

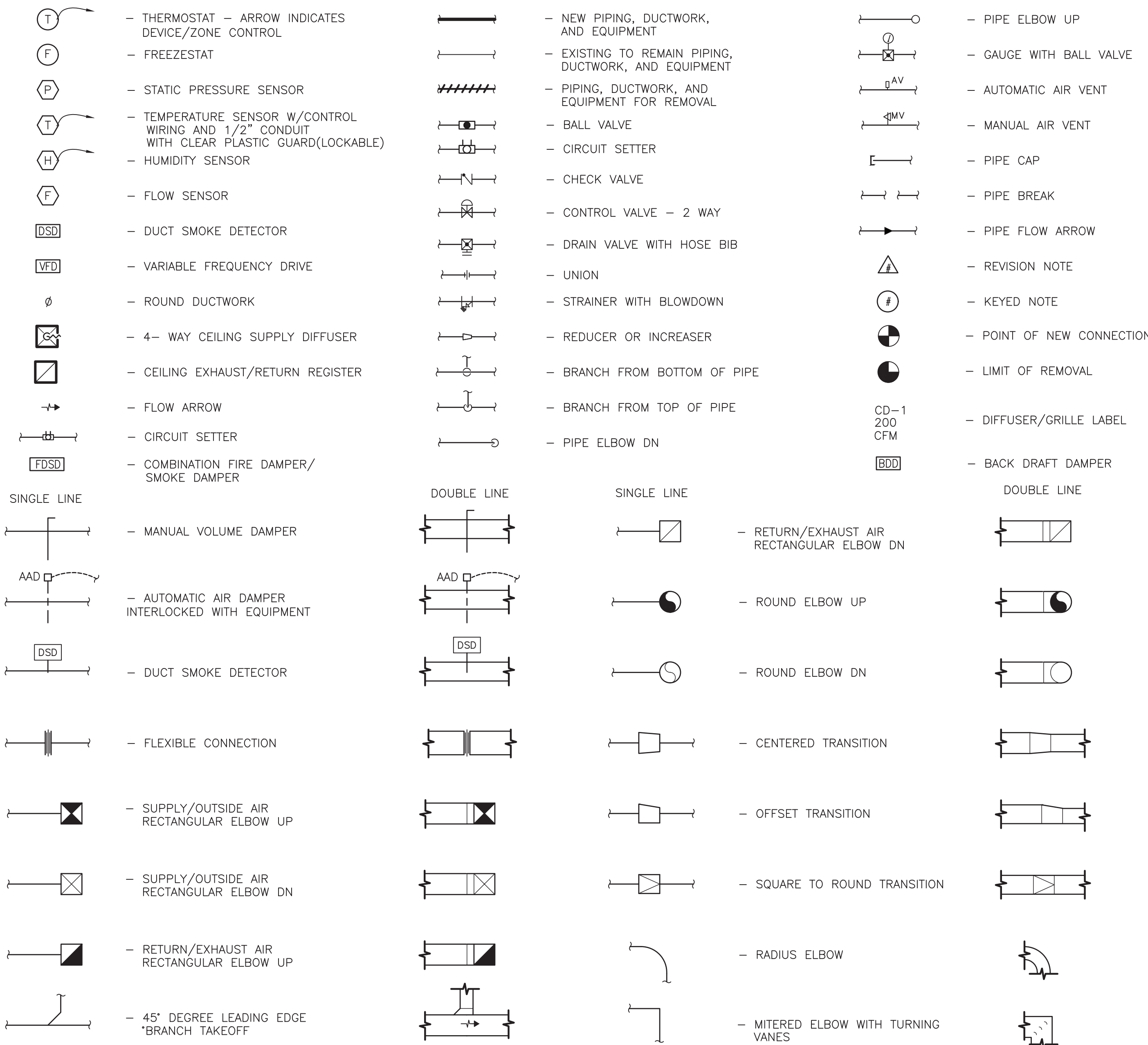
MECHANICAL GENERAL NOTES:

- DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. IT IS NOT INTENDED TO SPECIFY OR SHOW EVERY OFFSET, FITTING OR COMPONENT; HOWEVER, CONTRACT DOCUMENTS REQUIRE COMPONENTS AND MATERIALS WHETHER OR NOT INDICATED OR SPECIFICALLY SPECIFIED TO MAKE THE SYSTEMS BEING INSTALLED COMPLETE, CODE COMPLIANT, TESTED AND OPERATIONAL.
- CONTRACTOR SHALL FIELD VERIFY ALL LOCATIONS, DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
- ALL MATERIALS, EQUIPMENT, METHODS OF INSTALLATION, REMOVALS AND DISPOSAL SHALL BE IN ACCORDANCE WITH THE STANDARDS, REGULATIONS, CODES, ORDINANCES, AND LAWS OF LOCAL, STATE, AND FEDERAL GOVERNMENTS, AND OTHER AUTHORITIES THAT HAVE LAWFUL JURISDICTION.
- PERFORM WORK, PROVIDE MATERIALS AND EQUIPMENT FOR SYSTEMS SHOWN, SPECIFIED AND DESCRIBED ON DRAWINGS. COMPLETELY COORDINATE ALL TRADES OF THIS CONTRACT AND PROVIDE COMPLETE AND FULLY FUNCTIONAL INSTALLATION. ALL WORK IN THIS SET TO BE COMPLETED UNDER THIS CONTRACT, UNLESS OTHERWISE INDICATED.
- PROTECT ALL EXISTING AND NEW BUILDING ELEMENTS (INSTALLED BY OTHER CONTRACTS) FROM DAMAGE. CONTRACTOR SHALL RESTORE ALL DAMAGED ELEMENTS TO ORIGINAL OR BETTER CONDITION.
- WORK SHALL BE EXECUTED IN A WORKMANLIKE MANNER AND SHALL PRESENT NEAT, RECTILINEAR APPEARANCE WHEN COMPLETED. MAINTAIN MAXIMUM HEAD ROOM AT ALL TIMES. DO NOT RUN PIPES, DUCTS, AND CONDUIT EXPOSED UNLESS SHOWN AND NOTED TO BE EXPOSED ON DRAWINGS.
- MATERIALS AND EQUIPMENT SHALL BE NEW AND INSTALLED ACCORDING TO MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. MAINTAIN MANUFACTURER'S EQUIPMENT CLEARANCES.
- CONTRACTOR IS RESPONSIBLE FOR ALL WORK RELATED TO ISOLATING, SHUTTING DOWN, DRAINING, FILLING AND TESTING SYSTEMS TO ALLOW FOR COMPLETION OF WORK. INTERRUPTIONS TO EXISTING SERVICES AND SYSTEMS SHALL BE AS SHORT AS POSSIBLE AND AT A TIME AND DURATION APPROVED BY THE OWNER AND UTILITY AS APPLICABLE. INCLUDE ALL PREMIUM TIME ASSOCIATED WITH INTERRUPTIONS. ALL SYSTEM INTERRUPTIONS SHALL BE SCHEDULED WITH OWNER, UTILITY AND COORDINATED WITH OTHER TRADE WORK.
- ALL EQUIPMENT PIPING, WIRING, INSULATION ETC. INSTALLED IN HVAC AIR PLENUM SPACES SHALL MEET CODE REQUIREMENTS FOR SMOKE AND COMBUSTIBILITY.
- SEAL ALL PENETRATIONS THROUGH FIRE RATED WALLS, PARTITIONS AND FLOORS WITH UL RATED MATERIALS/METHODS EQUIVALENT TO FIRE RATING OF ASSEMBLY.
- COORDINATE ALL WALL/FOUNDATION PENETRATIONS WITH GENERAL CONTRACT AND SEAL WEATHERTIGHT. PROVIDE STAINLESS STEEL ESCUTCHEON PLATE/TRIM RING FOR EACH ABOVE GRADE PENETRATION (BOTH SIDES).
- PROVIDE PROPER ACCESS TO EQUIPMENT THAT REQUIRES INSPECTION, REPLACEMENT OR REPAIR. ACCESS PANELS/DOORS SHALL BE A MINIMUM OF 12"x12", UNLESS OTHERWISE NOTED.
- DO NOT SUPPORT EQUIPMENT FROM SUSPENDED CEILINGS. ALL SUPPORT SHALL BE FROM BUILDING STRUCTURE OR FROM CEILING SUSPENSION SYSTEM WHICH HAS BEEN REINFORCED. SUPPORTS SHALL BE SELECTED AND INSTALLED TO PROVIDE A VIBRATION FREE INSTALLATION.
- CLEANING DURING MECHANICAL WORK: THE MECHANICAL ROOM AND ROOMS WHERE WORK WILL BE DONE TO MINIMIZE DISTURBANCE IN THE BUILDINGS. WORKERS ARE TO USE PATHWAYS AND FACILITIES AGREED UPON WITH THE DISTRICT DESIGNEE. IN WRITING. THE AREA OUTSIDE THE BUILDING WHERE CUTTING WELDING OR STORAGE IS ALLOWED IS TO BE FENCED AT ALL TIMES. THE CONTRACTOR WILL ON A DAILY BASIS CLEAN THE GROUNDS AND THE BUILDING OF ANY DEBRIS OR GARBAGE GENERATED BY THEIR WORK.
- PROTECT EXISTING SURFACES AND EQUIPMENT NOT MARKED FOR REMOVAL OR MODIFICATION. CONTRACTOR RESPONSIBLE FOR REPAIR OF EXISTING SURFACES AND/OR EQUIPMENT TO THE APPROVAL OF THE OWNER.
- EACH CONTRACTOR RESPONSIBLE FOR RETURNING WALLS, CEILINGS AND SURFACES THEY DISTURB THAT ARE NOT SCHEDULED FOR REPLACEMENT BACK TO ORIGINAL CONDITIONS.

HVAC REMOVAL NOTES:

- THE SCOPE OF REMOVAL SHOWN ON "REMOVALS" DRAWING IS DIAGRAMMATIC ONLY AND INDICATES THE INTENT OF THE WORK TO BE PERFORMED AND NOT THE COMPLETE SCOPE OF DEMOLITION AND/OR REMOVAL WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE OR RELOCATE ANY RELATED MECHANICAL DEVICES/ITEMS EVEN IF NOT SPECIFICALLY INDICATED TO BE REMOVED ON THESE DRAWINGS IN ORDER TO ACCOMMODATE NEW WORK.
- EQUIPMENT/ITEMS SHOWN CROSS HATCHED ON DRAWINGS ARE ITEMS TO BE REMOVED. ANY DEVICES/ITEMS REMOVED SHALL INCLUDE (BUT SHALL NOT BE LIMITED TO) THE REMOVAL OF ALL ASSOCIATED PIPING, CONTROLS, ETC. THAT ARE NOT INCORPORATED IN THE NEW LAYOUT. THE CONTRACTOR SHALL PERFORM ALL WORK REQUIRED TO INSURE CONTINUITY OF SERVICE TO EXISTING REMAINING EQUIPMENT. NO EXTRAS RELATING TO THE SCOPE OF WORK DESCRIBED WILL BE ALLOWED.
- EQUIPMENT, PIPING, ETC. REQUIRED TO RECONNECT SHALL BE INSTALLED CONCEALED WITHIN THE SUSPENDED CEILINGS, PARTITIONS AND/OR WALLS, FLOORS. NO SURFACE MOUNTED OR EXPOSED EQUIPMENT, PIPING, ETC., SHALL BE PERMITTED, UNLESS SPECIFICALLY INDICATED.
- ALL ITEMS TO BE REMOVED SHALL BE REVIEWED WITH THE OWNER PRIOR TO REMOVAL. OWNER SHALL HAVE FIRST SALVAGE RIGHTS. ITEMS THE OWNER WISHES TO KEEP SHALL BE REMOVED WITH CARE AND STORED AS DIRECTED BY OWNER. ITEMS THE OWNER DOES NOT WISH TO KEEP SHALL BE REMOVED FROM THE SITE AND DISPOSED OF PROPERLY.

MECHANICAL SYMBOLS



HVAC ABBREVIATIONS

AAD	AUTOMATIC AIR DAMPER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AHU	AIR HANDLING UNIT
AMP	AMPERAGE
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER
BMS	BUILDING MANAGEMENT SYSTEM
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
CH	CABINET HEATER
CLG	CEILING
C	CONDENSATE
DB	DRYBULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROL (SYSTEM)
DEG	DEGREE
DIA	DIAMETER
DN	DOWN
DP	DEWPOINT TEMPERATURE
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
EFF	EFFICIENCY
EG	EXHAUST GRILLE
ESP	EXTERNAL STATIC PRESSURE
EXH	EXHAUST
F	FAHRENHEIT
FD	FIRE DAMPER
FF	FINAL FILTER
FLR	FLOOR
FPM	FEET PER MINUTE
FSTAT	FREEZESTAT
FT	FEET
FT HD	FEET OF HEAD
FT WG	FEET OF WATER GAUGE
FV	FACE VELOCITY
G	GAS
GAL	GALLON
GPM	GALLONS PER MINUTE
HD	HEAD
HP	HORSEPOWER
L	LOUVER
MAT	MIXED AIR TEMPERATURE
MAU	MAKE-UP AIR UNIT
MBH	1,000 BTU/HR
MCA	MINIMUM BRANCH CIRCUIT AMPACITY
MD	MOTORIZED DAMPER
OA	OUTSIDE AIR
OAI	OUTSIDE AIR INTAKE
PD	PRESSURE DROP
R	REMOVE
RA	RETURN AIR
RL	REFRIGERANT LIQUID
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
S	SATISFACTORY
SAT	SUPPLY AIR TEMPERATURE
SEN	SENSIBLE HEAT
SG	SPECIFIC GRAVITY
SP	STATIC PRESSURE
TAB	TESTING, ADJUSTING, BALANCE
TSTAT	THERMOSTAT
TYP	TYPICAL
UC	UNDER CUT
VD	VOLUME DAMPER
WB	WETBULB
WG	WATER GAUGE
ΔT	TEMPERATURE DIFFERENCE
IC	IRRIGATION CONTRACTOR

ENGINEER:



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WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING  
225 WEST STREET EXT, WARWICK, NY 10990

CBBS SED NO. 44-21-01-06-7-041-001 (BB-FIELD BATHROOM BUILDING)  
EDFF SED NO. 44-21-01-06-7-041-001 (FF-W/ FOOTBALL FIELD)  
CDHS SED NO. 44-21-01-06-0-001-040 (HS-W/ HIGH SCHOOL)

FILE PATH: N:\1 - PROJECT DIRECTORIES\1- E & R Projects\05- Warwick Valley CSD\05-21-04 Warwick Federal Grant Project\CAD\Package 2\05-21-04.m001.dwg

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BD SET	04.08.2022
REVISION	DATE
DRAWN BY	
CHECKED BY	
SHEET SIZE	30" x 42"
SCALE	AS NOTED

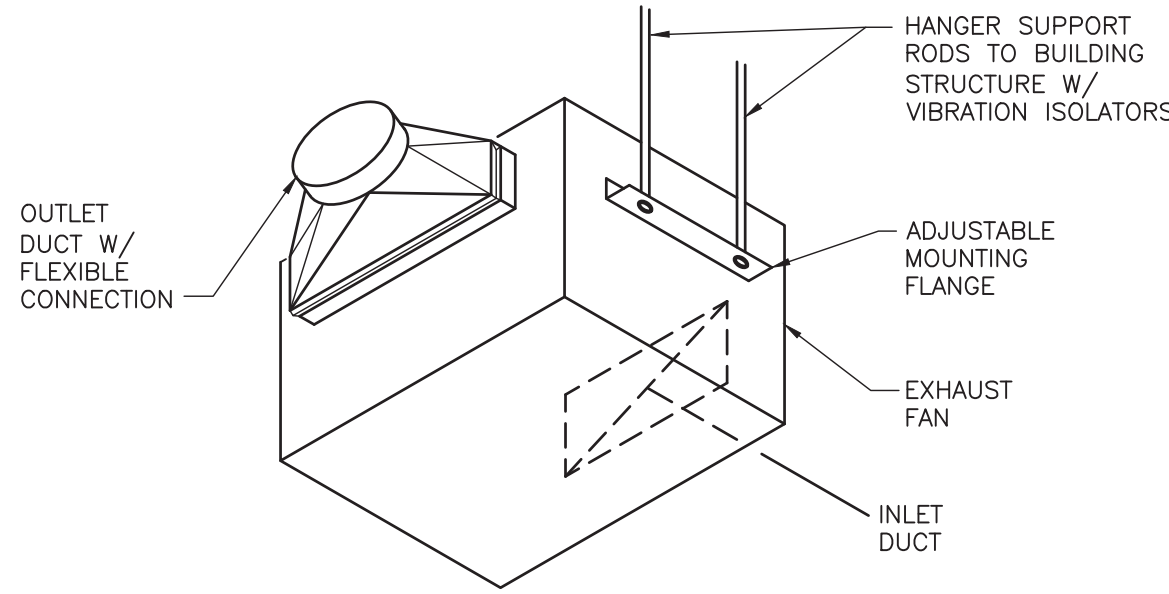
SHEET TITLE

ABBREVIATIONS  
AND SYMBOLS

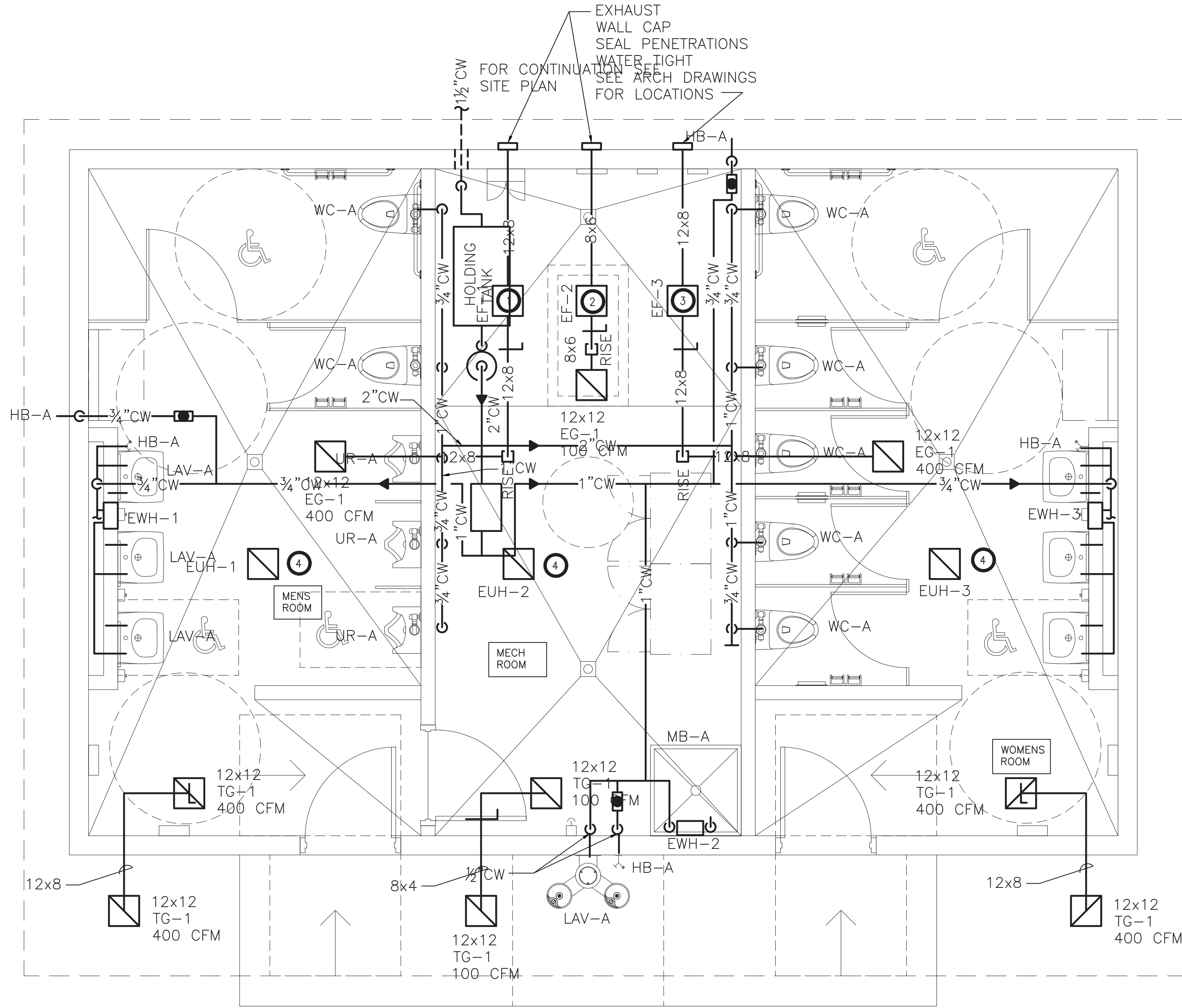
SHEET NO.

M-001





2 EXHAUST FAN DETAIL  
SCALE: NONE



1 BATHROOM FLOOR PLAN - NEW WORK  
SCALE: 3/8"=1'-0"

- KEYED NOTES - NEW WORK:
- 1 PROVIDE EXHAUST FAN EF-1 GREENHECK MODEL CSP-510, WC-8 AND ALL APPURTENANCES 400 CFM @.375 STATIC PRESSURE, 1070 RPM 217 WATTS (OR APPROVED EQUAL)
  - 2 PROVIDE EXHAUST FAN EF-2 GREENHECK MODEL CSP-190, WC-6 AND ALL APPURTENANCES 100 CFM @.500 STATIC PRESSURE, 1400 RPM 100 WATTS (OR APPROVED EQUAL)
  - 3 PROVIDE EXHAUST FAN EF-3 GREENHECK MODEL CSP-510, WC-8 AND ALL APPURTENANCES 400 CFM @.375 STATIC PRESSURE, 1070 RPM 217 WATTS (OR APPROVED EQUAL)
  - 4 PROVIDE ELECTRIC UNIT HEATER EUH 1,2,3 MARKEL G3385D-RP 3.0 KW 10200 BTU'S 277 VOLTS 10.8 AMPS 54" RISE. PROVIDE INTEGRAL THERMOSTAT. MOUNT IN CEILING. PROVIDE ALL SUPPORTS AS REQUIRED FROM STRUCTURE ABOVE (WIRING BY EC)

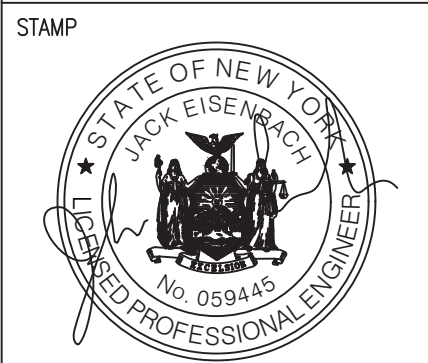
GRILLE SCHEDULE								
MARK	TYPE	MODEL	FACE SIZE	CEILING MODULE SIZE	NECK SIZE	FRAME TYPE	MATERIAL	MFR. FINISH
EG-1	EXHAUST	TITUS PAR	12x12	12x12	10"ø	SURFACE	STEEL	WHITE
TG-1	TRANSFER	TITUS 30RL	12x12	12x12	10"ø	SURFACE	STEEL	WHITE

NOTE 1: PROVIDE VOLUME DAMPERS SHOWN ON THE DRAWINGS.  
NOTE 2: PROVIDE OPTIONAL OPPOSED BLADE DAMPER AT FACE OF GRILLE

ENGINEER:  
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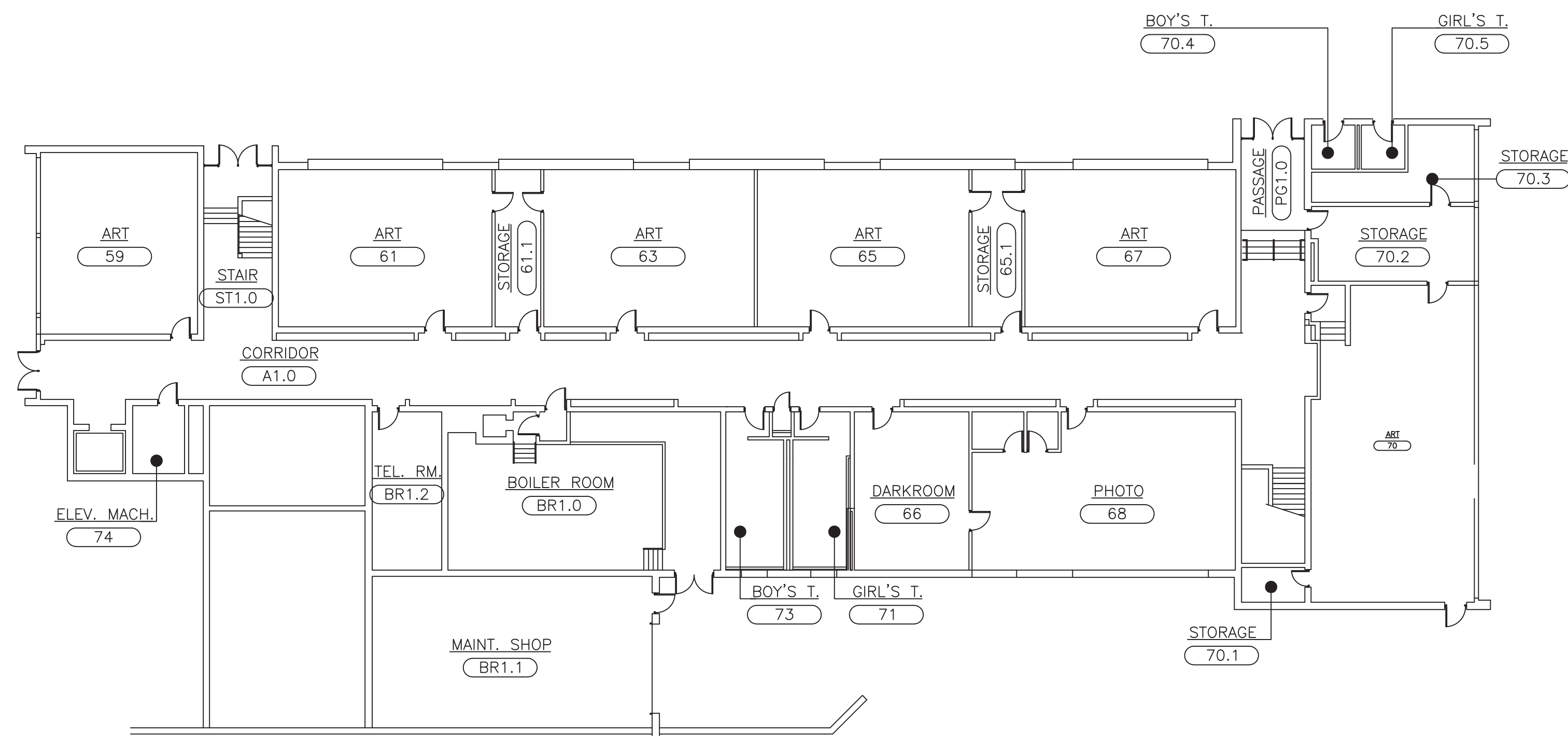
WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING  
225 WEST STREET EXT, WARWICK, NY 10990

BB SED NO. 44-21-01-06-7-041-001 (BB-FIELD BATHROOM BUILDING) BY SANDEBOULE ROAD, WARWICK, NY 10990  
DFF SED NO. 44-21-01-06-7-041-001 (FF-W/ FOOTBALL FIELD) BY SANDEBOULE ROAD, WARWICK, NY 10990  
CHS SED NO. 44-21-01-06-0-001-040 (CHS-W/ HIGH SCHOOL) BY SANDEBOULE ROAD, WARWICK, NY 10990

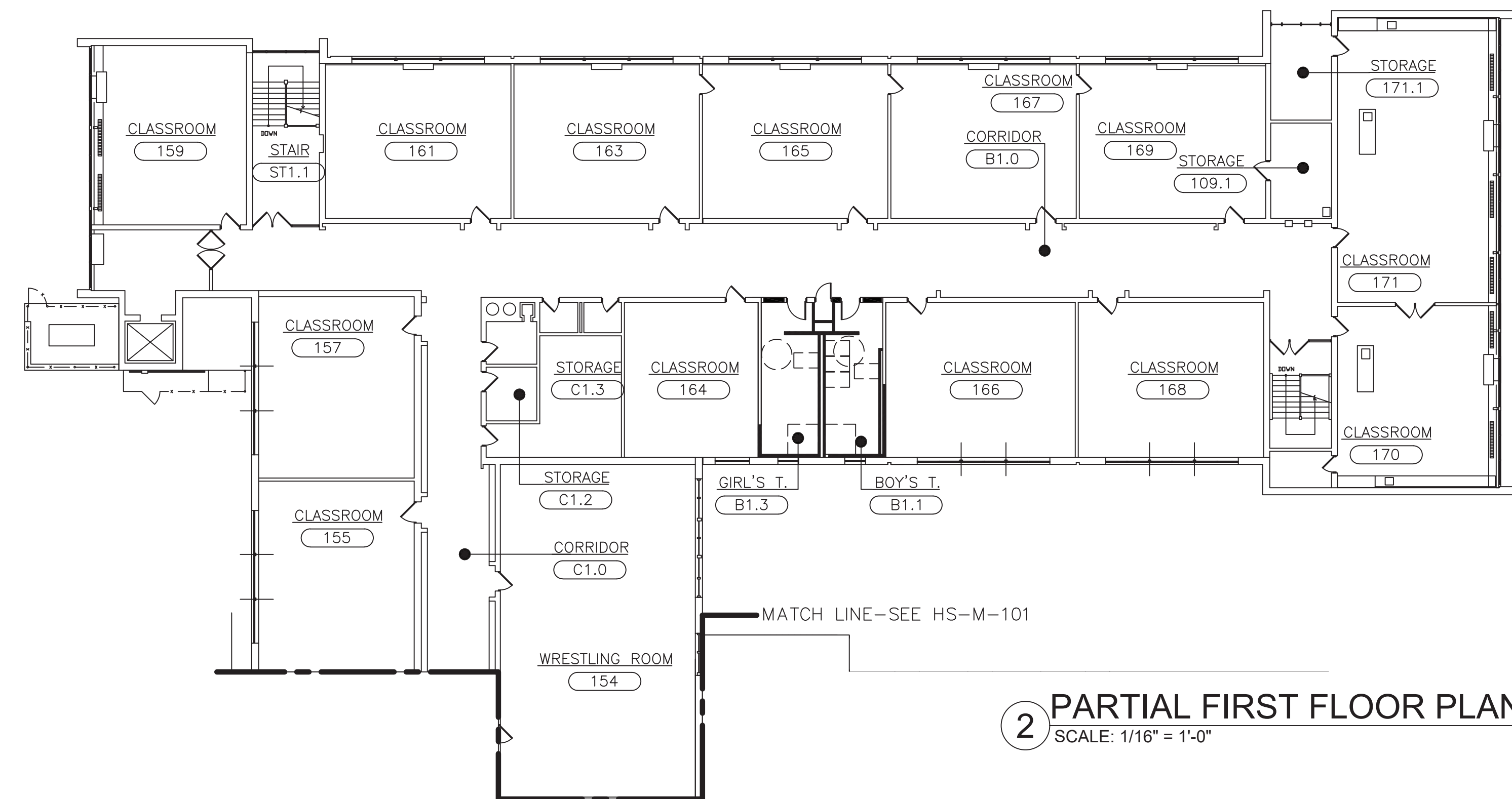
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BD SET	04.08.2022
REVISION	DATE
DRAWN BY	
CHECKED BY	
SHEET SIZE	30" X 42"
SCALE	AS NOTED

SHEET TITLE  
BATHROOM FLOOR  
PLAN - NEW WORK

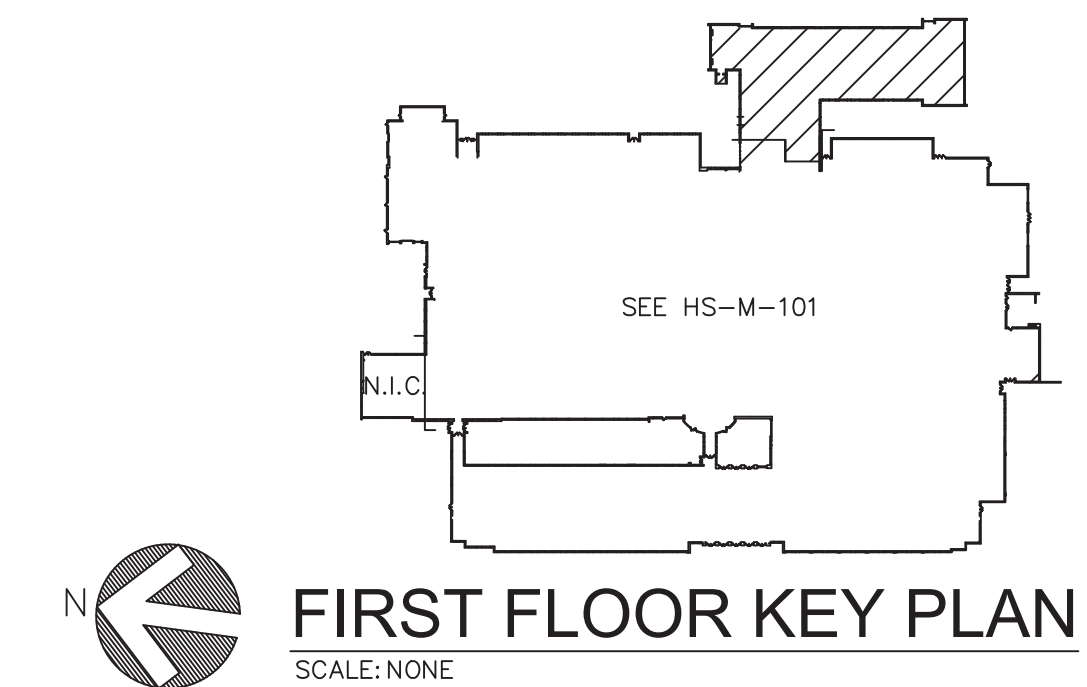
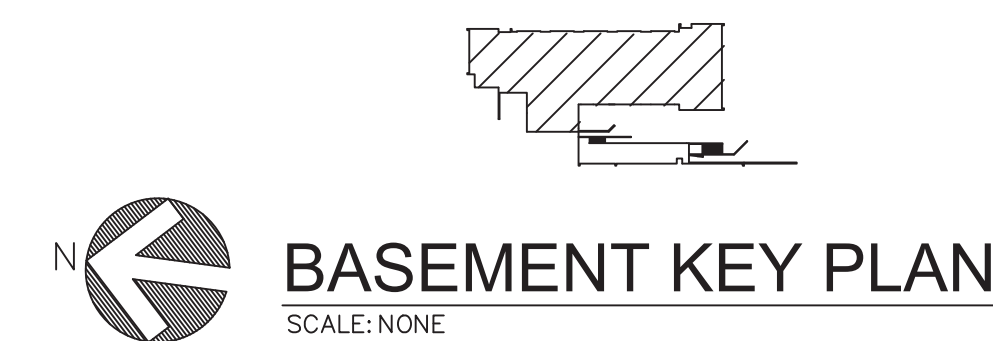
SHEET NO.  
**BB  
M-100**



**1 PARTIAL BASEMENT PLAN**  
SCALE: 1/16" = 1'-0"



**2 PARTIAL FIRST FLOOR PLAN**  
SCALE: 1/16" = 1'-0"

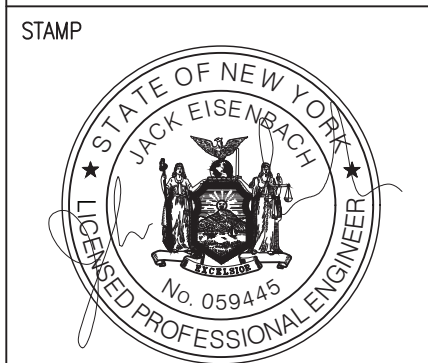


NOTE:  
PLAN PROVIDED FOR REFERENCE ONLY. FIELD  
VERIFY EXISTING CONDITIONS FOR UV-C  
INSTALLATION PRIOR TO BID. SEE UV-C FIXTURE  
SCHEDULES FOR DETAILS.

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**WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING**  
225 WEST STREET EXT, WARWICK, NY 10990

PROJECT NO. 05-21-04  
05-20-06

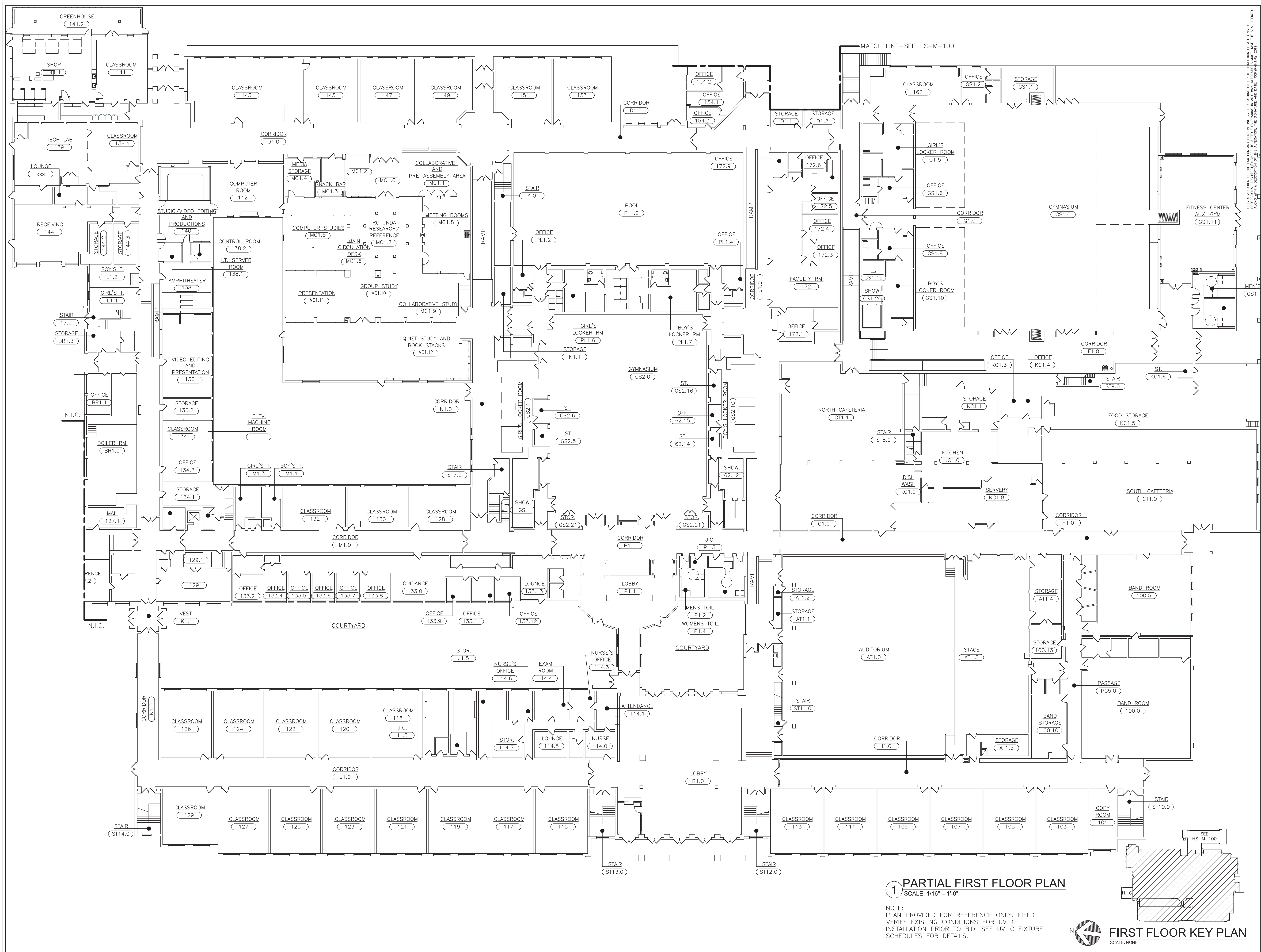
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SHEET SIZE 30" x 42"  
SCALE AS NOTED

SHEET TITLE  
**PARTIAL BASEMENT &  
FIRST FLOOR PLANS  
(UV-C CONTRACT)**

SHEET NO.  
**HS  
M-1**

FILE PATH: N:\1 - PROJECT DIRECTORIES\1 - E & R Projects\05- Warwick Valley CSD\05-21-04 HS-M100-M102.dwg





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Professional Engineer  
No. 08649

**WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING**  
225 WEST STREET EXT, WARWICK, NY 10990

PROJECT NO. 05-21-04  
05-20-06

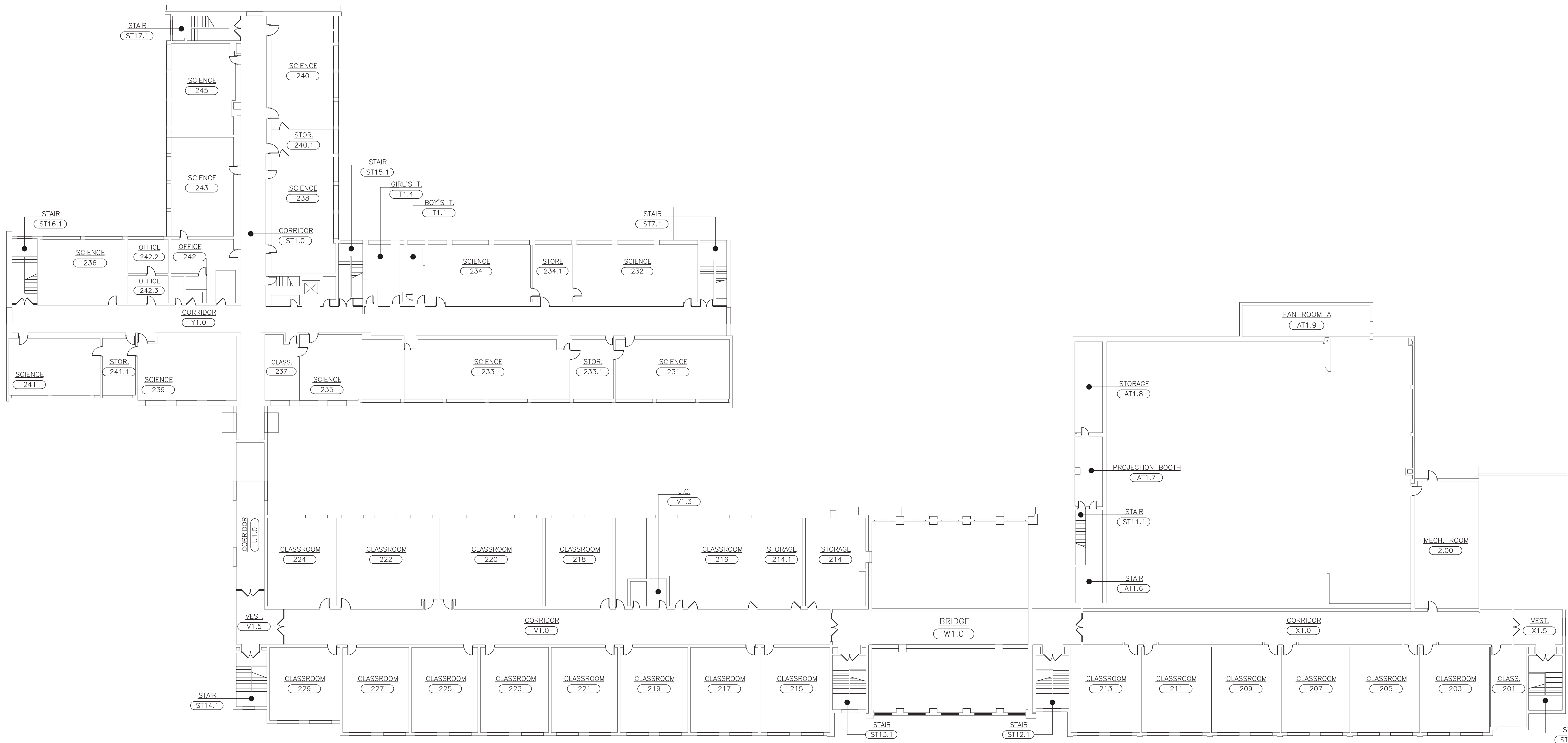
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SCALE AS NOTED

SHEET TITLE  
**PARTIAL FIRST FLOOR  
PLAN (UV-C CONTRACT)**

SHEET NO.  
**HS  
M-2**

FILE PATH: N:\1 - PROJECT DIRECTORIES\1 - E & P Projects\05- Warwick Valley CSD\05-21-04 Warwick Valley Central School District High School Renovations, Field Work and Exterior Bathroom Building\05-21-04 HS-M-002.dwg





1 PARTIAL SECOND FLOOR PLAN  
SCALE: 1/16" = 1'-0"

NOTE:  
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VERIFY EXISTING CONDITIONS FOR UV-C  
INSTALLATION PRIOR TO BID. SEE UV-C FIXTURE  
SCHEDULES FOR DETAILS.



SECOND FLOOR KEY PLAN  
SCALE: NONE

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DBB SED NO. 44-21-01-06-7-041-001 (BB-FIELD BATHROOM BUILDING) 89 SANGERVILLE ROAD, WARWICK, NY 10990  
CFF SED NO. 44-21-01-06-7-041-001 (FF-W FOOTBALL FIELD) 89 SANGERVILLE ROAD, WARWICK, NY 10990  
HS SED NO. 44-21-01-06-0-001-040 (HS-W HIGH SCHOOL) 89 SANGERVILLE ROAD, WARWICK, NY 10990

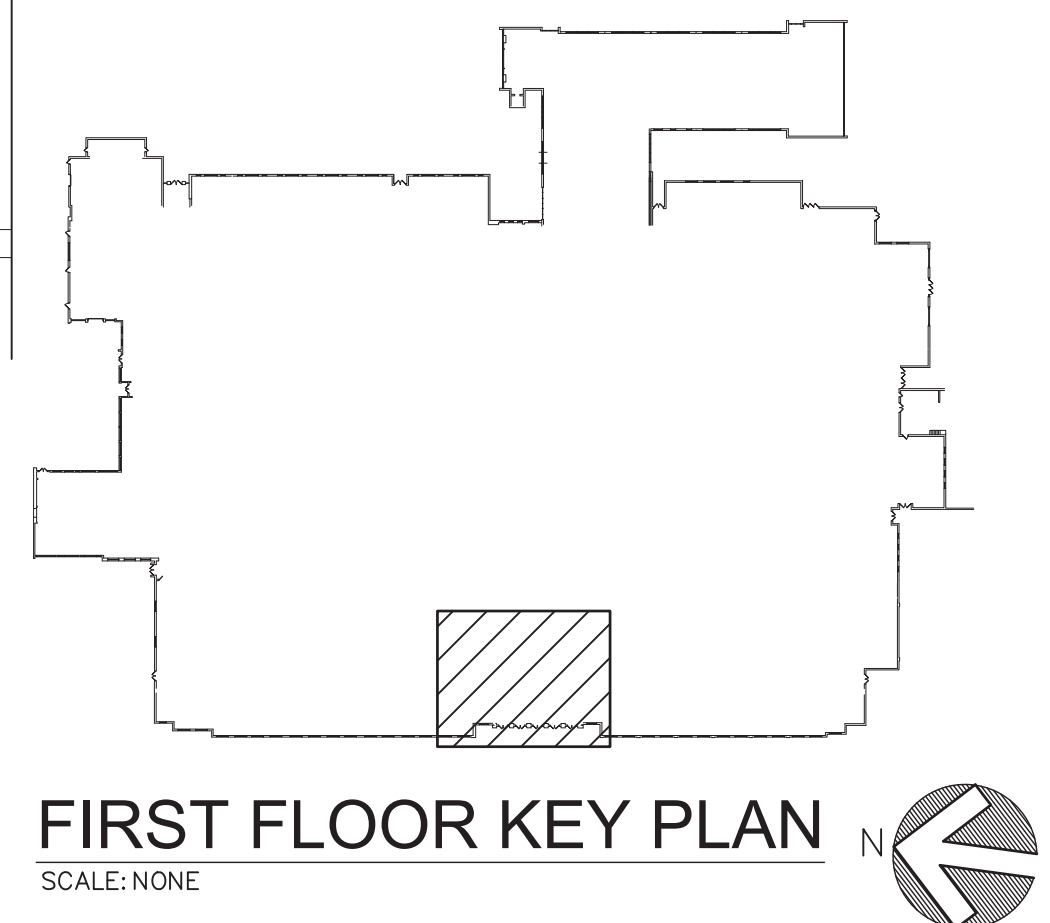
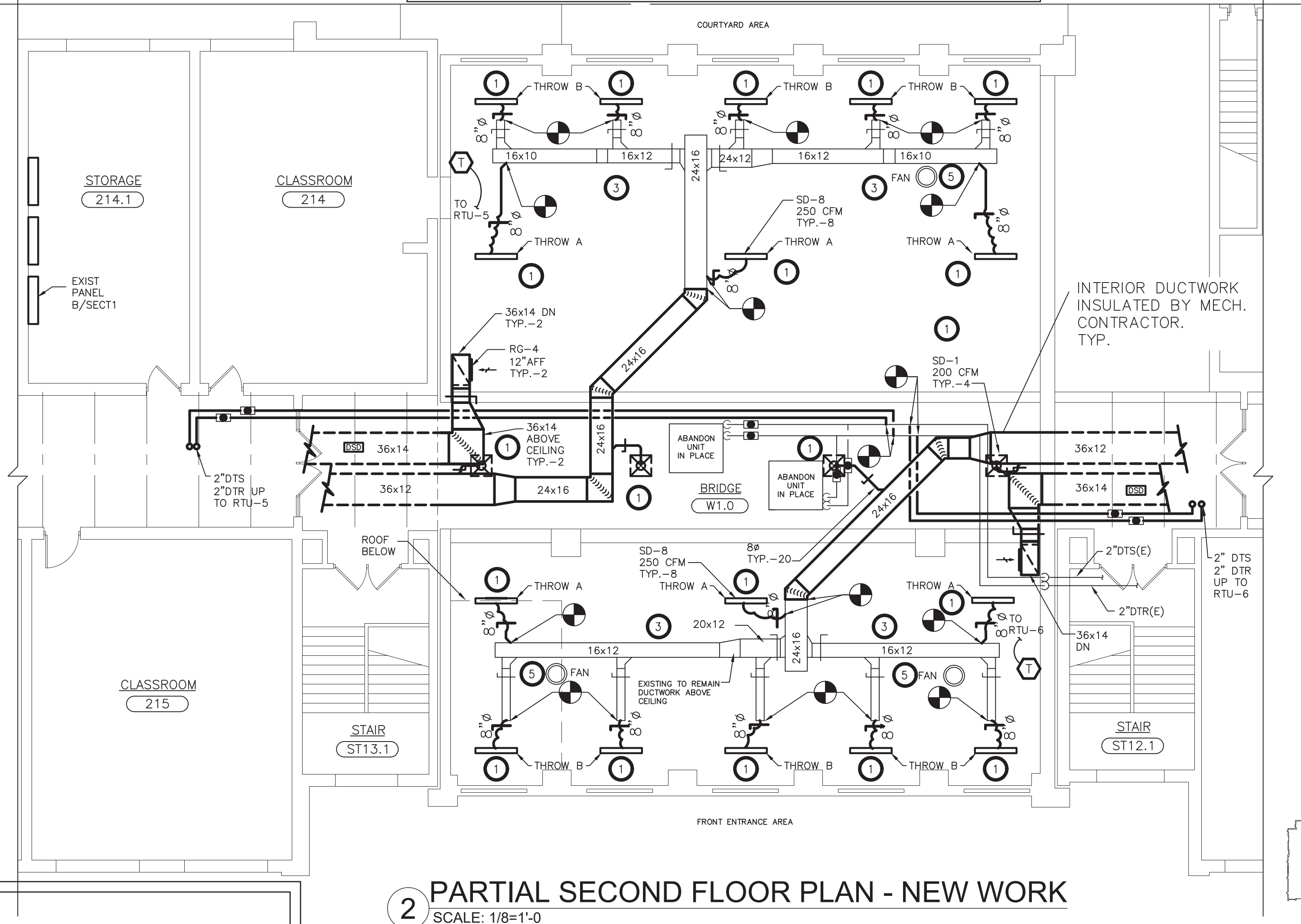
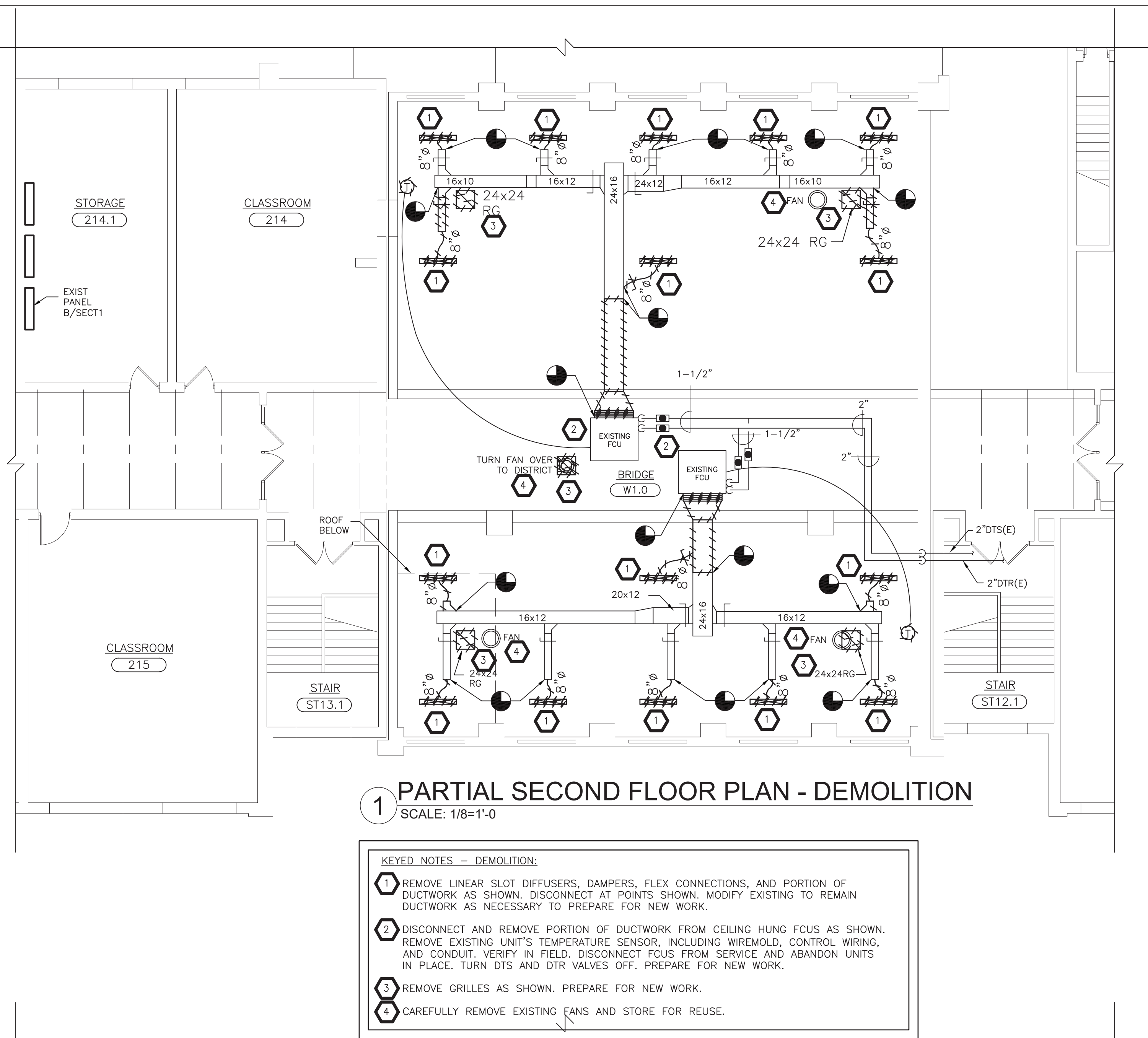
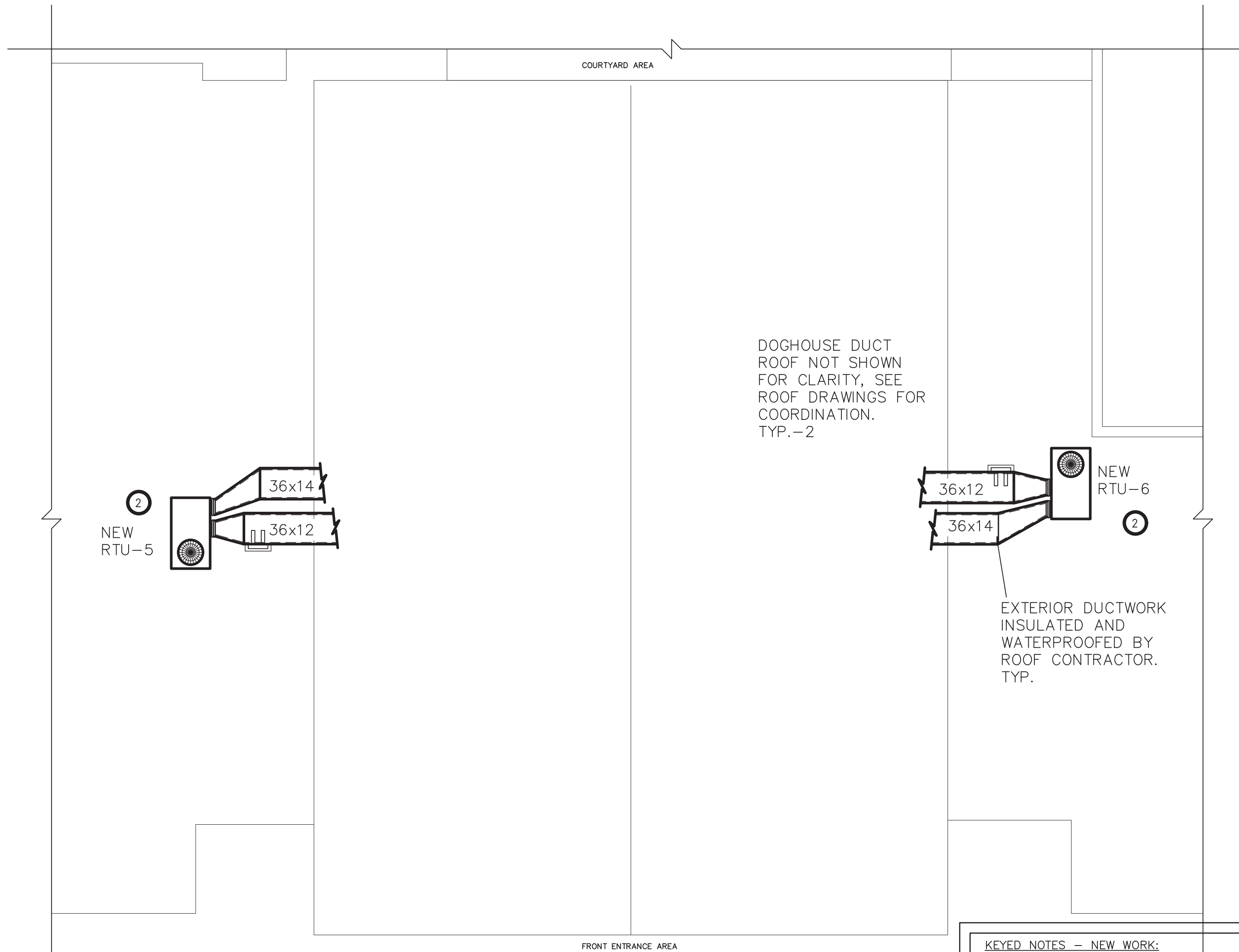
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SHEET SIZE	30" x 42"
SCALE	AS NOTED

SHEET TITLE  
PARTIAL SECOND  
FLOOR PLAN (UV-C  
CONTRACT)

SHEET NO.  
HS  
M-3

FILE PATH: N:\1 - PROJECT DIRECTORIES\1 - E & R Projects\05- Warwick Valley CSD\05-21-04 Warwick Valley Central Grant Project\CAD Package 2\05-21-04 HS-M03-M02.dwg





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WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING  
225 WEST STREET EXT, WARWICK, NY 10990  
CDBS SED NO. 44-21-01-06-7-041-001 (BB-FIELD BATHROOM BUILDING) 89 SANGERVILLE ROAD, WARWICK, NY 10990  
CDBS SED NO. 44-21-01-06-7-041-001 (FF-WY FOOTBALL FIELD) 89 SANGERVILLE ROAD, WARWICK, NY 10990  
CDBS SED NO. 44-21-01-06-7-041-001 (FF-WY FOOTBALL FIELD) 89 SANGERVILLE ROAD, WARWICK, NY 10990

PROJECT NO. 05-21-04  
05-20-06

BD SET 04.08.2022

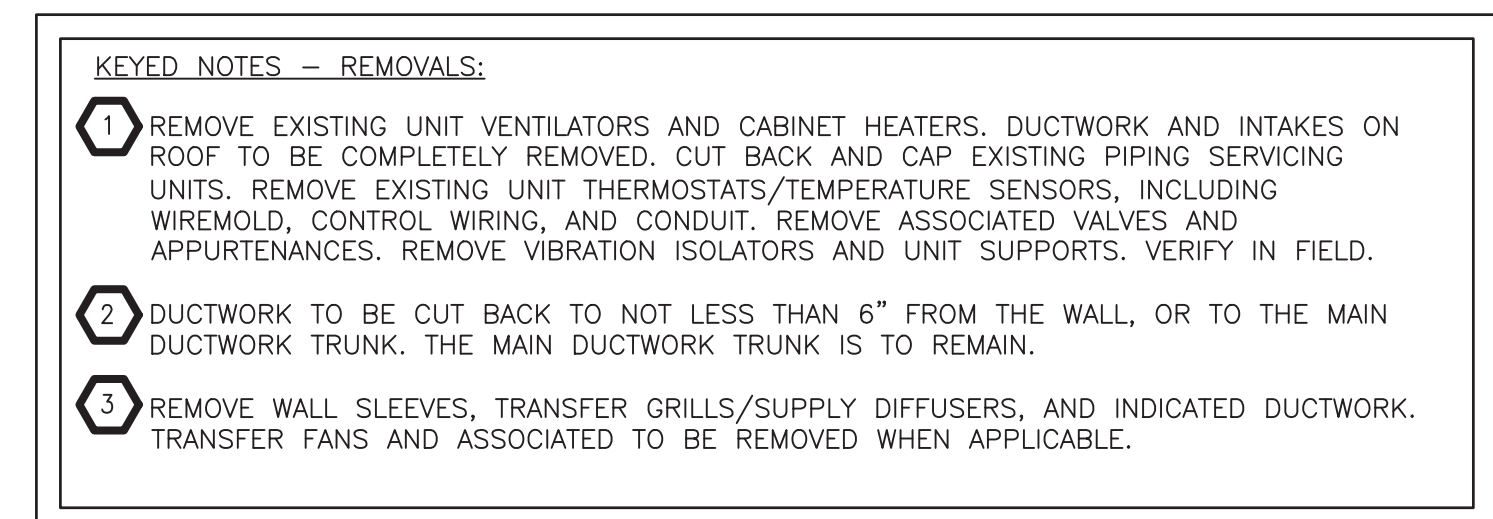
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SCALE AS NOTED

SHEET TITLE  
PARTIAL SECOND FLOOR PLAN - MAIN LOBBY - DEMOLITION AND NEW WORK

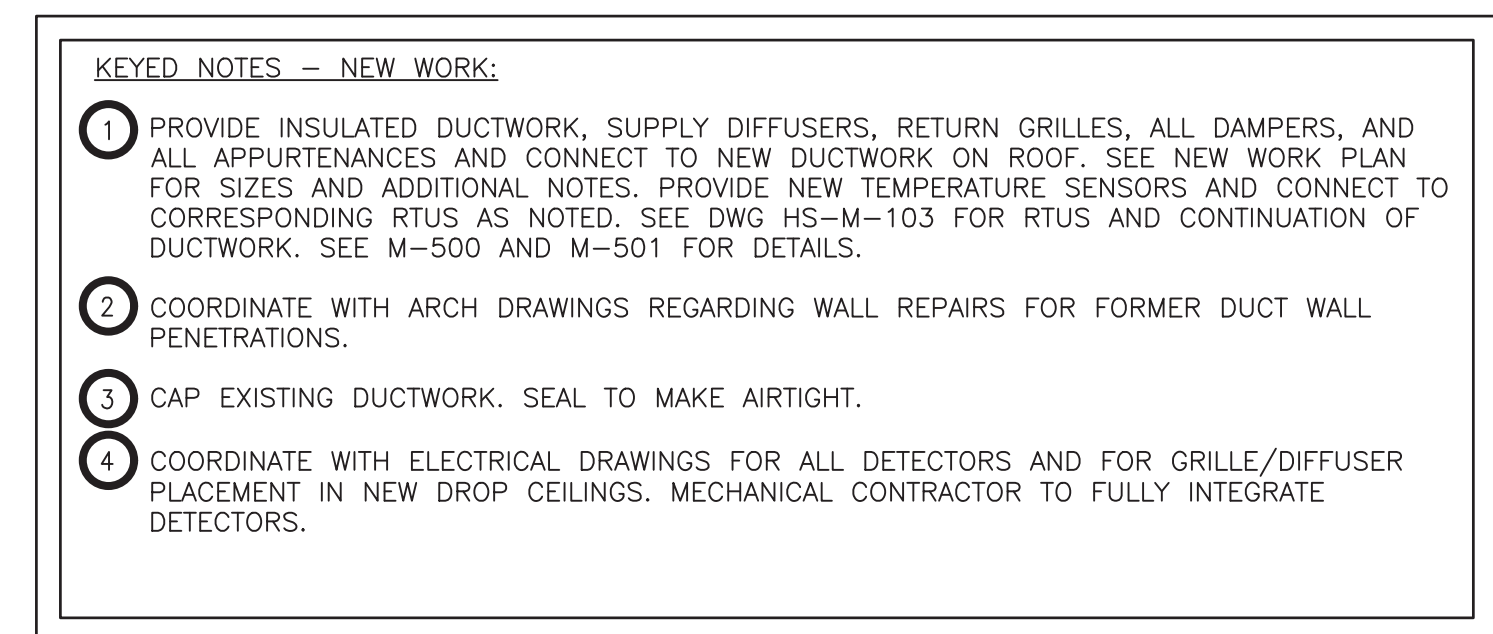
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HS  
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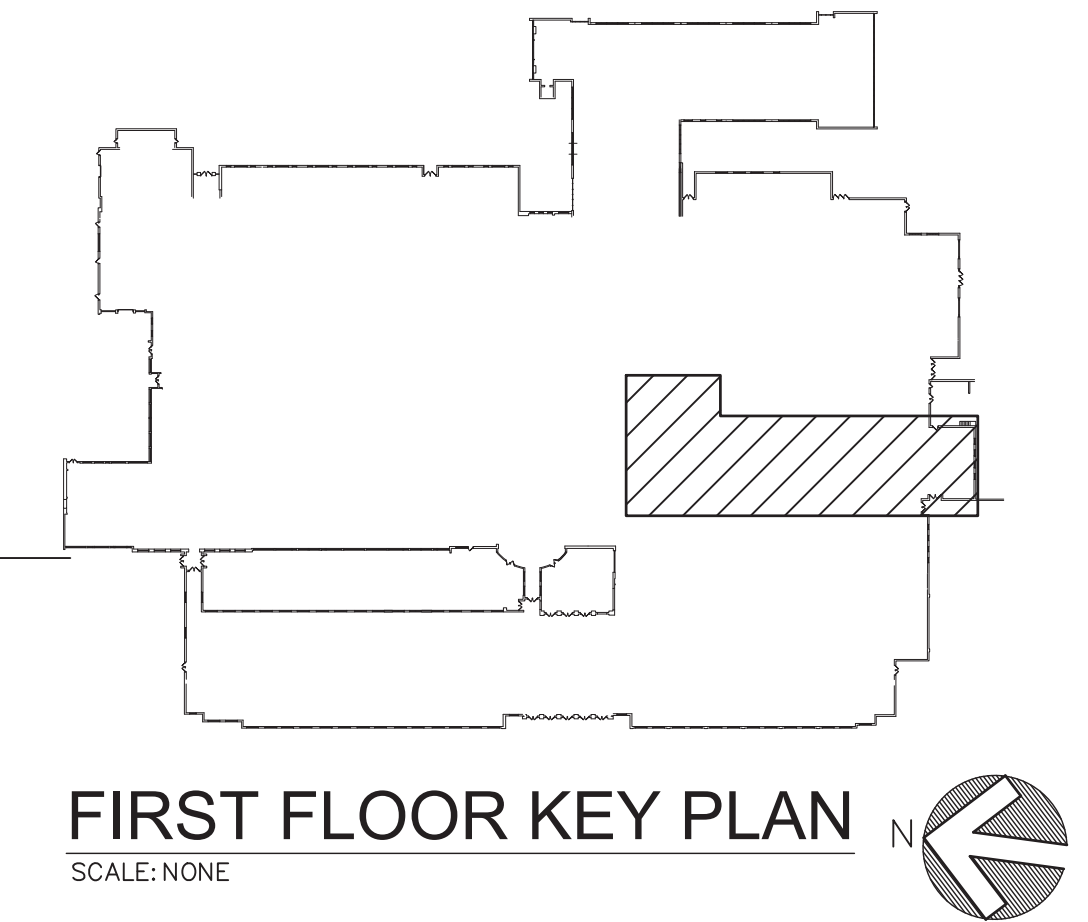
NOTE: LOCATIONS OF EXISTING EQUIPMENT PROVIDED FOR REFERENCE ONLY



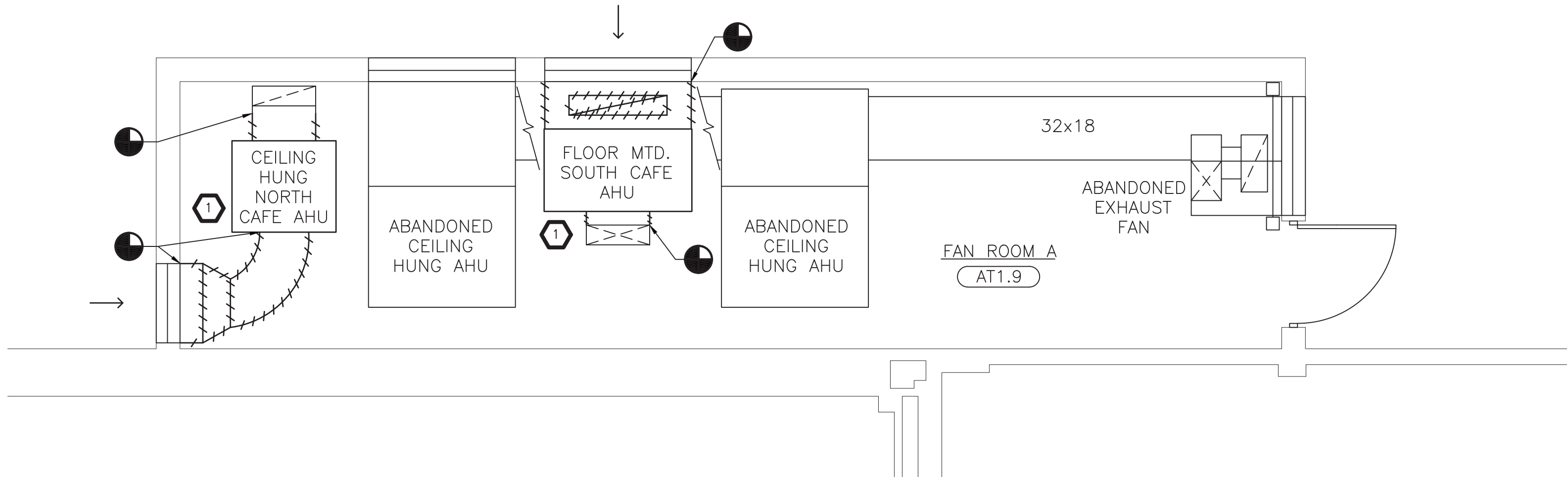
NOTE: LOCATIONS OF EXISTING EQUIPMENT PROVIDED FOR REFERENCE ONLY

GENERAL NOTES:

1. SEE UV-C LIGHTING SCHEDULES FOR NEW AND EXISTING EQUIPMENT.
2. CONTRACTOR TO COORDINATE WORK TO MAINTAIN ROOF WARRANTY.
3. ALL HVAC EQUIPMENT AND DUCTWORK ON THIS SHEET TO REMAIN FUNCTIONAL UNTIL NEW HVAC EQUIPMENT IS OPERATIONAL.



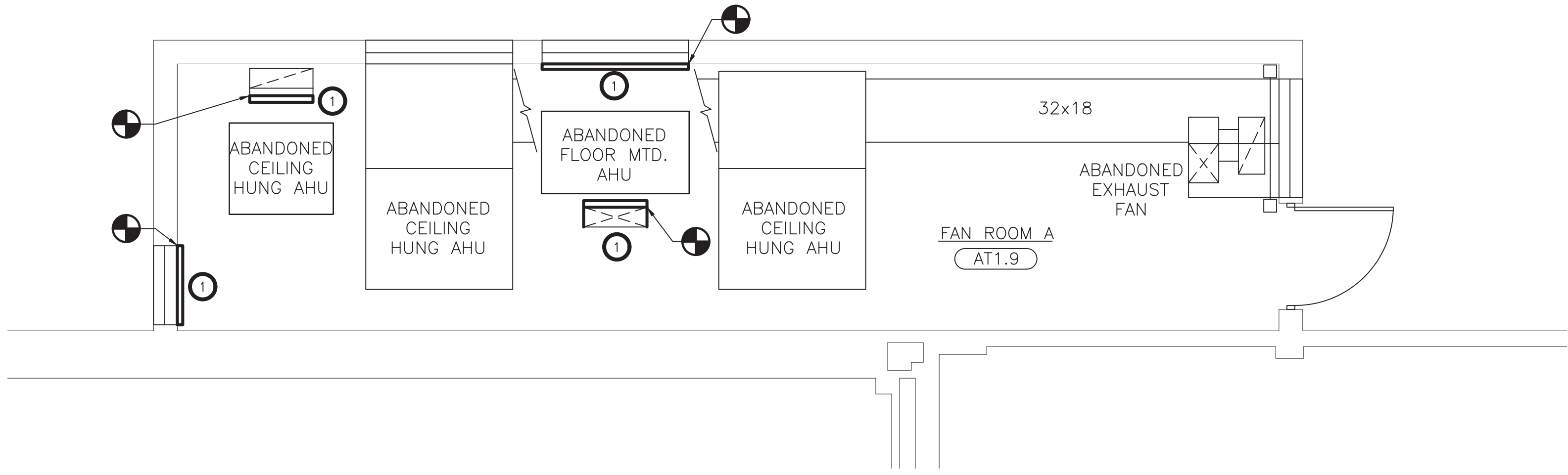




**1** PARTIAL SECOND FLOOR PLAN  
FAN ROOM A (CAFETERIA) - DEMOLITION  
SCALE: 1/4"=1'-0"

**KEYED NOTES -- REMOVALS:**

① DISCONNECT AND REMOVE PORTION OF DUCTWORK FROM CAFETERIA AHUS AS SHOWN. CUT BACK AND CAP EXISTING SUPPLY AND RETURN PIPING. REMOVE EXISTING CAFETERIA UNIT THERMOSTATS/TEMPERATURE SENSORS. VERIFY IN FIELD. DISCONNECT FROM SERVICE AND ABANDON UNITS IN PLACE. ELECTRICAL CONTRACTOR TO DISCONNECT POWER FEED.



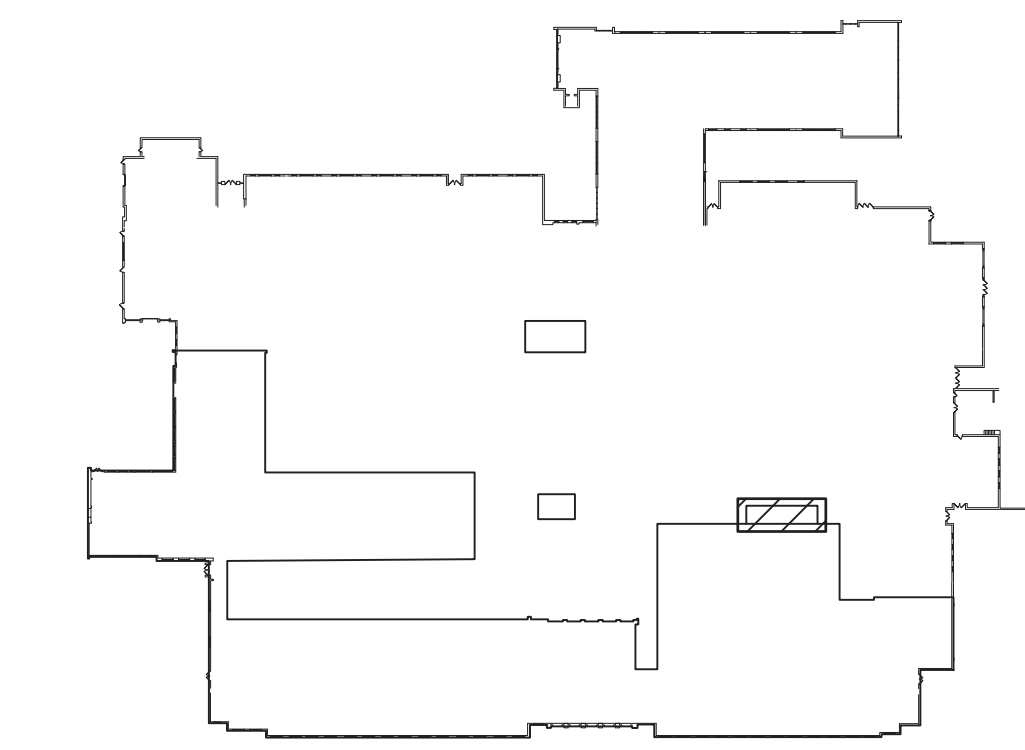
**2** PARTIAL SECOND FLOOR PLAN  
FAN ROOM A (CAFETERIA) - NEW WORK  
SCALE: 1/4"=1'-0"

**KEYED NOTES -- NEW WORK:**

① PROVIDE 18 GA STEEL BLANK OFF PANELS TO SEAL DUCTS AND LOUVERS; SEAL PANELS TO LOUVERS TO MAKE WEATHERTIGHT; SEAL PANELS TO DUCTWORK TO MAKE AIRTIGHT. PANELS TO HAVE SMOOTH AND SQUARE CUTS.

**GENERAL NOTES:**

1. HVAC EQUIPMENT AND DUCTWORK ON THIS SHEET NOTED FOR DISCONNECTION OR ABANDONMENT TO REMAIN FUNCTIONAL UNTIL NEW HVAC EQUIPMENT IS OPERATIONAL.

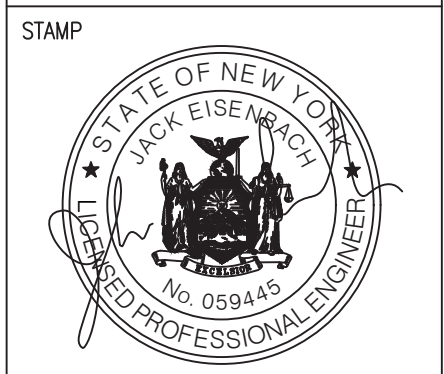


**SECOND FLOOR KEY PLAN**  
SCALE: NONE

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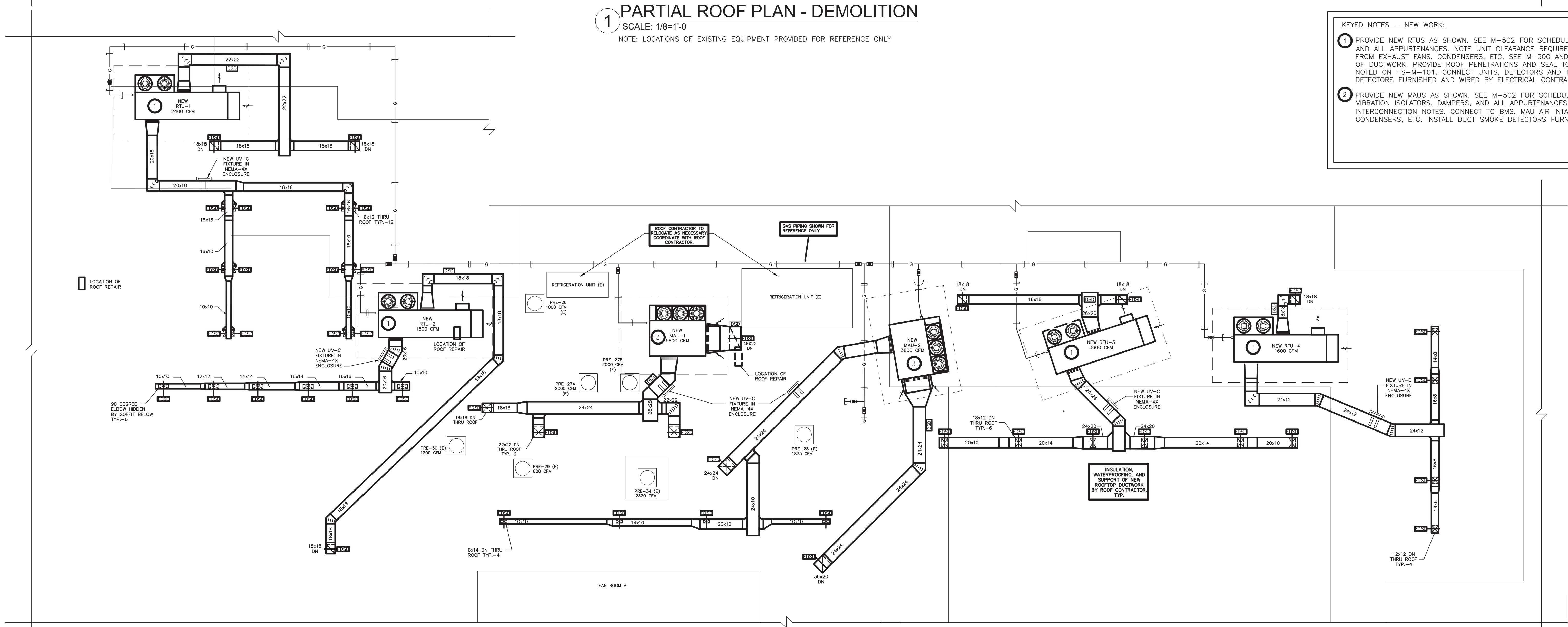
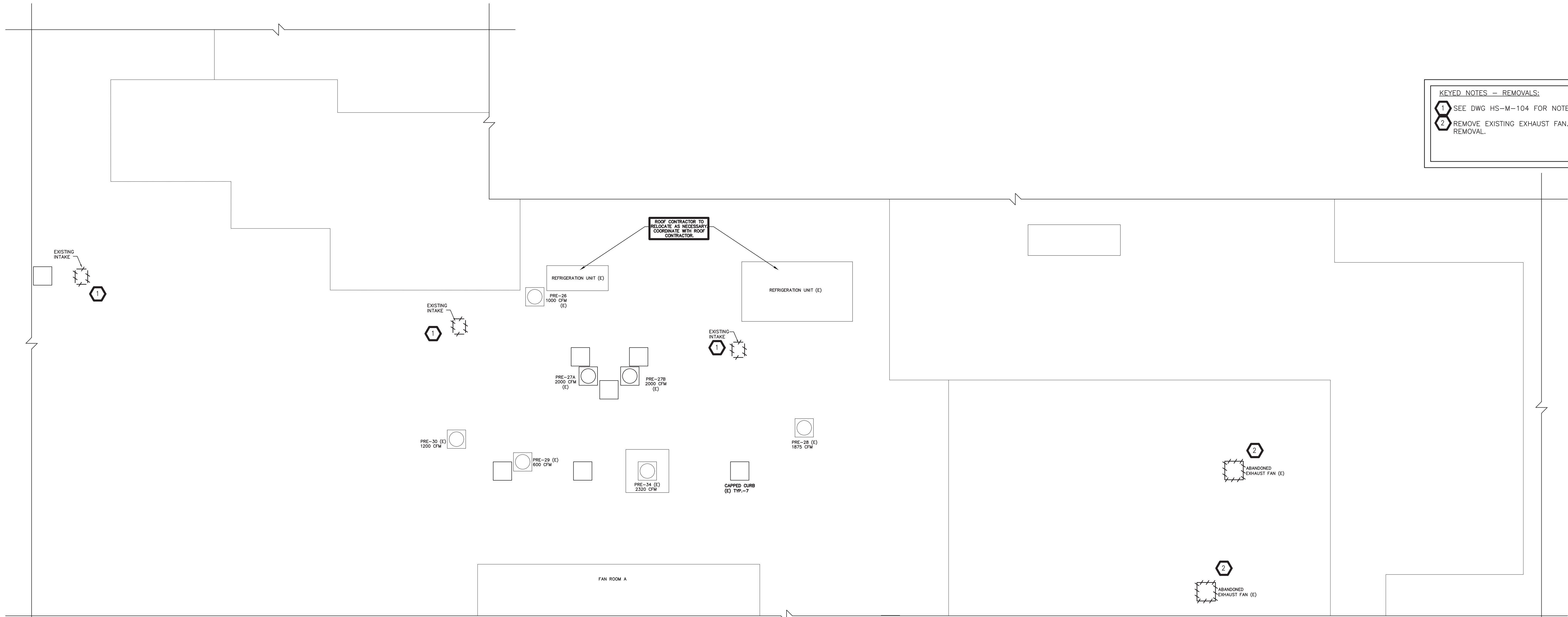
**WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING**  
225 WEST STREET EXT, WARWICK, NY 10990

COBB SED NO. 44-21-01-06-7-041-001 (BB-FIELD BATHROOM BUILDING) 89 SANGERVILLE ROAD, WARWICK, NY 10990  
CUFF SED NO. 44-21-01-06-7-041-001 (FF-W/ FOOTBALL FIELD) 89 SANGERVILLE ROAD, WARWICK, NY 10990  
HS SED NO. 44-21-01-06-0-001-040 (HS-W/ HIGH SCHOOL) 89 SANGERVILLE ROAD, WARWICK, NY 10990

PROJECT NO.	05-21-04 05-20-06
BID SET	04.08.2022
REVISION	DATE
DRAWN BY	
CHECKED BY	
SHEET SIZE	30" x 42"
SCALE	AS NOTED
SHEET TITLE	PARTIAL SECOND FLOOR PLAN - FAN ROOM A - DEMOLITION & NEW WORK
SHEET NO.	HS M-102

FILE PATH: -N:\1 - PROJECT DIRECTORIES\1- E & R Projects\05- Warwick Valley CSD\05-21-04 Warwick Federal Grant Project\CAD Package 2\05-21-04.HS-M101-M104.dwg





KEYED NOTES - REMOVALS:

1 SEE DWG HS-M-104 FOR NOTES ON REMOVAL OF EXISTING INTAKES ON ROOF.

2 REMOVE EXISTING EXHAUST FAN. COORDINATE WITH E.C. AND ROOF CONTRACTOR FOR REMOVAL.

KEYED NOTES - NEW WORK:

1 PROVIDE NEW RTUS AS SHOWN. SEE M-502 FOR SCHEDULE. PROVIDE DUCTWORK, VIBRATION ISOLATORS, DAMPERS, AND ALL APPURTENANCES. NOTE UNIT CLEARANCE REQUIREMENTS. RTU AIR INTAKES SHALL MAINTAIN A 10' DISTANCE FROM EXHAUST FANS, CONDENSERS, ETC. SEE M-500 AND M-501 FOR DETAILS. SEE HS-M-101 FOR CONTINUATION OF DUCTWORK. PROVIDE ROOF PENETRATIONS AND SEAL TO MAKE WEATERTIGHT. CONNECT TO TEMPERATURE SENSORS NOTED ON HS-M-101. CONNECT UNITS, DETECTORS AND TEMPERATURE SENSORS TO BMS. INSTALL DUCT SMOKE DETECTORS FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR. STRUCTURAL SUPPORTS BY ROOF CONTRACTOR.

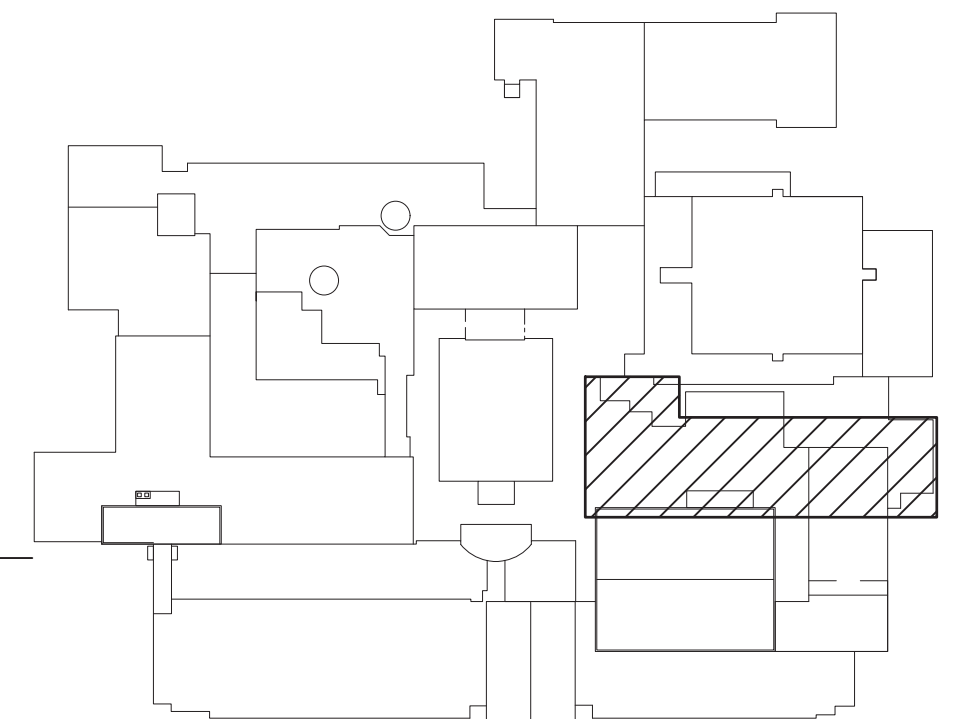
2 PROVIDE NEW MAUS AS SHOWN. SEE M-502 FOR SCHEDULE. PROVIDE DUCTWORK WITH INTERIOR ACOUSTIC LINING, VIBRATION ISOLATORS, DAMPERS, AND ALL APPURTENANCES. TIE INTO EXISTING EXHAUST FANS. SEE SEQUENCING FOR INTERCONNECTION NOTES. CONNECT TO BMS. MAU AIR INTAKES SHALL MAINTAIN 10' DISTANCE FROM EXHAUST FANS, CONDENSERS, ETC. INSTALL DUCT SMOKE DETECTORS FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR.

GENERAL NOTES:

1. SEE UV-C LIGHTING SCHEDULES FOR NEW AND EXISTING EQUIPMENT.

2. CONTRACTOR TO COORDINATE WORK TO MAINTAIN ROOF WARRANTY.

3. ALL INTAKES AND DUCTWORK MARKED FOR REMOVAL ARE TO REMAIN FUNCTIONAL UNTIL ASSOCIATED HVAC EQUIPMENT IS REMOVED.



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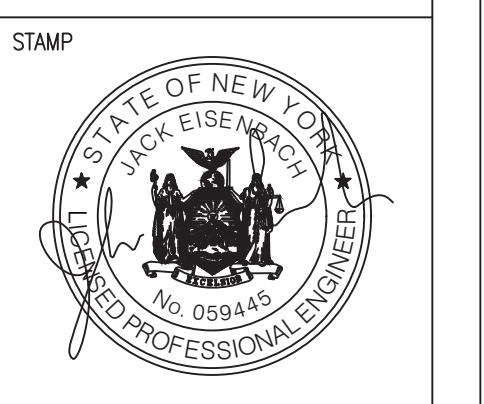
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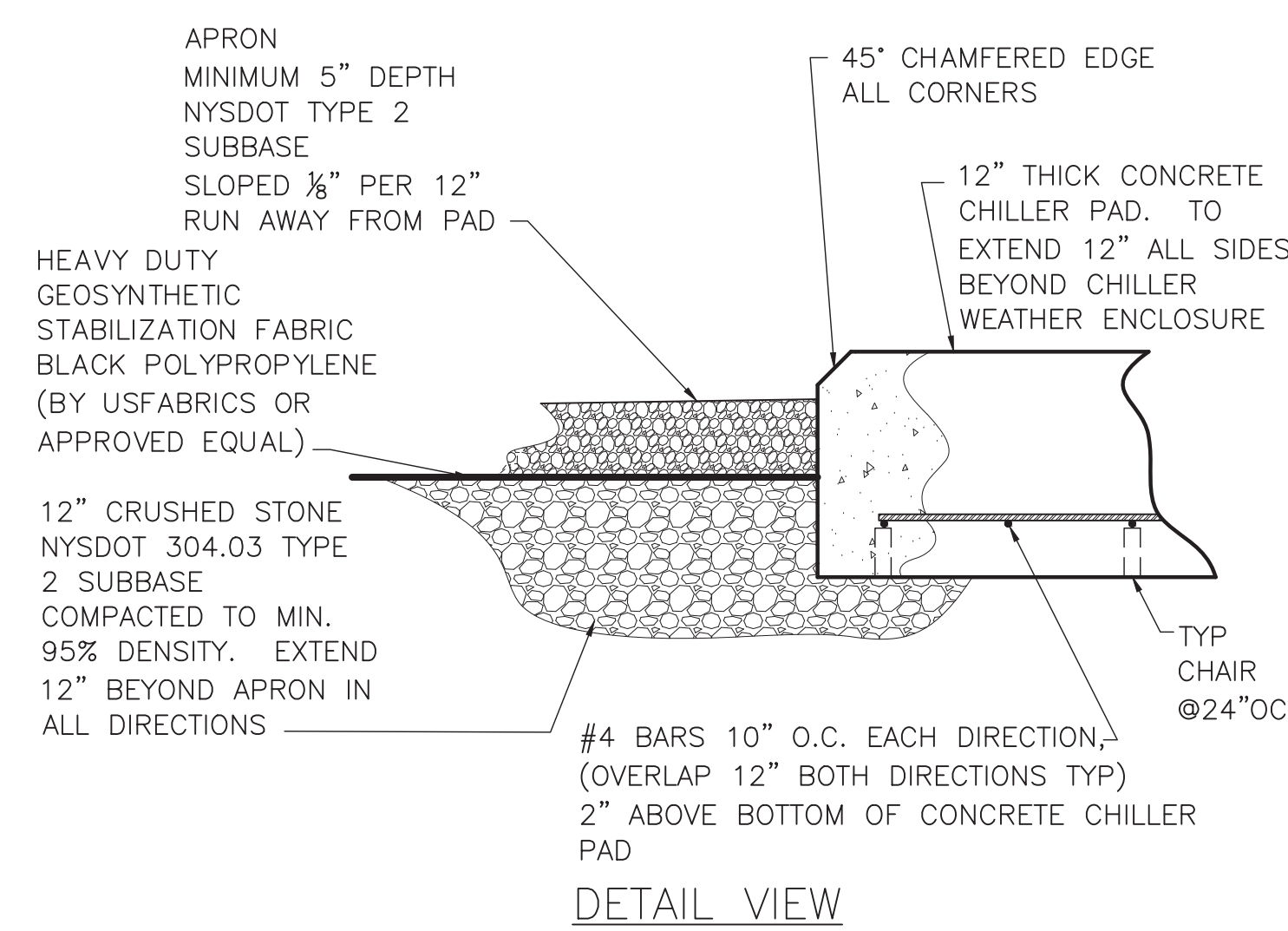


WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
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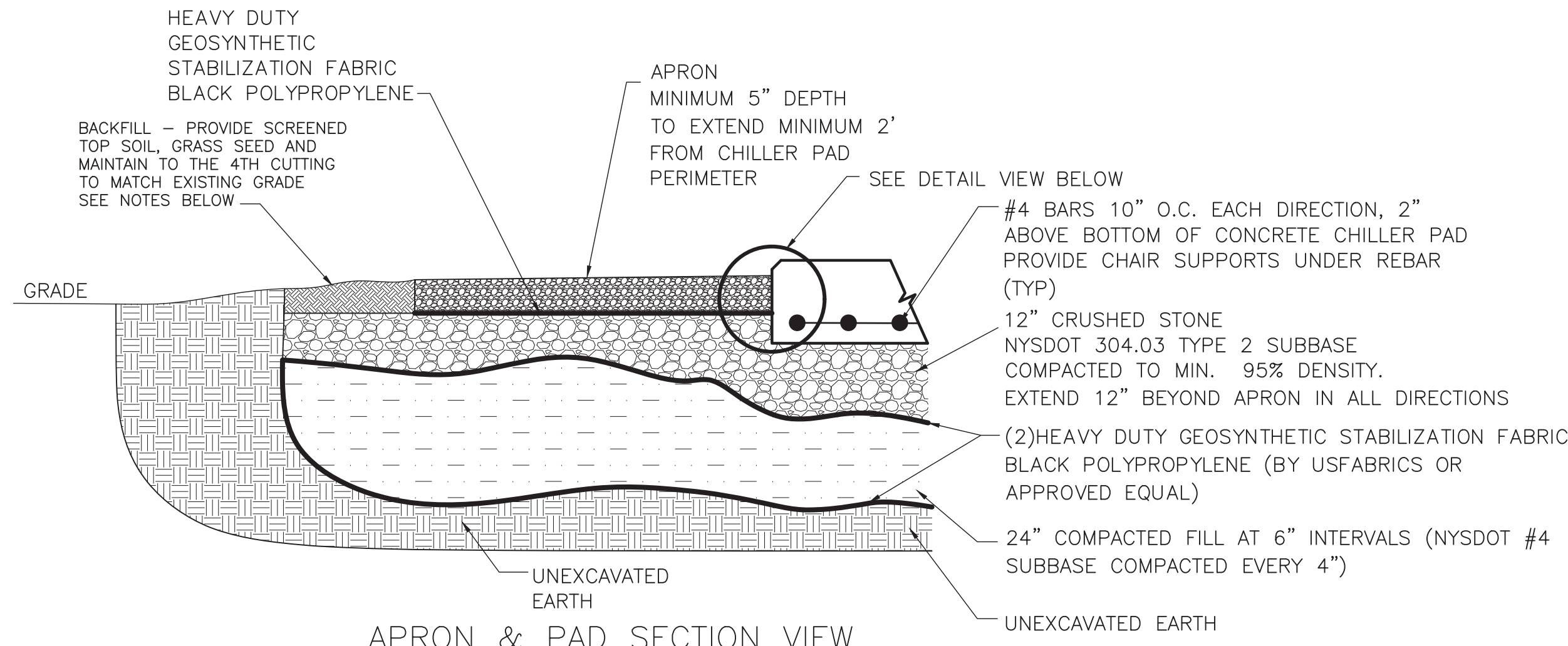
DBB SED NO. 44-21-01-06-7-041-001 (BB-FIELD BATHROOM BUILDING) 89 SANFORDVILLE ROAD, WARWICK, NY 10990  
CFF SED NO. 44-21-01-06-7-041-001 (FF-WY FOOTBALL FIELD) 89 SANFORDVILLE ROAD, WARWICK, NY 10990  
HS SED NO. 44-21-01-06-7-041-001 (HS-WY HIGH SCHOOL) 89 SANFORDVILLE ROAD, WARWICK, NY 10990

PROJECT NO.	05-21-04 05-20-06
BD SET	04.08.2022
REVISION	DATE
DRAWN BY	
CHECKED BY	
SHEET SIZE	30" x 42"
SCALE	AS NOTED
SHEET TITLE	PARTIAL ROOF PLAN - KITCHEN, SERVING, & CAFETERIAS - DEMOLITION & NEW WORK
SHEET NO.	HS M-103





DETAIL VIEW

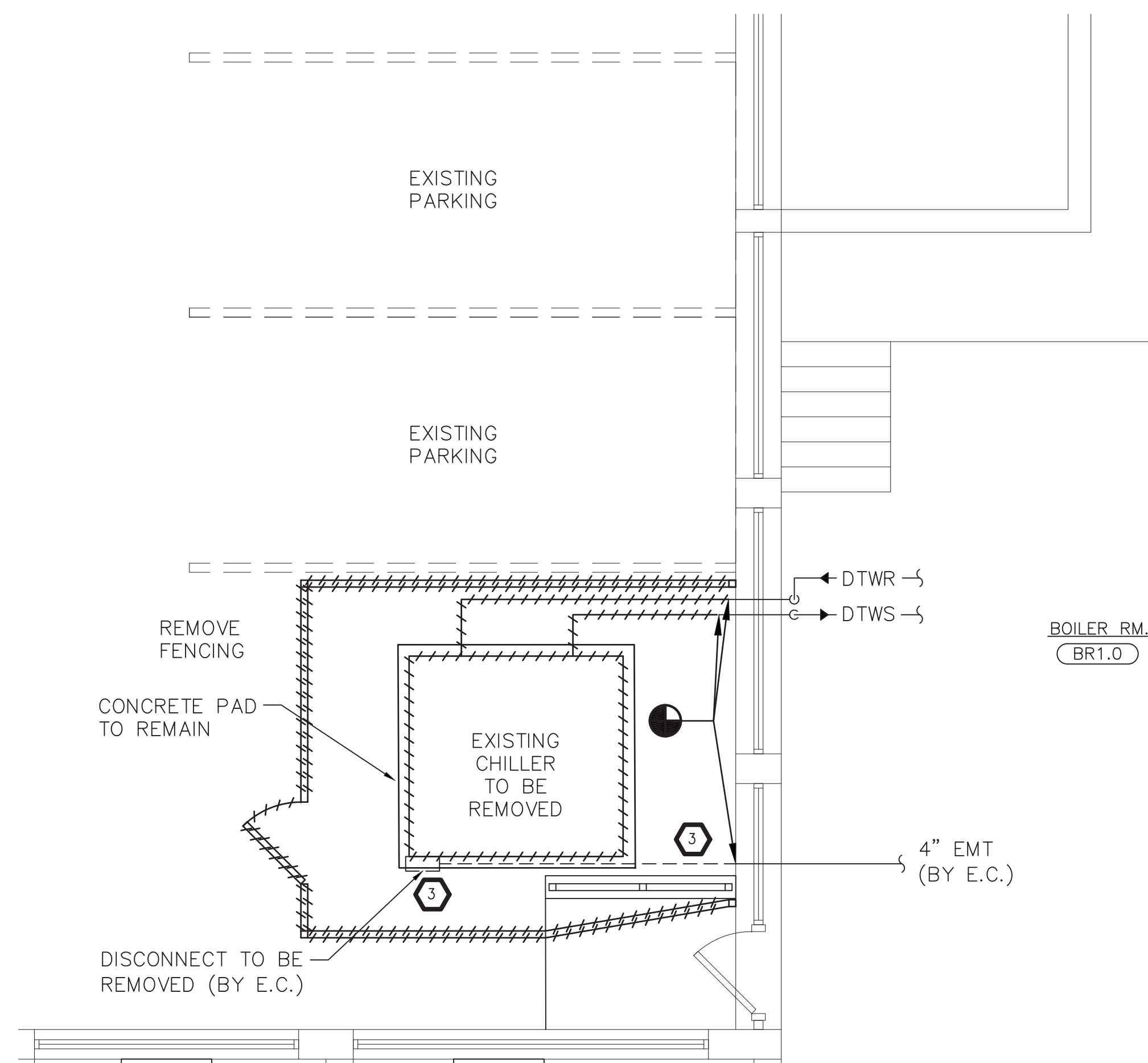


APRON & PAD SECTION VIEW

CONCRETE CHILLER PAD, APRON, AND GRADING NOTES:

- TOP OF NEW CHILLER PAD SHALL BE 4"± ABOVE EXISTING GRADE LEVEL
- TOP SURFACES FINISHES:
  - CHILLER PAD SHALL BE TROWEL FINISHED
- APRON: (SEE DETAILS THIS SHEET)
  - SHALL BE 2" ABOVE EXISTING GRADE LEVEL
  - COMPACTED FLAT SLOPED 1/8" PER 12" OF RUN AWAY FROM CONCRETE CHILLER PAD
  - VOID OF DEPRESSIONS GREATER THAN 1/8"
- PROVIDE ANCHOR BOLTS FOR CHILLER PER CHILLER MANUFACTURER'S WRITTEN REQUIREMENTS
- ALL CONCRETE WORK MUST FOLLOW ACI STANDARDS
- COORDINATE ALL WORK WITH OWNER
- CONCRETE:
  - MINIMUM 28 DAY COMPRESSIVE STRENGTH - 5000 PSI
  - MINIMUM CEMENT FACTOR - (5.5) 94 LB. SACKS PER CUBIC YARD OF CONCRETE
  - MAXIMUM AGGREGATE SIZE - 1"
  - MAXIMUM SLUMP - 4"
  - ADMIXTURES - WATER-REDUCING AGENT, AIR ENTERING AGENT (4% TO 6%)
- REINFORCING STEEL MATERIALS (SEE DETAIL #5/HS-M107):
  - REINFORCING BARS - NEW BILLET STEEL, ASTM A-165, GRADE 60
  - WELDED WIRE MESH REINFORCING - COLD DRAWN WIRE PER ASTM A-185
  - REINFORCING STEEL AND WIRE MESH TO BE UNPAINTED, UNCOATED, FREE FROM RUST, SCALE, AND OIL

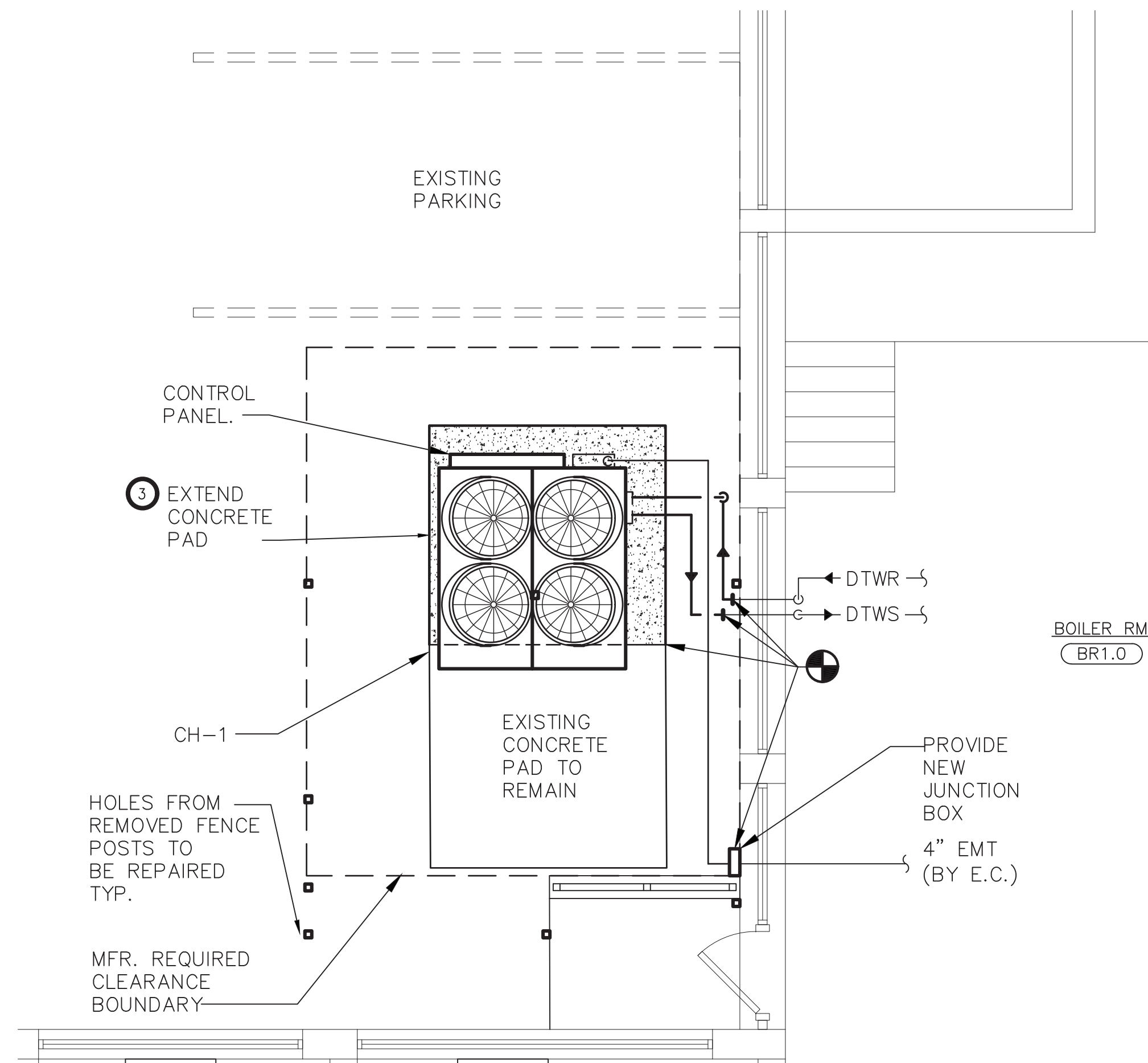
3 CONCRETE PAD DETAILS  
SCALE: NONE



1 PARTIAL FIRST FLOOR PLAN - DEMOLITION  
SCALE: 1/4"=1'-0"

KEYED NOTES - DEMOLITION:

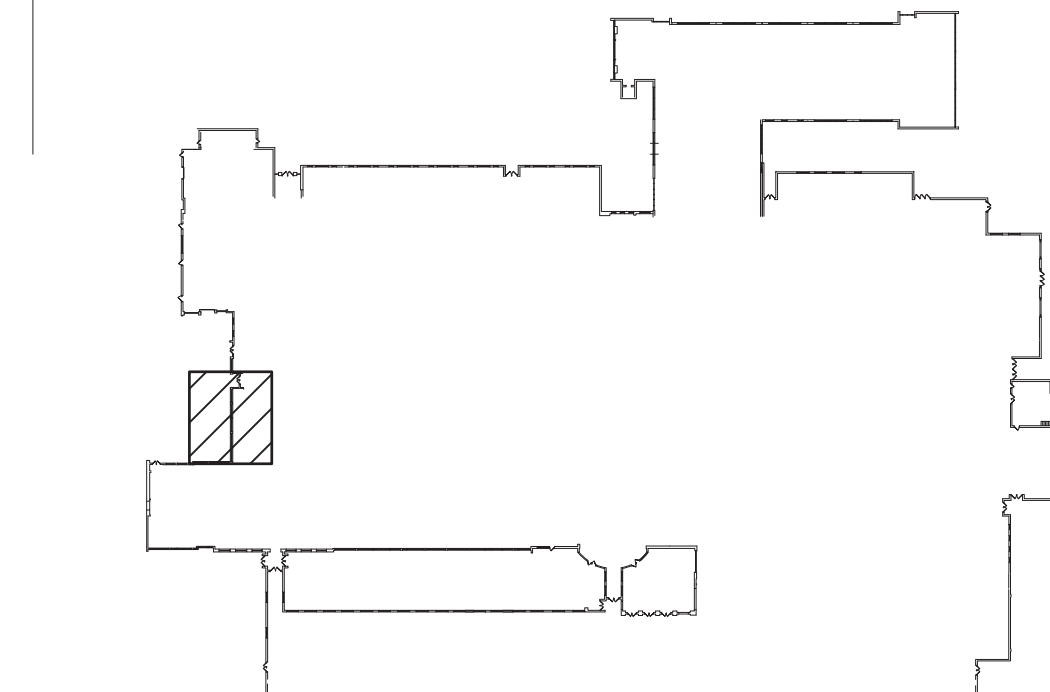
- REMOVE EXISTING CHILLER. DISCONNECT EXISTING DTW PIPING, DISCONNECT AT POINTS SHOWN.
- REMOVE FENCING, AND PORTION OF ASPHALT AS NECESSARY TO PREPARE AREA FOR NEW WORK. TURN FENCE OVER TO OWNER
- REMOVE DISCONNECT AND PORTION OF ELECTRICAL WIRING AND CONDUIT AS SHOWN.



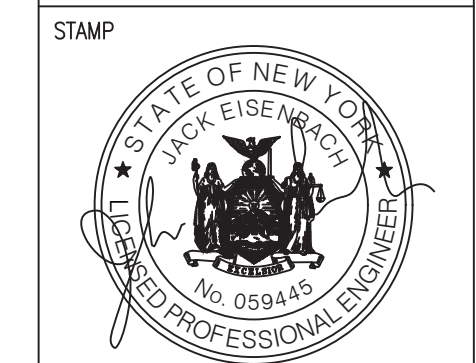
2 PARTIAL FIRST FLOOR PLAN - NEW WORK  
SCALE: 1/4"=1'-0"

KEYED NOTES - NEW WORK:

- PROVIDE NEW CHILLER TO BE INSTALLED AND CHARGED PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO PROVIDE NEW PIPING AND ASSOCIATED TO CONNECT TO EXISTING DTW PIPING, CONTROLS, AND ALL ACCESSORIES REQUIRED FOR A COMPLETE OPERATING SYSTEM. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL PIPE SIZING AND TO MAKE EXISTING PIPE TRANSITIONS FIT TO NEW CHILLER. RESEAL EXISTING DTW PIPING PENETRATIONS. CONTRACTOR IS RESPONSIBLE FOR START UP, TESTING, CERTIFICATIONS, AND INSPECTIONS. SEE M-502 FOR DETAILS.
- COORDINATE WITH GC FOR NEW CONCRETE PAD AND ASPHALT. REPAIR HOLES FROM REMOVED FENCE POSTS IN EXISTING ASPHALT AND CONCRETE.
- PROVIDE NEW 12" THICK CONCRETE PAD AS SHOWN. PIN EVERY 12"OC WITH 1/2"x12 REBAR AND GROUT AS REQUIRED.



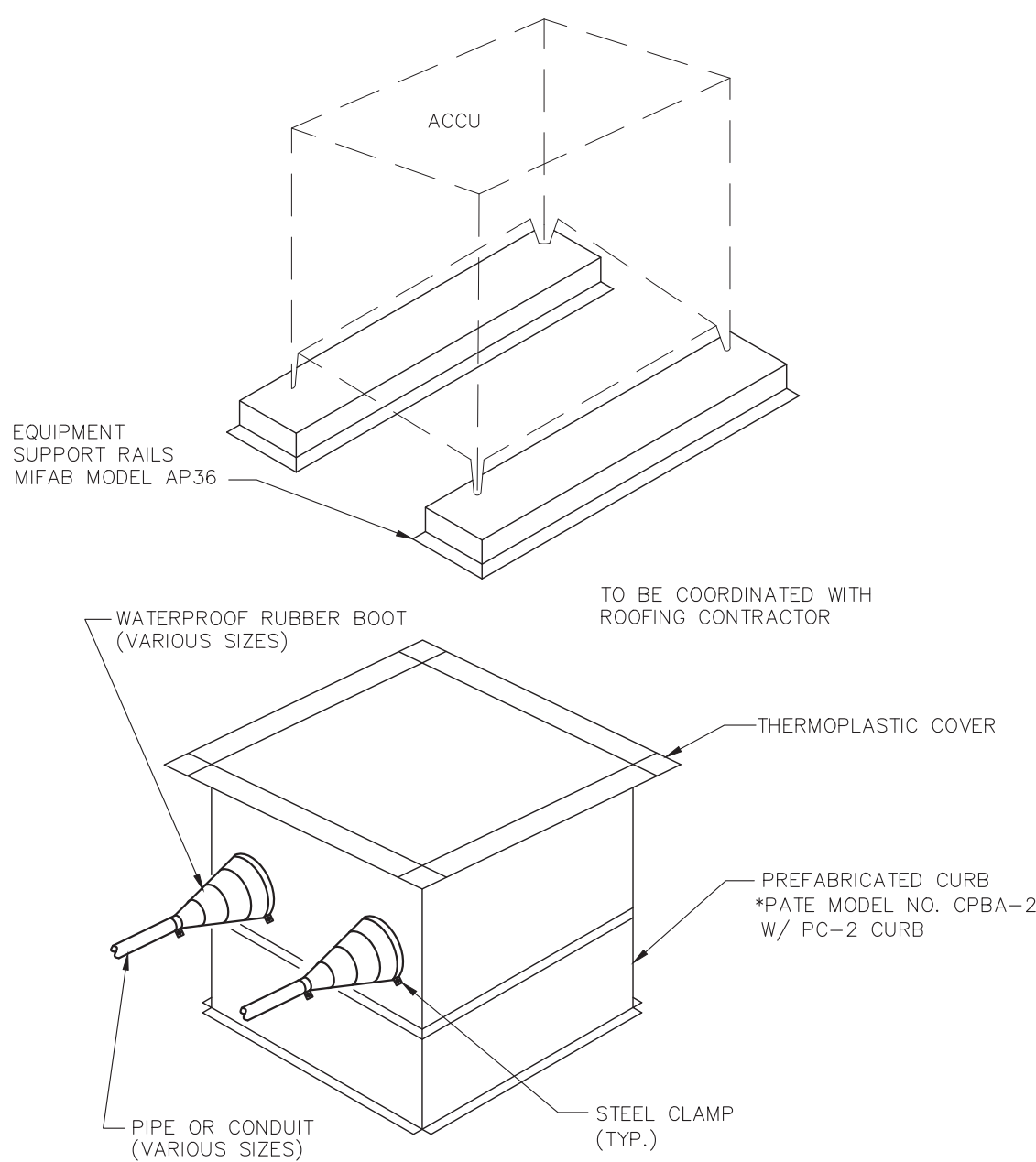
FIRST FLOOR KEY PLAN  
SCALE: NONE



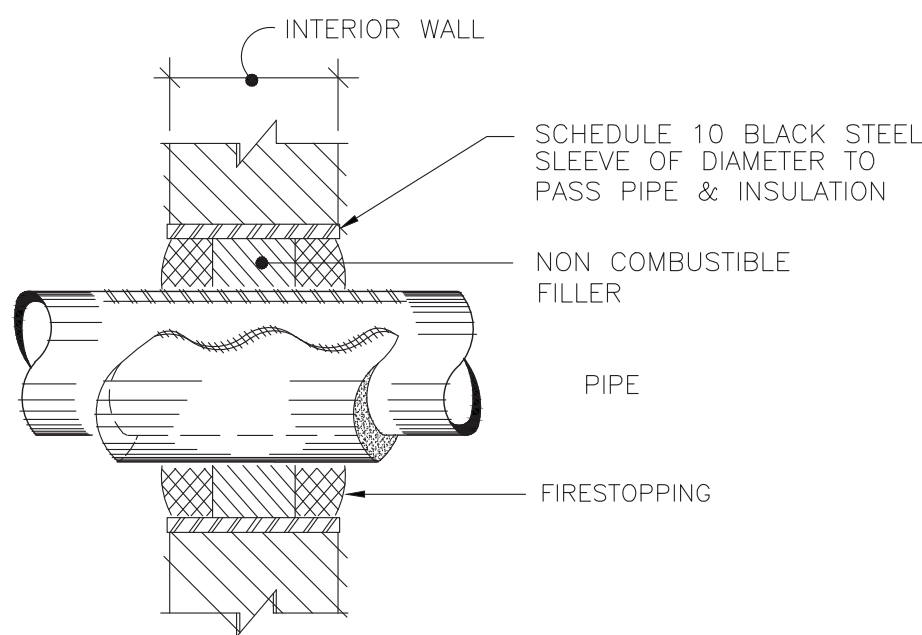
PROJECT NO.	05-21-04 05-20-06
BD SET	04.08.2022
REVISION	DATE
DRAWN BY	
CHECKED BY	
SHEET SIZE	30" x 42"
SCALE	AS NOTED

SHEET TITLE  
PARTIAL FIRST FLOOR  
PLAN - NORTH CHILLER -  
DEMOLITION & NEW  
WORK

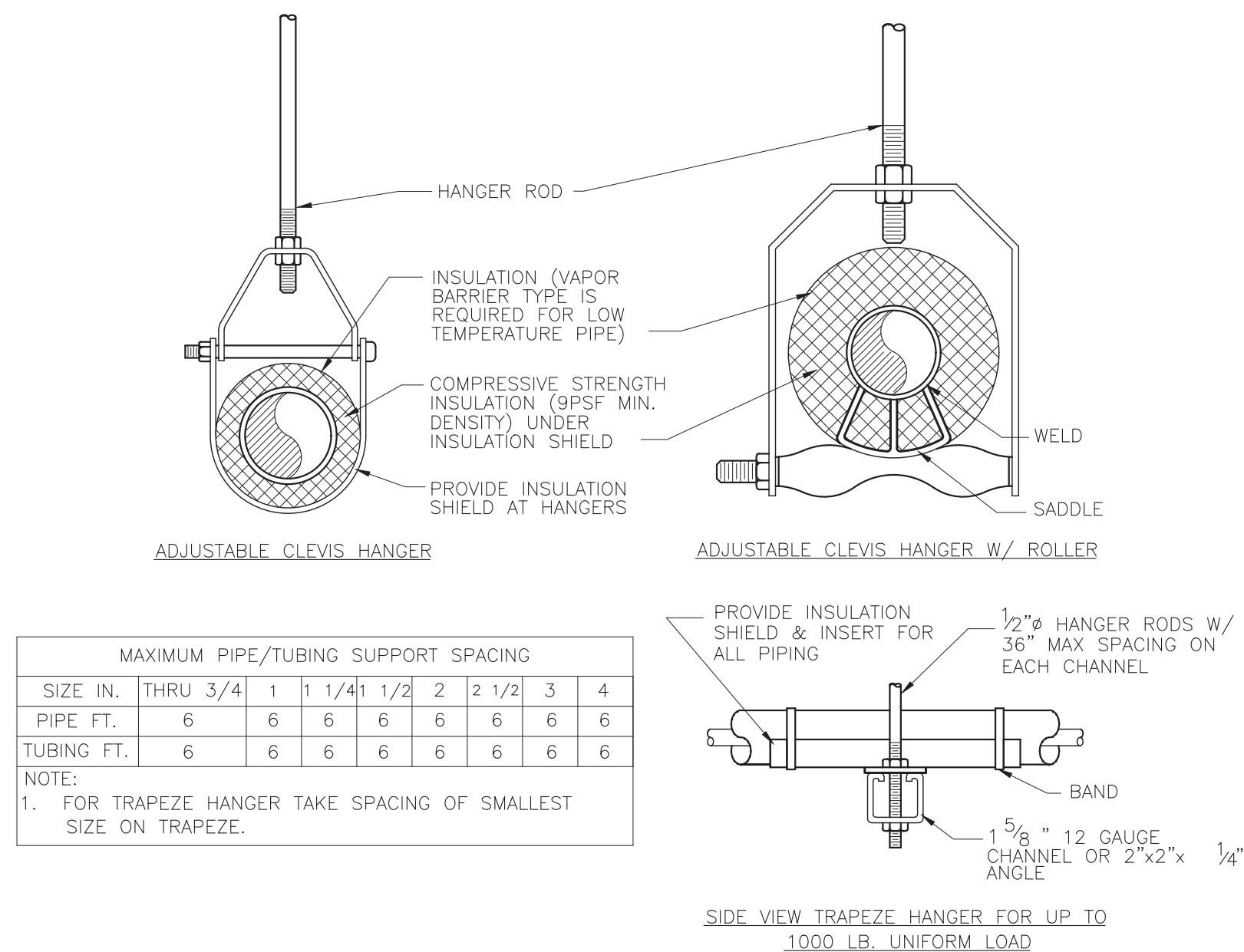




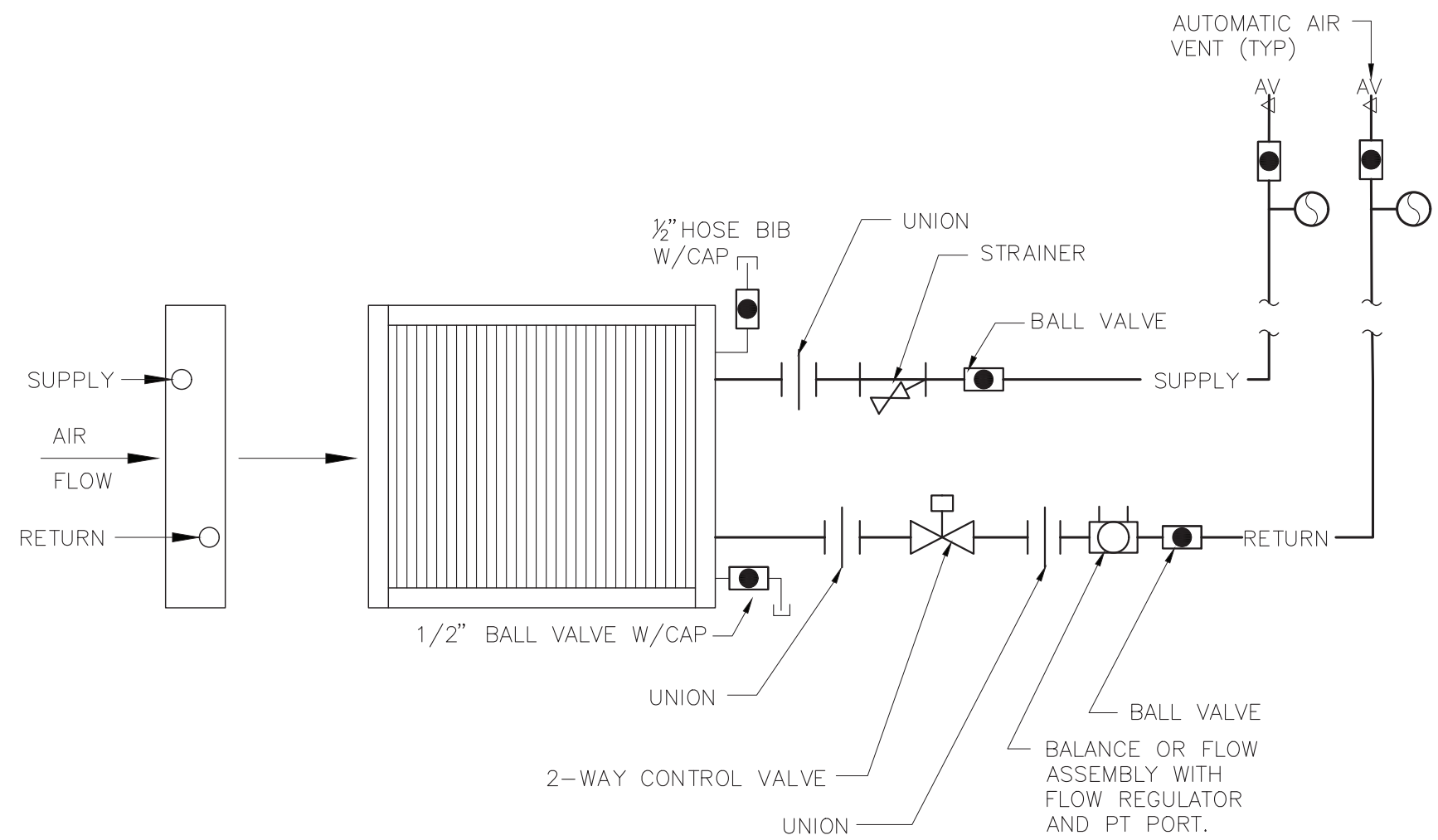
4 **PIPE/CONDUIT CURB ASSEMBLY DETAILS**  
SCALE: NONE



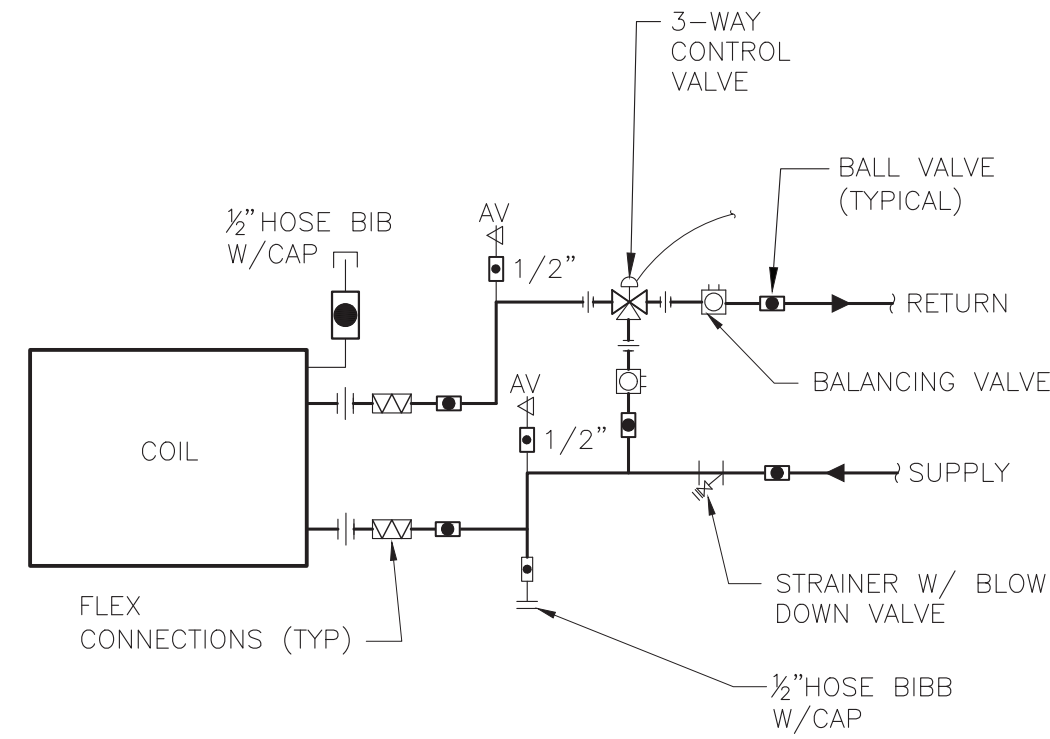
5 **PIPE SLEEVE AT WALL PENETRATION**  
SCALE: NONE



1 **PIPE SUPPORT DETAIL**  
SCALE: NONE



2 **UNIT VENTILATOR - FAN COIL UNIT HOT WATER / CHILLED WATER COIL DETAIL**  
SCALE: NONE



3 **COIL PIPING DETAIL 3 WAY VALVE**  
SCALE: NONE

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HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
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BID SET	04.08.2022
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DRAWN BY	
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SHEET SIZE	30" x 42"
SCALE	AS NOTED

SHEET TITLE

DETAILS

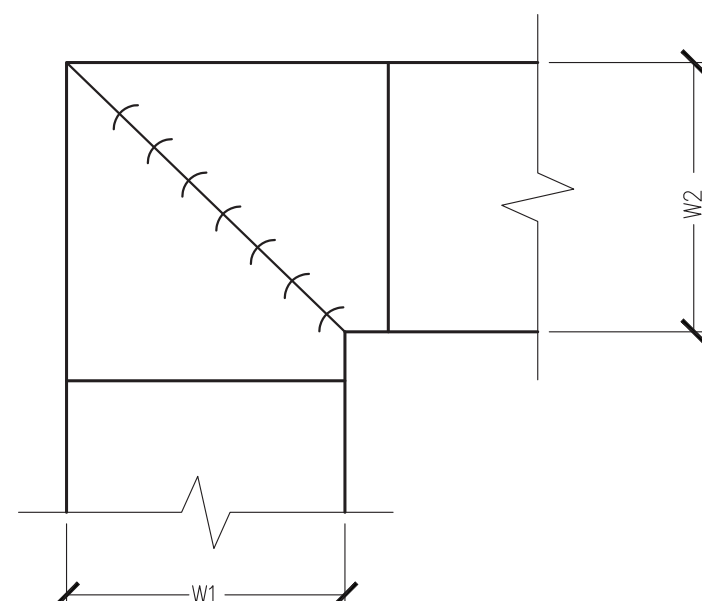
SHEET NO.

M-500



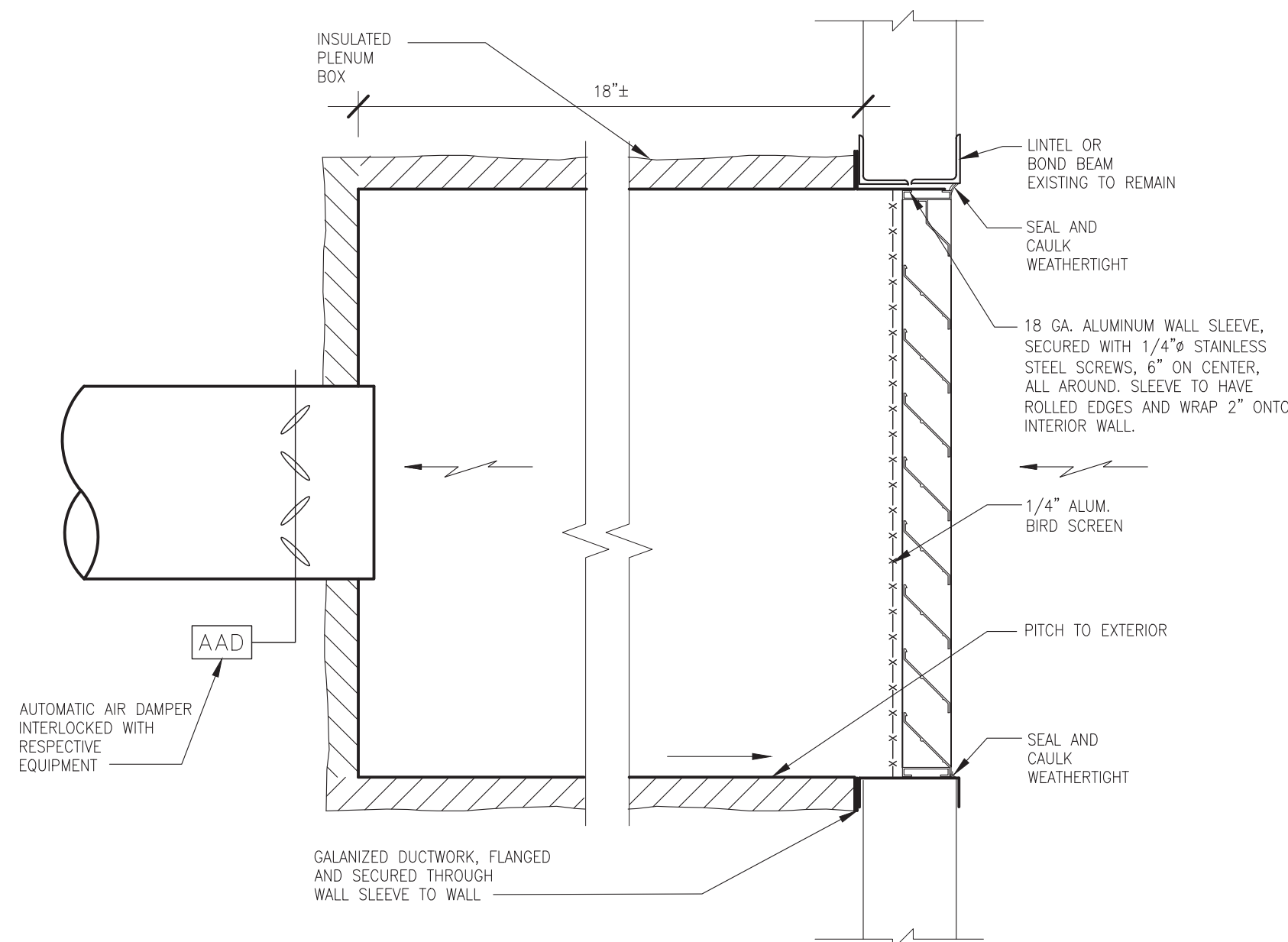
- NOTE:
1. INSTALL GOOSENECK WITH INTAKE AWAY FROM FRONT OF BUILDING

## AIR INTAKE RETANGULAR GOOSENECK DETAIL



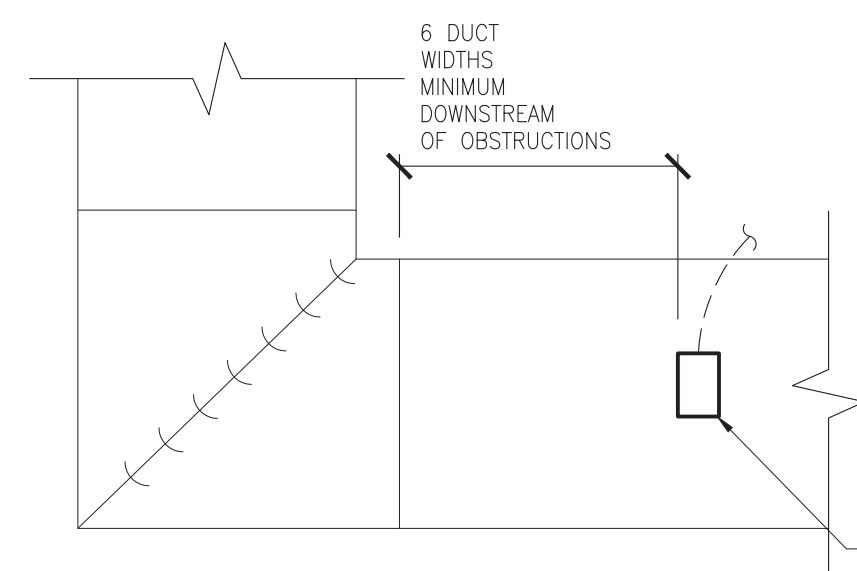
- NOTES:
1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
  2. WHEN W1 DOES NOT EQUAL W2 VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.
  3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" RADIUS, 1/8" MAXIMUM SPACE BETWEEN VANES AND A 3/4" TRAILING EDGE.
  4. WHEN W1 EQUALS W2 AND W1 IS GREATER THAN 20" VANES SHALL BE DOUBLE VANES TYPE.

## DUCTWORK SQUARE VANE ELBOWS DETAIL



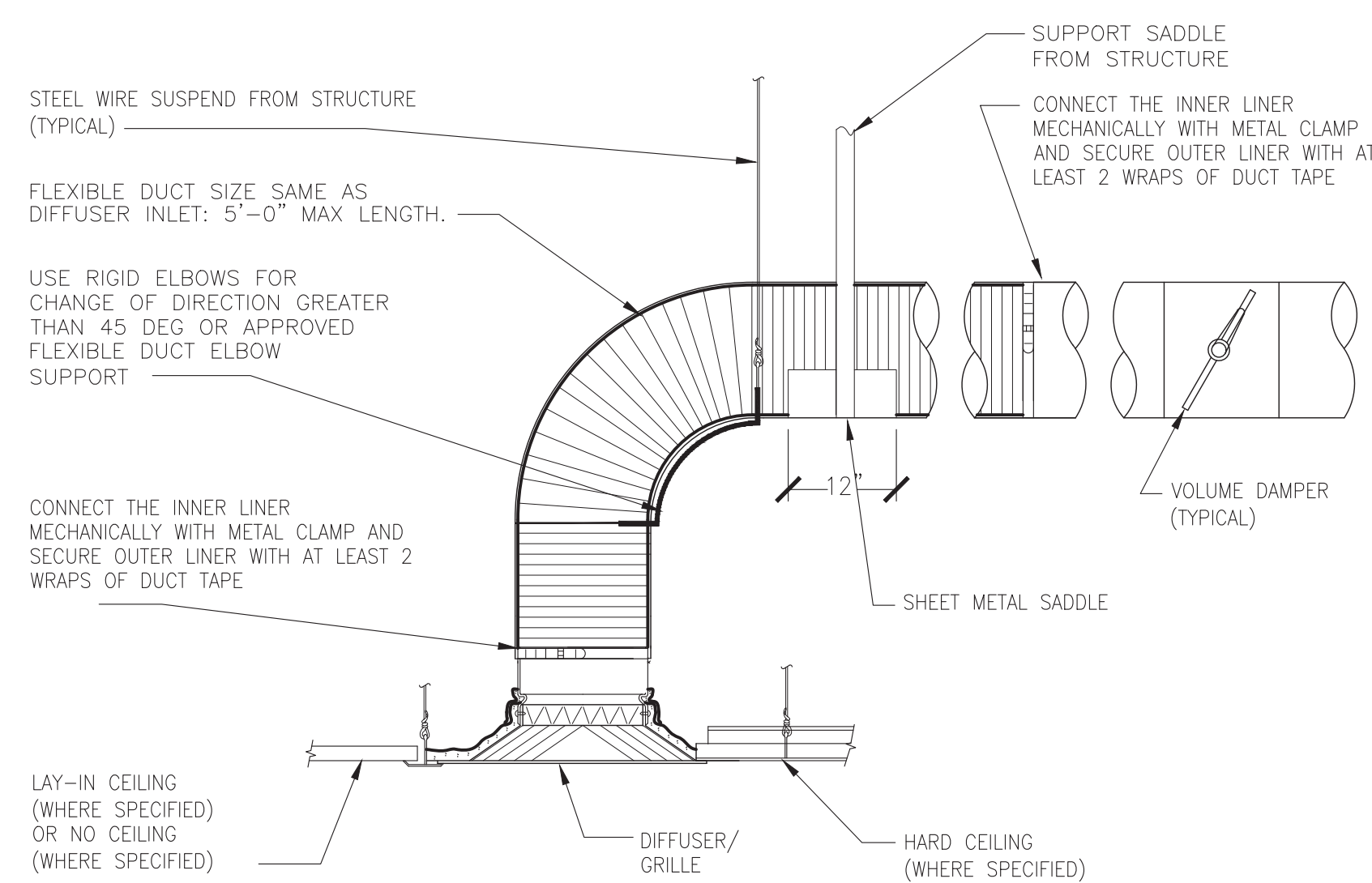
- NOTES:
1. ALL HARDWARE SHALL BE CORROSION RESISTANT AND HAVE FINISH TO MATCH ADJACENT SURFACE WHERE EXPOSED TO VIEW.
  2. PROVIDE RUSKIN ELF375DXH LOUVER. OR APPROVED EQUAL

#### 4 LOUVER DETAIL

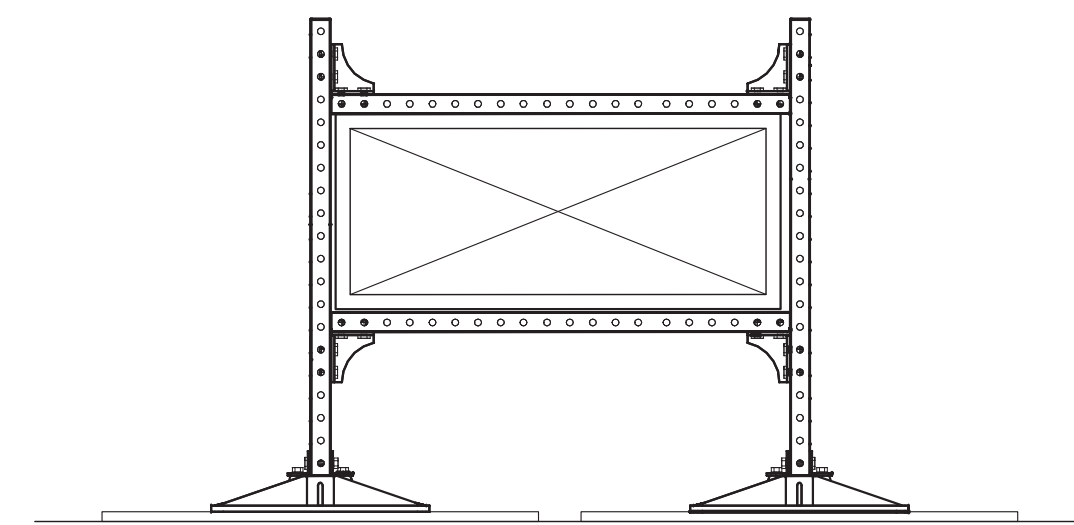


- NOTES:
1. DETECTORS SHALL BE FURNISHED/WIRED BY ELECTRICAL CONTRACTOR AND INSTALLED BY HVAC CONTRACTOR.

## DUCTWORK SMOKE DETECTOR INSTALLATION

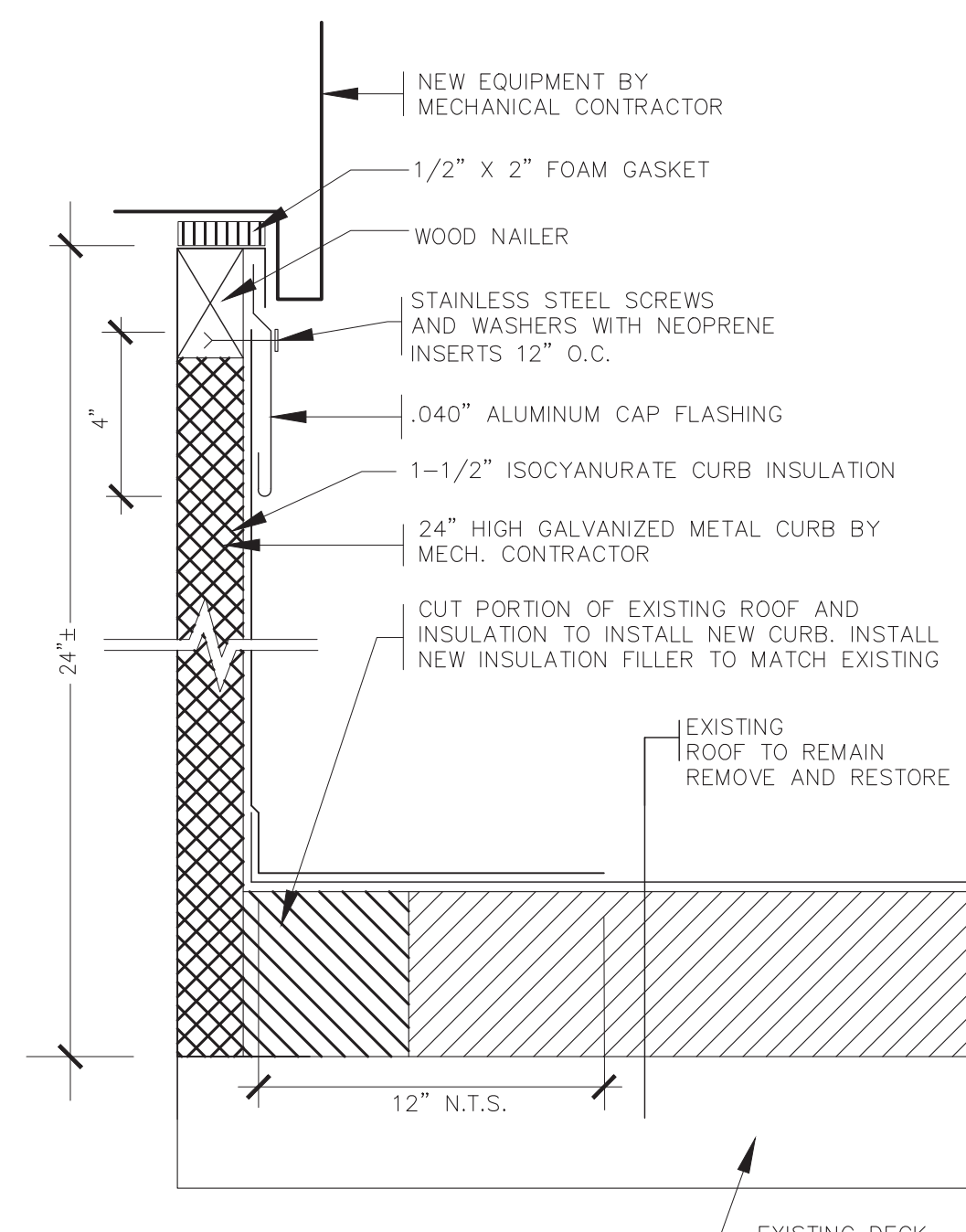


## 6 FLEXIBLE AIR DUCT CONNECTOR



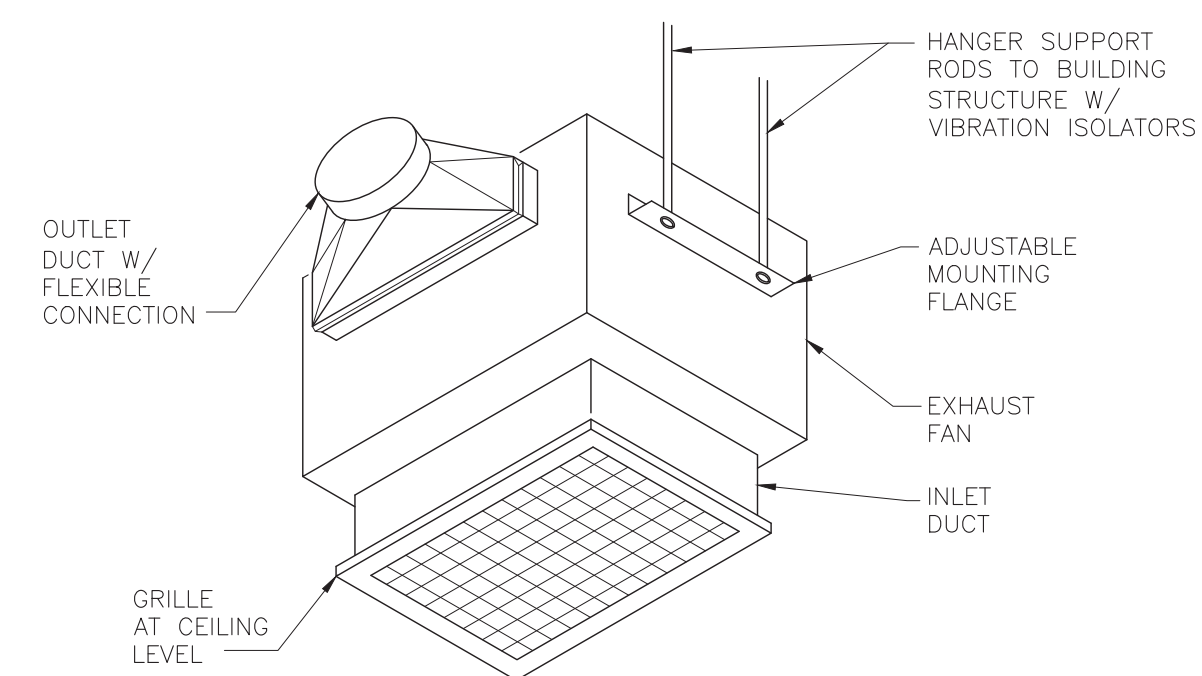
- NOTES:
1. CLEAR BALLAST (IF PRESENT) AND CLEAN SURFACE OF ROOF TO RECEIVE WALKWAY PAD.
  2. SPACE SUPPORTS PER SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" AND PER MANUFACTURERS RECOMMENDATIONS.

## ROOF MOUNTED DUCT SUPPORT DETAIL



- NOTE:  
ALL WORK ON THE EXISTING ROOF MUST BE PERFORMED BY AN  
AUTHORIZED APPLICATOR TO MAINTAIN THE EXISTING WARRANTY.

### TYPICAL HVAC CURB (EXISTING ROOF)



### 3 EXHAUST FAN DETAIL

SCALE: NONE



[illegible]

INSULATION SCHEDULE													
TYPE	EQUIPMENT OR SYSTEM SERVED	INSULATION CLASS (a)			JACKETING CLASS (b)			THICKNESS (IN)					
		INTERIOR CONCEALED	INTERIOR EXPOSED	EXTERIOR	INTERIOR GENERAL	EQUIPMENT ROOMS	EXTERIOR	NOMINAL PIPE SIZE (IN)				DUCTWORK	
								<1"	1"-<1½"	1½"- <4"	4 "- <8"	>8" & UP	(c)
A	RS, RL	FE (R-4)	FE (R-4)	FE (R-4)	0	0	4	0.5	1.5	1.5	1.5	1.5	
B	DCW, COOLING COIL CONDENSATE	FE (R-4)	--	--	0	--	--	0.5	0.5	1.0	1.0	1.0	
		--	FE (R-4)	--	--	4	--	0.5	0.5	1.0	1.0	1.0	
C	HWS, HWR	FG (R-7)	--	--	1	--	--	1.5	1.5	2	2	2	
		--	FG (R-7)	--	1	1	--	1.5	1.5	2	2	2	
		--	--	UR (R-9)	--	--	6	1.5	1.5	2	2	2	
D	DUCTWORK	FG (d) (R-6)	--	--	2	--	--	--	--	--	--	--	1.5(g)
		--	FG (e) (R-6)	--	2	2	--	--	--	--	--	--	2 (f)(g)
		--	--	UR(e) (R-12)	--	--	3	--	--	--	--	--	2 (i)
(a) FG -- FIBROUS GLASS FE -- FLEXIBLE ELASTOMERIC UR -- URETHANE CS -- CALCIUM SILICATE FR -- FIRE RATED		(b) 0 -- NONE 1 -- ALL SERVICE 2 -- ALUMINUM FOIL 3 -- CANVAS 4 -- POLYVINYL CHLORIDE 5 -- STAINLESS STEEL 6 -- ALUMINUM 7 -- EPDM			(c) SUPPLY AIR OUTSIDE AIR MIXED AIR RETURN AIR (d) BLANKET (e) RIGID BOARD			(f) INSPECT SUPPLY AIR WITHIN CONDITIONED SPACE (g) INSULATE EXHAUST AIR 15"-0" FROM EXTERIOR PENETRATION (i) TWO LAYERS, 3 IN TOTAL					
ALL INSULATION TO COMPLY WITH 2020 NYS ENERGY CONSERVATION CONSTRUCTION CODE													

ROOFTOP UNIT SCHEDULE																																			
	MARK	SERVICE	MODEL NO.	CFM	O/A MIN	FAN MOTOR (HP) (SUPPLY/EXHAUST)	TYPE	COOLING										HEATING										ELECTRICAL						UNIT WEIGHT (LB)	REMARKS
								TEMPERATURE (°F)					CAPACITY		GPM	ENT. FLUID (°F)	LVG. FLUID (°F)	EER	TYPE	TEMPERATURE (°F)			CAPACITY MBH	GPM	ENT. FLUID (°F)	LVG. FLUID (°F)	V/PH/HZ	MCA (A)	MOP (A)	FACTORY DISC.	VFD	GFCI OUTLET	ENERGY RECOV.		
								ENT. DB	AIR WB	LVG. DB	AIR WB	OD AMB DB/WB	TONS NOM.	MBH TOTAL						SENS.	ENT. DB	AIR WB													
(HS)	RTU-1	NORTH CAFETERIA	LG ARDE-112-36-30L-SI-C	2400	1700	(3)/(2)	PKG. DX - R410A REFRIG.	77.4	64.5	54.6	54.0	92/74	5.0	75.1	60.0	--	--	12.8	INDIRECT NATURAL GAS	59.1	90.0	100	--	--	208/3/60	39.1	50.0	YES	YES	YES	YES	3,284	SEE NOTES 1-7		
(HS)	RTU-2	NORTH CAFETERIA	LG ARDE-112-30-30H-SI-C	1800	1300	(2)/(1.5)	PKG. DX - R410A REFRIG.	78.0	64.9	51.9	51.5	92/74	5.0	71.1	51.6	--	--	12.8	INDIRECT NATURAL GAS	56.3	97.4	100	--	--	208/3/60	33.7	45.0	YES	YES	YES	YES	3,198	SEE NOTES 1-7		
(HS)	RTU-3	SOUTH CAFETERIA	LG ARDE-112-36-30H-10D-G	3600	2350	(5)/(3)	PKG. DX - R410A REFRIG.	78.3	65.1	54.0	53.1	92/74	10.0	130.0	96.1	--	--	11.6	INDIRECT NATURAL GAS	54.9	96.1	200	--	--	208/3/60	71.5	80.0	YES	YES	YES	YES	3,417	SEE NOTES 1-7		
(HS)	RTU-4	SOUTH CAFETERIA	LG ARDE-112-30-30L-SI-C	1600	1050	(2)/(1.5)	PKG. DX - R410A REFRIG.	80.2	66.4	51.8	51.5	92/74	5.0	71.2	49.7	--	--	12.8	INDIRECT NATURAL GAS	47.0	93.3	100	--	--	208/3/60	33.7	45.0	YES	YES	YES	YES	3,198	SEE NOTES 1-7		
(HS)	RTU-5	MAIN LOBBY	YORK XTO-30x45	2450	750	(3.0)/--	DTW COIL - CHILLED WTR.	80.0	67.0	57.7	55.8	92/74	6.8	81.7	57.7	19.0	45	53	--	DTW COIL - HOT WTR.	50.0	127.5	200	12	180.0	150.0	208/3/60	22.0	25.0	YES	YES	YES	YES	1,722	SEE NOTES 1-6
(HS)	RTU-6	MAIN LOBBY	YORK XTO-30x45	2450	750	(3.0)/--	DTW COIL - CHILLED WTR.	80.0	67.0	57.7	55.8	92/74	6.8	81.7	57.7	19.0	45	53	--	DTW COIL - HOT WTR.	50.0	127.5	200	12	180.0	150.0	208/3/60	22.0	25.0	YES	YES	YES	YES	1,722	SEE NOTES 1-6
NOTE 1: PROVIDE DAMPERS SHOWN ON THE DRAWINGS AND ADDITIONAL DAMPERS AS NECESSARY FOR AIR BALANCING OR AS NEEDED TO COMPLY WITH EECQNS C403.7.7 REQUIREMENTS FOR INTAKES AND EXHAUST OPENINGS.																																			
NOTE 2: OBSERVE REQUIRED AND RECOMMENDED CLEARANCES FOR UNIT DURING PLACEMENT. INSTALL UNIT ACCORDING TO MANUFACTURER RECOMMENDATIONS.																																			
NOTE 3: MECHANICAL CONTRACTOR TO PROVIDE WEATHERPROOF ENCLOSURES "SYSTEM SENSOR DH400CE-1" OR APPROVED EQUAL FOR ALL DUCT SMOKE DETECTORS MOUNTED IN EXTERIOR DUCTWORK ON ROOF.																																			
NOTE 4: MAINTAIN MINIMUM OF 10' FROM ROOF EDGE WHEN PLACING UNIT.																																			
NOTE 5: UNLESS OTHERWISE SPECIFIED, UNITS ARE TO HAVE MERV-8 FILTERS FOLLOWED BY MERV-13 FILTERS.																																			
NOTE 6: INTERCONNECT DUCT SMOKE DETECTORS (FURNISHED AND WIRED BY EC) TO DEACTIVATE UNIT WHEN DSD ALARMS.																																			
NOTE 7: INTERCONNECT CARBON MONOXIDE DETECTORS (PROVIDED BY EC) TO DEACTIVATE UNIT WHEN CO DETECTOR ALARMS, INTERCONNECT TO EACH UNIT SERVING THE SAME SPACE AS THE CO DETECTOR(S).																																			
NOTE 8: INTERCONNECT CARBON DIOXIDE DETECTORS (PROVIDED BY EC) TO MODULATE CONDITIONED AIR SUPPLY BASED ON DEMAND.																																			

	MARK	SERVICE	MODEL NO.	CFM	O/A MIN	SUPPLY FAN HP	TYPE	COOLING										HEATING			ELECTRICAL					UNIT WEIGHT (LB)	REMARKS			
								TEMPERATURE (°F)						CAPACITY				EER	TYPE	TEMPERATURE (°F)		CAPACITY MBH	V/PH/Hz	MCA (A)	MOP (A)			FACTORY DISC.	CONVN. GFCI OUTLET	ENERGY RECOV.
								ENT. AIR		LVG. AIR		OD AMB DB/WB	TONS NOM.	MBH		DB	°WB													
								DB	WB	DB	WB			TOTAL	SENS.															
(HS)	MAU-1	KITCHEN	LG ARDR-212-25I-N	5800	350	7.5	PKG. DX - R410A REFRIG.	90.2	72.9	55.5	55.2	92/74	25.0	344.9	221.7	10.1	INDIRECT NATURAL GAS	7.4	71.3	500,000	208/3/60	145.7	175.0	YES	YES	YES	YES	YES	3,852	SEE NOTES 1-8
(HS)	MAU-2	SERVERY	LG ARDR-212-17.5I-M	3800	500	5	PKG. DX - R410A REFRIG.	90.2	72.9	54.6	54.3	92/74	17.5	234.9	148.8	11	INDIRECT NATURAL GAS	7.6	85.6	400,000	208/3/60	93.7	125.0	YES	YES	YES	YES	YES	3,198	SEE NOTES 1-8
NOTE 1: PROVIDE DAMPERS SHOWN ON THE DRAWINGS AND ADDITIONAL DAMPERS AS NECESSARY FOR AIR BALANCING OR AS NEEDED TO COMPLY WITH ECCO/NSV C403.7.7 REQUIREMENTS FOR INTAKES AND EXHAUST OPENINGS.																														
NOTE 2: OBSERVE REQUIRED AND RECOMMENDED CLEARANCES FOR UNIT DURING PLACEMENT. INSTALL UNIT ACCORDING TO MANUFACTURER RECOMMENDATIONS.																														
NOTE 3: MECHANICAL CONTRACTOR TO PROVIDE WEATHERPROOF ENCLOSURES "SYSTEM SENSOR DH400OE-1" OR APPROVED EQUAL FOR ALL DUCT SMOKE DETECTORS MOUNTED IN EXTERIOR DUCTWORK ON ROOF.																														
NOTE 4: "COOLING" AND "HEATING" EAT AND LAT CALCULATED AT WORST CASE - 90% OA, 10% RETURN.																														
NOTE 5: UNITS OUTFISHED WITH FACTORY MOTORIZED DAMPER AND AIR FLOW MONITOR ON OA INTAKE AND FIELD INSTALLED MOTORIZED DAMPER ON RETURNS. SEE M-600 FOR CONTROL SEQUENCING.																														
NOTE 6: UNITS TO BE PROVIDED WITH TWO MERV 8 FILTERS FOLLOWED BY TWO MERV 13 FILTERS. REFER TO MANUFACTURER'S RECOMMENDATIONS.																														
NOTE 7: INTERCONNECT DUCT SMOKE DETECTORS (FURNISHED AND WIRED BY EC) TO DEACTIVATE UNIT WHEN DSD ALARMS.																														
NOTE 8: INTERCONNECT CARBON MONOXIDE DETECTORS (PROVIDED BY EC) TO DEACTIVATE UNIT WHEN CO ALARMS. INTERCONNECT TO EACH UNIT SERVING THE SAME SPACE AS THE CO DETECTOR(S).																														

CHILLER SCHEDULE																																	
	MARK	SERVICE	BRAND/MODEL NO.	CAPACITY (TONS)	PACKAGE/ SPLIT	CONDENSER			EVAPORATOR										QTY.	COMPRESSOR				ELECTRICAL						REMARKS			
						DESIGN AMBIENT TEMP. (°F)	MIN. AMBIENT TEMP. (°F)	FAN QTY.	FLUID	VOL. (GAL)	FLOW (GPM)	FLOW MIN/MAX (GPM)	P DROP (FT)	P DROP MIN/H2O (FT H2O)	CONNECTION TYPE / SIZE (IN)	ENT. FLUID (°F)	LVG. FLUID (°F)	SUCT. INSUL- ATED		TYPE	QTY.	REFRIG. TYPE	UNIT CHARGE (LB)	V/PH/HZ	MCA (A)	MOP (A)	FACTORY DISC.	VFD	CONVN. GFCI OUTLET		UNIT WEIGHT (LB)		
(HS)	CH-1 (NORTH CHILLER)	2 PIPE DTW SYS.-BLDG.	DAIKIN AGZ070E DST AIR COOLED CHILLER	64.78	PACKAGE	95.0	32.0	4	WATER	3.2	155.0	102.9	274.4	17.1	7.90	50.7	LEFT/2.5	54.00	44.00	YES	1	AIR-SCROLL	4	R410A	46	208/3/60	320	350	YES	YES	YES	3497	SEE NOTES 1-4
NOTE 1: COIL FINS ARE MICROCHANNEL - EPOXY COATED. NOTE 2: OBSERVE REQUIRED AND RECOMMENDED CLEARANCES FOR UNIT DURING PLACEMENT, INSTALL, CHARGE, AND START UP UNIT ACCORDING TO MANUFACTURER RECOMMENDATIONS. NOTE 3: IF CONVENIENCE GFCI OUTLET OPTION IS UNAVAILABLE, PROVIDE AND WIRE STANDALONE GFCI OUTLET. NOTE 4: CHILLER REQUIRES DRAINING, SHUT DOWN, AND 3 WAY VALVE CHANGE OVER DURING HEATING SEASON. PROVIDE TYPED SEASONAL SHUTDOWN/ STARTUP PLAN TO AVOID DAMAGE AND POST IN NEARBY BOILER ROOM. REFER TO MANUFACTURER RECOMMENDATIONS WHEN AVAILABLE. SUBMIT SHUTDOWN/STARTUP PLAN DIGITALLY IN CLOSEOUT DOCUMENTS.																																	

<div> <div> OA DESIGN CRITERIA</div> <div>WARWICK HIGH SCHOOL</div> </div>		NOTES
RTU-1 & RTU-2 – NORTH CAFETERIA CAFETERIA OCCUPANT DENSITY = 100/1000 SQUARE FEET RP=7.5 CFM/PERSON PZ=295 PEOPLE (POSTED MAX OCCUPANCY) RA=0.18 CFM/SQ.FT. AZ=4341 SQ.FT. VBZ=2993.88 CFM		
MIN TOTAL OUTSIDE AIR REQUIRED – 3,000 CFM		
RTU-3 & RTU-4 – SOUTH CAFETERIA CAFETERIA OCCUPANT DENSITY = 100/1000 SQUARE FEET RP=7.5 CFM/PERSON PZ=329 PEOPLE (POSTED MAX OCCUPANCY) RA=0.18 CFM/SQ.FT. AZ=4854 SQ.FT. VBZ=3341.22 CFM		
MIN TOTAL OUTSIDE AIR REQUIRED – 3,400 CFM		
RTU-5 & RTU-6 – MAIN LOBBY FIRST FLOOR LOBBY OCCUPANT DENSITY = 30/1000 SQ.FT. RP=7.5 CFM/PERSON PZ=145 PEOPLE (CALCULATED) RA=0.06 CFM/SQ.FT. AZ=4826 SQ.FT. (VBZ 1)=1377.06 CFM SECOND FLOOR CORRIDOR (LOBBY BRIDGE) OCCUPANT DENSITY = -/1000 SQUARE FEET * RP= - CFM/PERSON * PZ= - PEOPLE * RA=0.06 CFM/SQ.FT. AZ=114.3 SQ.FT. (VBZ 2)=68.58 CFM VBZ=(VBZ 1)+(VBZ 2)=1445.64 CFM		* PER 2020 IBC, POPULATION-BASED OCCUPANCY VALUES ARE NOT PROVIDED FOR CORRIDOR/ VENTILATION CALCULATIONS. CALCULATION IS BASED ON BREATHING ZONE AREA.
MIN TOTAL OUTSIDE AIR REQUIRED – 1,500 CFM		
MAU-1 – KITCHEN CAFETERIA OCCUPANT DENSITY = 20/1000 SQUARE FEET RP=7.5 CFM/PERSON PZ=19 PEOPLE (CALCULATED) RA=0.18 CFM/SQ.FT. AZ=943 SQ.FT. VBZ=311.19 CFM		
MIN TOTAL OUTSIDE AIR REQUIRED – 350 CFM		
MAU-2 – SERVERY CAFETERIA OCCUPANT DENSITY = 20/1000 SQUARE FEET RP=7.5 CFM/PERSON PZ=30 PEOPLE (CALCULATED) RA=0.18 CFM/SQ.FT. AZ=1502 SQ.FT. VBZ=495.66 CFM		
MIN TOTAL OUTSIDE AIR REQUIRED – 500 CFM		

EXHAUST FAN SCHEDULE											
	MARK	LOCATION / SERVICE	FAN TYPE	AIR FLOW CFM	STATIC PRESS. (IN WG.)	MAX. RPM	HP/WATTS	VOLT/PHASE	MODEL	MFG	REMARKS
(BB)	EF-1	OUTDOOR BATHROOM BUILDING	DIRECT-DRIVE	400	.375	1070	217 WATTS	115/1	CSP-A510	GREENHECK	SEE NOTES 1,2,4
(BB)	EF-2	OUTDOOR BATHROOM BUILDING	DIRECT-DRIVE	100	.375	1400	113 WATTS	115/1	CSP-A190	GREENHECK	SEE NOTES 1,2,3
(BB)	EF-3	OUTDOOR BATHROOM BUILDING	DIRECT-DRIVE	400	.375	1070	217 WATTS	115/1	CSP-A510	GREENHECK	SEE NOTES 1,2,4
NOTE 1: PROVIDE VIBRATION ISOLATORS. SEAL PENETRATIONS TO BE WEATHER PROOF. SEAL DUCTWORK FOR AIRTIGHT SEAL.											
NOTE 2: PROVIDE "VARI-SPEED" CONTROLS. MOUNT INTERNALLY.											
NOTE 3: PROVIDE GREENHECK WC-6											
NOTE 4: PROVIDE GREENHECK WC-8											



WARWICK VALLEY HIGH SCHOOL UV-C LIGHTING SCHEDULE (CONTINUED)								
NEW UV-C CIRCUIT MARK	LOCATION/SERVICE	HVAC UNIT TYPE	HVAC UNIT NOMINAL AIR FLOW (CFM)	HVAC UNIT VOLTAGE/PH	UV-C INSTALL LOCATION	UV-C FIXTURE VOLTAGE/PH	QTY.	UV-C POWER LOCATION
SECOND FLOOR								
UVC-HS-57	201	UV	750	120/1	IN CABINET	UV-FCU-CL 60H-P-B-VENT	1	HVAC POWER
UVC-HS-58	203	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-59	205	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-60	207	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-61	209	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-62	211	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-63	213	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-64	214	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-65	215	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-66	216	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-67	217	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-68	218	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-69	219	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-70	220	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-71	221	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-72	222	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-73	223	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-74	224	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-75	225	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-76	227	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-77	229	UV	1250	120/1	IN CABINET	UV-FCU-CL 90H-P-B-VENT	1	
UVC-HS-78	CORR./242.2-242.3 OFFICES	HORIZ. FCU	575	120/1	14"x8" DUCT	UV-DUCT-FL 2/35HP-NX	1	

(\*) INDICATES UNIT IS PROVIDED NEW AS PART OF CURRENT PROJECT. REFER TO M DRAWINGS FOR MORE INFORMATION. DO NOT PROVIDE UV-C FIXTURES TO EXISTING TO BE REMOVED EQUIPMENT.

(\*\*) INDICATES A VRF SYSTEM PAIRED WITH AN HRU. TIE UV-C POWER AND CONTROLS INTO HRU.

**ENGINEER:**

The logo for Eisenbach & Ruhne Engineering, P.C. features the letters 'E' and 'R' in a stylized, bold, sans-serif font. The letters are white and set against a dark, rectangular background. The 'E' and 'R' are slightly overlapping, with the 'R' positioned to the right of the 'E'. The background of the logo has a subtle, repeating pattern of small, light-colored squares.

**Eisenbach & Ruhne Engineering, P.C.**  
291 Gateshead Street - Union, NY 13501  
Ph: 513-335-1018 Fax: 513-335-8366  
[www.eandrupc.com](http://www.eandrupc.com)

**CONSULTANT(S):**

The logo for Fuller & D'Angelo P.C. consists of the text 'FULLER & D'ANGELO P.C.' in a bold, sans-serif font. The text is white and set against a dark, rectangular background. The background of the logo has a subtle, repeating pattern of small, light-colored squares.

**FULLER  
& D'ANGELO  
P.C.**

The logo for Fuller & D'Angelo Architects Planners features the text 'ARCHITECTS PLANNERS' in a bold, sans-serif font. The text is white and set against a dark, rectangular background. The background of the logo has a subtle, repeating pattern of small, light-colored squares.

**ARCHITECTS  
PLANNERS**

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ELIZABETH NEW YORK 07208  
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& D'ANGELO P.C.**



**WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING**  
225 WEST STREET/EXT. WARWICK, NY 10900

PROJECT NO.	05-21-04 05-02-05
BID SET	04.08.2022
REVISION	DATE
DRAWN BY	
CHECKED BY	
SHEET SIZE	30" X 42"
SCALE	AS NOTED
SHEET TITLE	
HIGH SCHOOL UV-C LIGHT FIXTURE SCHEDULE (UV-C CONTRACT)	
SHEET NO.	

# M-503

NOTE 1: PROVIDE UV-C LIGHT FIXTURES AND BULBS FROM LIGHT PROGRESS USA BRAND, NO SUBSTITUTION, AND ANY HARDWARE, SHIELDING, WIRING, DRIVERS, RELAYS, TRANSFORMERS, AND ALL APPURTENANCES NECESSARY FOR INSTALLATION.

NOTE 2: PROVIDE POWER TO LIGHT FIXTURES USING 2#12 -W1#12 GND WIRING. PROVIDE 3/4" CONDUIT OR METAL CLADDING TO POWER AND CONTROL WIRING. POWER AND CONTROL WIRING TO BE IN SEPARATE CONDUIT/MC TO AVOID INTERFERENCE.

NOTE 3: UV-C CONTRACTOR TO PROVIDE AND COORDINATE CUTTING, PATCHING, SEALING, AND REINSULATING OF DISTURBED DUCTWORK. REINFORCE DUCTWORK TO MAINTAIN RIGIDITY AND PROVIDE SUPPORT TO PREVENT DUCTWORK SAGGING, DEFORMATION, OR VIBRATION. TEST AND SEAL ALL PENETRATIONS TO BE AIRTIGHT.

NOTE 4: EACH UV-C LIGHTING CIRCUIT MUST INCLUDE AN INDIVIDUAL SERVICE SWITCH. ONE SERVICE SWITCH MUST DISCONNECT POWER FROM ALL UV-C FIXTURES ON THE CIRCUIT. THIS SERVICE SWITCH SHALL NOT DISCONNECT POWER TO THE HVAC UNIT, CONTROLLER, OR FAN. THE SERVICE SWITCH FACE PLATES MUST INDICATE ON AND OFF DIRECTIONS.

NOTE 5: THE SERVICE SWITCH SHALL HAVE A STATUS INDICATING LED, EITHER INCORPORATED INTO THE SWITCH OR OTHERWISE ADDED. THE SERVICE SWITCH LED SHALL ILLUMINATE ONLY IF THE UV-C FIXTURE(S) ARE ON AND ILLUMINATED. IF THERE ARE FACTORY-MOUNTED STATUS LEDS ON THE UV-C FIXTURES AND THEY ARE VISIBLE FROM THE OUTSIDE OF THE FIXTURE, THE SWITCH STATUS LED MAY BE OMITTED.

NOTE 6: UV-C LIGHTING AND ALL APPURTENANCES MUST BE POSITIONED TO BE ACCESSIBLE WITHIN REASON TO ALLOW FOR CLEANING, MAINTENANCE, AND REPLACEMENT OF BULB(S). VERIFY PLACEMENT BASED ON FIELD CONDITIONS. PROVIDE PAINTED ACCESS PANELS AS NEEDED.

NOTE 7: TIE INTO SPECIFIED HVAC EQUIPMENT CONTROLS. REFER TO THE UV-C ACTIVATION CONDITIONS DETAIL REGARDING WHEN THE UV-C FIXTURE(S) SHALL BE ACTIVATED.

NOTE 8: CONNECT TO BMS CONTROLS AND INTEGRATE TO TRIP TROUBLE CODES FOR MALFUNCTIONS, SUCH AS A NON-FUNCTIONAL BALLAST OR BULB. PROVIDE UV-C FIXTURE WITH OPTIONS AND EQUIPMENT TO COMMUNICATE WITH EXISTING BMS. VERIFY IN FIELD.

NOTE 9: AFFIX 1" PLASTIC OR VINYL LABELS TO EACH UV-C LIGHT FIXTURE AND SERVICE SWITCH WITH THE CORRESPONDING UV-C CIRCUIT MARK NOTED ABOVE. EACH UV-C FIXTURE TO BE MARKED WITH AN APPROPRIATE WARNING LABEL. PROVIDE PLASTIC OR VINYL PURPLE MARKERS TO APPROXIMATELY MARK LOCATIONS OF UV-C FIXTURES ABOVE CEILINGS. AFFIX TO T-BAR FOR DROP CEILINGS. AFFIX A LABEL READING "UV-C ON" NEAR ALL STATUS INDICATING LEDS, WHETHER FACTORY-MOUNTED OR OTHERWISE. FOR CIRCUITS THAT REQUIRE POWER TO COME FROM A NEARBY AVAILABLE POWER PANEL, AFFIX LABEL TO CIRCUIT SWITCH INDICATING PANEL'S ROOM NUMBER, PANEL NAME, AND BREAKER NUMBER.

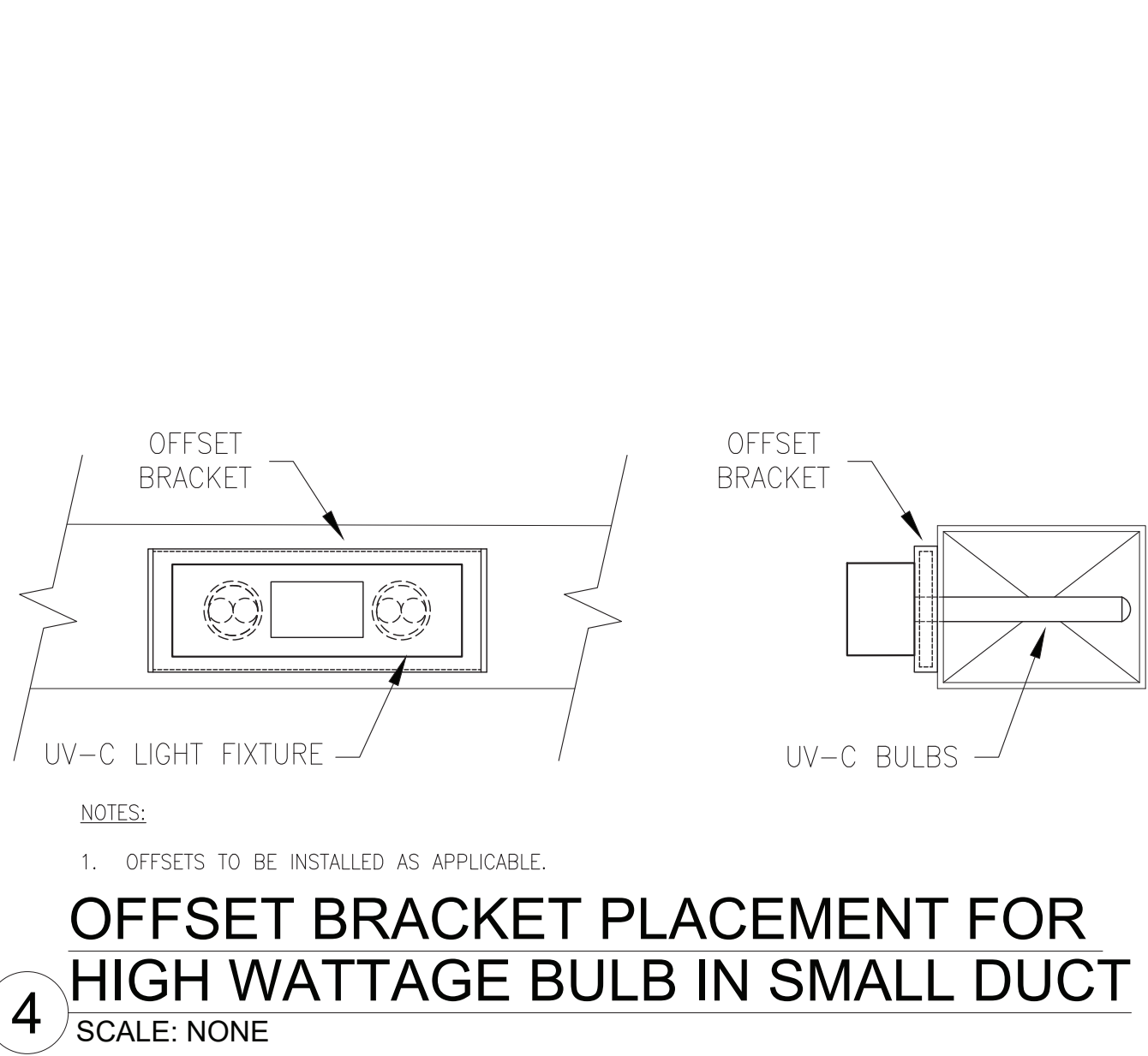
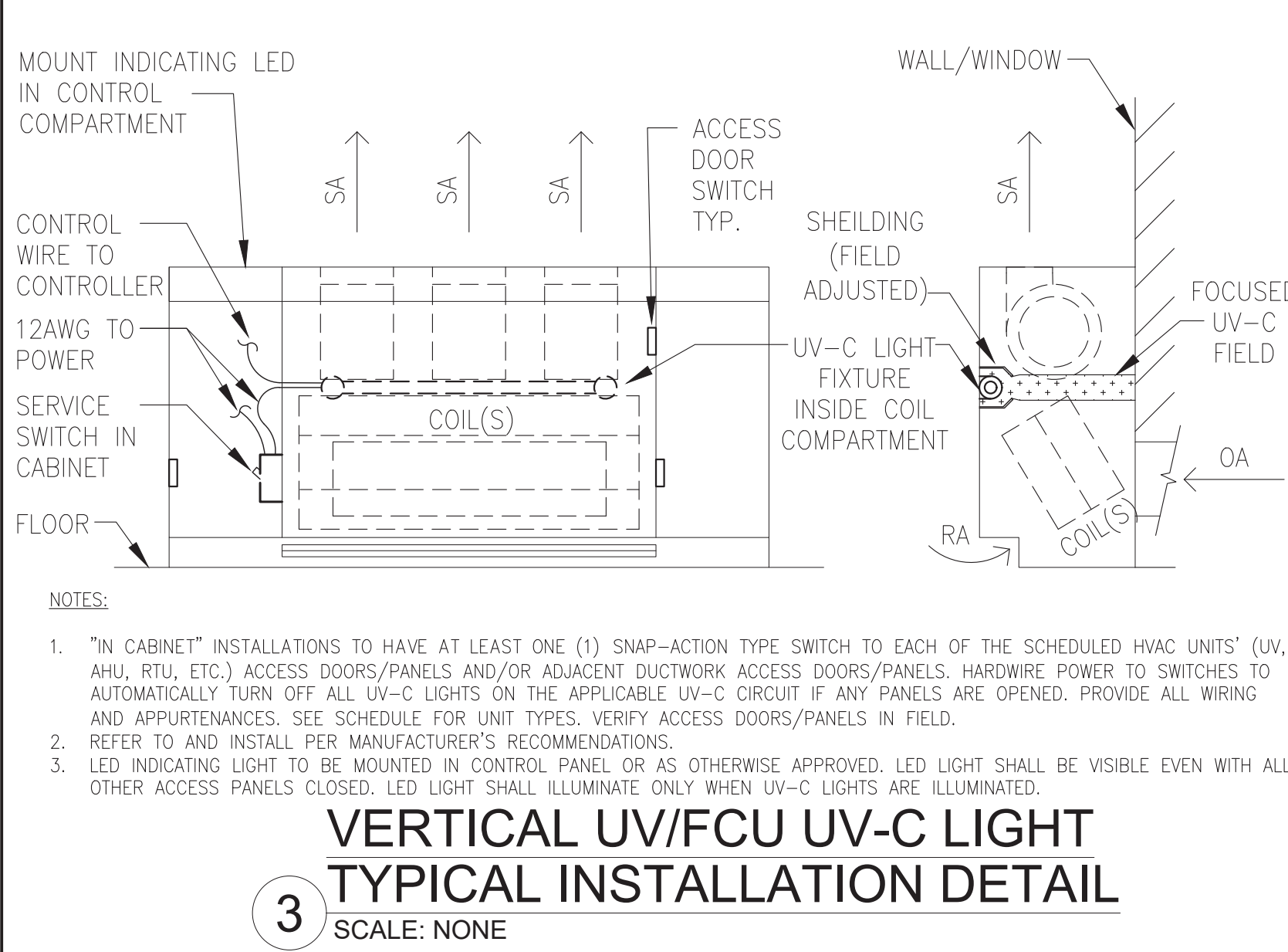
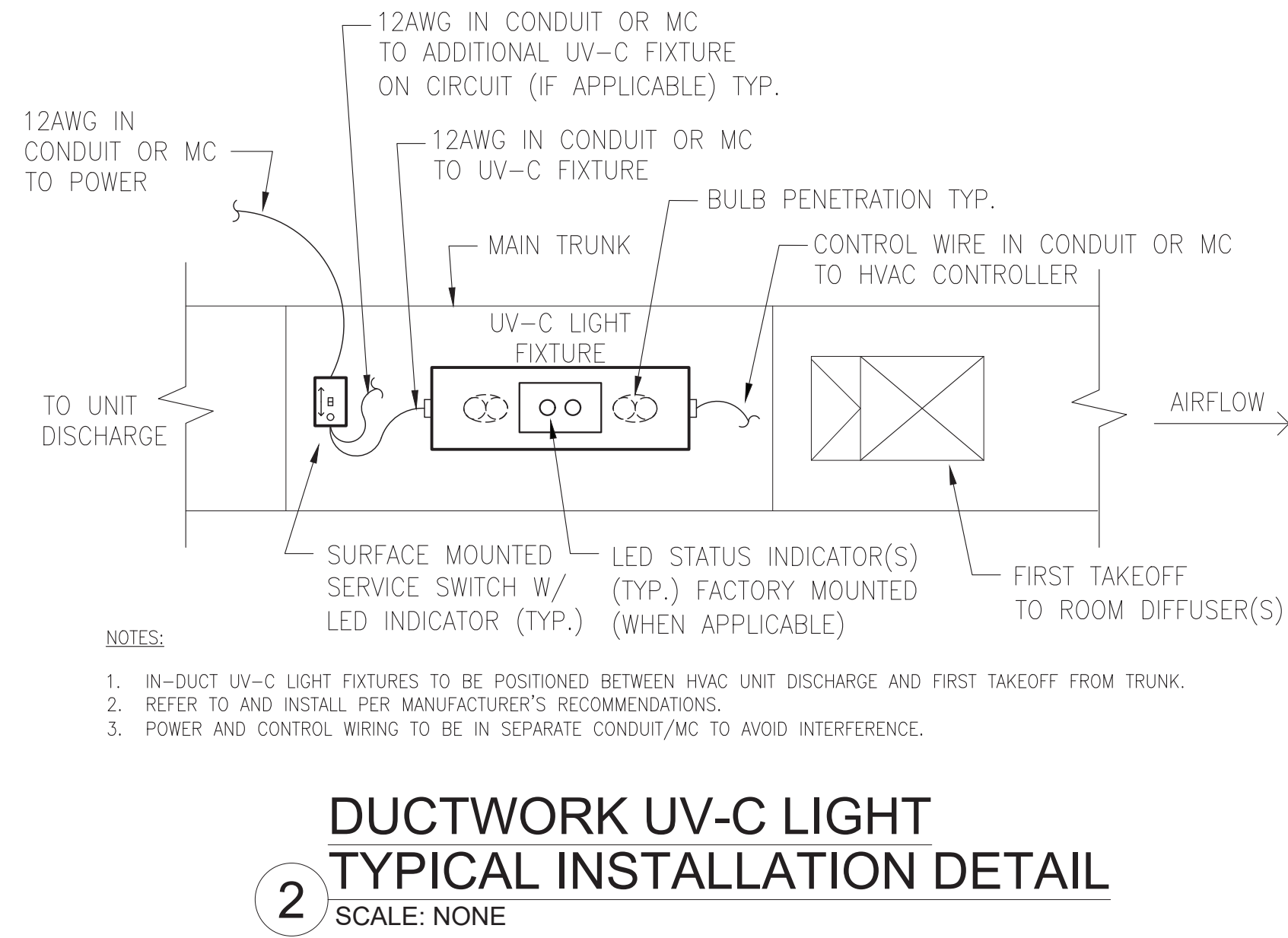
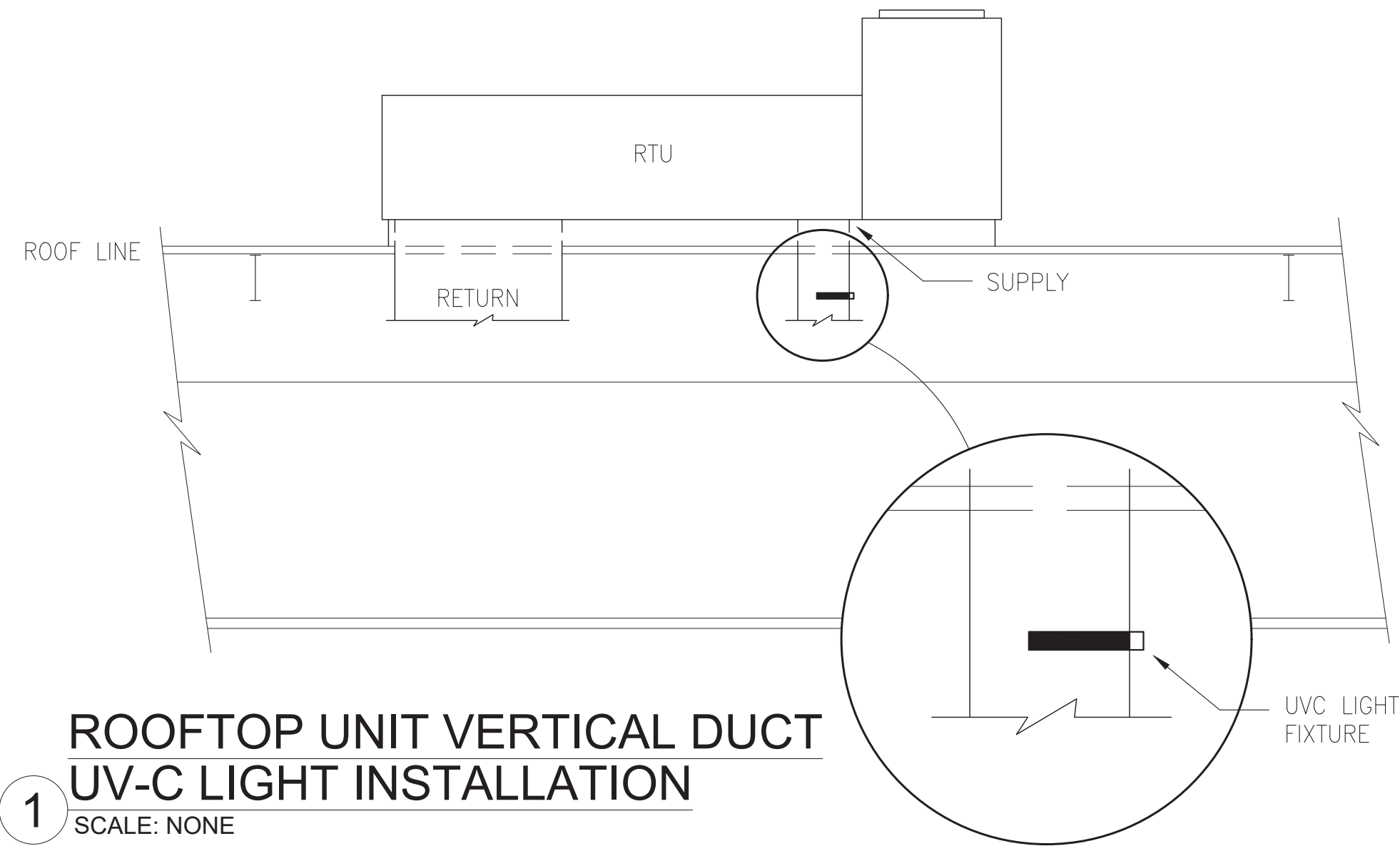
NOTE 10: CONTROLS TO BE COORDINATED WITH DISTRICT CONTROLS VENDOR (JOHNSON CONTROLS).

NOTE 11: ALL LOCATIONS, ORIENTATIONS, AND TYPES OF UV-C LIGHT FIXTURES ARE APPROXIMATE. DETERMINE FINAL LOCATION/ORIENTATION BASED ON MANUFACTURER'S RECOMMENDATIONS AND FIELD CONDITIONS.

NOTE 12: FOR UNITS WITH FIXTURES INDICATED TO BE MOUNTED "IN CABINET", PROVIDE AT LEAST ONE (1) SNAP-ACTION TYPE SWITCH TO EACH OF THE SCHEDULED HVAC UNITS' (UV, AHU, RTU, ETC.) ACCESS DOORS/PANELS AND/OR ADJACENT DUCTWORK ACCESS DOORS/PANELS. HARDWIRE POWER TO SWITCHES TO AUTOMATICALLY TURN OFF ALL UV-C LIGHTS ON THE APPLICABLE UV-C CIRCUIT IF ANY PANELS ARE OPENED. PROVIDE ALL WIRING AND APPURTENANCES. SEE SCHEDULE FOR UNIT TYPES. VERIFY ACCESS DOORS/PANELS IN FIELD.

NOTE 13: "IN CABINET" INSTALLATIONS SHALL MAKE USE OF LIGHT SHIELDING AND REQUIRE PROPER AIMING DURING INSTALLATION. REFER TO MANUFACTURER'S RECOMMENDATIONS.





EQUIPMENT:	LABELS REQUIRED:
UV-C LIGHT FIXTURES	<ul style="list-style-type: none"> <li>UV-C CIRCUIT MARK</li> <li>"UV-C ON" AT INDICATING LEDS</li> <li>WARNING LABEL (BY MANUFACTURER)</li> <li>BLANK LABEL ON CEILINGS FOR QUICK LOCATION (WHEN APPLICABLE)</li> </ul>
SERVICE SWITCH	<ul style="list-style-type: none"> <li>UV-C CIRCUIT MARK</li> <li>"UV-C ON" AT INDICATING LEDS (WHEN APPLICABLE)</li> <li>PANEL LOCATION, NAME, BREAKER # (WHEN APPLICABLE)</li> </ul>

NOTE: LABEL COLOR TO BE PURPLE, OR AS SELECTED BY DISTRICT

## 5 LABELING REQUIREMENTS AND LOCATIONS

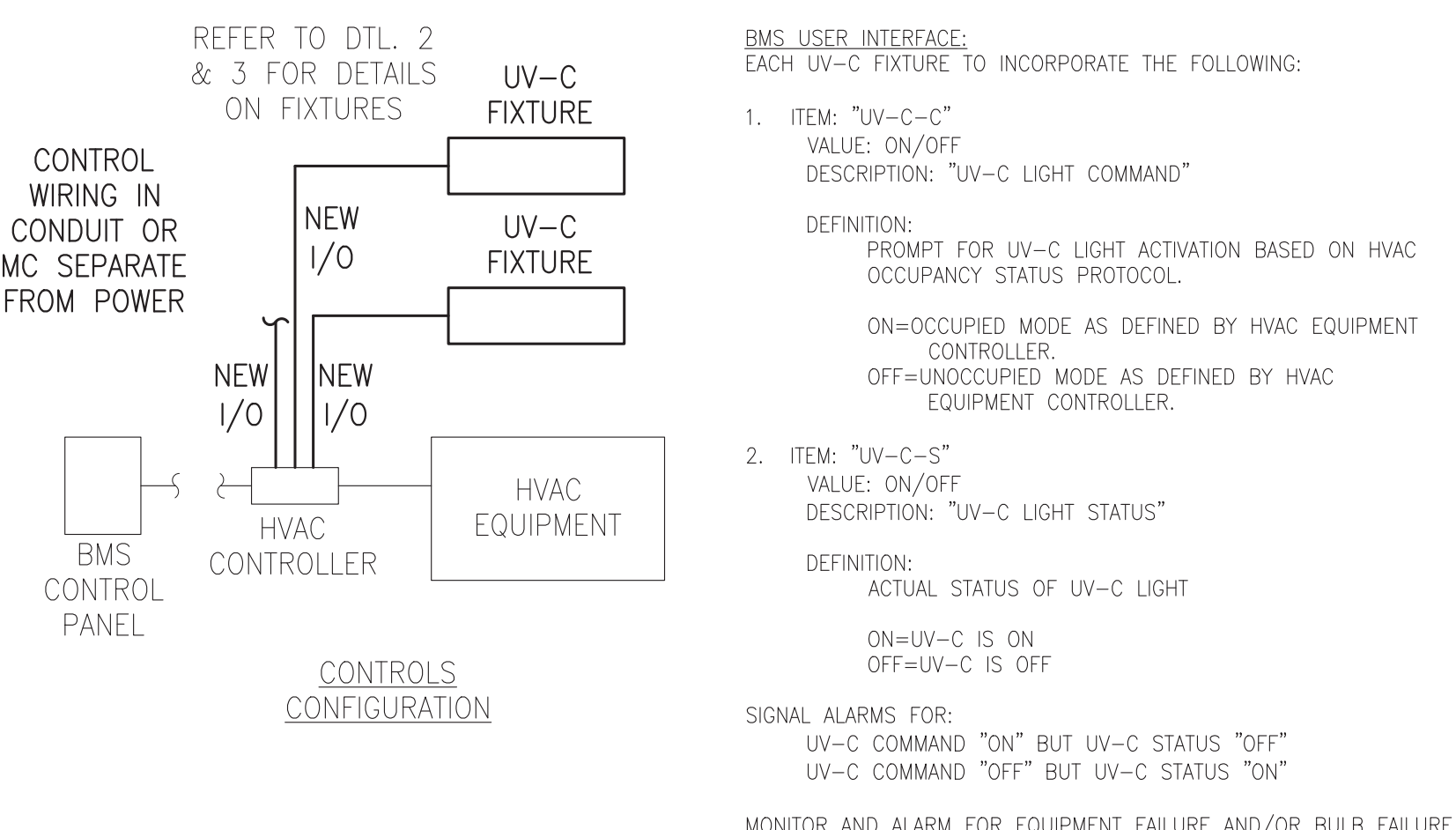
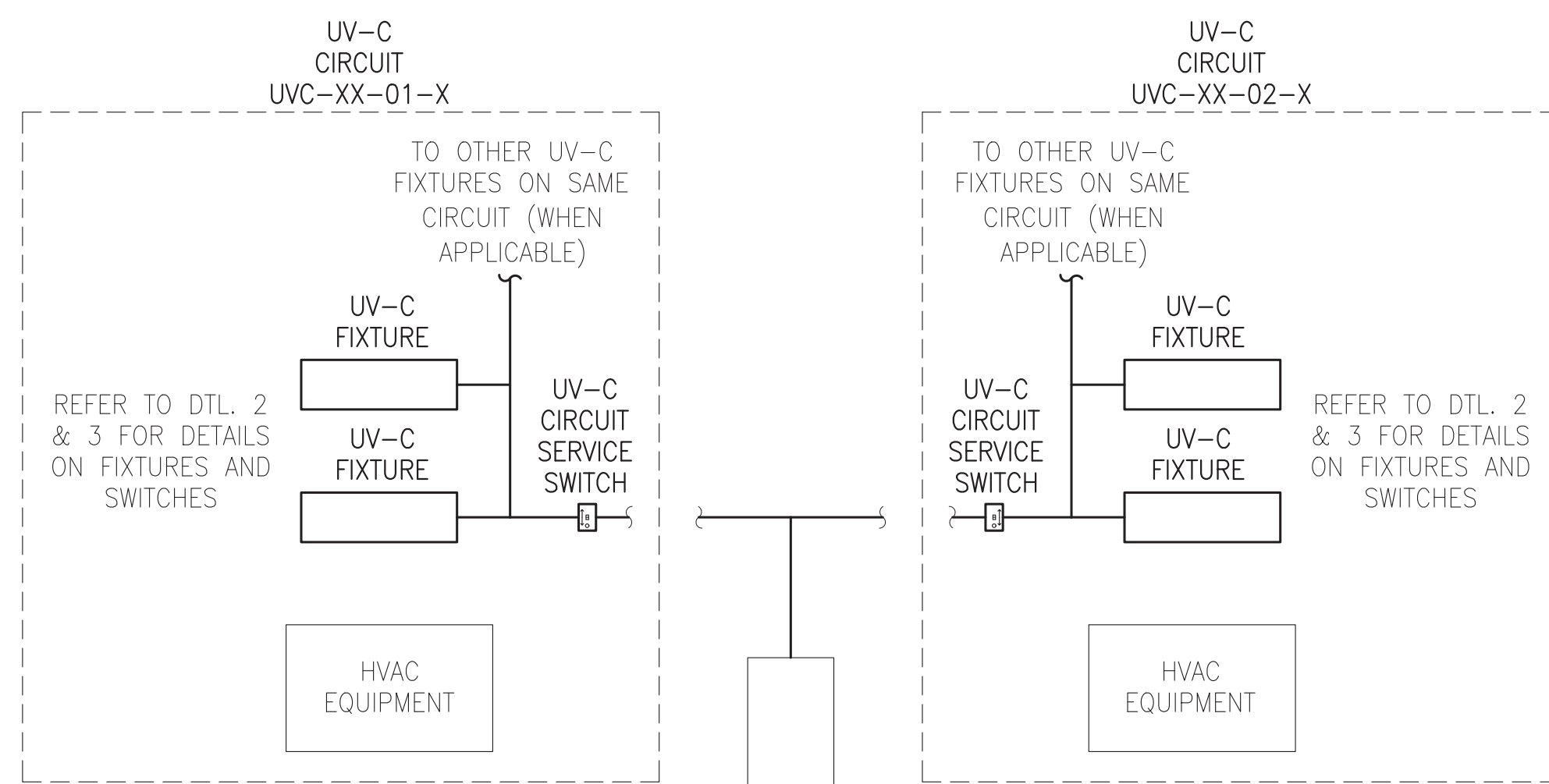
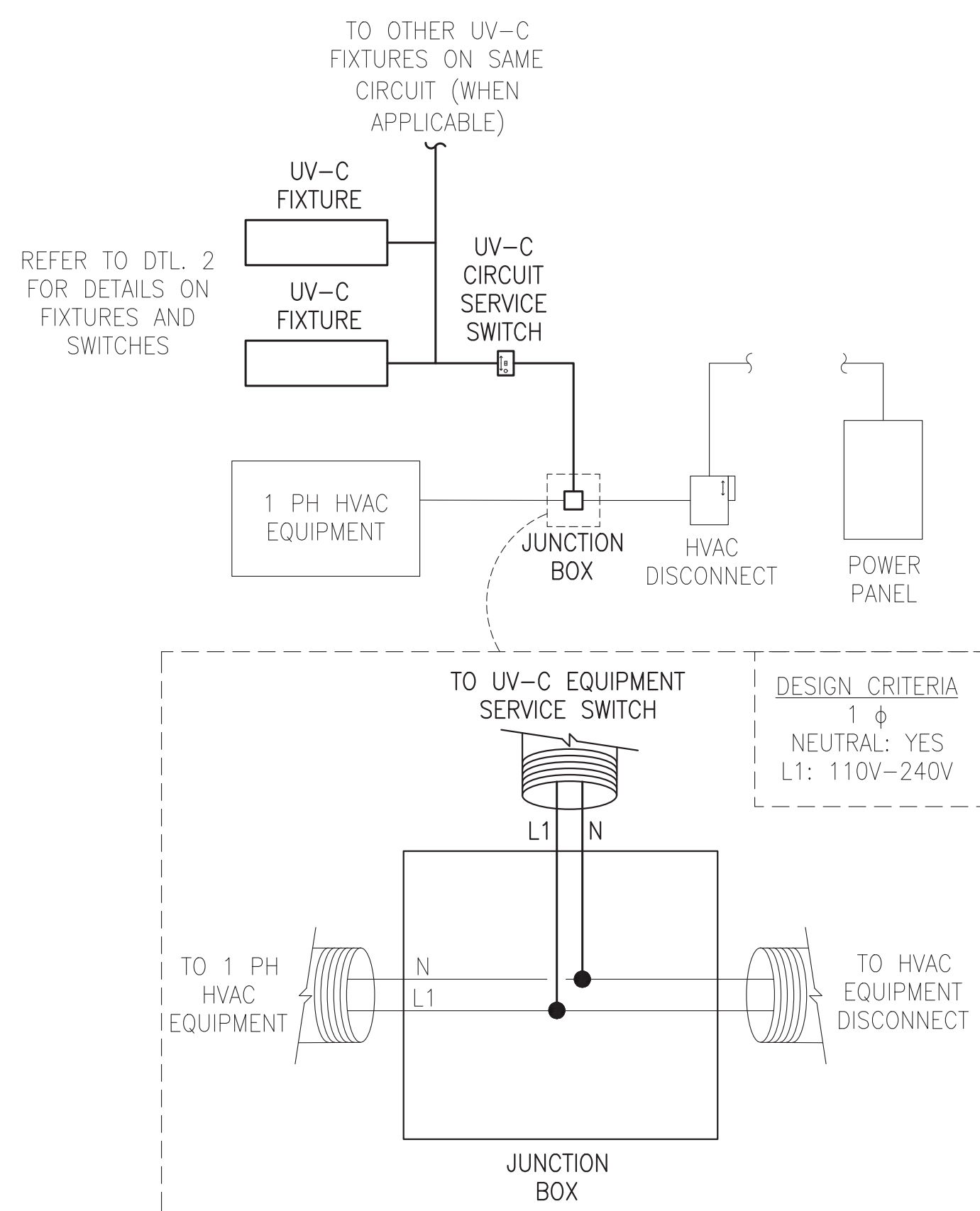
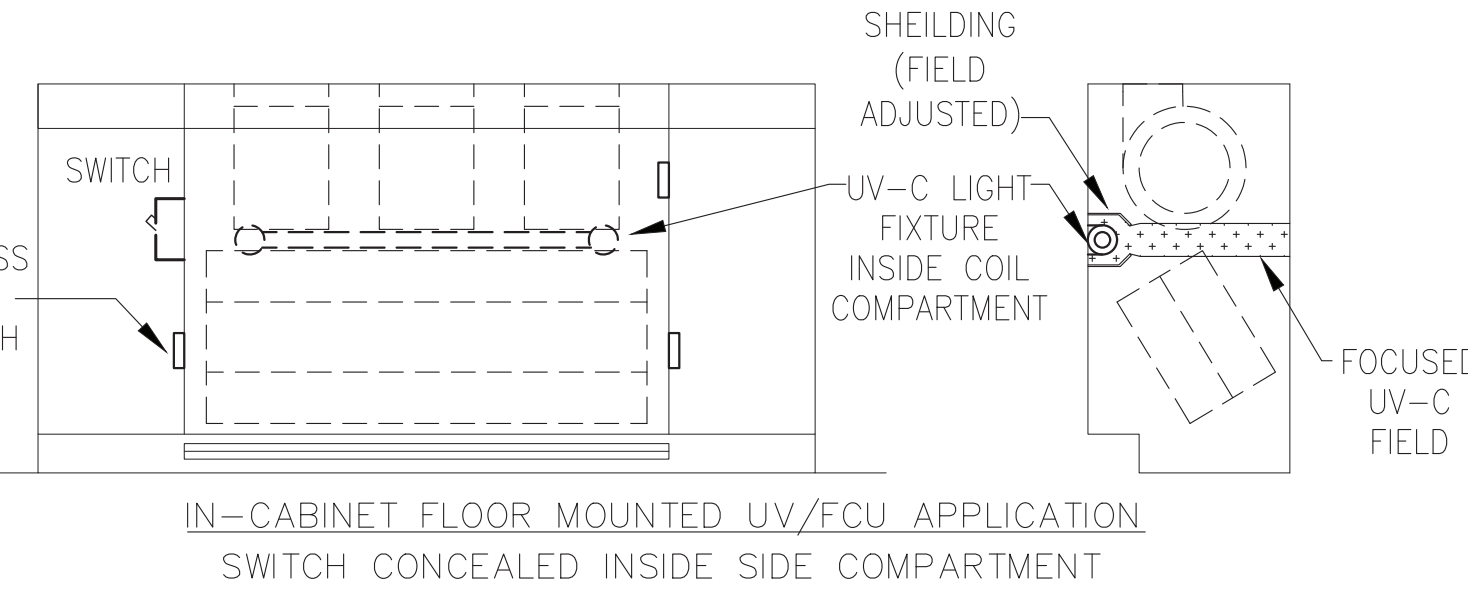
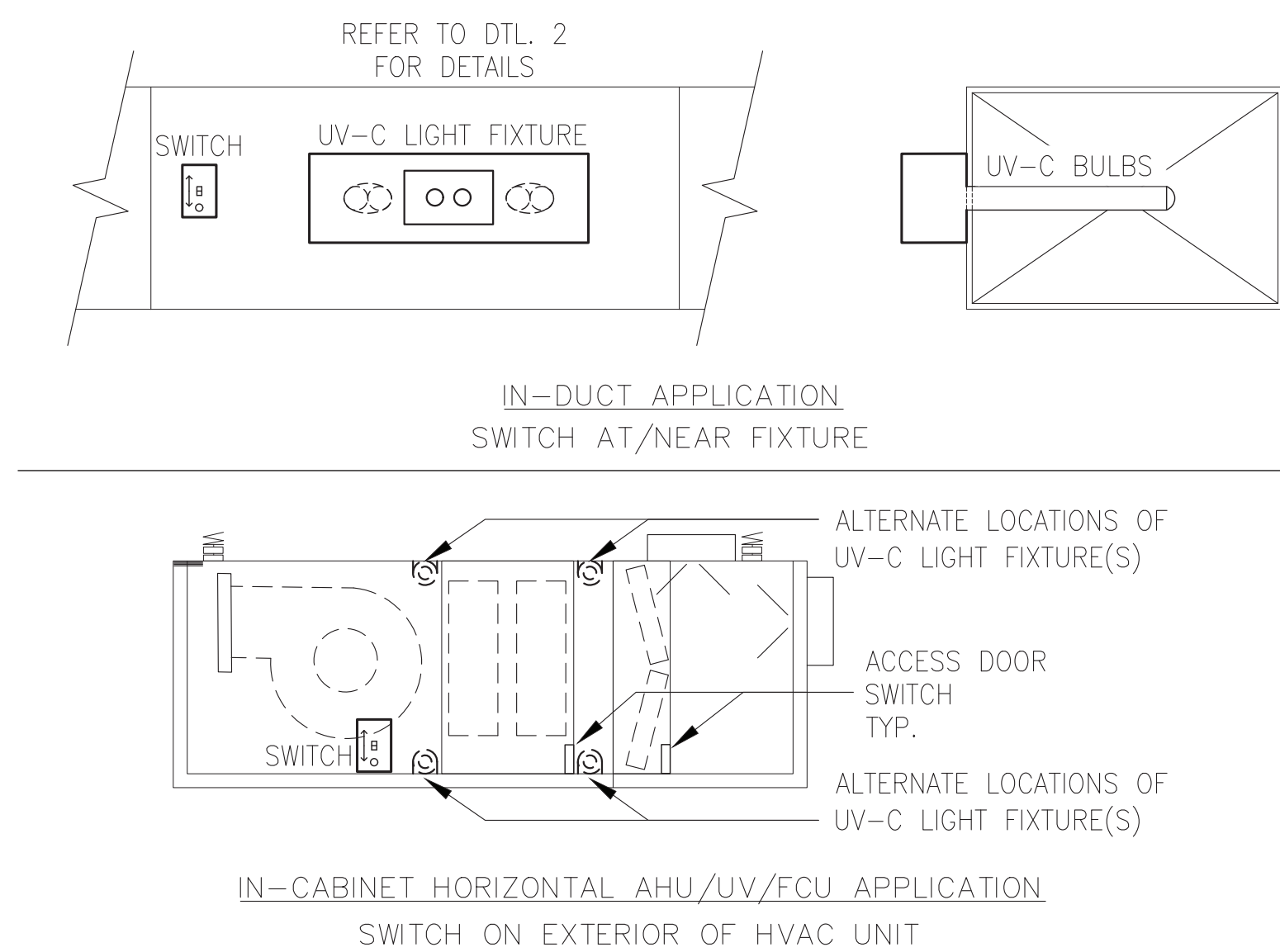
SCALE: NONE

UV-C & LED "OFF" CONDITIONS (REASONS IN BOLD)			
"UNOCCUPIED MODE" UNIT/ FAN (ON)	"OCCUPIED MODE" UNIT/ FAN (ON)	"OCCUPIED MODE" UNIT/ FAN (ON)	"OCCUPIED MODE" UNIT/ FAN (ON)
<p>DISC. SWITCH (ON) SWITCH LED (OFF)</p> <p>ALL ACCESS DOOR SNAP SWITCHES (CLOSED)</p> <p>UV-C (OFF)</p> <p>UV-C (OFF)</p>	<p>DISC. SWITCH (OFF) SWITCH LED (OFF)</p> <p>ALL ACCESS DOOR SNAP SWITCHES (CLOSED)</p> <p>UV-C (OFF)</p> <p>UV-C (OFF)</p>	<p>DISC. SWITCH (ON) SWITCH LED (OFF)</p> <p>ANY ACCESS DOOR SNAP SWITCH (OPEN)</p> <p>UV-C (OFF)</p> <p>UV-C (OFF)</p>	<p>DISC. SWITCH (ON) SWITCH LED (ON)</p> <p>ALL ACCESS DOOR SNAP SWITCHES (CLOSED)</p> <p>UV-C (ON)</p> <p>UV-C (ON)</p>
NOTE 1	NOTE 2	NOTE 3	NOTE 4

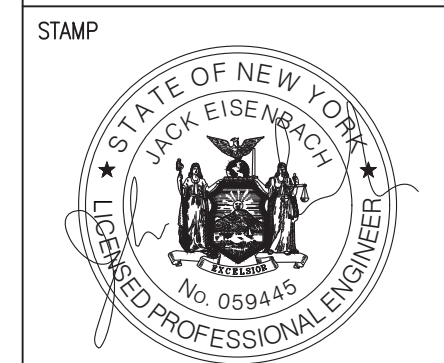
- NOTES:
- UV-C FIXTURES SHALL NOT ENGAGE DURING "UNOCCUPIED" MODE. "OCCUPIED MODE" TO BE ACTIVE WITHIN THE TIME FRAME FROM ONE HOUR BEFORE SCHOOL UNTIL ONE HOUR AFTER SCHOOL "UNOCCUPIED MODE" TO BE ACTIVE OUTSIDE OF THAT TIME FRAME (COORDINATE TIME-FRAME SETTING WITH DISTRICT REPRESENTATIVE), OR AS DEFINED BY THE HVAC EQUIPMENT.
  - THE DISCONNECTING SWITCH IN THE "OFF" POSITION SHALL NOT ILLUMINATE THE LED AND SHALL DISCONNECT ALL UV-C LIGHTS ON THE CIRCUIT. UV-C FIXTURES SHALL NOT ENGAGE IF THE DISCONNECTING SWITCH IS "OFF".
  - HVAC UNITS WITH UV-C LIGHT FIXTURES INSTALLED INSIDE OF THE UNIT'S CABINET (WHEN APPLICABLE) SHALL HAVE SNAP SWITCH SENSORS INSTALLED TO ALL ACCESS DOORS. IF ANY ACCESS DOOR SNAP SWITCH SENSORS ARE OPEN THE UV-C FIXTURES SHALL NOT ENGAGE.
  - THE UV-C LIGHT FIXTURES AND DISCONNECTING SWITCH LED SHALL ENGAGE AND ILLUMINATE ONLY WHEN: DURING "OCCUPIED MODE", WHEN THE HVAC UNIT IS "ON", ALL SNAP SWITCH SENSORS ARE CLOSED, AND DISCONNECTING SWITCH IS "ON".

## 6 UV-C LIGHT FIXTURE ACTIVATION CONDITIONS

SCALE: NONE



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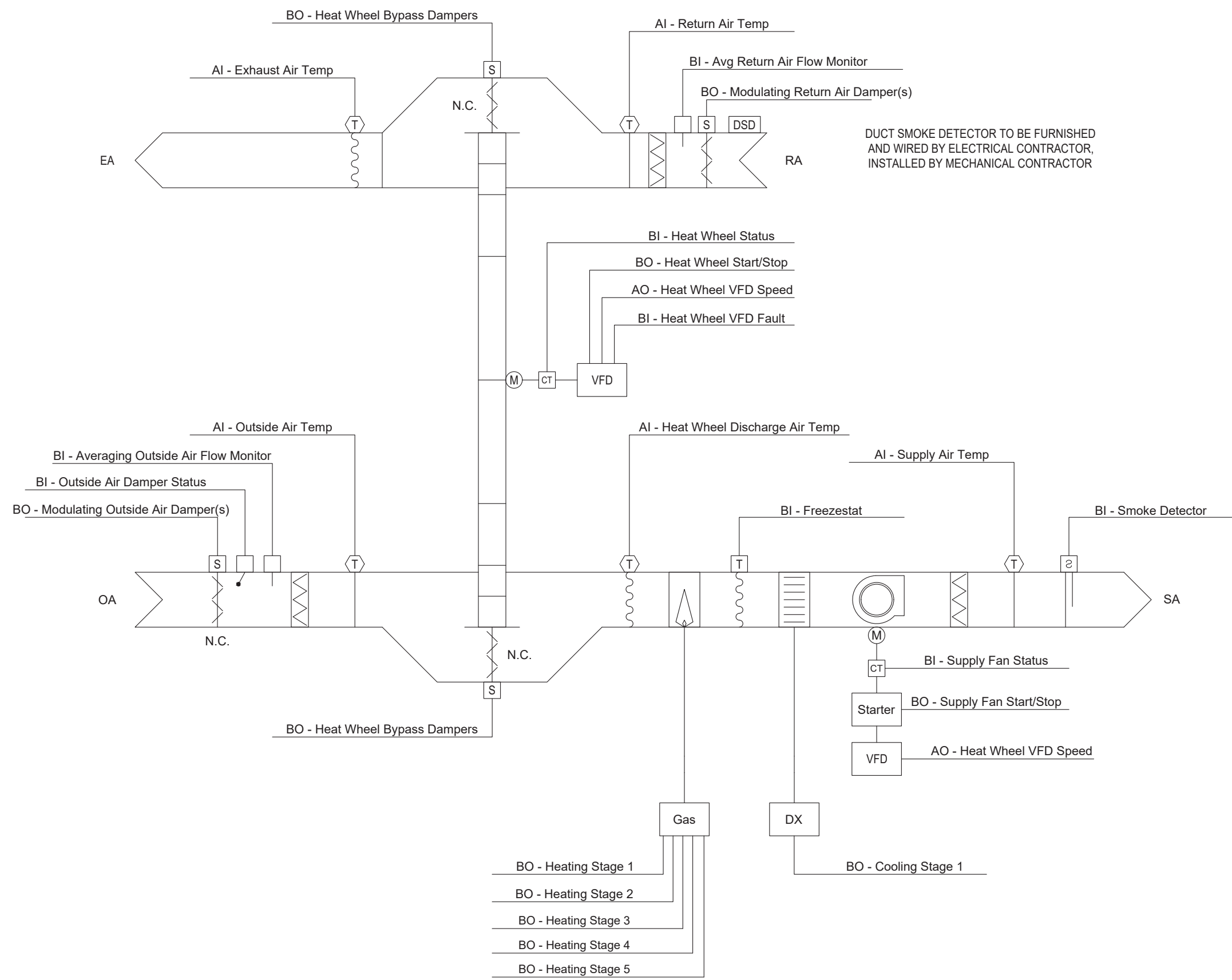


WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING  
225 WEST STREET EXT, WARWICK, NY 10990  
CDBB SED NO. 44-21-01-06-7-041-001 (BF-FIELD BATHROOM BUILDING)  
CDBB SED NO. 44-21-01-06-7-041-001 (FF-FW FOOTBALL FIELD)  
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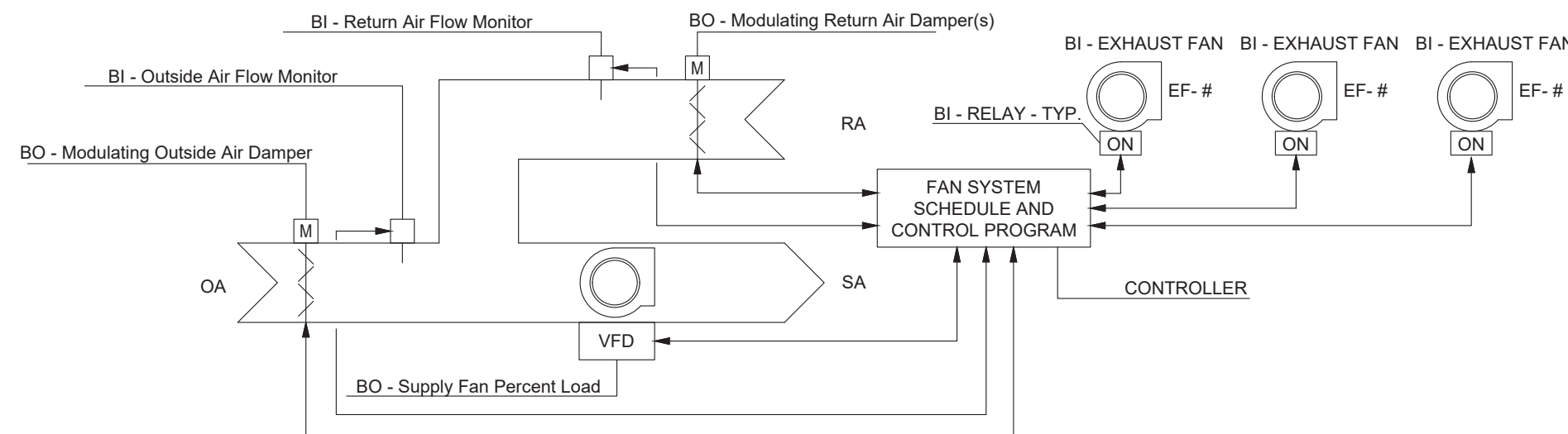
PROJECT NO.	05-21-04
BID SET	04.08.2022
REVISION	DATE
DRAWN BY	
CHECKED BY	
SHEET SIZE	30" x 42"
SCALE	AS NOTED
SHEET TITLE	UV-C LIGHT FIXTURE DETAILS (UV-C CONTRACT)
SHEET NO.	

M-504





1 MAKE UP AIR UNIT CONTROL SCHEMATIC  
SCALE: NONE



2 MAKE UP AIR UNIT FAN SYSTEM CONTROL SCHEMATIC  
SCALE: NONE

#### CONTROL DIAGRAMS LEGEND

AI = ANALOG INPUT. A PHYSICAL INPUT TO THE CONTROL MODULE.  
AO = ANALOG OUTPUT. A PHYSICAL OUTPUT FROM THE CONTROL MODULE.  
AV = ANALOG VALUE. AN INTERMEDIATE (SOFTWARE) POINT THAT MAY BE EDITABLE OR READ-ONLY. EDITABLE AVS ARE TYPICALLY USED TO ALLOW THE USER TO SET A FIXED CONTROL PARAMETER, SUCH AS A SETPOINT. READ ONLY AVS ARE TYPICALLY USED TO DISPLAY THE STATUS OF A CONTROL OPERATION.  
BI = BINARY INPUT. A PHYSICAL INPUT TO THE CONTROL MODULE.  
BO = BINARY OUTPUT. A PHYSICAL OUTPUT FROM THE CONTROL MODULE.  
BV = BINARY VALUE. AN INTERMEDIATE (SOFTWARE) POINT THAT MAY BE EDITABLE OR READ-ONLY. EDITABLE BVS ARE TYPICALLY USED TO ALLOW THE USER TO SET A FIXED CONTROL PARAMETER, SUCH AS A SETPOINT. READ ONLY BVS ARE TYPICALLY USED TO DISPLAY THE STATUS OF A CONTROL OPERATION.

#### MAKEUP AIR UNIT – SUPPLY AIR TEMP

RUN CONDITIONS – SCHEDULED:  
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:  
OCCUPIED MODE: THE UNIT SHALL MAINTAIN  
75 DEG. F (ADJ.) COOLING SETPOINT  
70 DEG. F (ADJ.) HEATING SETPOINT.

UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN  
80 DEG. F (ADJ.) COOLING SETPOINT.  
65 DEG. F (ADJ.) HEATING SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).  
LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

ZONE OPTIMAL START:  
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

ZONE UNOCCUPIED OVERRIDE:  
A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START UP IS AVAILABLE, THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

FREEZE PROTECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS.

SMOKE DETECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS.  
A SIGNAL SHALL BE SENT TO THE FIRE CONTROL PANEL AND BMS TO INITIATE ALARMS.

ECONOMIZER:  
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2 DEG. F LESS THAN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20%(ADJ.) OPEN WHENEVER OCCUPIED.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:  
OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG. F (ADJ.),  
AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE,  
AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL CLOSE WHENEVER:  
MIXED AIR TEMPERATURE DROPS FROM 45 DEG. F TO 40 DEG. F (ADJ.),  
OR ON LOSS OF SUPPLY FAN STATUS,  
OR THE FREEZESTAT (IF PRESENT) IS ON.

ENERGY RECOVERY:  
HEAT RECOVERY WHEEL – VARIABLE SPEED:  
THE CONTROLLER SHALL MODULATE THE HEAT WHEEL FOR ENERGY RECOVERY AS FOLLOWS.

COOLING RECOVERY MODE:  
THE CONTROLLER SHALL MEASURE THE HEAT WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE HEAT WHEEL SPEED TO MAINTAIN A SETPOINT 2°F (ADJ.) LESS THAN THE UNIT SUPPLY AIR TEMPERATURE SETPOINT. THE HEAT WHEEL SHALL RUN FOR COOL RECOVERY WHENEVER:  
UNIT RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE BELOW THE OUTSIDE AIR TEMPERATURE,  
AND THE UNIT IS IN A COOLING MODE,  
AND THE SUPPLY FAN IS ON.

HEATING RECOVERY MODE:  
THE CONTROLLER SHALL MEASURE THE HEAT WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE HEAT WHEEL SPEED TO MAINTAIN A SETPOINT 2°F (ADJ.) GREATER THAN THE UNIT SUPPLY AIR TEMPERATURE SETPOINT. THE HEAT WHEEL SHALL RUN FOR HEAT RECOVERY WHENEVER:

UNIT RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE ABOVE THE OUTSIDE AIR TEMPERATURE.

AND THE UNIT IS IN A HEATING MODE.

AND THE SUPPLY FAN IS ON.

PERIODIC SELF-CLEANING:  
THE HEAT WHEEL SHALL RUN AT 5% SPEED (ADJ.) FOR 10SEC (ADJ.) EVERY 4HRS (ADJ.) THE UNIT RUNS.

FROST PROTECTION:  
THE HEAT WHEEL SHALL RUN AT 5% SPEED (ADJ.) WHENEVER:  
OUTSIDE AIR TEMPERATURE DROPS BELOW 15°F (ADJ.)  
OR WHENEVER EXHAUST AIR TEMPERATURE DROPS BELOW 20°F (ADJ.).

OUTSIDE AIR DAMPER:  
THE OUTSIDE AIR DAMPER SHALL OPEN ANYTIME THE UNIT RUNS AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE SUPPLY FAN SHALL START ONLY AFTER THE DAMPER STATUS HAS PROVEN THE DAMPER IS OPEN. THE OUTSIDE AIR DAMPER SHALL CLOSE 4SEC (ADJ.) AFTER THE SUPPLY FAN STOPS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
OUTSIDE AIR DAMPER FAILURE: COMMANDED OPEN, BUT THE STATUS IS CLOSED.  
OUTSIDE AIR DAMPER IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN.

AVERAGING OUTSIDE AIR FLOW MONITOR:  
THE OUTSIDE AIR FLOW MONITOR SHALL MONITOR CFM OF OUTSIDE AIR COMING THROUGH THE OUTSIDE AIR DAMPER WHENEVER THE UNIT RUNS. OUTSIDE AIR FLOW MONITOR CFM READING SHALL BE READ BY CONTROLLER.

BUILDING EXHAUST FAN EQUIPMENT INTEGRATION TO MAU SUPPLY FAN:  
CONTROLLER TO READ AN ON/OFF INPUT SIGNAL FROM EXISTING BUILDING EXHAUST FANS.  
CONTROLLER TO MODULATE OUTSIDE AIR DAMPER, RETURN AIR DAMPER, SUPPLY FAN CFM, AND COOLING/HEATING STAGING TO ACHIEVE SETTINGS LISTED IN FAN SYSTEM TABLE.  
THE VFD SHALL REDUCE SUPPLY FAN RPM WHEN COMMANDED (MIN. 50% SPEED, ADJ. – SEE FAN SYSTEM TABLE).  
HEATING/COOLING SHALL STAGE DOWN TO DELIVER USER DEFINED TEMPERATURE SETPOINTS AND TO PREVENT SHORT CYCLING.  
CONTROLLER TO MAINTAIN THE MINIMUM OUTDOOR AIR CFM (SEE EQUIPMENT SCHEDULE).  
CONTROLLER TO MAKE DECISIONS BASED ON A CODED CONTROL PROGRAM INCORPORATING ELEMENTS OUTLINED IN THE FAN SYSTEM SCHEDULE.  
THE BYPASS DAMPERS WILL OPEN WHENEVER THE HEAT WHEEL IS DISABLED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.  
SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.  
SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).  
HEAT WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).  
HEAT WHEEL VFD IN FAULT

SUPPLY FAN:  
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.  
SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.  
SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

SUPPLY AIR TEMPERATURE SETPOINT – FIXED:  
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A FIXED SUPPLY AIR TEMPERATURE SETPOINT OF 65°F (ADJ.).

COOLING STAGE:  
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE COOLING SHALL BE ENABLED WHENEVER:  
OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.),  
AND THE SUPPLY AIR TEMPERATURE IS ABOVE COOLING SETPOINT,  
AND THE FAN STATUS IS ON.

GAS HEATING STAGES:  
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND STAGE THE HEATING TO MAINTAIN ITS HEATING SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE HEATING SHALL BE ENABLED WHENEVER:  
OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.),  
AND THE SUPPLY AIR TEMPERATURE IS BELOW HEATING SETPOINT,  
AND THE FAN STATUS IS ON.

PREFILTER HOURS:  
THE CONTROLLER SHALL MONITOR THE FAN RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
PREFILTER CHANGE REQUIRED: PREFILTER HAS BEEN IN USE FOR MORE THAN 2200HR (ADJ.).

FINAL FILTER HOURS:  
THE CONTROLLER SHALL MONITOR THE FAN RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
FINAL FILTER CHANGE REQUIRED: FINAL FILTER HAS BEEN IN USE FOR MORE THAN 2200HRS (ADJ.).

SUPPLY AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

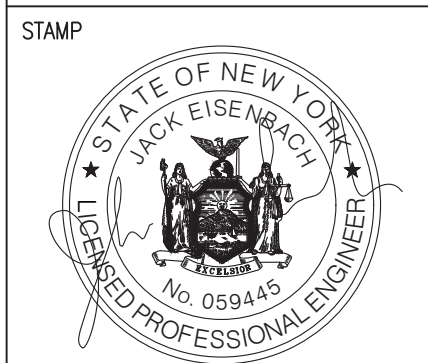
ALARMS SHALL BE PROVIDED AS FOLLOWS:  
HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).  
LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

BMS INTEGRATION  
UNIT SHALL BE INTEGRATED INTO BMS UI. UNIT STATUS CONSISTING OF OCCUPIED/UNOCCUPIED/OFF AS WELL AS "COND-# FROM THE FAN SYSTEM SCHEDULE SHALL BE CLEARLY IDENTIFIABLE ALONG WITH ANY ALARMS.

KITCHEN FAN SYSTEM SCHEDULE – MAU-1								
	MARK	SUPPLY CFM	FAN PERCENT LOAD	RETURN CFM	OA CFM / MAKEUP AIR	EXHAUST FANS ACTIVE	PERCENT MAKEUP	REMARKS
	COND_1	5800	100	350	5450	FOUR FANS: PRE-27A, PRE-27B, PRE-26, & PRE-30	80-88	
	COND_2	5800	100	600	5200	THREE FANS: PRE-27A & PRE-27B AND EITHER PRE-26 OR PRE-30	90-100	
	COND_3	5800	100	2100	4000	TWO FANS: PRE-27A & PRE-27B	87-100	
	COND_4	4350	75	1750	2500	TWO FANS: PRE-26 & PRE-30	89-100	
	COND_5	2900	50	1400	1500	ONE FAN: PRE-26 OR PRE-30	83-100	
	COND_6	2900	50	1900	1000	NONE	N/A	
NOTE 1: PROVIDE CONTROLLERS, DAMPER ACTUATORS, RELAYS, WIRING AND ASSOCIATED FOR A BALANCED FUNCTIONING SYSTEM.								
NOTE 2: NEWLY PROVIDED EXHAUST FAN RELAY TO SEND INPUT SIGNAL TO MAU CONTROLLER. WHEN EXHAUST FAN IS ACTIVE, MAU CONTROLLER RECEIVES INPUT TO SIGNAL THAT THE EXHAUST FAN IS ACTIVE. MAU TO MONITOR AND MAKE DECISIONS REGARDING SUPPLY FAN SPEED, AIR DAMPER MOVEMENT, ETC. BASED ON COMBINATIONS OF ACTIVE FANS, AS SHOWN IN THE TABLE ABOVE. DURING BALANCING, CONTRACTOR TO SET MANUAL AND MOTORIZED DAMPER POSITIONS TO ACHIEVE DESIRED AIRFLOW AS OUTLINED ABOVE.								
NOTE 3: EXHAUST FAN PRE-29 IS INCLUDED IN CALCULATIONS BUT WILL NOT RECEIVE A RELAY.								
NOTE 4: FANS PRE-27A AND PRE-27B TO RUN SIMULTANEOUSLY.								
NOTE 5: DESIRED PERCENT MAKEUP IS 80%-100%.								

SERVERY FAN SYSTEM SCHEDULE – MAU-2								
	MARK	SUPPLY CFM	FAN PERCENT LOAD	RETURN CFM	OA CFM	EXHAUST FANS ACTIVE	PERCENT MAKEUP	REMARKS
	COND_1	3800	100	200	3600	TWO FANS: PRE-34 & PRE-28	86	
	COND_2	3800	100	1500	2300	ONE FAN: EITHER PRE-34 OR PRE-28	99-100	
	COND_3	1900	50	1400	500	NONE	N/A	
NOTE 1: PROVIDE CONTROLLERS, DAMPER ACTUATORS, RELAYS, WIRING AND ASSOCIATED FOR A BALANCED FUNCTIONING SYSTEM.								
NOTE 2: NEWLY PROVIDED EXHAUST FAN RELAY TO SEND INPUT SIGNAL TO MAU CONTROLLER. WHEN EXHAUST FAN IS ACTIVE, MAU CONTROLLER RECEIVES INPUT TO SIGNAL THAT THE EXHAUST FAN IS ACTIVE. MAU TO MONITOR AND MAKE DECISIONS REGARDING SUPPLY FAN SPEED, AIR DAMPER MOVEMENT, ETC. BASED ON COMBINATIONS OF ACTIVE FANS, AS SHOWN IN THE TABLE ABOVE. DURING BALANCING, CONTRACTOR TO SET MANUAL AND MOTORIZED DAMPER POSITIONS TO ACHIEVE DESIRED AIRFLOW AS OUTLINED ABOVE.								
NOTE 3: DESIRED PERCENT MAKEUP IS 80%-100%.								

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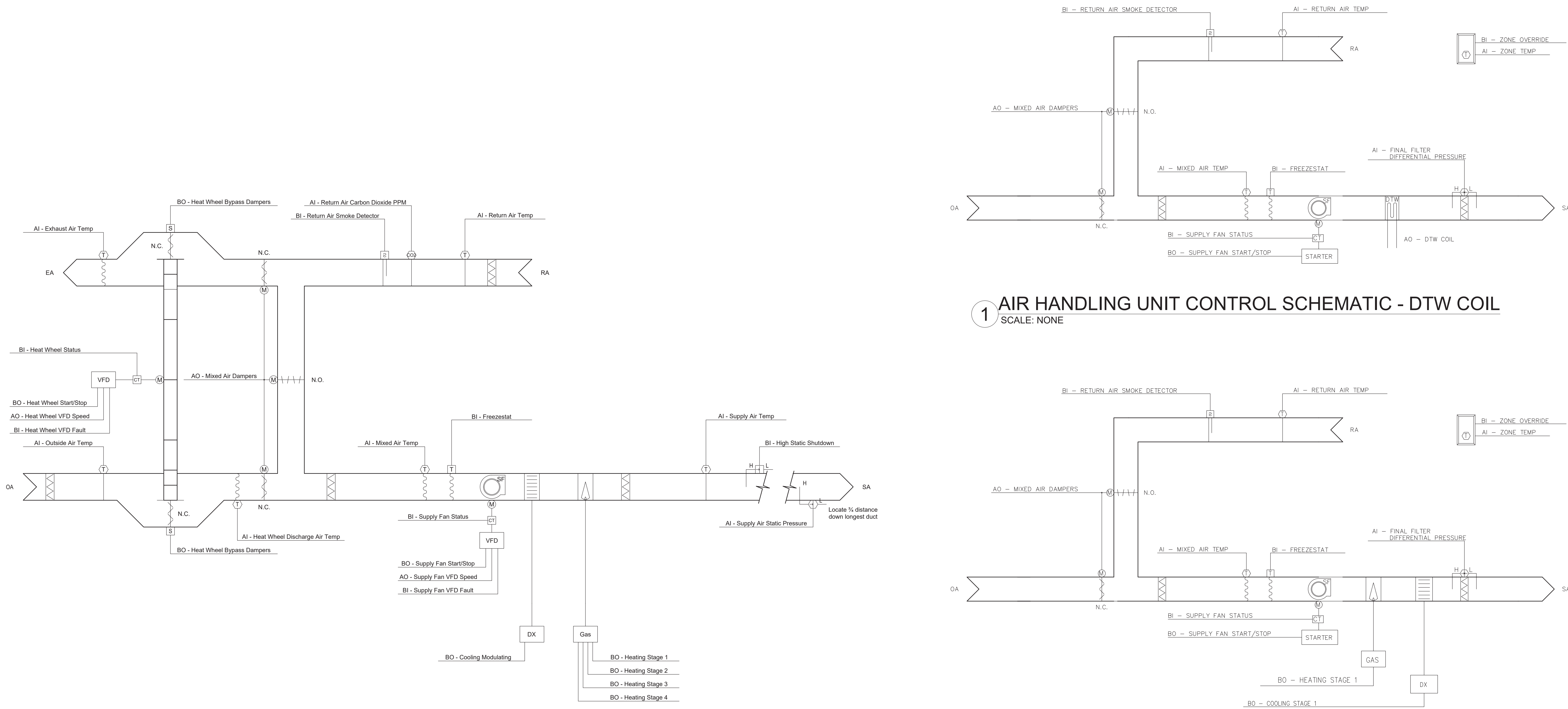


WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING  
225 WEST STREET EXT, WARWICK, NY 10990  
CBS SED NO. 44-21-01-06-7-041-001 (BB-FIELD BATHROOM BUILDING) 89 SANKERVILLE ROAD, WARWICK, NY 10990  
DIFF SED NO. 44-21-01-06-7-041-001 (FF-W FIELD BATHROOM BUILDING) 89 SANKERVILLE ROAD, WARWICK, NY 10990  
HS SED NO. 44-21-01-06-0-001-040 (HS-W HIGH SCHOOL) 89 SANKERVILLE ROAD, WARWICK, NY 10990

PROJECT NO.	05-21-04 05-20-06
BID SET	04.08.2022
REVISION	DATE
DRAWN BY	
CHECKED BY	
SHEET SIZE	30" x 42"
SCALE	AS NOTED
SHEET TITLE	
CONTROL SCHEMATICS	
SHEET NO.	

M-600





### 3 RTU CONTROL SCHEMATIC - GAS HEATING DX COOLING WITH ENERGY WHEEL

SCALE: NONE

VARIABLE AIR VOLUME (ROOF TOP UNIT)

RUN CONDITIONS – SCHEDULED:  
THE UNIT SHALL RUN BASED UPON AN OPERATOR ADJUSTABLE SCHEDULE.

FREEZE PROTECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS.

HIGH STATIC SHUTDOWN:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING AN HIGH STATIC SHUTDOWN SIGNAL.

RETURN AIR SMOKE DETECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.

SUPPLY FAN:  
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

SUPPLY AIR DUCT STATIC PRESSURE CONTROL:  
THE CONTROLLER SHALL MEASURE DUCT STATIC PRESSURE AND SHALL MODULATE THE SUPPLY FAN VFD SPEED TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT OF 1.5IN H2O (ADJ.). THE SUPPLY FAN VFD SPEED SHALL NOT DROP BELOW 30% (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.
- LOW SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.
- SUPPLY FAN VFD FAULT.

HEAT RECOVERY WHEEL – VARIABLE SPEED:  
THE CONTROLLER SHALL MODULATE THE HEAT RECOVERY WHEEL FOR ENERGY RECOVERY AS FOLLOWS:

COOLING RECOVERY MODE:  
THE CONTROLLER SHALL MEASURE THE HEAT WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE HEAT WHEEL SPEED TO MAINTAIN A SETPOINT 2°F (ADJ.) GREATER THAN THE UNIT SUPPLY AIR TEMPERATURE SETPOINT. THE HEAT WHEEL SHALL RUN FOR COOL RECOVERY WHENEVER:

- THE UNIT RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE BELOW THE OUTSIDE AIR TEMPERATURE.
- AND THE UNIT IS IN A COOLING MODE.
- AND THE ECONOMIZER (IF PRESENT) IS OFF.
- AND THE SUPPLY FAN IS ON.

HEATING RECOVERY MODE:  
THE CONTROLLER SHALL MEASURE THE HEAT WHEEL DISCHARGE AIR TEMPERATURE AND MODULATE THE HEAT WHEEL SPEED TO MAINTAIN A SETPOINT 2°F (ADJ.) GREATER THAN THE UNIT SUPPLY AIR TEMPERATURE SETPOINT. THE HEAT WHEEL SHALL RUN FOR HEAT RECOVERY WHENEVER:

- THE UNIT RETURN AIR TEMPERATURE IS 5°F (ADJ.) OR MORE ABOVE THE OUTSIDE AIR TEMPERATURE.
- AND THE UNIT IS IN A HEATING MODE.
- AND THE ECONOMIZER (IF PRESENT) IS OFF.

AND THE SUPPLY FAN IS ON.

PERIODIC SELF-CLEANING:  
THE HEAT WHEEL SHALL RUN AT 5% SPEED (ADJ.) FOR 10SEC (ADJ.) EVERY 4HR (ADJ.) THE UNIT RUNS.

FROST PROTECTION:  
THE HEAT WHEEL SHALL RUN AT 5% SPEED (ADJ.) WHENEVER:

- OUTSIDE AIR TEMPERATURE DROPS BELOW 15°F (ADJ.)
- OR THE EXHAUST AIR TEMPERATURE DROPS BELOW 20°F (ADJ.).

THE HEAT WHEEL BYPASS DAMPERS WILL OPEN WHENEVER THE HEAT WHEEL IS DISABLED.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HEAT WHEEL ROTATION FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- HEAT WHEEL IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- HEAT WHEEL RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).
- HEAT WHEEL VFD FAULT.

SUPPLY AIR TEMPERATURE SETPOINT – OUTSIDE AIR RESET:  
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A SUPPLY AIR TEMPERATURE SETPOINT RESET BASED ON OUTSIDE AIR TEMPERATURE.

THE SUPPLY AIR TEMPERATURE SETPOINT SHALL RESET FOR COOLING AS FOLLOWS:

- AS OUTSIDE AIR TEMPERATURE RISES FROM 50°F (ADJ.) TO 85°F (ADJ.)
- THE SUPPLY AIR TEMPERATURE SETPOINT SHALL RESET DOWNWARDS FROM 65°F (ADJ.) TO 55°F (ADJ.).

IF THE RETURN AIR TEMPERATURE DROPS BELOW 68°F (ADJ.), THEN THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET FOR HEATING AS FOLLOWS:

- AS OUTSIDE AIR TEMPERATURE DROPS FROM 50°F (ADJ.) TO 20°F (ADJ.),
- THE SUPPLY AIR TEMPERATURE SETPOINT SHALL RESET UPWARDS FROM 75°F (ADJ.) TO 95°F (ADJ.).

COOLING STAGES:  
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE COOLING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).
- AND THE ECONOMIZER (IF PRESENT) IS DISABLED OR FULLY OPEN.
- AND THE SUPPLY FAN STATUS IS ON.
- AND THE HEATING (IF PRESENT) IS NOT ACTIVE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS 5°F (ADJ.) GREATER THAN SETPOINT.

GAS HEATING STAGES:  
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND STAGE THE HEATING TO MAINTAIN ITS HEATING SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE HEATING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE SUPPLY FAN STATUS IS ON.
- AND THE COOLING (IF PRESENT) IS NOT ACTIVE.

THE HEATING STAGES SHALL RUN FOR FREEZE PROTECTION WHENEVER:

- SUPPLY AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.).
- AND THE SUPPLY FAN STATUS IS ON.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS 5°F (ADJ.) LESS THAN SETPOINT.

ECONOMIZER:  
THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F (ADJ.) LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN WHENEVER OCCUPIED.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
- AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL CLOSE WHENEVER:

- MIXED AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.).
- OR THE FREEZESTAT (IF PRESENT) IS ON.
- OR ON LOSS OF SUPPLY FAN STATUS.

THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START-UP IS AVAILABLE THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

MINIMUM OUTSIDE AIR VENTILATION – CARBON DIOXIDE (CO2) CONTROL:  
WHEN IN THE OCCUPIED MODE, THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 CONCENTRATION AND MODULATE THE OUTSIDE AIR DAMPERS OPEN ON RISING CO2 CONCENTRATIONS, OVERRIDING NORMAL DAMPER OPERATION TO MAINTAIN A CO2 SETPOINT OF 750 PPM (ADJ.).

PREFILTER HOURS:  
THE CONTROLLER SHALL MONITOR THE FAN RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- PREFILTER CHANGE REQUIRED: PREFILTER HAS BEEN IN USE FOR MORE THAN 2200 HRS (ADJ.).

FINAL FILTER HOURS:  
THE CONTROLLER SHALL MONITOR THE FAN RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- FINAL FILTER CHANGE REQUIRED: FINAL FILTER HAS BEEN IN USE FOR MORE THAN 2200 HRS (ADJ.).

MIXED AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE AND USE AS REQUIRED FOR ECONOMIZER CONTROL (IF PRESENT) OR PREHEATING CONTROL (IF PRESENT).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

RETURN AIR CARBON DIOXIDE (CO2) CONCENTRATION MONITORING:  
THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 CONCENTRATION.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION: IF THE RETURN AIR CO2 CONCENTRATION IS GREATER THAN 1000PPM (ADJ.) WHEN IN THE UNIT IS RUNNING.

RETURN AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE AND USE AS REQUIRED FOR SETPOINT CONTROL, OR ECONOMIZER CONTROL (IF PRESENT).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SUPPLY AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

RUN CONDITIONS – SCHEDULED:  
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:  
OCCUPIED MODE: THE UNIT SHALL MAINTAIN  
75 DEG. F (ADJ.) COOLING SETPOINT  
70 DEG. F (ADJ.) HEATING SETPOINT.

UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN  
60 DEG. F (ADJ.) COOLING SETPOINT  
65 DEG. F (ADJ.) HEATING SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).  
LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

ZONE OPTIMAL START:  
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

ZONE UNOCCUPIED OVERRIDE:  
A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.

FREEZE PROTECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A FREEZESTAT STATUS.

RETURN AIR SMOKE DETECTION:  
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.

SUPPLY FAN:  
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.  
SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.  
SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

HEATING COIL:  
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING COIL TO MAINTAIN ITS HEATING SET POINT.

THE HEATING SHALL BE ENABLED WHENEVER:  
OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG.F (ADJ.).  
AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.  
AND THE SUPPLY FAN STATUS IS ON.  
THE HEATING COIL SHALL OPEN WHENEVER THE FREEZESTAT (IF PRESENT) IS ON.

ECONOMIZER:  
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2 DEG. F LESS THAN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20%(ADJ.) OPEN WHENEVER OCCUPIED.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:  
OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG. F (ADJ.).  
AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.  
AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL CLOSE WHENEVER:  
MIXED AIR TEMPERATURE DROPS FROM 45 DEG. F TO 40 DEG. F (ADJ.).  
OR ON LOSS OF SUPPLY FAN STATUS.  
OR THE FREEZESTAT (IF PRESENT) IS ON.

THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START-UP IS AVAILABLE, THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

MINIMUM OUTSIDE AIR VENTILATION – FIXED PERCENTAGE:  
THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM POSITION (ADJ.) DURING BUILDING OCCUPIED HOURS AND BE CLOSED DURING UNOCCUPIED HOURS.

FINAL FILTER DIFFERENTIAL PRESSURE MONITOR:  
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FINAL FILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

MIXED AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE AND USE AS REQUIRED FOR ECONOMIZER CONTROL (IF PRESENT) OR PREHEATING CONTROL (IF PRESENT).

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90 DEG. F (ADJ.).  
LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45 DEG. F (ADJ.).

BMS INTEGRATION  
UNIT SHALL BE INTEGRATED INTO BMS UI. UNIT STATUS CONSISTING OF OCCUPIED/UNOCCUPIED/OFF SHALL BE CLEARLY IDENTIFIABLE ALONG WITH ANY ALARMS.

#### CONTROL DIAGRAMS LEGEND

AI = ANALOG INPUT. A PHYSICAL INPUT TO THE CONTROL MODULE.

AO = ANALOG OUTPUT. A PHYSICAL OUTPUT FROM THE CONTROL MODULE.

AV = ANALOG VALUE. AN INTERMEDIATE (SOFTWARE) POINT THAT MAY BE EDITABLE OR READ-ONLY. EDITABLE AVS ARE TYPICALLY USED TO ALLOW THE USER TO SET A FIXED CONTROL PARAMETER, SUCH AS A SETPOINT. READ ONLY AVS ARE TYPICALLY USED TO DISPLAY THE STATUS OF A CONTROL OPERATION.

BI = BINARY INPUT. A PHYSICAL INPUT TO THE CONTROL MODULE.

BO = BINARY OUTPUT. A PHYSICAL OUTPUT FROM THE CONTROL MODULE.

BV = BINARY VALUE. AN INTERMEDIATE (SOFTWARE) POINT THAT MAY BE EDITABLE OR READ-ONLY. EDITABLE BVs ARE TYPICALLY USED TO ALLOW THE USER TO SET A FIXED CONTROL PARAMETER, SUCH AS A SETPOINT. READ ONLY BVs ARE TYPICALLY USED TO DISPLAY THE STATUS OF A CONTROL OPERATION.

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STAMP



**WARWICK VALLEY CENTRAL SCHOOL DISTRICT  
HIGH SCHOOL RENOVATIONS, FIELD WORK AND  
EXTERIOR BATHROOM BUILDING**  
225 WEST STREET EXT, WARWICK, NY 10990

PROJECT NO. 05-21-04  
05-20-06

BID SET 04.08.2022

REVISION DATE

DRAWN BY

CHECKED BY

SHEET SIZE 30" x 42"

SCALE AS NOTED

SHEET TITLE

CONTROL SCHEMATICS

SHEET NO.

M-601

FILE PATH: N:\1 - PROJECT DIRECTORIES\1 - E & P Projects\05 - Warwick Valley CSD\05-21-04 Warwick Valley Central School District High School Renovations, Field Work and Exterior Bathroom Building\05-21-04.mxd