT NEW FIXTURES. PROVIDE CONDUIT/WIRING NEW TRANSFORMER TO NEW FIXTURE. LIGHTING TO BE CONTROLLED BY POWER TO THE CRANE.
  - PROVIDE NEW 600V-120V, 3KVA, THREE-PHASE DELTA-WYE TRANSFORMER. CONNECT PRIMARY TO OVERHEAD BRIDGE CRANES 600V POWER SUPPLY AND SECONDARY TO NEW LIGHTING FIXTURES. TRANSFORMER TO BE C/W OVERLOAD FUSING ON PRIMARY AND SECONDARY SIDE AND JUNCTION BOXES TO HOUSE FUSING. COORDINATE LOCATION OF TRANSFORMER AND JUNCTION BOXES ON CRANE. ON SITE WITH DEPARTMENTAL REPRESENTATIVE. EACH FIXTURE IS TO BE CONNECTED TO INDIVIDUAL PHASE FOR BALANCE.
  - LIGHTING CONTROL ZONE 6 IS OPEN TO THE BASEMENT LEVEL BELOW. THE NEW SWITCH INSIDE ZONE 6 SHALL BE MOUNTED ADJACENT TO THE DOOR IN BASEMENT LEVEL. CONFIRM EXACT SWITCH LOCATION ON SITE WITH DEPARTMENTAL REPRESENTATIVE.
  - REMOVE ABANDONED LIGHTING BALLASTS IN THIS ZONE AND ALL ASSOCIATED WIRING AND CONDUIT BACK TO SOURCE.
  - REMOVE EXISTING ABANDONED CONDUIT AND WIRE BACK TO SOURCE IN PANEL 207-1-SP ON SECOND FLOOR.

Canadian Space Agency / Agence spatiale canadienne

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plan plan

AREA OF WORK

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No.	Revision	Date

**LICENCED PROFESSIONAL ENGINEER**  
M. MANSOUR  
100138114  
PROVINCE OF ONTARIO

PROFESSIONAL STAMP

A	A
C	B/C

project: **DAVID FLORIDA LABORATORY**  
BUILDING No. 65, SHIRLEY'S BAY, ONTARIO  
LIGHTING ENERGY EFFICIENCY UPGRADE  
PHASE II - TVAC GROUND FLOOR

drawing: **DEMOLITION AND NEW LIGHTING AND CONTROLS LAYOUT** design

designed: **M. MANSOUR** concu  
date: **SEPT 2015**

drawn: **M. MANSOUR** dessine  
date: **SEPT 2015**

reviewed: **AG** examine  
date: **SEPT 2015**

approved: **M. FARID** approve  
date: **SEPT 2015**

scale: **AS INDICATED**

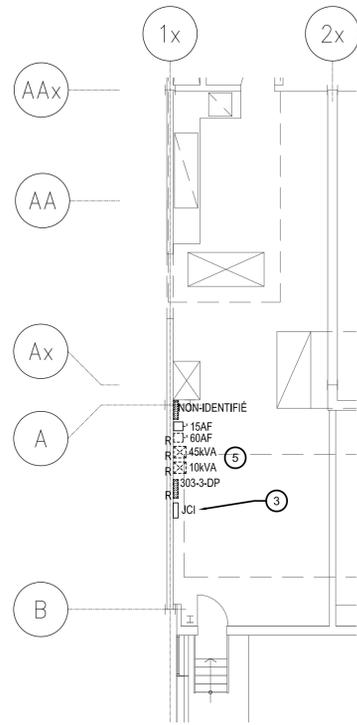
project no.: **CSA15-E3b** no. du projet

drawing no.: **E002** no. du dessin

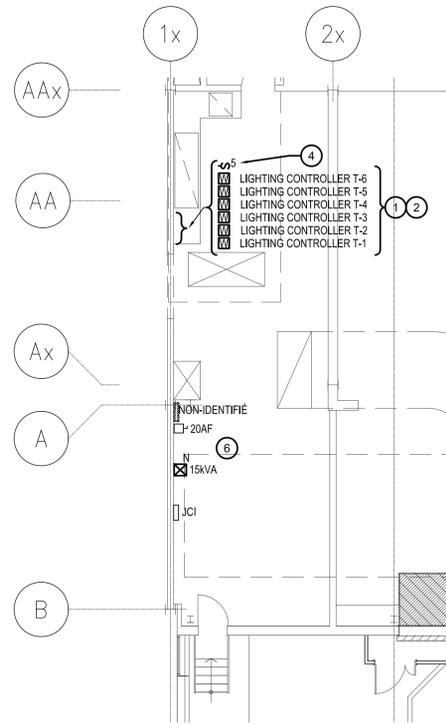


DRAWING NOTES

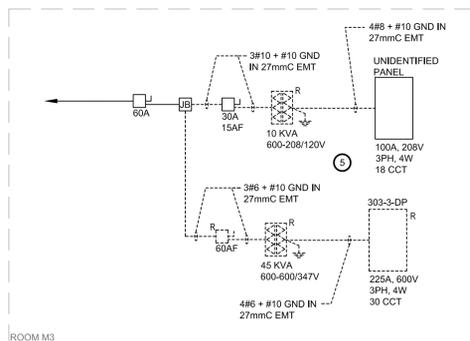
- PROVIDE NEW LIGHTING CONTROLLER, CIRCUIT AS INDICATED. PROVIDE NEW 20A-1P BREAKERS IN PANEL AS REQUIRED. LABEL EACH LIGHTING CONTROLLER WITH CLEAR P-TOUCH LABEL INDICATING LIGHTING CONTROLLER NUMBER, DESCRIPTION OF LIGHTS FED, SOURCE PANEL AND CIRCUIT NUMBER. PROVIDE NEW UPDATED TYPE-WRITTEN PANEL SCHEDULE FOR NEW PANEL 303-1-LT TO INDICATE NEW LIGHTING LOADS.
- PROVIDE NEW NEMA TYPE 2 ENCLOSURE FOR SECURITY OF THE LIGHTING CONTROLS. SIZE ENCLOSURE TO SUIT INSTALLATION OF ALL WATTSTOPPER MODULES AND ASSOCIATED IO MODULES, AND PERIPHERALS. ENCLOSURE MUST HAVE LOCKABLE COVER. FINAL LOCATION OF ENCLOSURE TO BE FINALIZED ON SITE WITH THE PROJECT MANAGER.
- EXISTING JOHNSON CONTROLS PANEL FOR TIE-IN TO NEW WATTSTOPPER LIGHTING CONTROL SYSTEM. CONTRACTOR TO RETAIN THE SERVICES OF JOHNSON CONTROLS INC. FOR ALL RESPECTIVE WORK RELATING TO THE EXISTING LIGHTING CONTROL SYSTEM IN THE BUILDING. CSA SHALL PROVIDE THE CONTACT PERSON AT JOHNSON CONTROLS FAMILIAR WITH THE DFL BUILDING, UPON CONTRACT AWARD.
- PROVIDE ONE (1) LOW VOLTAGE FIVE-BUTTON SCENE SWITCH. LABEL ZONES WITH CLEAR P-TOUCH LABELS WITH BLACK LETTERING ON COVERPLATE. PROVIDE CONDUIT AND WIRING BACK TO NEW WATTSTOPPER LIGHTING CONTROLS SYSTEM IN MECHANICAL ROOM M3 ON THIRD FLOOR.
- DISCONNECT AND REMOVE EXISTING WALL MOUNTED 10KVA AND 45KVA TRANSFORMERS, PANEL 303-3-DP AND 60A DISCONNECT. REMOVE EXISTING ASSOCIATED WIRING AND CONDUIT. REFER TO SINGLE LINE DIAGRAM FOR CONNECTION DETAILS.
- PROVIDE 15KVA WALL-MOUNTED TRANSFORMER AND 20A CLASS J FUSE IN EXISTING DISCONNECT. CONNECT TO EXISTING 100A UNIDENTIFIED PANEL. REFER TO SINGLE LINE DIAGRAM FOR CONNECTION DETAILS. PROVIDE SEISMIC RESTRAINTS FOR THE NEW TRANSFORMER. RETAIN A STRUCTURAL ENGINEER IN THE PROVINCE OF ONTARIO TO CERTIFY SEISMIC BRACING. ROOM M3 HAS LIMITED PHYSICAL ACCESS. CONSIDERATION IS NEEDED TO LIFT TRANSFORMER.
- PROVIDE BREAKER AS INDICATED. EXISTING PANEL SQUARE-D



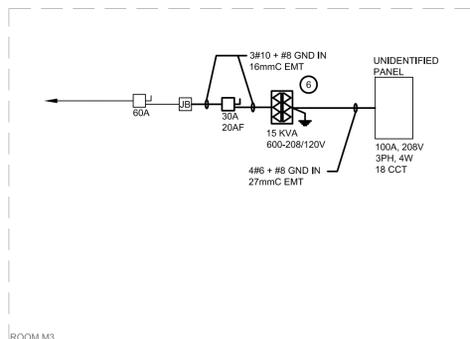
1 THIRD FLOOR PARTIAL PLAN - ROOM M3  
POWE AND LIGHTING CONTROLS DEMOLITION  
E003 SCALE: 1:100



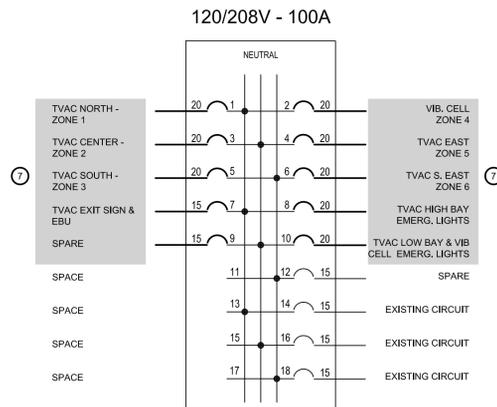
2 THIRD FLOOR PARTIAL PLAN - ROOM M3  
POWER AND LIGHTING CONTROLS NEW  
E003 SCALE: 1:100



3 SINGLE LINE DIAGRAM - DEMOLITION  
E003 SCALE: N.T.S.



4 SINGLE LINE DIAGRAM - NEW  
E003 SCALE: N.T.S.



5 PANEL SCHEDULE - NEW  
E003 SCALE: N.T.S.

FIXTURE SCHEDULE	
TYPE	DESCRIPTION
L1	PRE-PURCHASED HIGH BAY LUMINAIRE 6 MODULE LED (SUPPLIED BY OWNER)  VOLTAGE INPUT: 120V OUTPUT: VERY HIGH OUTPUT MIN. COLOUR TEMP: 4000K OPTICS BEAM: 40° NARROW MOUNTING: 1/2" THREADED ROD MOUNT KIT DIMMING: 0-10V DIMMABLE SYSTEM WATTS: 539W MAKE: GE MODEL: ABH3-0-6-V-48-4-N-N-22-K-N-W  BOTTOM OF FIXTURE LEVEL WITH UNDERSIDE OF OPEN WEB STEEL JOISTS. FIXTURE TO BE MOUNTED TO TWO (2) UNISTRUTS BRACED ACROSS THE TOP OF TWO ADJACENT OPEN-WEB-STEEL JOISTS. THE USE OF THREADED ROD SHALL BE MINIMIZED.
L2	PRE-PURCHASED HIGH BAY LUMINAIRE 4 MODULE LED (SUPPLIED BY OWNER)  VOLTAGE INPUT: 120V OUTPUT: VERY HIGH OUTPUT MIN. COLOUR TEMP: 4000K OPTICS BEAM: 40° NARROW MOUNTING: 1/2" THREADED ROD MOUNT KIT DIMMING: 0-10V DIMMABLE SYSTEM WATTS: 359W MAKE: GE MODEL: ABH3-0-4-V-48-4-N-N-22-K-N-W  BOTTOM OF FIXTURE LEVEL WITH UNDERSIDE OF OPEN WEB STEEL JOISTS. FIXTURE TO BE MOUNTED TO TWO (2) UNISTRUTS BRACED ACROSS THE TOP OF TWO ADJACENT OPEN-WEB-STEEL JOISTS. THE USE OF THREADED ROD SHALL BE MINIMIZED.
L3	PRE-PURCHASED HIGH BAY LUMINAIRE 3 MODULE LED (SUPPLIED BY OWNER)  VOLTAGE INPUT: 120V OUTPUT: VERY HIGH OUTPUT MIN. COLOUR TEMP: 4000K OPTICS BEAM: 40° NARROW MOUNTING: 1/2" THREADED ROD MOUNT KIT DIMMING: 0-10V DIMMABLE SYSTEM WATTS: 270W MAKE: GE MODEL: ABH3-0-3-V-48-4-N-N-22-K-N-W  SURFACE MOUNTED TO BOTTOM OF CRANE
L9	PRE-PURCHASED RECESSED, LAY-IN TILE 1220X 305mm LED LUMINAIRE (SUPPLIED BY OWNER)  VOLTAGE INPUT: 120V MINIMUM CRI: 85 MIN. COLOUR TEMP: 4000K NOMINAL LUMENS: 3,600 SYSTEM WATTS: 39W DIMMING: 0-10V DIMMABLE LENS: FROSTED, PRISMATIC ACRYLIC LENS, FIXLATION-FREE HOUSING: 22-GAUGE DIE-FORMED COLD-ROLLED STEEL HOUSING CWV FLAT ALUMINUM DOOR, T-SLOT HINGE ALLOWS REVERSIBLE HINGING AND LATCHING, FULLY ENCLOSED SPRING-LOADED CAMP LATCHES. RATING: UL FINISH: WHITE POWDER COAT MAKE: METALUX MODEL: 14GRFA-LD4-36-F1-UNV-L840-CD1-G3-U

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1.	ISSUED FOR TENDER	JULY 2016
No.	Revision	Date



project  
DAVID FLORIDA LABORATORY  
BUILDING No. 65, SHIRLEY'S BAY, ONTARIO  
LIGHTING ENERGY  
EFFICIENCY UPGRADE  
PHASE II - TVAC GROUND  
FLOOR

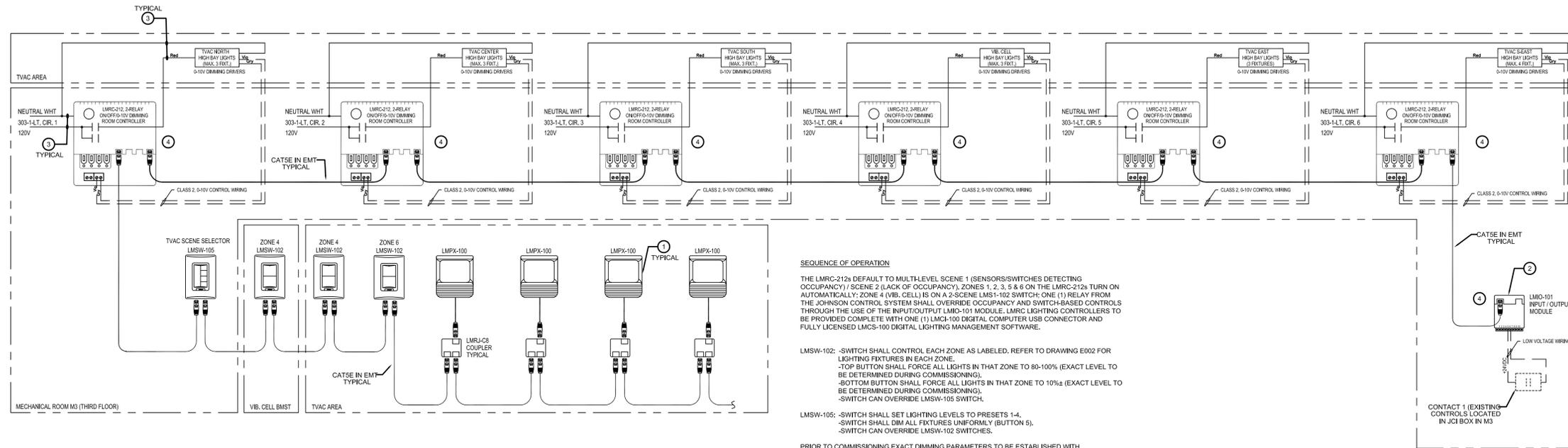
drawing  
DESIGNATION  
DEMOLITION AND NEW  
POWER LAYOUT  
AND SCHEDULES

designed	M. MANSOUR	conçu
date	SEPT 2015	
drawn	M. MANSOUR	dessiné
date	SEPT 2015	
reviewed	AG	examiné
date	SEPT 2015	
approved	M. FARID	approuvé
date	SEPT 2015	
scale	AS INDICATED	

project no.  
CSA15-E3b  
drawing no.  
E003

**DRAWING NOTES**

- 1 REFER TO DETAIL 2/E004 FOR OCCUPANCY SENSOR INSTALLATION DETAILS.
- 2 PROVIDE NEW LMO-101 MODULE.
- 3 TYPICAL FOR ALL: MINIMUM WIRE SIZE FOR LIGHTING CIRCUITS IS #8 AWG. EACH CIRCUIT TO BE INSTALLED IN A SEPARATE CONDUIT.
- 4 PROVIDE NEW NEMA TYPE 2 ENCLOSURE FOR SECURITY OF THE LIGHTING CONTROLS. SIZE ENCLOSURE TO SUIT INSTALLATION OF ALL WATSTOPPER MODULES AND ASSOCIATED I/O MODULES, AND PERIPHERALS. ENCLOSURE MUST HAVE LOCKABLE COVER. FINAL LOCATION OF ENCLOSURE TO BE FINALIZED ON SITE WITH THE PROJECT MANAGER.



**SEQUENCE OF OPERATION**

THE LMR-C-212s DEFAULT TO MULTI-LEVEL SCENE 1 (SENSORS/SWITCHES DETECTING OCCUPANCY) / SCENE 2 (LACK OF OCCUPANCY). ZONES 1, 2, 3, 5 & 6 ON THE LMR-C-212s TURN ON AUTOMATICALLY; ZONE 4 (VIB. CELL) IS ON A 2-SCENE LMS-1-102 SWITCH; ONE (1) RELAY FROM THE JOHNSON CONTROL SYSTEM SHALL OVERRIDE OCCUPANCY AND SWITCH-BASED CONTROLS THROUGH THE USE OF THE INPUT/OUTPUT LMO-101 MODULE. LMR-C LIGHTING CONTROLLERS TO BE PROVIDED COMPLETE WITH ONE (1) LMR-C-100 DIGITAL COMPUTER USB CONNECTOR AND FULLY LICENSED LMCS-100 DIGITAL LIGHTING MANAGEMENT SOFTWARE.

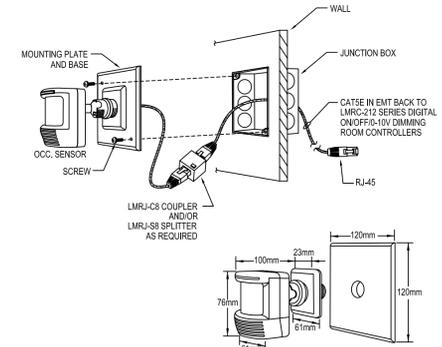
**LMSW-102:** - SWITCH SHALL CONTROL EACH ZONE AS LABELED, REFER TO DRAWING E002 FOR LIGHTING FIXTURES IN EACH ZONE.  
- TOP BUTTON SHALL FORCE ALL LIGHTS IN THAT ZONE TO 80-100% (EXACT LEVEL TO BE DETERMINED DURING COMMISSIONING).  
- BOTTOM BUTTON SHALL FORCE ALL LIGHTS IN THAT ZONE TO 10%± (EXACT LEVEL TO BE DETERMINED DURING COMMISSIONING).  
- SWITCH CAN OVERRIDE LMSW-105 SWITCH.

**LMSW-105:** - SWITCH SHALL SET LIGHTING LEVELS TO PRESETS 1-4.  
- SWITCH SHALL DIM ALL FIXTURES UNIFORMLY (BUTTON 5).  
- SWITCH CAN OVERRIDE LMSW-102 SWITCHES.

PRIOR TO COMMISSIONING EXACT DIMMING PARAMETERS TO BE ESTABLISHED WITH DEPARTMENTAL REPRESENTATIVE INCLUDING LEVELS FOR PRESET SCENES 1-4; FADE TIMES; AND FADE AND RAMP RATES, BLINK WARNING ETC.

RETAIN THE SERVICES OF THE MANUFACTURER'S TECHNICAL REPRESENTATIVE (OR QUALIFIED TECHNICIAN) AND PROVIDE ALL NECESSARY EQUIPMENT TO PROGRAM, TEST, AND COMMISSION THE LIGHTING CONTROLS SYSTEM ON SITE. RETAIN THE SERVICES OF THE BAS SYSTEM MANUFACTURER FOR INTEGRATION OF THE NEW LIGHTING CONTROL SYSTEM TO THE BUILDING AUTOMATION CONTROLS SYSTEM. ALL WORK, INCLUDING BUT NOT LIMITED TO PROGRAMMING, CONTROL WIRING AND HARDWARE CHANGES REQUIRED TO INTERFACE WITH THE EXISTING BAS SYSTEM SHALL BE PERFORMED BY THE EXISTING BUILDING AUTOMATION CONTROLS SYSTEM MANUFACTURER.

**1 TVAC AREA LIGHTING CONTROL SCHEMATIC**  
SCALE: N.T.S.



**2 OCCUPANCY SENSOR INSTALLATION DETAILS**  
SCALE: N.T.S.

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project: **DAVID FLORIDA LABORATORY**  
BUILDING No. 65, SHIRLEY'S BAY, ONTARIO  
**LIGHTING ENERGY EFFICIENCY UPGRADE PHASE II - TVAC GROUND FLOOR**

drawing: **CONTROL DETAILS**

designed	M. MANSOUR	conçu
date	SEPT 2015	
drawn	M. MANSOUR	dessiné
date	SEPT 2015	
reviewed	AG	examiné
date	SEPT 2015	
approved	M. FARID	approuvé
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drawing no.	E004	no. du dessin