



Canadian Food Inspection Agency

Agence canadienne d'inspection des aliments

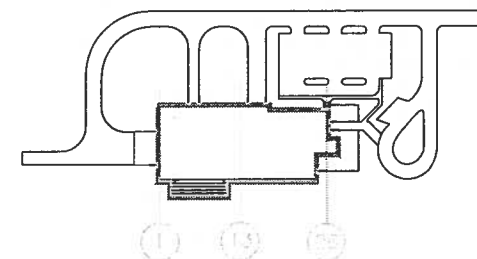
EXHAUST PLENUM BOXES REPLACEMENT CHARLOTTETOWN LAB

MECHANICAL

M-001	ROOF LEVEL DEMOLITION AND NEW CONSTRUCTION LAYOUT PLAN
M-002	PENTHOUSE LEVEL DEMOLITION AND NEW CONSTRUCTION LAYOUT PLAN
M-003	GROUND FLOOR DEMOLITION AND NEW CONSTRUCTION LAYOUT PLAN
M-004	MECHANICAL DETAILS
M-005	CONTROL DETAILS
M-006	MECHANICAL SCHEDULES AND NOTES

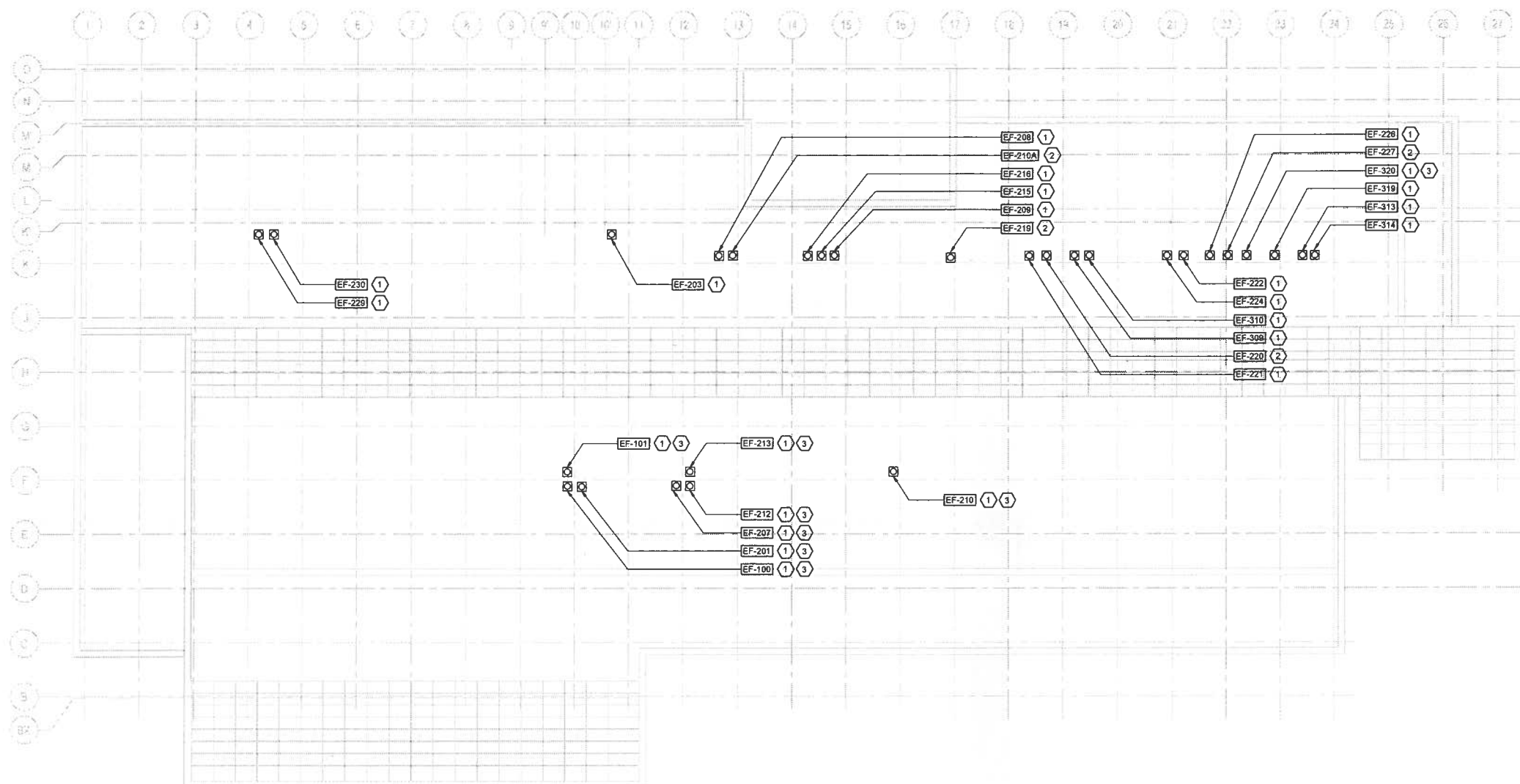
ELECTRICAL

E-001 PENTHOUSE LEVEL ELECTRICAL LAYOUT AND SINGLE LINE



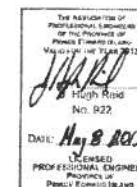
REV 0 - ISSUED FOR TENDER - MAY 8, 2013

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PLAN - ROOF LEVEL NEW CONSTRUCTION AND DEMOLITION LAYOUT

SCALE: 1:150



GENERAL NOTES:

1. WHEN CUTTING INTO OR PATCHING EXISTING DUCTWORK, INSTALL NEW INSULATION AS REQUIRED TO MATCH SURROUNDING INSULATION TYPE, THICKNESS, JACKET, AND FINISH.
2. REMOVE ALL DEMOLISHED EQUIPMENT FROM SITE AND DISPOSE OF AT APPLICABLE FACILITIES.
3. CONTRACT REQUIRES A COMPLETE AIR FLOW MEASURING SURVEY BE PERFORMED PRIOR TO ANY FAN REMOVALS OR DECOMMISSIONING OF SYSTEMS.

CONSTRUCTION NOTES:

1. EXISTING FAN TO BE REMOVED AND REPLACED WITH NEW FAN. INSTALL NEW FAN ON EXISTING CURB. TIE FAN INTO EXISTING DUCTWORK. SEE DETAIL 1, DWG M-004.
2. EXISTING FAN TO BE REMOVED. CAP EXISTING DUCTWORK. INSTALL CAP ON EXISTING CURB. SEE DETAIL 2 DWG M-004.
3. DECOMMISSION BUILDING CONTROLS SERVING FAN AND ISOLATION DAMPER. FOR DETAILS SEE NOTES ON DWG M-002.
4. REMOVE REDUNDANT CONTROLS WIRING, PNEUMATIC TUBING, DEVICES, ACTUATORS AND CONTROLLERS SERVING THE PLENUM BYPASS DAMPER (FOUND ONLY ON FANS SERVING FUME HOODS). REMOVE BACK TO MAIN CONTROL PANEL.



CLIENT NAME / LOGO:



LEGEND

- FUME HOOD TYPE EXHAUST FAN
- EXHAUST FAN I.D.

0	ISSUED FOR TENDER	H.R.	8MAY2013
REV	DESCRIPTION	APP	DATE

PROJECT NAME:
CFIA EXHAUST
PLENUM BOX REPLACEMENT
CHARLOTTETOWN LAB

JOB LOCATION:
CHARLOTTETOWN, P.E.I.

DRAWING TITLE:
ROOF LEVEL
DEMOLITION AND
NEW CONSTRUCTION
LAYOUT PLAN

DWN BY:	R.S.S.	CKD BY:	P.M.
DES BY:	S.F.	SHT NO:	1 OF 7

SCALE: 1:150

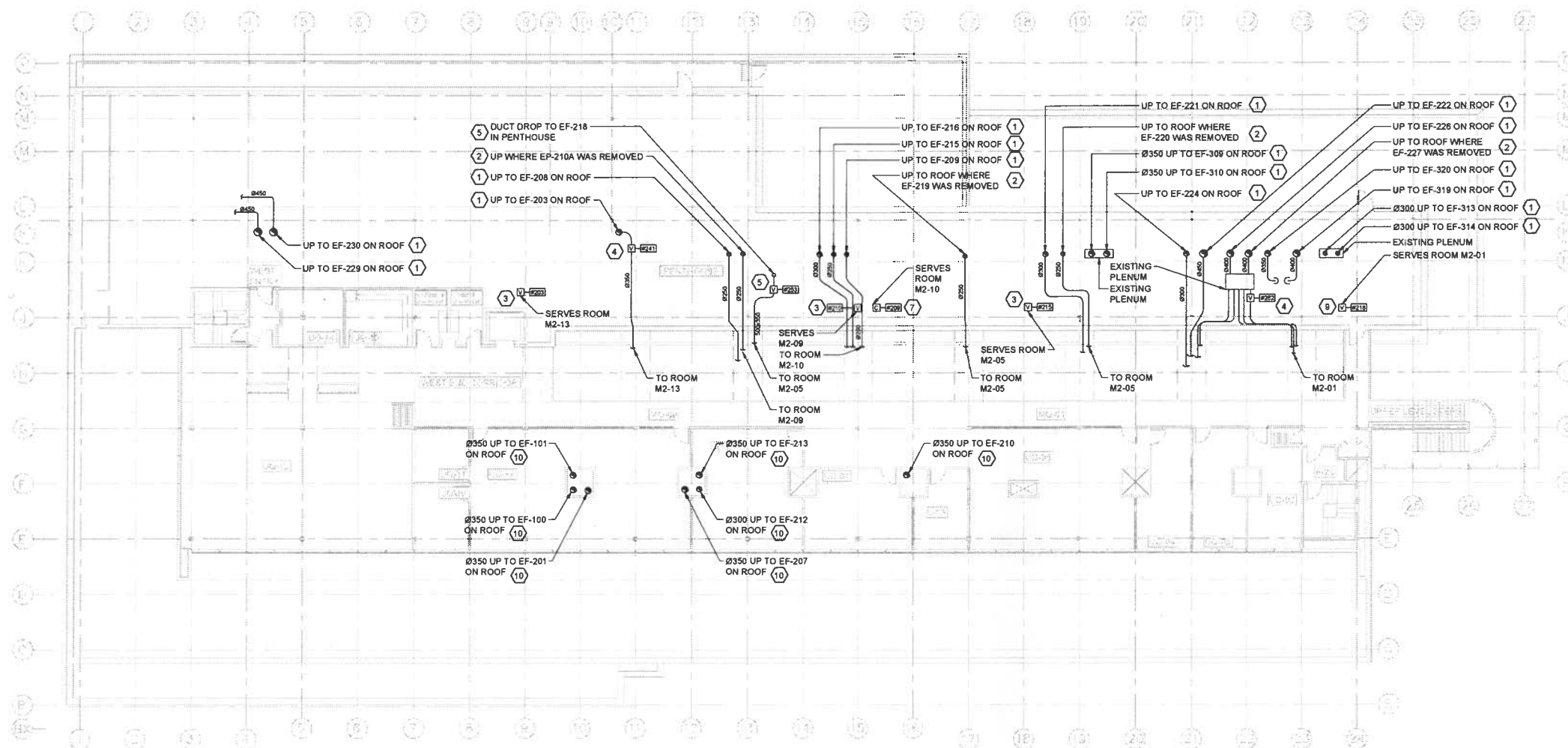
CLIENT JOB NO:	EASTPOINT JOB NO:
-	6006

DRAWING NO:	REV:
M-001	0



 Canadian Food Inspection Agency Agence canadienne d'inspection des aliments

	EXISTING DUCTWORK
	ROUND DUCT CROSS SECTION
	VARIABLE AIR VOLUME (VAV) TERMINAL UNIT
	CONSTANT AIR VOLUME (CAV) TERMINAL UNIT
	TERMINAL UNIT I.D.



5. TIE IN NEW SHORT SECTION OF DUCTWORK FROM NEW FAN INTO EXISTING DUCTWORK AT LOCATION NEAR ROOF PENETRATION. SEE DETAIL 1, DWG M-004.
6. CAP EXISTING DUCT AT LOCATION NEAR ROOF PENETRATION. SEE DETAIL 2, DWG M-004.
 - DECOMMISSION BUILDING CONTROLS PROGRAMMING FOR EXHAUST FAN AND ISOLATION DAMPER. LEAVE ALL PHYSICAL CONTROLS WIRING, CONTROLS DEVICES, PNEUMATIC LINES, CONTROLLERS, ETC IN PLACE SERVING ISOLATION DAMPER CONTROL AND EXHAUST FAN STATUS. REMOVE REFERENCE TO EXHAUST FAN AND ISOLATION DAMPER FROM GRAPHICAL USER INTERFACE, CONTROL SCHEMATICS AND SEQUENCE OF OPERATION.
7. REPLACE EXISTING SUPPLY VARIABLE VOLUME AIR TERMINAL UNIT (VAV) WITH NEW UNIT AS PER EQUIPMENT SCHEDULE ON DWG M-006.
 - TIE NEW TERMINAL UNIT INTO EXISTING DUCTWORK AS PER DETAIL 3, DWG M-004.
 - TIE IN REHEAT COIL INTO EXISTING HEATING SUPPLY AND RETURN AS PER DETAIL 4, DWG M-004.
 - TIE IN TO EXISTING BUILDING CONTROLS AS PER DWG M-005.
8. REPLACE EXISTING EXHAUST AIR VARIABLE VOLUME TERMINAL UNIT (VAV) WITH NEW UNIT AS PER EQUIPMENT SCHEDULE ON DWG M-006.
 - TIE NEW TERMINAL UNIT INTO EXISTING DUCTWORK AS PER DETAIL 7, DWG M-004.
 - TIE IN TO EXISTING BUILDING CONTROLS AS PER DWG M-005.
9. REPLACE EXISTING EXHAUST AIR VARIABLE VOLUME TERMINAL UNIT (VAV) WITH NEW UNIT AS PER EQUIPMENT SCHEDULE ON DWG M-006.
 - TIE NEW TERMINAL UNIT INTO EXISTING DUCTWORK AS PER DETAIL 5, DWG M-004.
 - TIE IN TO EXISTING BUILDING CONTROLS AS PER DWG M-005.
 - BLANK OFF EXISTING DUCTWORK LEAVING EXISTING CENTRIFUGAL EXHAUST FAN EF-217 AND FAN TO REMAIN ON SITE AS A SPARE. EXHAUST FAN EF-218 TO REMAIN IN USE. SEE DETAIL 5, DWG M-004 FOR DUCTING MODIFICATION DETAILS.
 - CHANGE OUT FAN MOTOR SHAFTS AND BELTS ON EF-218 TO MEET REQUIRED MAXIMUM AIRFLOW OF 810 U.S. REQUIRED STATIC PRESSURE AT NEW AIRFLOW CONDITION TO BE CALCULATED BASED ON FLOW AND STATIC MEASUREMENTS OF EXHAUST FAN OPERATING AT EXISTING CONDITIONS BEFORE MODIFICATIONS. COORDINATE WITH AIR BALANCING CONTRACTOR.
 - UPDATE SEQUENCE OF OPERATION FOR EF-218 AS FOLLOWS:
 - OCCUPIED (DAYTIME) OPERATING MODE: FAN EF-218 TO OPERATE AT FULL SPEED.
 - UNOCCUPIED (NIGHT/SETBACK) MODE: FAN EF-218 TO OPERATE AT REDUCED SPEED (2 SPEED MOTOR).
 - LOCK OUT POWER SUPPLY TO REHEAT COILS ON EF-217. LEAVE ALL PHYSICAL CONTROLS WIRING, CONTROLS DEVICES, PNEUMATIC LINES, CONTROLLERS, ETC IN PLACE SERVING ISOLATION DAMPER AND EXHAUST FAN. REMOVE REFERENCE TO EXHAUST FAN EF-217 AND ISOLATION DAMPER FROM GRAPHICAL USER INTERFACE, CONTROL SCHEMATICS AND SEQUENCE OF OPERATION.
10. NOT USED
11. REPLACE EXISTING SUPPLY AIR CONSTANT VOLUME TERMINAL UNIT (CAV) WITH NEW UNIT AS PER EQUIPMENT SCHEDULE ON DWG M-006.
 - TIE NEW TERMINAL UNIT INTO EXISTING DUCTWORK AS PER DETAIL 6, DWG M-004.
 - TIE IN REHEAT COIL INTO EXISTING HEATING SUPPLY AND RETURN AS PER DETAIL 4, DWG M-004.
 - REMOVE EXISTING HEPA FILTER ASSEMBLY AND CENTRIFUGAL SUPPLY FAN SF-208 AND INSTALL NEW DUCTWORK AS SHOWN IN DETAIL 6, DWG M-004. REMOVE ELECTRICAL POWER WIRING SERVING SF-208 BACK TO BACK TO PANEL OR MCC (REF ELECTRICAL DWG E-001). REMOVE REFERENCE TO SF-208, HEPA FILTER, AND HEAP FILTER DIFFERENTIAL PRESSURE GAUGES FROM BAS GRAPHICAL USER INTERFACE CONTROL SCHEMATICS, AND SEQUENCE OF OPERATION.
12. NOT USED
13. REPLACE TWO EXISTING SUPPLY AIR VARIABLE VOLUME TERMINAL UNITS (VAV'S) #218 AND #218A WITH ONE NEW VAV AS PER EQUIPMENT SCHEDULE ON DWG M-006.
 - TIE NEW TERMINAL UNIT INTO EXISTING DUCTWORK AS PER DETAIL 3, DWG M-004.
 - TIE IN TO EXISTING BUILDING CONTROLS AS PER DWG M-005.
14. TIE IN NEW SHORT SECTION OF DUCTWORK FROM NEW FAN INTO EXISTING DUCTWORK AT LOCATION NEAR ROOF PENETRATION. SEE DETAIL 1, DWG M-004. CUT ACCESS HOLES INTO EXISTING DUCT CHASE AS REQUIRED TO MAKE DUCT CONNECTION. REINSTATE ACCESS HOLES IN CHASE TO MATCH SURROUNDING CONDITIONS.

SCALE: 1:150



1. WHEN CUTTING INTO OR PATCHING EXISTING DUCTWORK, INSTALL NEW INSULATION AS REQUIRED TO MATCH SURROUNDING INSULATION TYPE, THICKNESS, JACKET, AND FINISH.
2. WHEN CUTTING INTO OR PATCHING EXISTING PIPEWORK, INSTALL NEW INSULATION AS REQUIRED TO MATCH SURROUNDING INSULATION TYPE, THICKNESS, JACKET, AND FINISH.
3. DUCT SIZES SHOWN ON DRAWING BASED ON ORIGINAL CONSTRUCTION DRAWINGS CONTRACTOR TO VERIFY ACTUAL DUCT SIZES BEFORE ORDERING EQUIPMENT.
4. REMOVE ALL DEMOLISHED EQUIPMENT FROM SITE AND DISPOSE OF AT APPLICABLE FACILITIES.

THE ASSOCIATION OF
PROFESSIONAL ENGINEERS OF
THE PROVINCE OF
PELAWANG ISLAND ISLAND
VALID FOR THE YEAR 2013

SHARIF

No. 922













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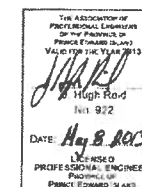
LEASING
PROFESSIONAL ENGINEER
PROVINCE OF
PELAWANG ISLAND

0	ISSUED FOR TENDER	H.R.	8MAY2013
REV	DESCRIPTION	APP	DATE
PROJECT NAME			
CFIA EXHAUST PLENUM BOX REPLACEMENT CHARLOTTETOWN LAB			
JOB LOCATION:			
CHARLOTTETOWN, P.E.I.			
DRAWING TITLE:			
PENTHOUSE LEVEL DEMOLITION AND NEW CONSTRUCTION LAYOUT PLAN			
DWN BY:	R.S.S.	CKD BY:	P.M.
DES BY:	S.F.	SHT NO:	2 OF 7
SCALE:		1:150	
CLIENT JOB NO:		EASTPOINT JOB NO:	
-		6006	
DRAWING NO:		REV:	
M-002		0	



LEGEND

- | | |
|---|--|
|  | EXISTING EXHAUST DUCTWORK |
|  | EXISTING SUPPLY AIR |
|  | ROUND DUCT CROSS SECTION |
|  | RECTANGULAR DUCT CROSS SECTION |
|  | EXISTING EXHAUST GRILLE |
|  | EXISTING SUPPLY DIFFUSER |
|  | EXISTING EXHAUST GRILLE TO BE REMOVED |
|  | EXISTING BIOLOGICAL SAFETY CABINET (BSC) |
|  | GRILLE/DIFFUSER I.D. |
|  | AIR FLOW (L/s) |
|  | EXISTING FUME HOOD CABINET |
|  | EXISTING CANOPY HOOD |



GROUND FLOOR PLAN - DUCT MODIFICATIONS AND AIR BALANCING

SCALE: 1:150

1:150



CONSTRUCTION NOTES:

1. EXISTING BSC TO BE MODIFIED FROM COMBINATION RECIRCULATION/EXHAUST MODE TO RECIRCULATION ONLY MODE *BY OWNER*.
 - REMOVE SECTION OF DUCT FROM BSC TO ABOVE CEILING. CAP EXISTING DUCT IN CEILING SPACE ABOVE BSC. PATCH CEILING AND PAINT TO MATCH SURROUNDING CONDITIONS.
 - REMOVE REFERENCE TO BSC FROM BUILDING CONTROLS GRAPHICAL USER INTERFACE.
2. EXHAUST SYSTEM TO BE DECOMMISSIONED (FORMER ROOFTOP FAN EF-220).
 - REMOVE EXHAUST GRILLE FROM CEILING. CAP EXISTING EXHAUST DUCTING IN CEILING SPACE. PATCH CEILING AND PAINT TO MATCH SURROUNDING CONDITIONS.
 - DECOMMISSION BUILDING CONTROLS PROGRAMMING AND UPDATE USER INTERFACE GRAPHICS. REMOVE REFERENCE TO "OLD BSC", AND ASSOCIATED CAV BOX FROM BUILDING CONTROLS GRAPHICAL USER INTERFACE. SEE CONSTRUCTION NOTES ON DWG M-002 FOR ADDITIONAL FAN DECOMMISSIONING REQUIREMENTS.
3. EXHAUST SYSTEM TO BE DECOMMISSIONED (FORMER ROOFTOP FAN EF-219).
 - EXISTING BSC TO BE MODIFIED FROM COMBINATION RECIRCULATION/EXHAUST MODE TO RECIRCULATION ONLY MODE *BY OWNER*.
 - REMOVE SECTION OF DUCT FROM BSC TO ABOVE CEILING. CAP EXISTING DUCT IN CEILING SPACE ABOVE BSC. PATCH CEILING AND PAINT TO MATCH SURROUNDING CONDITIONS.
 - DECOMMISSION BUILDING CONTROLS PROGRAMMING AND UPDATE USER INTERFACE GRAPHICS. REMOVE REFERENCE TO BSC AND ASSOCIATED CAV BOX FROM BUILDING CONTROLS GRAPHICAL USER INTERFACE. SEE CONSTRUCTION NOTES ON DWG M-002 FOR ADDITIONAL FAN DECOMMISSIONING REQUIREMENTS.
4. EXISTING BSC TO BE MODIFIED FROM COMBINATION RECIRCULATION/EXHAUST MODE TO RECIRCULATION ONLY MODE *BY OWNER*.
 - REMOVE SECTION OF DUCT FROM BSC TO ABOVE CEILING. CAP EXISTING DUCT IN CEILING SPACE ABOVE BSC. PATCH CEILING AND PAINT TO MATCH SURROUNDING CONDITIONS.
 - REMOVE REFERENCE TO BSC AND ASSOCIATED CAV BOX FROM BUILDING CONTROLS USER INTERFACE.
5. EXHAUST GRILLE FROM CEILING. CAP EXISTING EXHAUST DUCTING IN CEILING SPACE. PATCH CEILING AND PAINT TO MATCH SURROUNDING CONDITIONS.
 - REMOVE REFERENCE TO "OLD BSC" AND ASSOCIATED CAV BOX FROM BUILDING CONTROLS GRAPHICAL USER INTERFACE.
6. EXISTING BIOLOGICAL SAFETY CABINET (BAKER, B2) AND CONNECTED DUCTWORK TO REMAIN AS IS (NO MODIFICATIONS REQUIRED).
7. EXHAUST SYSTEM TO BE DECOMMISSIONED (FORMER ROOFTOP FAN EF-210A).
 - REMOVE SECTION OF DUCT FROM TOP OF CANOPY HOOD TO ABOVE CEILING. CAP EXISTING DUCT IN CEILING SPACE. PATCH CEILING AND PAINT TO MATCH SURROUNDING CONDITIONS.
 - DECOMMISSION BUILDING CONTROLS PROGRAMMING AND UPDATE USER INTERFACE GRAPHICS. REMOVE REFERENCE TO CANOPY AND ASSOCIATED CAV BOX FROM BUILDING CONTROLS GRAPHICAL USER INTERFACE. SEE CONSTRUCTION NOTES ON DWG M-002 FOR ADDITIONAL FAN DECOMMISSIONING REQUIREMENTS.

GENERAL NOTES:

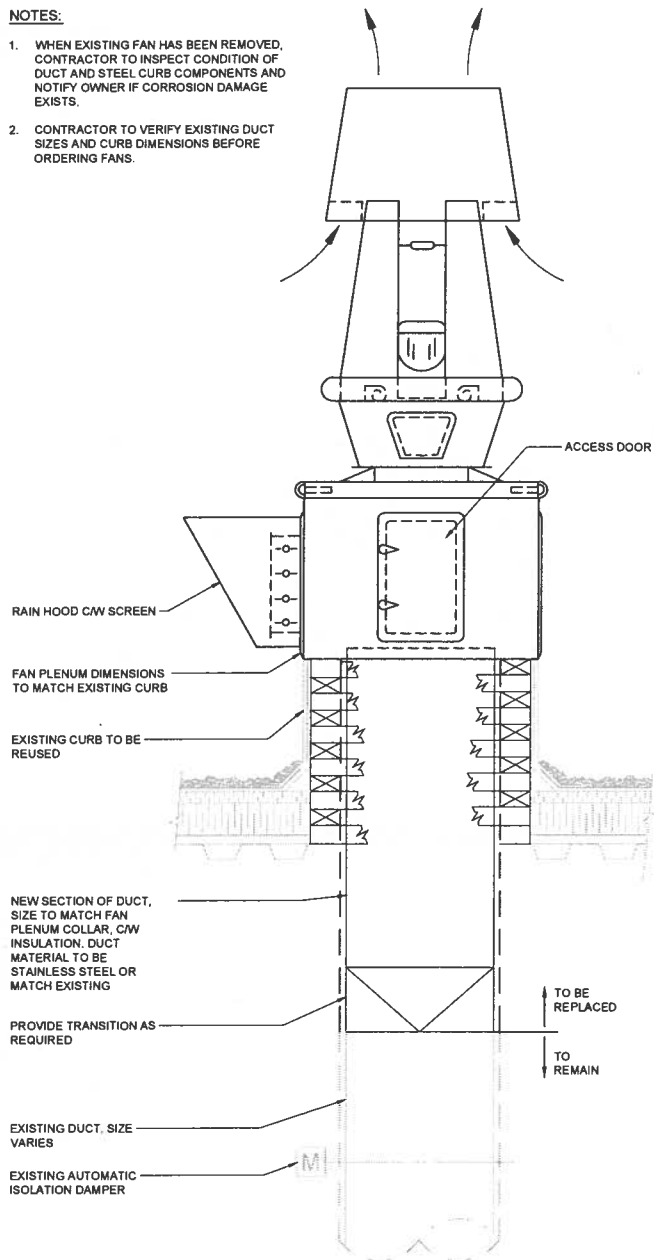
1. ALL EXISTING DIFFUSERS AND GRILLES TO BE REBALANCED FOR NEW AIR FLOWS AS SHOWN. AIR FLOWS SHOWN HAVE BEEN DETERMINED BASED ON EXISTING AS-BUILT INFORMATION FOR THE BUILDING AND ARE SUBJECT TO CHANGE BASED ON RESULTS OF EXISTING CONDITIONS AIRFLOW SURVEY. CONFIRM FINAL AIRFLOW FIGURES WITH PROJECT ENGINEER BEFORE PERFORMING REBALANCE.
2. WHEN CUTTING INTO OR PATCHING EXISTING DUCTWORK, INSTALL NEW INSULATION AS REQUIRED TO MATCH SURROUNDING INSULATION TYPE, THICKNESS, JACKET, AND FINISH.
3. DUCT LAYOUT AND SIZES SHOWN ON DRAWING BASED ON ORIGINAL CONSTRUCTION DRAWINGS. CONTRACTOR TO VERIFY ACTUAL DUCT LAYOUT AND SIZES BEFORE PERFORMING MODIFICATIONS.
4. REMOVE ALL DEMOLISHED EQUIPMENT FROM SITE AND DISPOSE OF AT APPLICABLE FACILITIES.
5. UPON COMPLETION OF EXHAUST FAN REPLACEMENT AND BALANCING, ARRANGE FOR FIELD CERTIFICATION OF ALL EXISTING FUME HOODS, AND CLASS II BIOLOGICAL SAFETY CABINETS, AS PER THE FOLLOWING LIST. OBTAIN CERTIFICATION SERVICES FROM CURRENT PROVIDER IN BUILDING OR APPROVED EQUAL. RE-CERTIFY FUME HOODS TO REQUIREMENTS DETAILED IN *CSA Z316.5-04 (R2009) FUME HOODS AND ASSOCIATED EXHAUST SYSTEMS*. RE-CERTIFY BIOLOGICAL SAFETY CABINETS TO REQUIREMENTS LISTED IN *NSF/ANSI 49 - 2012 BIOSAFETY CABINETS. DESIGN CONSTRUCTION, PERFORMANCE AND FIELD CERTIFICATION*.

LAB ID	FUME HOOD DR BSC	EXHAUST FAN ID
M3-02	FUME HOOD	EF-100
M3-04	FUME HOOD	EF-101
M2-15	FUME HOOD	EF-201
M2-14	FUME HOOD	EF-207
M2-09	FUME HOOD	EF-21C
M2-08	FUME HOOD	EF-213
M3-03	FUME HOOD	EF-32C
M2-01	BSC (BAKER B2)	EF-22E
M2-01	BSC	N/A (RECIPIENT)
M2-01	BSC	N/A (RECIPIENT)
M2-05	BSC	N/A (RECIPIENT)
M2-10	BSC	N/A (RECIPIENT)

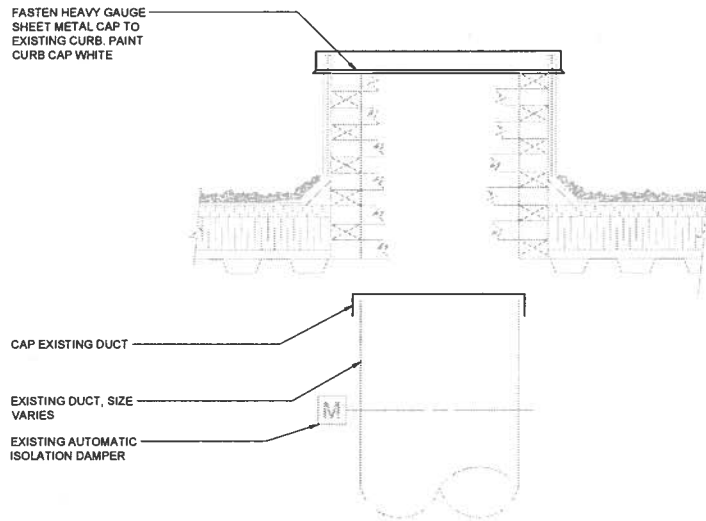
THE HOUSE & L.L. LAL, INC. 241-241

NOTES:

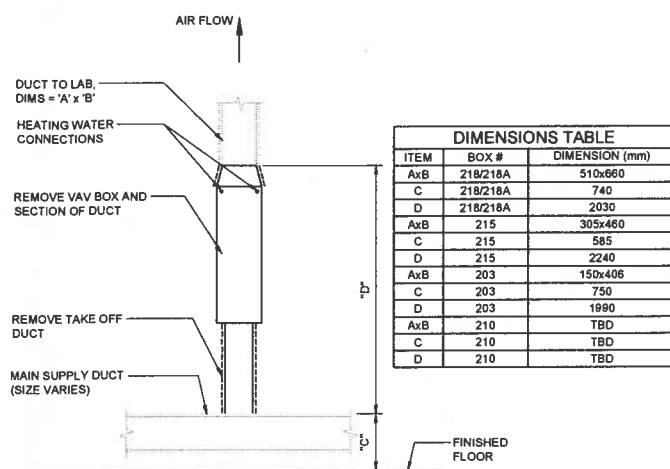
1. WHEN EXISTING FAN HAS BEEN REMOVED, CONTRACTOR TO INSPECT CONDITION OF DUCT AND STEEL CURB COMPONENTS AND NOTIFY OWNER IF CORROSION DAMAGE EXISTS.
2. CONTRACTOR TO VERIFY EXISTING DUCT SIZES AND CURB DIMENSIONS BEFORE ORDERING FANS.



1 DETAIL - ROOFTOP FAN REPLACEMENT
M-001 / M-002 SCALE: N.T.S.

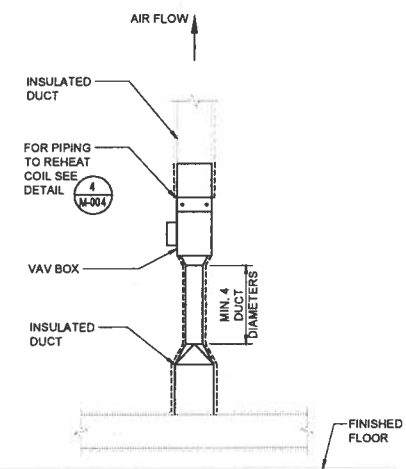


2 DETAIL - CAP EXISTING CURB
M-001 / M-002 SCALE: N.T.S.

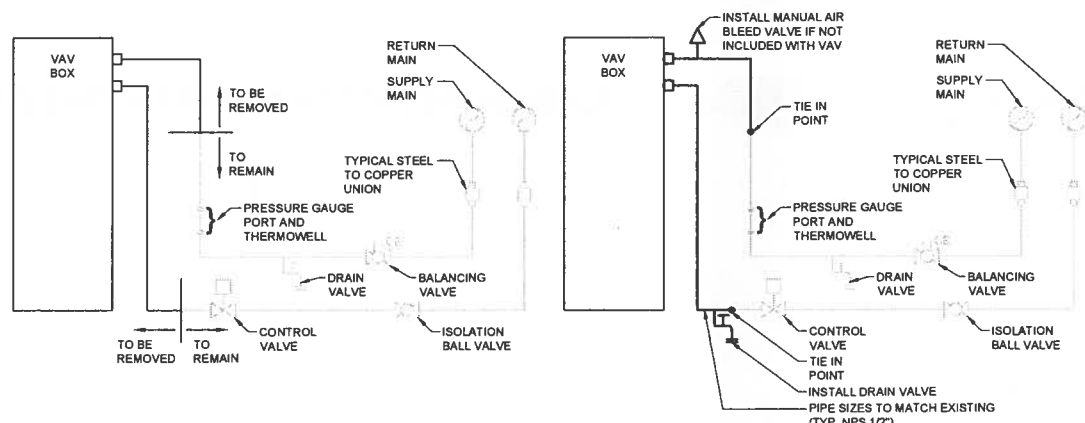


DEMOLITION

3 ELEVATION - VERTICALLY MOUNTED SUPPLY AIR VAV
OR CAV TYPICAL FOR VAV #218/218A, 215, 203, 210
M-002 SCALE: 1:30



NEW CONSTRUCTION

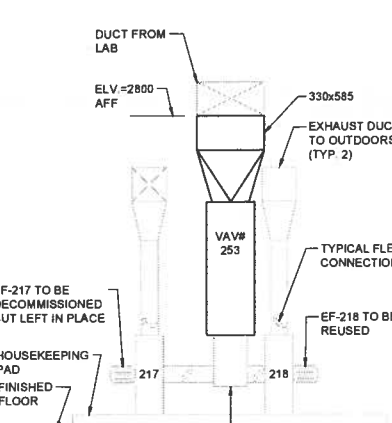


DEMOLITION

NEW CONSTRUCTION

4 TYPICAL HOT WATER PIPING FOR VAV AND
CAV BOXES #218, 215, 203, 209, 210
M-002 / M-004 SCALE: N.T.S.

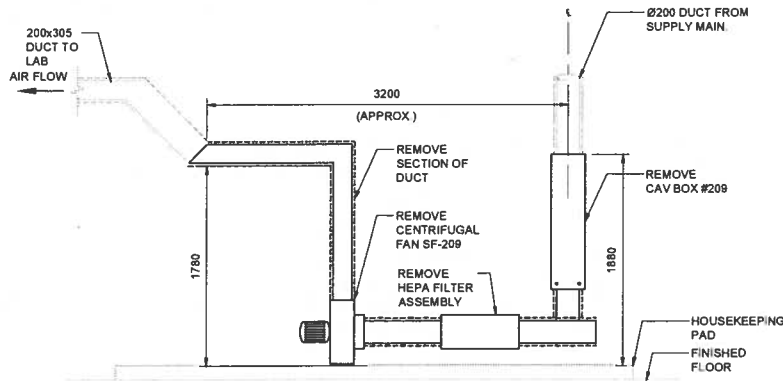
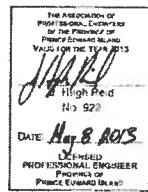
NOTE: EXISTING VAV #218 INCLUDES TWO SETS OF HEATING WATER BRANCH PIPES CONTROL VALVES, ETC. SERVING TWO REHEAT COILS. ONLY ONE CONTROL VALVE IS REQUIRED FOR RE-USE. UNUSED BRANCH PIPES TO BE CAPPED.



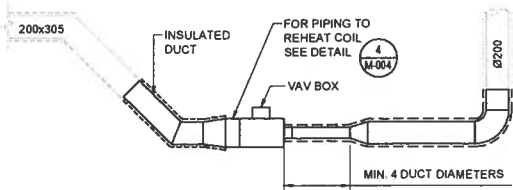
DEMOLITION

NEW CONSTRUCTION

5 ELEVATION - EXHAUST
AIR VAV #253
M-002 SCALE: 1:30



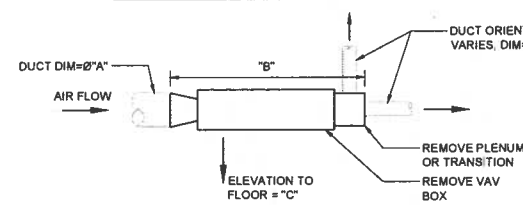
DEMOLITION



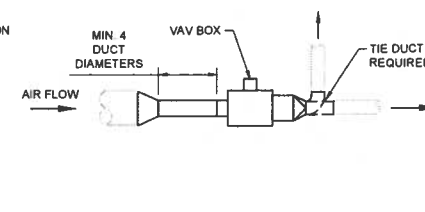
NEW CONSTRUCTION

6 ELEVATION - DEMOLITION OF CAV #209, HEPA FILTER
AND BOOSTER FAN
M-002 SCALE: 1:30

DIMENSIONS TABLE		
ITEM	BOX #	DIMENSION (mm)
ØA	246	250
B	246	2200
C	246	3050
ØA	241	350
B	241	2240
C	241	2440



DEMOLITION



NEW CONSTRUCTION

7 ELEVATION - HORIZONTALLY MOUNTED EXHAUST
AIR VAV TYPICAL FOR VAV #262, 241
M-002 SCALE: 1:30



CLIENT NAME / LOGO:

Canadian Food Inspection Agency Agence canadienne d'inspection des aliments

LEGEND:

INSULATED DUCT

0 ISSUED FOR TENDER H.R. 8MAY2013

REV DESCRIPTION APP DATE

PROJECT NAME:
CFIA EXHAUST
PLENUM BOX REPLACEMENT
CHARLOTTETOWN LAB

JOB LOCATION:
CHARLOTTETOWN, P.E.I.

DRAWING TITLE:

MECHANICAL
DETAILS

DWN BY: R.S.S. CKD BY: P.M.

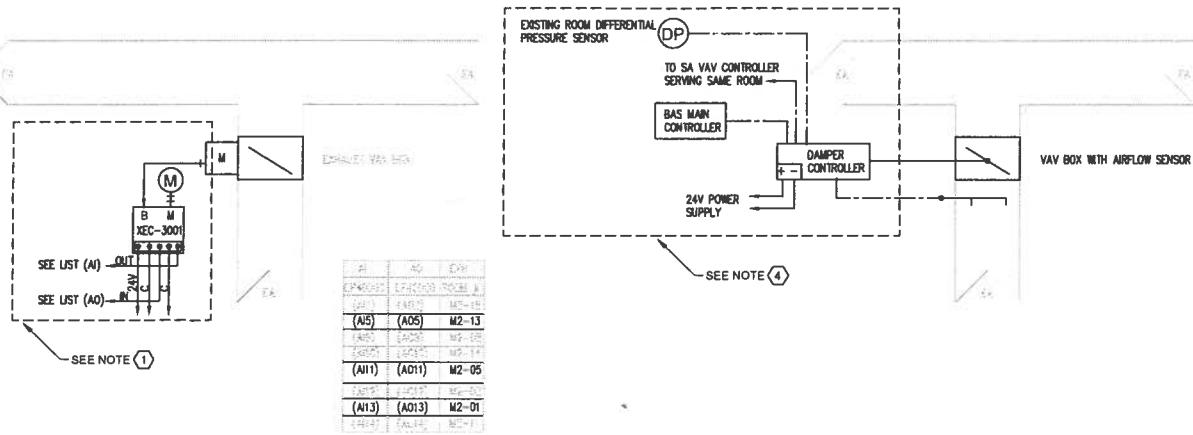
DES BY: S.F. SHT NO: 4 OF 7

SCALE: AS SHOWN

CLIENT JOB NO: EASTPOINT JOB NO:
6006

DRAWING NO: M-004 REV: 0

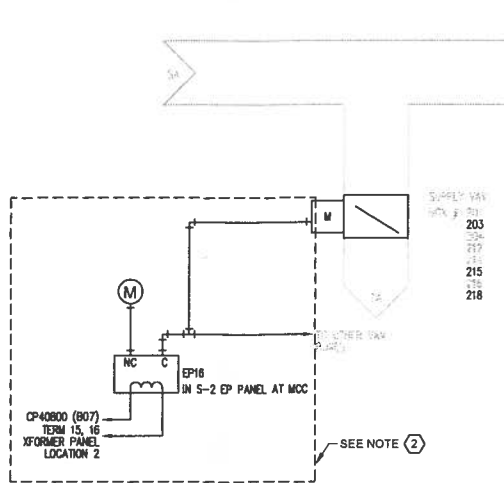
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DEMOLITION

NEW CONSTRUCTION

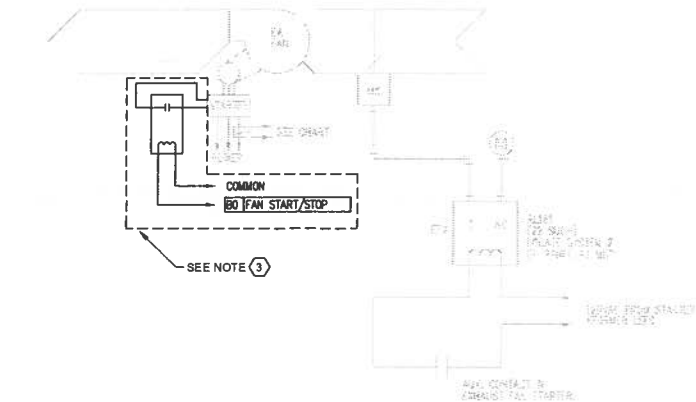
1 DETAIL - LEVEL 2 ROOM PRESSURE CONTROL EXHAUST VAV TYPICAL FOR VAV # 262, 253, 241
M-005 SCALE: N.T.S.



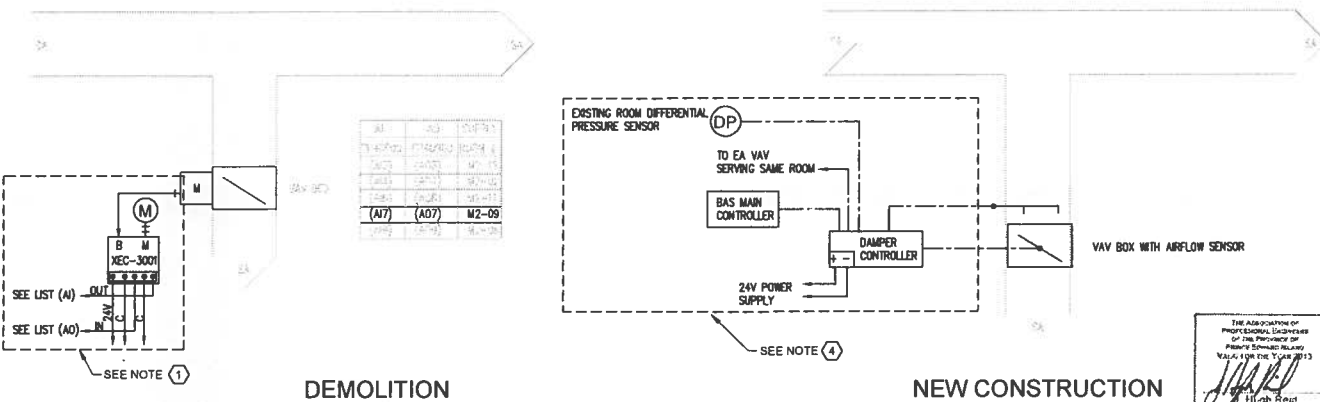
DEMOLITION

NEW CONSTRUCTION

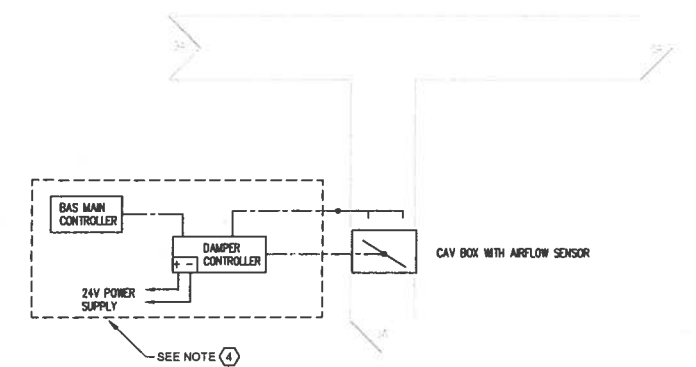
2 DETAIL - SYSTEM 2 SUPPLY AIR CONSTANT VOLUME WITH NIGHT SETBACK TYPICAL FOR VAV # 203, 215, 218
M-005 SCALE: N.T.S.



3 DETAIL - SYSTEM 1 & 2 EXHAUST FAN AND DAMPER CONTROLS TYPICAL FOR 19 FANS
M-005 SCALE: N.T.S.



4 DETAIL - LEVEL 2 ROOM PRESSURE CONTROL SUPPLY VAV TYPICAL FOR VAV # 210
M-005 SCALE: N.T.S.



5 DETAIL - LEVEL 2 CONSTANT VOLUME CAV TYPICAL FOR CAV # 209
M-005 SCALE: N.T.S.

GENERAL NOTES

- EXISTING BUILDING AUTOMATIC CONTROLS SYSTEM IS A DELTA CONTROLS SYSTEM. ALL TIE IN TO OR MODIFICATION OF EXISTING BUILDING CONTROLS SYSTEMS TO BE PERFORMED BY CURRENT CONTROLS PROVIDER.
- SCHEMATIC DRAWINGS, POINTS ID, PANEL #S, CONTROLLER #S ETC SHOWN ON THIS DRAWING ARE FROM THE DELTA CONTROLS AS-BUILT DRAWINGS. CONTROLS CONTRACTOR TO CONFIRM ALL INFORMATION ON SITE.
- PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOUR REQUIRED TO COMPLETE ALL WORK AS INDICATED ON THIS DRAWING, IN THE PROJECT MECHANICAL AND ELECTRICAL SPECIFICATIONS, AND AS REQUIRED BY CODE.
- PROVIDE UPDATES TO EXISTING SHOP DRAWINGS AND SEQUENCES OF OPERATION UPON COMPLETION OF ALL WORK.
- ALL CONTROL WIRE, LOW VOLTAGE WIRE AND CONDUIT SHALL COMPLY WITH 2012 CANADIAN ELECTRICAL CODE AND ELECTRICAL SPECIFICATION SECTIONS. ALL WIRING SHALL BE CONTAINED IN METAL CONDUIT.
- TIE INTO EXISTING 24V POWER SOURCE WHERE AVAILABLE. PROVIDE ADDITIONAL TRANSFORMERS ONLY IF REQUIRED.
- TIE INTO EXISTING MAIN BAS CONTROL PANELS. PROVIDE ADDITIONAL PANELS OR I/O MODULES ONLY IF REQUIRED.

SCOPE

- SYSTEM 1 AND SYSTEM 2 ROOFTOP EXHAUST FANS THAT ARE BEING REPLACED AS PART OF THIS JOB TO BE TIED INTO THE BUILDING CONTROLS SYSTEM FOR START/STOP CAPABILITIES. SEE DETAILS ON THIS DWG.
- THREE PNEUMATICALLY ACTUATED EXHAUST AIR VAV BOXES AND FOUR PNEUMATICALLY ACTUATED SUPPLY AIR VAV BOXES TO BE REPLACED WITH ELECTRONIC ACTUATED UNITS AND TIED INTO THE BUILDING CONTROLS SYSTEM. ONE CONSTANT VOLUME AIR CAV BOX TO BE REPLACED WITH AN ELECTRONIC ACTUATED VAV BOX AND TIED INTO THE BUILDING CONTROLS SYSTEM. REMOVE ALL REDUNDANT CONTROL EQUIPMENT AND DEVICES INCLUDING PNEUMATIC TUBING, WIRING, SWITCHES, ETC. SEE DETAILS ON THIS DWG.
- UPON REPLACEMENT OF VAV BOXES (ABOVE), THE SPEED OF THE EXISTING SYSTEM # 2 AHU FANS TO BE REDUCED (TO ACCOMMODATE LOWERED AIRFLOWS REQUIRED). COORDINATE WITH AIR BALANCING CONTRACTOR IN ORDER TO PERFORM STATIC PRESSURE AND AIR FLOW MEASUREMENTS OF SYSTEM 2 AHU BEFORE ANY MODIFICATIONS TO SYSTEM TAKE PLACE. UPON COMPLETION OF MODIFICATIONS TO THE SYSTEM, ADJUST SPEED SETPOINT OF THE VFD'S SERVING THE AHU SUPPLY FANS (SF-1 AND SF-2), IN ORDER TO MATCH THE REQUIRED STATIC PRESSURE. PERFORM THE ABOVE FOR BOTH DAY TIME OPERATING AND NIGHTTIME OPERATING SCHEMES.
- SEQUENCE OF OPERATION FOR EXHAUST FAN EF-218 IS TO BE MODIFIED. SEE CONSTRUCTION NOTES ON DWG M-002.
- SEVERAL CONTROL SYSTEMS TO BE DECOMMISSIONED AFTER REMOVAL OF FANS. REFER TO SPECIFIC CONSTRUCTION NOTES ON DWGS M-001 THRU TO M-003 FOR DETAILS.
- UPDATE PROGRAMMING AND GRAPHICAL USER INTERFACE TO REFLECT ANY CHANGES MADE TO THE HVAC SYSTEM. REFER TO SPECIFIC CONSTRUCTION NOTES ON DWGS M-001 THRU TO M-003 FOR DETAILS.

CONSTRUCTION NOTES:

- EXISTING VAV BOX TO BE REMOVED AS PER DWG. M-002. REMOVE REDUNDANT EP TRANSDUCER, PNEUMATIC TUBING, WIRING, ETC. TERMINATE PNEUMATIC TUBING BRANCH NEAR MAIN AND REMOVE WIRING BACK TO JUNCTION BOX OR PANEL.
- EXISTING VAV BOX TO BE REMOVED AS PER DWG. M-002. REMOVE REDUNDANT PNEUMATIC TUBING. TERMINATE PNEUMATIC TUBING BRANCH NEAR MAIN. EXISTING EP TRANSDUCER TO REMAIN IN PLACE AS IT SERVES OTHER EXISTING VAV BOXES. ENSURE THAT FUNCTIONALITY OF OTHER VAV BOXES REMAINS UNCHANGED.

- INSTALL NEW START/STOP CONTROL CAPABILITIES INTEGRATED INTO THE BUILDING AUTOMATION SYSTEM FOR THE FOLLOWING FANS:

EF-100, EF-101, EF-201, EF-203, EF-207, EF-208, EF-209, EF-210, EF-212, EF-213, EF-215, EF-216, EF-221, EF-222, EF-224, EF-226, EF-228, EF-229, EF-230

SEQUENCE OF OPERATION: ISOLATION DAMPER SHALL BE CLOSED WHEN FAN IS OFF. WHEN FAN IS INITIATED ON THROUGH THE BAS, FAN ISOLATION DAMPER SHALL OPEN AND FAN SHALL START. WHEN FAN IS INITIATED OFF THROUGH THE BAS, FAN SHALL STOP AND FAN ISOLATION DAMPER SHALL CLOSE. NOTE: DAMPER OPEN/CLOSE OPERATION BY AUX. CONTACT IN FAN STARTER.

- NEW VAV BOX TO BE INSTALLED AS PER DWG. M-002. INSTALL NEW DAMPER CONTROLLER AND TIE INTO EXISTING BUILDING CONTROLS SYSTEM. COORDINATE WITH AIR BALANCING CONTRACTOR FOR CALIBRATION OF AIRFLOW SENSOR. UPDATE SEQUENCE OF OPERATION FOR LABORATORIES AS PER BELOW. TIE INTO EXISTING ROOM DIFFERENTIAL PRESSURE SENSOR, AND REUSE EXISTING WIRING WHERE AVAILABLE.

MODIFIED SEQUENCE OF OPERATION FOR LABORATORY AIRFLOW CONTROL:

CONSTANT AIRFLOW VOLUME LABS M2-01, M2-05, M2-13

DESCRIPTION: LABORATORY IS CONSIDERED A CONSTANT AIR VOLUME ROOM WITH NIGHT SETBACK. BAS SHALL MONITOR ROOM/HALLWAY PRESSURE DIFFERENTIAL, VAV AIRFLOW, AND VAV DAMPER POSITION. FOR DESIRED AIRFLOWS SET POINTS IN LABORATORIES, REFER TO AIRFLOW SCHEDULE IN APPENDIX 4.

ROOM PRESSURE CONTROL: SUPPLY AIRFLOW SHALL BE CALCULATED AS NECESSARY TO MAINTAIN DESIRED ROOM PRESSURE AS THE EXHAUST AIRFLOW CHANGES FROM DAYTIME OPERATING AIR FLOW TO NIGHT SETBACK OPERATING AIRFLOW. THE SUPPLY AIRFLOW SHALL RESET WHEN DAYTIME OR NIGHT SETBACK OPERATING SCHEMES ARE INITIATED BY THE BAS.

SUPPLY AIRFLOW = EXHAUST AIRFLOW - OFFSET AIRFLOW

WHERE SUPPLY AIRFLOW IS A COMBINATION OF SUPPLY AIR VAV AIRFLOW AND OTHER CONSTANT SUPPLY SOURCES SUCH AS TRANSFER DUCT AIRFLOW, EXHAUST AIRFLOW IS A COMBINATION OF EXHAUST AIR VAV AIRFLOW, AND OTHER CONSTANT EXHAUST DEVICES SUCH AS BIO SAFETY CABINETS, AND OFFSET AIRFLOW IS A USER ENTERED VALUE.

CONSTANT AIRFLOW VOLUME LAB M2-10

DESCRIPTION: LABORATORY IS CONSIDERED A VARIABLE AIR VOLUME ROOM (NO NIGHT SET BACK). BAS SHALL MONITOR VAV AIRFLOW, AND VAV DAMPER POSITION. FOR DESIRED AIRFLOWS SET POINTS IN LABORATORIES, REFER TO AIRFLOW SCHEDULE IN APPENDIX 4.

ROOM PRESSURE CONTROL: SUPPLY AIR VAV SHALL MAINTAIN A CONSTANT AIRFLOW.

VARIABLE AIRFLOW VOLUME LAB M2-09

DESCRIPTION: LABORATORY IS CONSIDERED A VARIABLE AIR VOLUME ROOM (WITH NO NIGHT SET BACK). A FUME HOOD IN THE LABORATORY OPERATES INDEPENDENTLY OF THE BAS. BAS SHALL MONITOR ROOM/HALLWAY PRESSURE DIFFERENTIAL, VAV AIRFLOW, AND VAV DAMPER POSITION. FOR DESIRED AIRFLOW SET POINTS IN LABORATORIES, REFER TO AIRFLOW SCHEDULE IN APPENDIX 4.

ROOM PRESSURE CONTROL: SUPPLY AIR VAV SHALL MODULATE IN ORDER TO MAINTAIN ROOM PRESSURE.

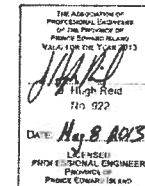


CLIENT NAME / LOGO:

Canadian Food Inspection Agency
Agence canadienne d'inspection des aliments

LEGEND:

--- SCOPE OF WORK
BOXXXX NEW BINARY OUTPUT



REV	DESCRIPTION	APP	DATE
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PROJECT NAME:
**CFIA EXHAUST
PLENUM BOX REPLACEMENT
CHARLOTTETOWN LAB**

JOB LOCATION:
CHARLOTTETOWN, P.E.I.

DRAWING TITLE:

**CONTROLS
DETAILS**

DWN BY:	R.S.S.	CKD BY:	P.M.
DES BY:	S.F.	SHT NO:	5 OF 7

SCALE: AS SHOWN

CLIENT JOB NO:	EASTPOINT JOB NO:
-	6006

DRAWING NO:	REV:
M-005	0

FILE: R006 @ 11 MAY 2013 14:58

ROOFTOP EXHAUST FAN SCHEDULE

TAG	FAN TYPE	LAB # SERVED	EQUIPMENT SERVED	MAX. INLET AIR FLOW ^{1,2} (L/S)	INLET SP ³ (Pa)	HP	MOTOR (V/PH/Hz)	DRIVE	FAN RPM	BYPASS AIR FLOW (L/S)	EXTRACTED AIR FLOW (L/S)	TOTAL AIR FLOW (L/S)	EFF. STACK HT. (M)	WEIGHT (KG)	ACCESSORIES	NOTES	STANDARD OF ACCEPTANCE ¹	
																	MANUFACTURER ¹	MODEL
EF-100	INDUCED FLOW, UPBLAST	M1-02	FUME HOOD	566	632	3	575/3/60	DIRECT, ARR 4	1770	605	995	2166	10	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-101	INDUCED FLOW, UPBLAST	M1-04	FUME HOOD	566	498	3	575/3/60	DIRECT, ARR 4	1770	713	1087	2366	11	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-201	INDUCED FLOW, UPBLAST	M2-15	FUME HOOD	472	461	3	575/3/60	DIRECT, ARR 4	1770	834	1111	2417	11	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-203	INDUCED FLOW, UPBLAST	M2-13	GENERAL EX.	440	430	3	575/3/60	DIRECT, ARR 4	1770	883	1125	2448	11	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-207	INDUCED FLOW, UPBLAST	M2-11	FUME HOOD	472	505	3	575/3/60	DIRECT, ARR 4	1770	798	1079	2349	11	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-208	INDUCED FLOW, UPBLAST	M2-12	GENERAL EX., BSC	321	1089	3	575/3/60	DIRECT, ARR 4	1770	368	586	1275	7	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-209	INDUCED FLOW, UPBLAST	M2-10	GENERAL EX.	164	1071	3	575/3/60	DIRECT, ARR 4	1770	543	602	1309	7	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-210	INDUCED FLOW, UPBLAST	M2-09	FUME HOOD	472	1121	3	575/3/60	DIRECT, ARR 4	1770	142	521	1135	6	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-212	INDUCED FLOW, UPBLAST	M2-08	CANOPY	283	436	3	575/3/60	DIRECT, ARR 4	1770	1005	1096	2384	10	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-213	INDUCED FLOW, UPBLAST	M2-08	FUME HOOD	401	1057	3	575/3/60	DIRECT, ARR 4	1770	325	618	1344	7	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-215	INDUCED FLOW, UPBLAST	M2-07	GENERAL EX., BSC	191	1084	3	575/3/60	DIRECT, ARR 4	1770	498	586	1275	7	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-216	INDUCED FLOW, UPBLAST	M2-06	GENERAL EX., BSC	220	1071	3	575/3/60	DIRECT, ARR 4	1770	467	602	1309	7	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-221	INDUCED FLOW, UPBLAST	M2-02	CANOPY	283	1084	3	575/3/60	DIRECT, ARR 4	1770	406	586	1275	7	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-222	INDUCED FLOW, UPBLAST	M2-02	GENERAL, BENCH HOOD	525	1160	3	575/3/60	DIRECT, ARR 4	1770	4	449	978	6	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-224	INDUCED FLOW, UPBLAST	M2-03	GENERAL EX., BSC	244	983	3	575/3/60	DIRECT, ARR 4	1770	595	713	1552	8	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-226	INDUCED FLOW, UPBLAST	M2-01	BSC, GENERAL EX.	763	1030	3	575/3/60	DIRECT, ARR 4	1770	1	649	1413	7	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-229	INDUCED FLOW, UPBLAST	CHEMICAL STG RM	CANOPY, GENERAL EX.	775	849	3	575/3/60	DIRECT, ARR 4	1770	211	839	1825	9	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-230	INDUCED FLOW, UPBLAST	CHEMICAL STG RM	CANOPY, GENERAL EX.	705	680	3	575/3/60	DIRECT, ARR 4	1770	422	959	2086	9	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT		STROBIC	BS-00218
EF-309	INDUCED FLOW, UPBLAST	M3-26, M3-28, M3-29	(X2) BSC'S, GENERAL EX., TRANSFERS	557	1121	3	575/3/60	DIRECT, ARR 4	1770	57	521	1135	8	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT	EF-309, EF-310 TO BE INSTALLED IN PARALLEL ⁵ INVERTER DUTY MOTOR REQ'D	STROBIC	BS-00218
EF-310	INDUCED FLOW, UPBLAST	M3-26, M3-28, M3-29	(X2) BSC'S, GENERAL EX., TRANSFERS	557	1121	3	575/3/60	DIRECT, ARR 4	1770	57	521	1135	6	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT	EF-309, EF-310 TO BE INSTALLED IN PARALLEL ⁵ INVERTER DUTY MOTOR REQ'D	STROBIC	BS-00218
EF-313	INDUCED FLOW, UPBLAST	M3-06, M3-07, M3-08, AUTOCLAVE RM	(X3) BSC'S, AUTOCLAVE ROOM EXHAUST	328	1148	3	575/3/60	DIRECT, ARR 4	1770	415	635	1378	8	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT	EF-313, EF-314 TO BE INSTALLED IN PARALLEL ⁵ INVERTER DUTY MOTOR REQ'D	STROBIC	BS-00218
EF-314	INDUCED FLOW, UPBLAST	M3-06, M3-07, M3-08, AUTOCLAVE RM	(X3) BSC'S, AUTOCLAVE ROOM EXHAUST	328	1148	3	575/3/60	DIRECT, ARR 4	1770	415	635	1378	8	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT	EF-313, EF-314 TO BE INSTALLED IN PARALLEL ⁵ INVERTER DUTY MOTOR REQ'D	STROBIC	BS-00218
EF-319	INDUCED FLOW, UPBLAST	M3-03	BSC, GENERAL EX.	408	1140	3	575/3/60	DIRECT, ARR 4	1770	92	425	925	6	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT	INVERTER DUTY MOTOR REQ'D	STROBIC	BS-00218
EF-320	INDUCED FLOW, UPBLAST	M3-03	FUME HOOD	401	523	3	575/3/60	DIRECT, ARR 4	1770	859	1071	2331	10	225	PLENUM WITH BYPASS DAMPER ⁴ , DISCONNECT	INVERTER DUTY MOTOR REQ'D	STROBIC	BS-00218

NOTES:

1. OTHER ACCEPTABLE MANUFACTURERS LISTED IN SPECIFICATIONS.
2. LISTED AIRFLOWS AND STATIC PRESSURES ARE REQUIRED FOR DUCTING TO LABORATORIES AND LABORATORY EQUIPMENT. VALUES DO NOT INCORPORATE BYPASS AIR FLOWS.
3. INDIVIDUAL FANS EACH WITH BYPASS PLENUM. COMMON PLENUM INSIDE PENTHOUSE BENEATH ROOF.
4. MANUALLY ADJUSTABLE DAMPER THAT CAN BE LOCKED IN SET POSITION.
5. AIRFLOWS AND STATIC PRESSURES ARE BASED ON EXISTING NAMEPLATE INFORMATION AND BUILDING AS BUILT INFORMATION. ACTUAL FIGURES TO BE CONFIRMED THROUGH AIR BALANCING SURVEY BEFORE EQUIPMENT IS REMOVED.

TERMINAL UNIT (VAV AND CAV) SCHEDULE

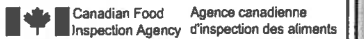
TAG	TYPE	LAB # SERVED	SERVICE		INLET SIZE (MM DIA)	REQ'D MINIMUM AIRFLOW	REQ'D MAXIMUM AIRFLOW	HOT WATER REHEAT COIL							NOTES	STANDARD OF ACCEPTANCE ¹		
			EQUIPMENT	AHU/EXHAUST FAN SYS		(L/S)	(L/S)	# ROWS	ENT AIR TEMP (°C)	LVL AIR TEMP (°C)	ENT WATER TEMP (°C)	LVL WATER TEMP (°C)	CAPACITY (KW)	WATER FLOW (LPM)		MANUFACTURER ¹	MODEL	UNIT SIZE
#216	VAV, SINGLE DUCT	M2-01	LAB SUPPLY AIR	AHU No 2	251	149	604	1	12.7	23.9	93	82	0.02	10.5	FIBRE FREE FOAM LINER. CONTROLS BY OTHERS.	NAILOR	P30RW	10
#262	VAV, SINGLE DUCT	M2-01	GENERAL EXHAUST	EF-226	225	115	570	N/A	N/A	N/A	N/A	N/A	N/A	N/A	FIBRE FREE FOAM LINER. CONTROLS BY OTHERS.	NAILOR	P3001	9
#215	VAV, SINGLE DUCT	M2-05	LAB SUPPLY AIR	AHU No.2	200	90	460	1	12.7	23.9	93	82	0.02	8.0	FIBRE FREE FOAM LINER. CONTROLS BY OTHERS.	NAILOR	P30RW	8
#253	VAV, SINGLE DUCT	M2-05	GENERAL EXHAUST	EF-218	251	240	610	N/A	N/A	N/A	N/A	N/A	N/A	N/A	FIBRE FREE FOAM LINER. CONTROLS BY OTHERS.	NAILOR	P3001	10
#203	VAV, SINGLE DUCT	M2-13	LAB SUPPLY AIR	AHU No 2	149	50	160	1	12.7	23.9	93	82	0.02	2.8	FIBRE FREE FOAM LINER. CONTROLS BY OTHERS.	NAILOR	P30RW	6
#241	VAV, SINGLE DUCT	M2-13	GENERAL EXHAUST	EF-203	225	330	440	N/A	N/A	N/A	N/A	N/A	N/A	N/A	FIBRE FREE FOAM LINER. CONTROLS BY OTHERS.	NAILOR	P3001	9
#209	CAV, SINGLE DUCT	M2-10	LAB SUPPLY AIR	AHU No.2	98	71	71	1	12.7	23.9	93	82	0.02	1.2	FIBRE FREE FOAM LINER. CONTROLS BY OTHERS.	NAILOR	P30RW	4
#210	VAV, SINGLE DUCT	M2-09	LAB SUPPLY AIR	AHU No.2	200	90	400	1	12.7	23.9	93	82	0.02	6.9	FIBRE FREE FOAM LINER. CONTROLS BY OTHERS.	NAILOR	P30RW	8

NOTES:

1. OTHER ACCEPTABLE MANUFACTURERS LISTED IN SPECIFICATIONS.
2. AIR FLOWS SHOWN HAVE BEEN DETERMINED BASED ON EXISTING AS-BUILT INFORMATION FOR THE BUILDING AND ARE SUBJECT TO CHANGE BASED ON RESULTS OF EXISTING CONDITIONS AIRFLOW SURVEY. CONFIRM FINAL AIRFLOW FIGURES WITH PROJECT ENGINEER BEFORE ORDERING EQUIPMENT.



CLIENT NAME / LOGO:



0	ISSUED FOR TENDER	H.R.	8MAY2013
REV	DESCRIPTION	APP	DATE

PROJECT NAME:
CFIA EXHAUST
PLENUM BOX REPLACEMENT
CHARLOTTETOWN LAB

JOB LOCATION:
CHARLOTTETOWN, P.E.I.

DRAWING TITLE:

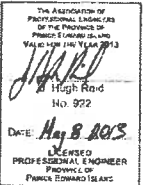
MECHANICAL
SCHEDULE & NOTES

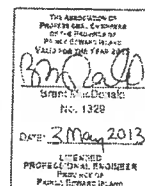
DWN BY:	R.S.S.	CKD BY:	P.M.
DES BY:	S.F.	SHT NO:	6 OF 7

SCALE: AS SHOWN

CLIENT JOB NO:	EASTPOINT JOB NO:
-	6006

DRAWING NO:	REV:
M-006	0





SCALE 1:150

Wiring Diagram

BATTERY

ALTERNATOR

FUSE

RELAY

SWITCH

IGNITION

START

VCC #2

BOX SCHEDULE	
3	4" SD x 2-1/8"
6	4-11/16 SD x 2-1/8"
8	2x2x4 E
8	2x2x4 E
10	2x2x4 E

