University of Rhode Island

Sound Attenuation Removal & Ductwork Replacement
Garrahy Residence Hall
Kingston Campus

Kingston, RI

www.uri.edu

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CREATIVE ENVIRONMENT CORP. CONSULTING ENGINEERS

HVAC • ELECTRICAL
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URI PROJECT #KC.R.GARR.2012.001

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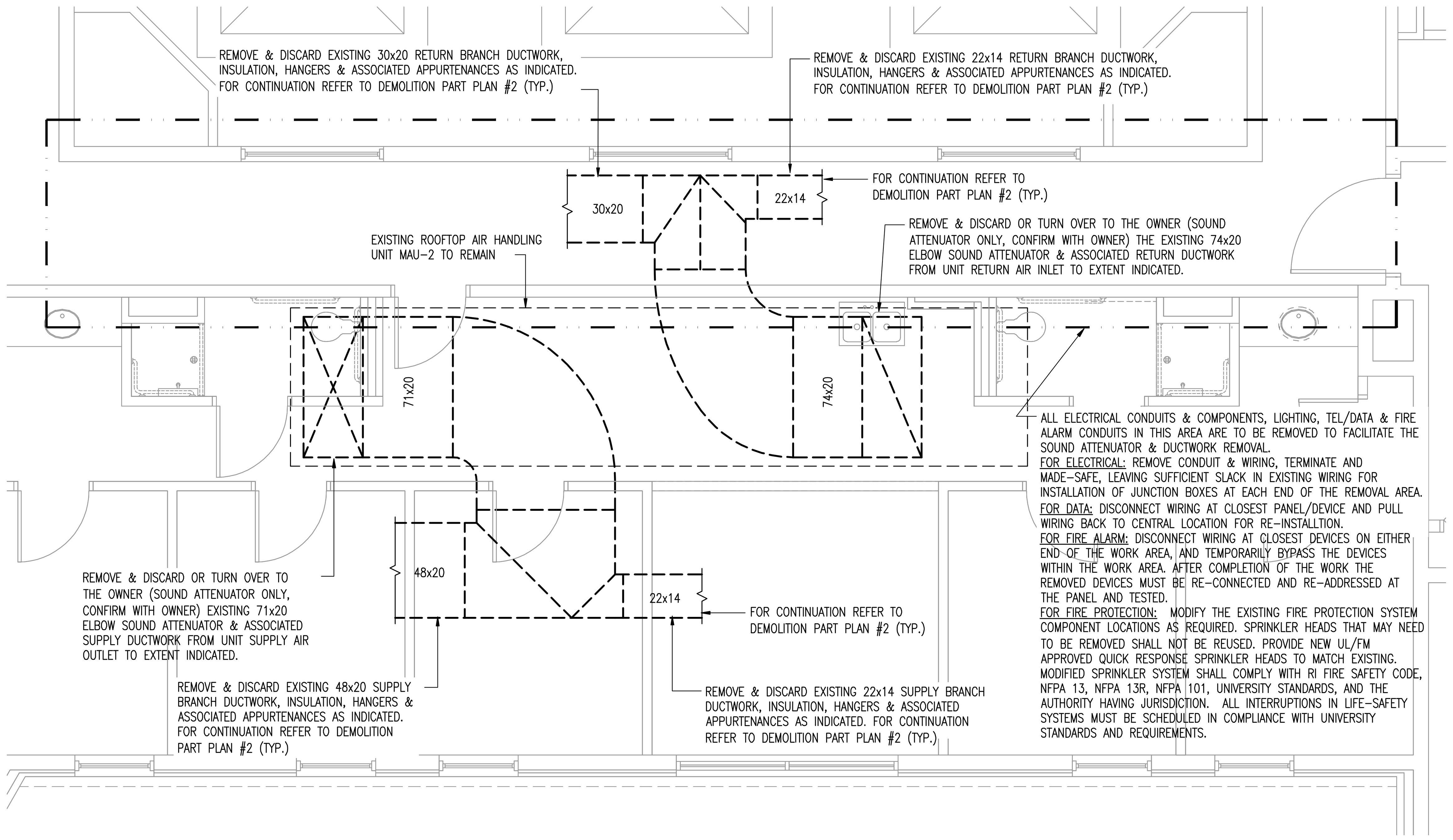
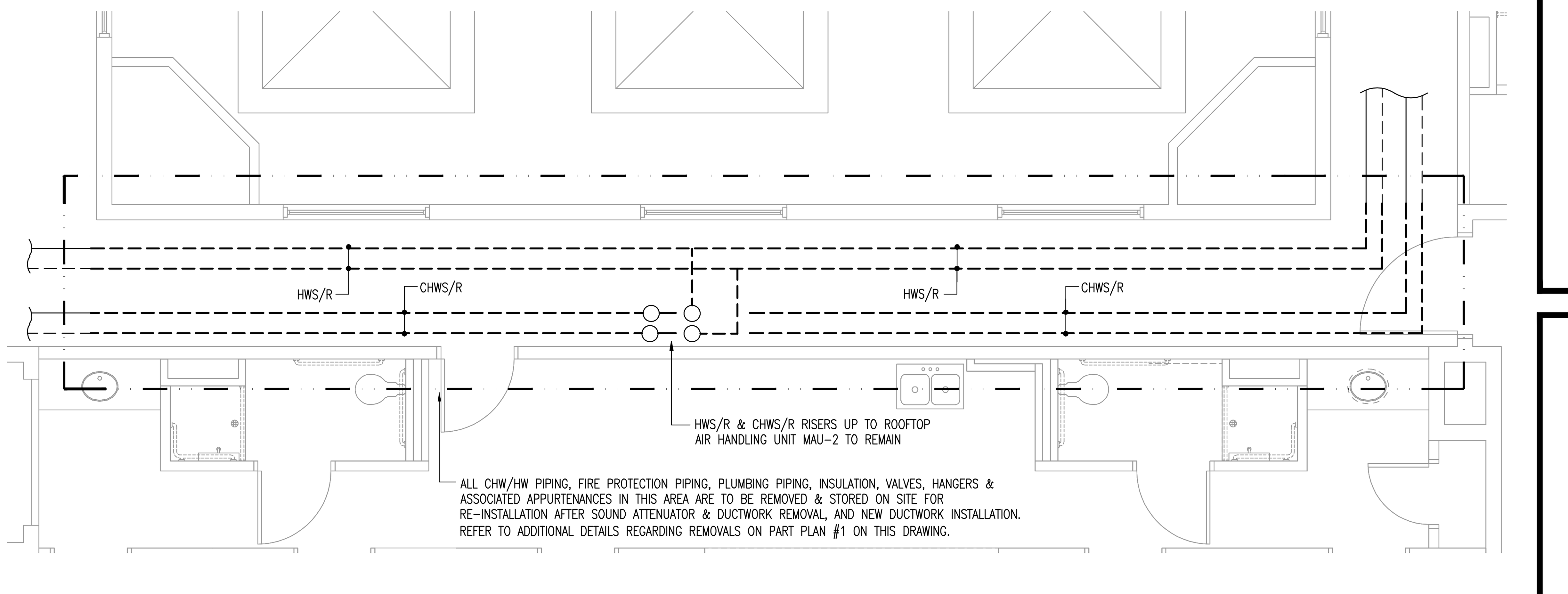
DRAWING LIST

MECHANICAL DRAWINGS:



FOURTH FLOOR PARTIAL PLAN #1 - MECHANICAL DEMOLITION - UPPER DUCTWORK

SCALE: 1/4"=1'-0"



FOURTH FLOOR PARTIAL PLAN #3 - MECHANICAL DEMOLITION - PIPING

SCALE: 1/4"=1'-0"

LEGEND

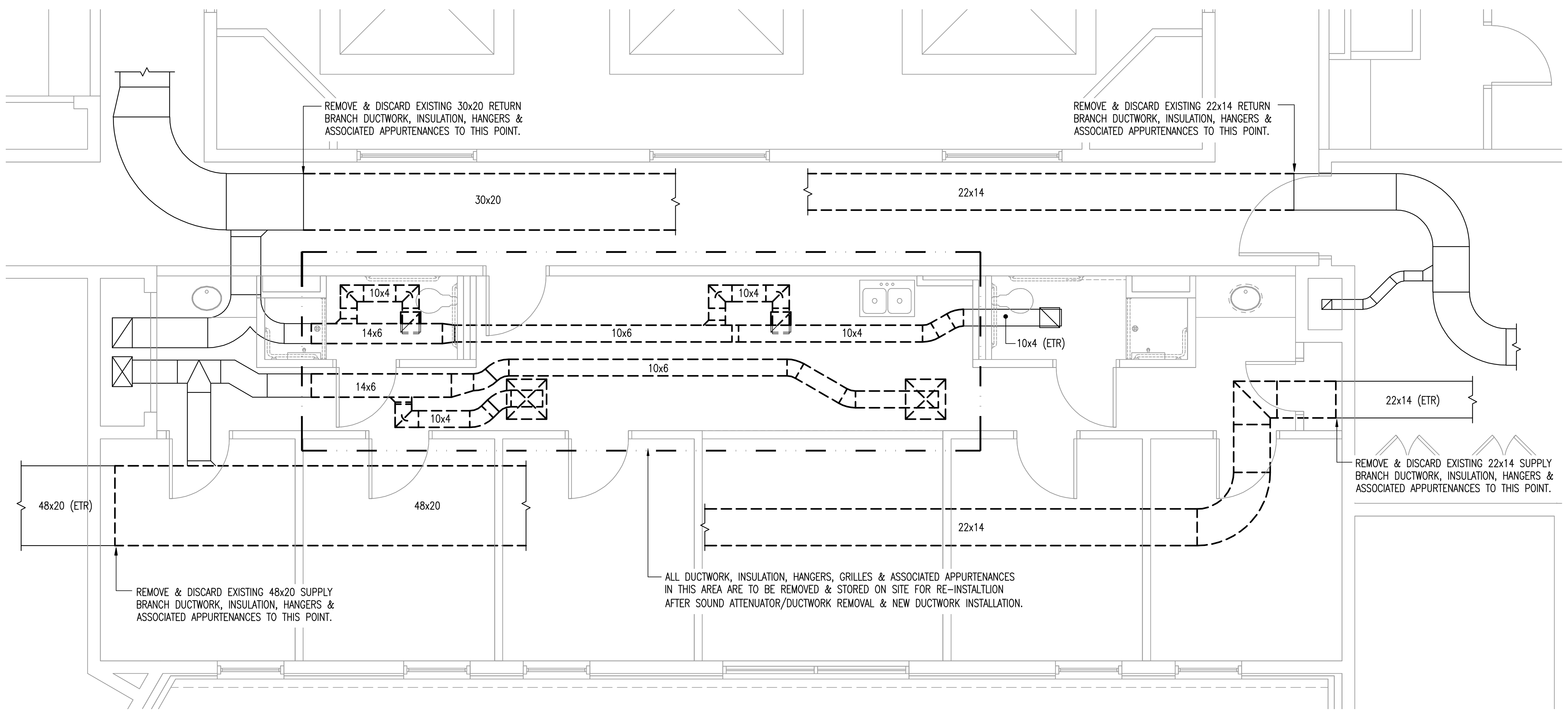
– – – – –	EXISTING EQUIPMENT, DUCTWORK & PIPING TO BE REMOVED AND DISCARDED
―――――	EXISTING EQUIPMENT, DUCTWORK & PIPING TO REMAIN AS INSTALLED OR RELOCATED AS REQUIRED.

DEMOLITION GENERAL NOTES

THE INTENT OF THE SCOPE OF DEMOLITION FOR THIS PROJECT IS IN TWO PARTS. THE PURPOSE OF THE PROJECT IS TO REMOVE THE EXISTING ELBOW SOUND ATTENUATORS ON THE SUPPLY & RETURN MAIN CONNECTIONS TO THE ROOFTOP AIR HANDLING UNIT AND REMOVE/REPLACE THE ASSOCIATED SUPPLY & RETURN DUCTWORK MAINS/BRANCHES AS INDICATED. IN ORDER TO ACCOMPLISH THAT SCOPE OF WORK WILL REQUIRE THE REMOVAL OF BOTH MECHANICAL AND OTHER TRADE'S WORK LOCATED BELOW AND AROUND THESE ATTENUATORS AND DUCTS.
THE SCOPE OF WORK INCLUDES REMOVAL & REINSTALLATION OF ANY WALLS, CEILING TILES & GRID, TRIM AND ACCESSORIES, INSULATION, FIRE-STOPPING, BRANCH DUCTWORK & DIFFUSERS/REGISTERS, CHW/HW PIPING, PLUMBING PIPING, FIRE PROTECTION PIPING, ELECTRICAL WIRING, COMPONENTS, & FIXTURES, FIRE ALARM WIRING & DEVICES, AND TEL/DATA INSTALLED BELOW THE ATTENUATORS & DUCTWORK MAINS THAT ARE TO BE REMOVED, AND SMOKE DETECTION/TEMPERATURE CONTROL COMPONENTS INSTALLED WITHIN AND ON THE EXISTING DUCTWORK AS NECESSARY TO ACCOMPLISH THE SCOPE OF WORK.

UNDER DEMOLITION, THE FOLLOWING IS, IN GENERAL, THE EXTENT OF THE WORK TO BE PERFORMED BY THE CONTRACTORS UNDER THIS CONTRACT. THE INTENT AND RESULTANT DEMOLITION SCOPE OF WORK IS FOR ALL DUCT MAINS WITHIN THE PROJECT AREA TO BE REMOVED & DISCARDED; BRANCH DUCTS AND REGISTERS/DIFFUSERS/GRILLES MAY BE REMOVED & REINSTALLED. OTHER REMOVALS ASSOCIATED WITH THIS WORK MAY BE REMOVED AND REINSTALLED, WITH THE EXCEPTION OF FIRE SPRINKLER HEADS AS NOTED ON PART PLAN #1. REFER TO NOTES BELOW FOR ADDITIONAL INFORMATION.

1. PRIOR TO SUBMITTING BID, VISIT SITE AND IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK OF THIS SECTION. DEMOLITION WORK WILL REQUIRE CAREFUL SITE EXAMINATION PRIOR TO BIDDING. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY CONSTRUED BY EXPERIENCED OBSERVERS.
2. ALL REMOVAL/REINSTALLATION WORK WILL BE COMPLETED BY TRADE CONTRACTORS LICENSED IN THOSE SPECIFIC DISCIPLINES.
3. PRIOR TO COMMENCING DEMOLITION, CONTRACTOR SHALL IDENTIFY WITH OWNER ANY SPECIFIC ITEMS (SOUND ATTENUATORS) TO BE RETURNED TO THE OWNER AFTER DEMOLITION.
4. ALL DEMOLITION DEBRIS SHALL BE DISPOSED OF IN ACCORDANCE WITH STATE AND LOCAL REGULATIONS. CONTRACTOR SHALL SECURE ALL REQUIRED DEMOLITION PERMITS.
5. THIS CONTRACTOR SHALL PROTECT ADJACENT WORK AND SURROUNDING AREA FINISHES, APPLIANCES, FLOORING, ETC. AGAINST INJURY OR DAMAGE; SEAL PLUMBING FIXTURE DRAINS TO PREVENT BLOCKAGE BY DEBRIS.
6. CAREFULLY REMOVE AND STORE DEVICES, ACCESSORIES, SIGNAGE, MATERIAL, AND EQUIPMENT TO BE RELOCATED OR REINSTALLED IN A LOCATION COORDINATED WITH THE OWNER. OPEN ENDS OF WORK SHALL BE CLOSED WITH TEMPORARY COVERS OR PLUGS DURING STORAGE AND CONSTRUCTION TO PREVENT ENTRY OF OBSTRUCTING MATERIAL.
7. THIS CONTRACTOR SHALL COORDINATE ALL UTILITY AND LIFE-SAFETY SHUTDOWNS IN COMPLIANCE WITH THE UNIVERSITY'S SYSTEM IMPAIRMENT NOTIFICATION REQUIREMENTS, THE OFFICE OF CAPITAL PROJECTS, AND THE MANAGER OF ALARMS. THE LIFE SAFETY SYSTEMS MUST REMAIN FUNCTIONAL DURING WORK ON THIS PROJECT.
8. THERE IS AN ELECTRICAL DISTRIBUTION PANEL LOCATED DIRECTLY BELOW THE SOUND ATTENUATOR. IF IT IS DETERMINED THAT THIS PANEL NEEDS TO BE REMOVED IN ORDER TO COMPLETE THIS WORK, TEMPORARY POWER WILL NEED TO BE BROUGHT INTO THIS SUITE FOR USE DURING THIS PROJECT. IF IT IS DETERMINED THAT WORK CAN BE SAFELY COMPLETED WITH THIS PANEL REMAINING IN PLACE, THE PANEL AND WIRING MUST BE PROTECTED FROM DAMAGE.
9. IT IS NOT THE INTENT TO SHOW EVERY LENGTH OF DUCTWORK, PIPE, CONDUIT, EQUIPMENT, OR EXACT SIZES TO BE REMOVED IN THE DEMOLITION WORK. DRAWING INDICATES THE GENERAL AREA OF WORK WITH DIAGRAMMATICALLY LOCATED EQUIPMENT, PIPING, DUCTWORK, CONDUIT, AND SIZES. EXACT LOCATION AND SIZE OF ALL COMPONENTS, AND ITEMS THAT SPECIFICALLY NEED OT BE REMOVED TO ACCOMPLISH THE INTENT OF THE SCOE OF WORK ARE TO BE DETERMINED IN THE FIELD AND AS REQUIRED BY THE ACTUAL BUILDING CONDITIONS.
10. ALL EXISTING MECHANICAL DUCTWORK AND ACCESSORIES NOT BEING USED FOR THE NEW SYSTEM SHALL BE REMOVED AND DISPOSED OF, WHETHER SPECIFICALLY NOTED OR NOT. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE DISCONNECTION AND REMOVAL OF THE EXISTING MECHANICAL EQUIPMENT, DUCTWORK, PIPING, VALVES, ETC., IN DESIGNATED AREAS. CUT & TEMPORARILY CAP PIPING AND DUCTWORK.
11. ALL TEMPERATURE CONTROL COMPONENTS INSTALLED IN DUCTWORK BEING REMOVED SHALL BE REMOVED AND STORED. ALL COMPONENTS SHALL BE REINSTALLED IN THE NEW DUCTWORK AND RETESTED.
12. ALL EXISTING SEISMIC RESTRAINT COMPONENTS SHALL REMAIN FOR RE-INSTALLATION. ANY NEW SEISMIC RESTRAINT REQUIRED SHALL BE PROVIDED AND INSTALLED IN COMPLIANCE WITH THE INTERNATIONAL BUILDING CODE AND ASCE 7-05.

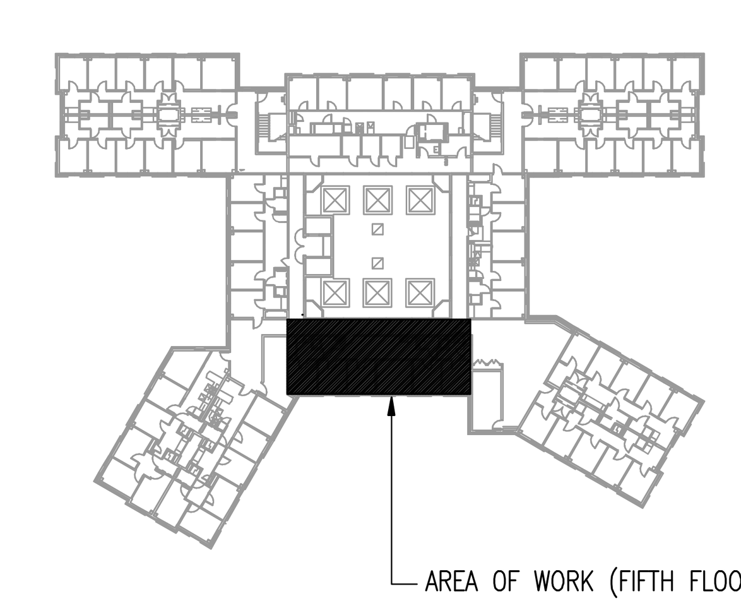


FOURTH FLOOR PARTIAL PLAN #2 - MECHANICAL DEMOLITION - LOWER DUCTWORK

SCALE: 1/4"=1'-0"

NOTE

INDEPENDANT SOUND TESTING WILL BE PERFORMED BEFORE REMOVALS, AND AFTER THE REPLACEMENT IS COMPLETE IN ORDER TO EVALUATE EFFECTIVENESS AND RESULTS.



KEY PLAN

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Project: SOUND ATTENUATION REMOVAL/ DUCTWORK REPLACEMENT GARRAHAY RESIDENCE HALL UNIVERSITY OF RHODE ISLAND

Status: ISSUED FOR CONSTRUCTION

No.	Revision/Issue	Date

Sheet Title: PARTIAL FOURTH FLOOR PLANS - MECHANICAL DEMOLITION

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Scale:	AS NOTED
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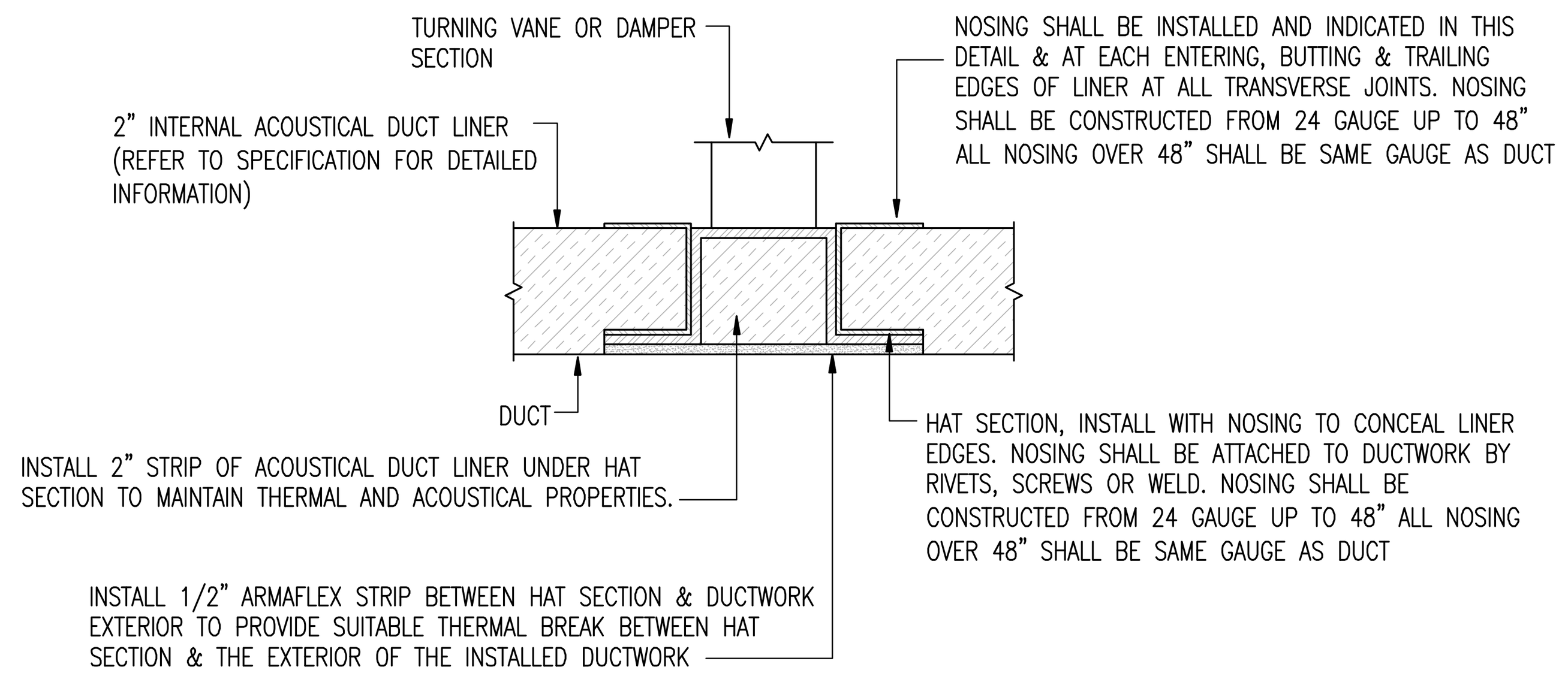
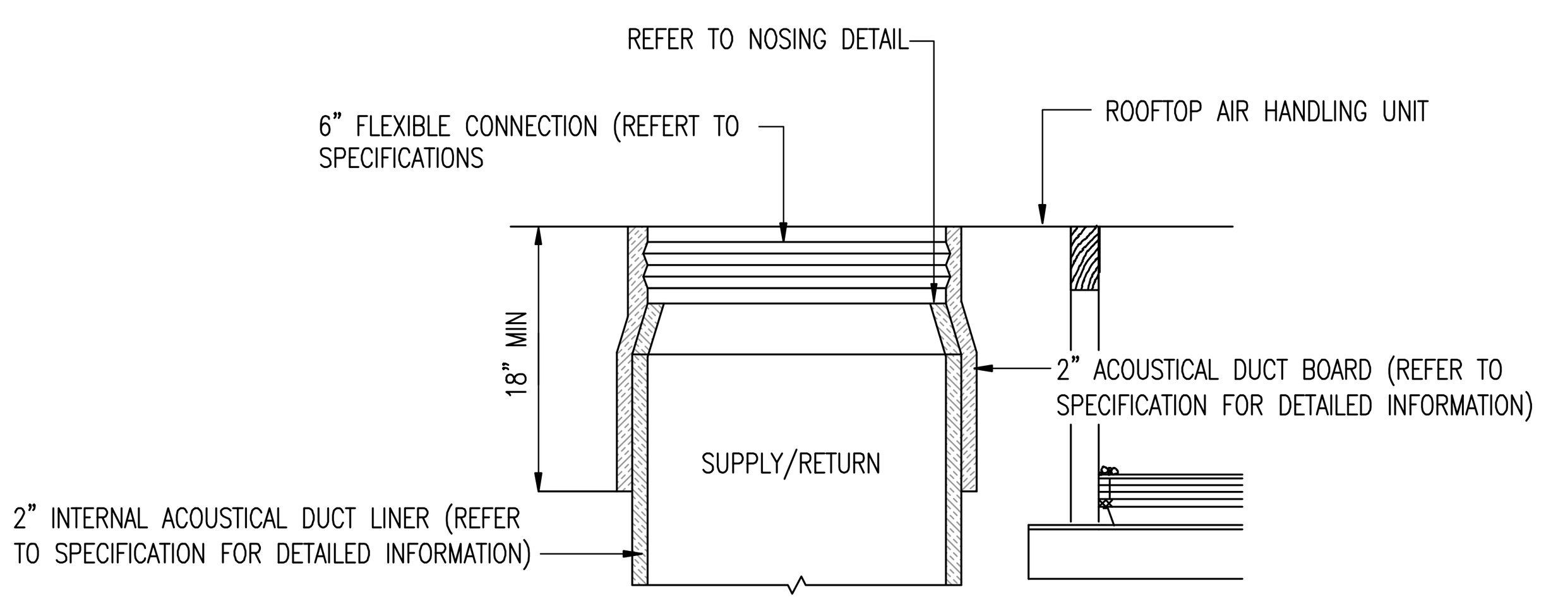
Drawing No: M-1.0

Sheet 1 of 3



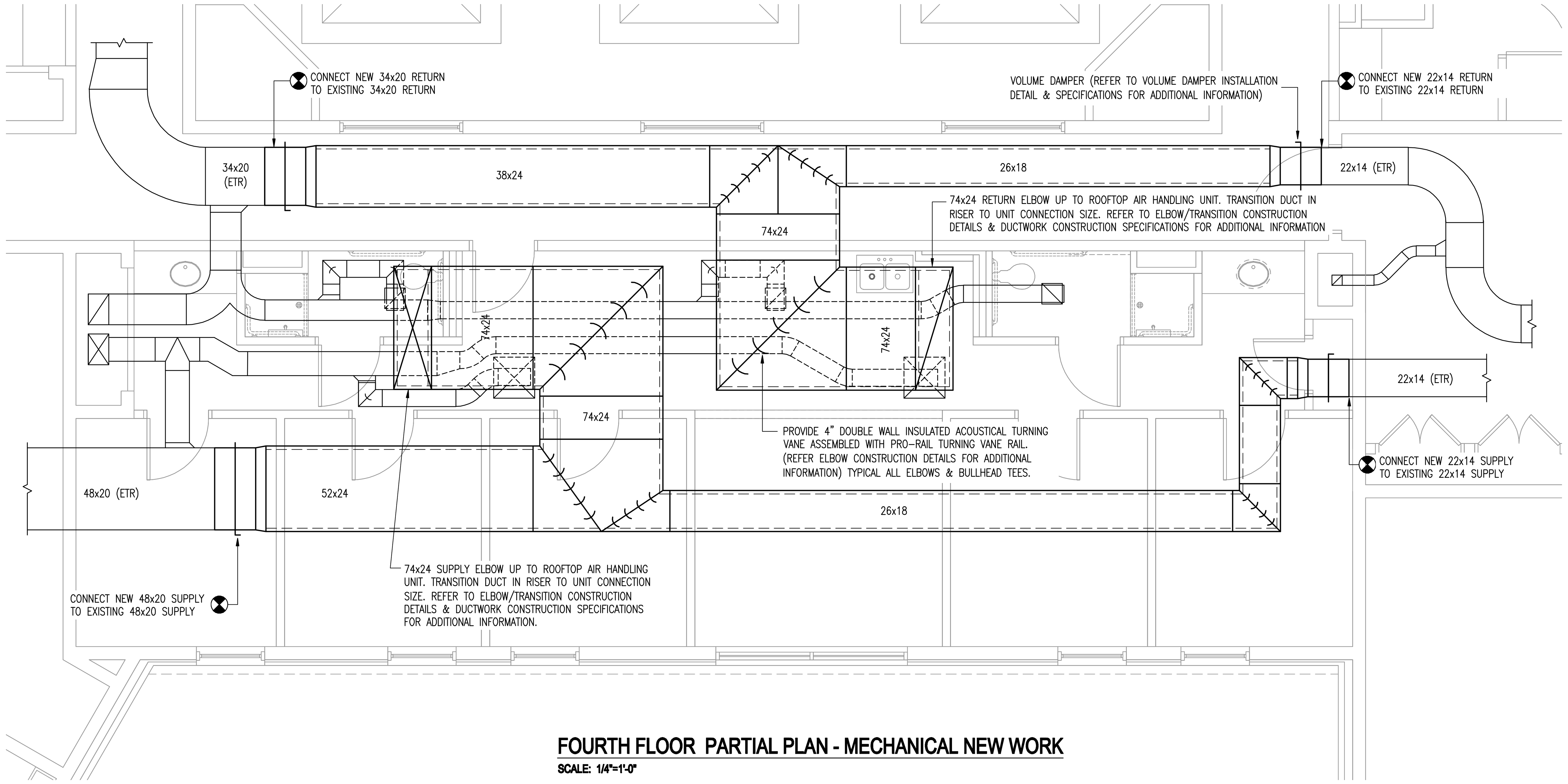
NOSING & TURNING VANE INSTALLATION DETAIL

NOT TO SCALE



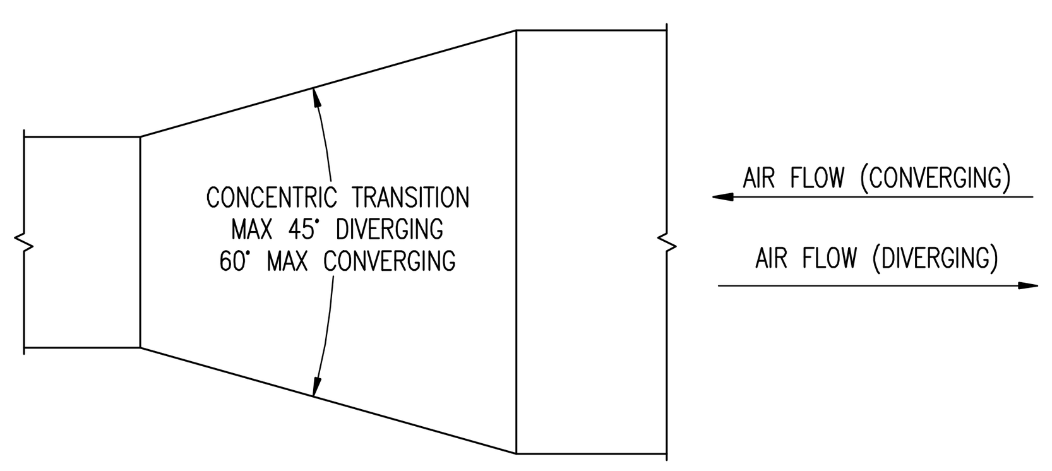
FLEXIBLE CONNECTION INSULATION DETAIL

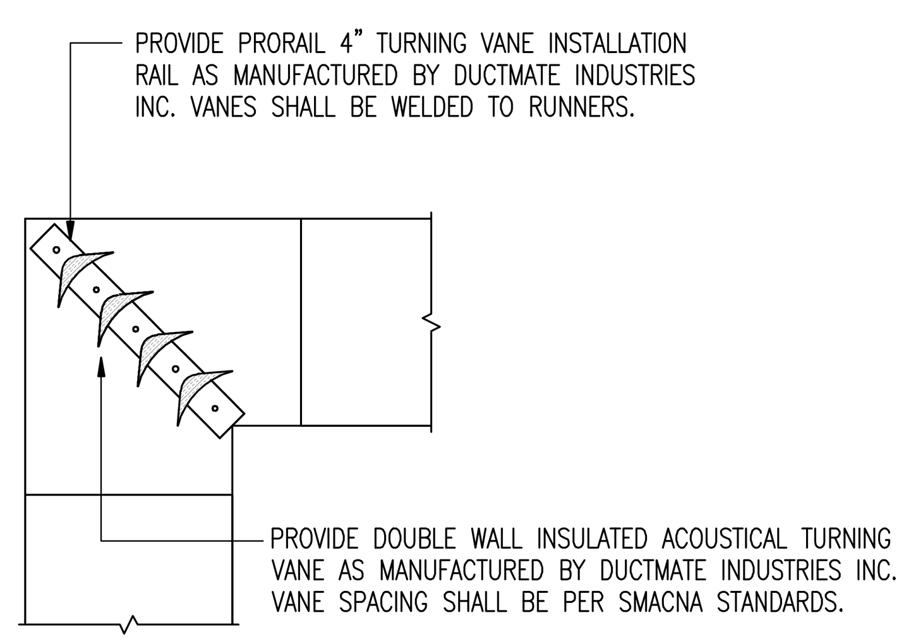
NOT TO SCALE



FOURTH FLOOR PARTIAL PLAN - MECHANICAL NEW WORK

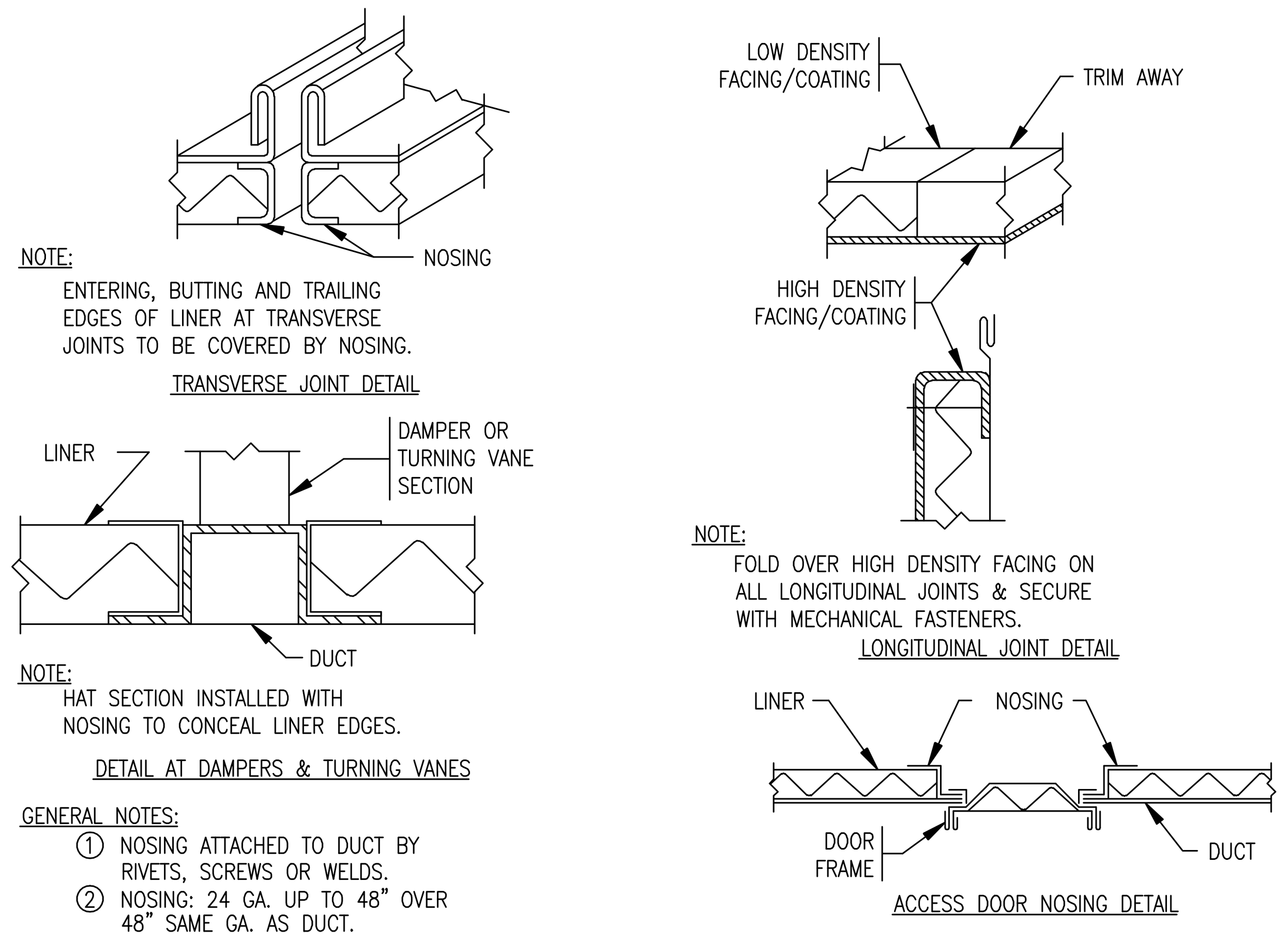
SCALE: 1/4"=1'-0"





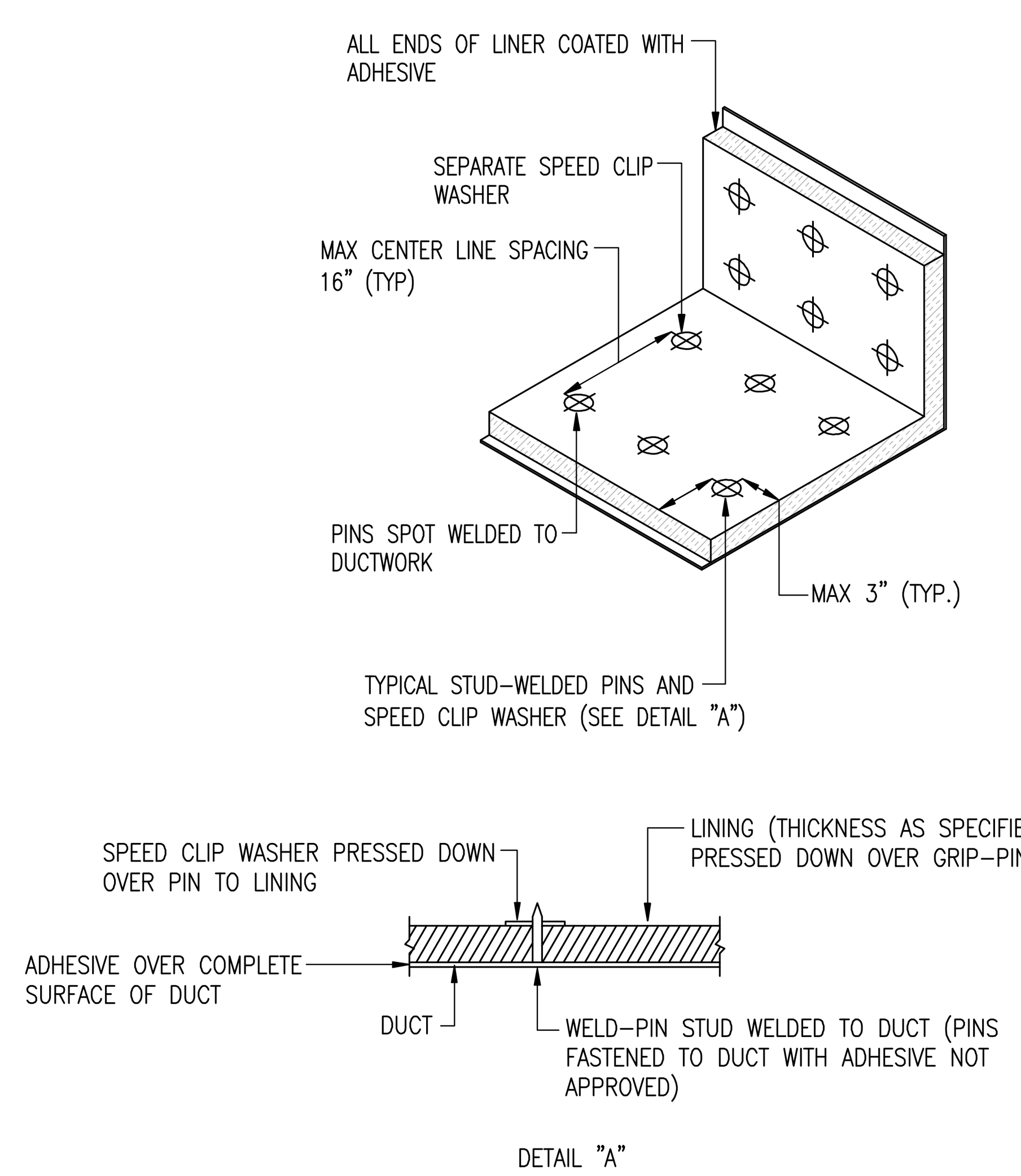
DUCTWORK CONSTRUCTION DETAILS

NOT TO SCALE



DUCT LINING NOSING DETAIL

NOT TO SCALE



SOUND LINING INSTALLATION DETAIL

NOT TO SCALE

NOTES

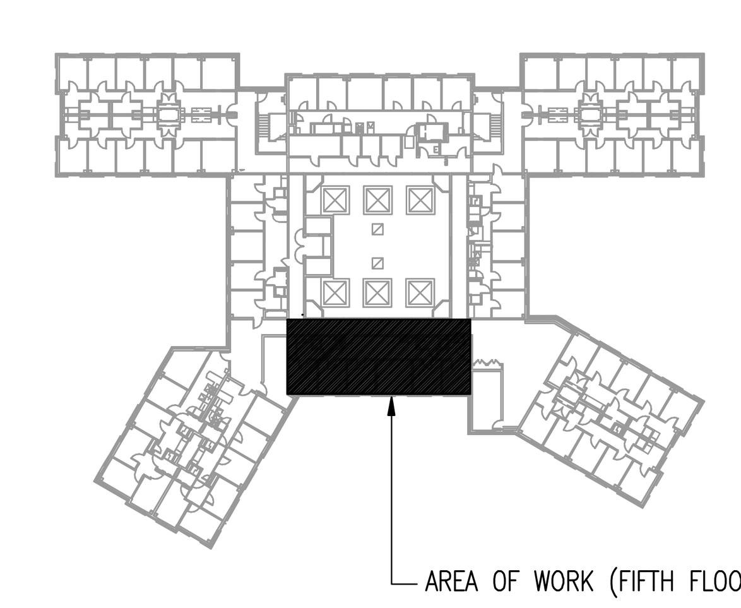
1. FOR NOSING, JOINT AND DETAILS AT DAMPER & TURNING VANES. REFER TO "SMACNA" FOR SOUND LINING NOSING DETAILS. IN ADDITION REFER TO DUCT CONSTRUCTION & SOUND LINING DETAILS THIS SHEET.
2. NOT LESS THAN TWO PINS ON EACH FACE OF DUCT.

GENERAL NOTES

THE PURPOSE OF THE PROJECT IS TO REMOVE THE EXISTING ELBOW SOUND ATTENUATORS ON THE SUPPLY & RETURN MAIN CONNECTIONS TO THE ROOFTOP AIR HANDLING UNIT & REPLACE THE ASSOCIATED SUPPLY & RETURN DUCTWORK MAINS/BRANCHES AS INDICATED TO REDUCE THE LEVEL OF AIR-FLOW NOISE.

UNDER THE REINSTALLATION, THE FOLLOWING IS, IN GENERAL, THE EXTENT OF THE WORK TO BE PERFORMED BY THE CONTRACTORS UNDER THIS CONTRACT. THE INTENT AND RESULTANT RE-INSTALLATION SCOPE OF WORK IS FOR ALL SYSTEMS WITHIN THE PROJECT LIMITS TO BE RE-INSTALLED TO RESTORE THE LOCATION AND FUNCTION TO EQUAL OR BETTER QUALITY OF FINISHES THAN PRIOR TO THE WORK TAKING PLACE. REFER TO NOTES BELOW FOR ADDITIONAL INFORMATION.

1. PRIOR TO DEMOLITION THIS CONTRACTOR SHALL TAKE DIGITAL PHOTOGRAPHS OF THE AREA IN ORDER TO ASSURE THAT THE ORIGINAL COINDITIONS ARE RESTORED TO THE ORIGINAL QUALITY, AND TO IDENTIFY ANY VISIBLE DEFICIENCIES FOUND IN THE EXISTING WORKMANSHIP OR FINISHES. THIS RESTORATION SHALL INCLUDE CARPENTRY, METAL WORK, PLASTERING, PAINTING, AND CLEANING OF WALLS, CEILINGS, AND FLOORS IN AREAS DISTURBED OR AFFECTED BY THIS WORK. RESTORATION SHALL BE DONE TO THE SATISFACTION OF THE OWNER.
2. ALL GYPSUM PARTITIONS AND FIRE-STOPPING WILL BE RESTORED TO MAINTAIN FIRE, SMOKE, SOUND, AND INSULATION RATINGS.
3. THE CEILING GRID AND ACT PANELS WILL BE RE-INSTALLED TO BE LEVEL AND SQUARE. ANY DAMAGED LENGTHS OF CEILING GRID OR DAMAGED CEILING TILES WILL BE REPLACED UNDER THIS CONTRACT WITH STOCK TO MATCH EXISTING.
4. THIS CONTRACTOR WILL PAINT PATCHED AREAS TO MATCH EXISTING USING UNIVERSITY STANDARDS FOR PAINT COLOR AND BRAND; CONTACT THE PAINT SHOP SUPERVISOR IN MAINTENANCE FOR SPECIFICATION.
5. THIS CONTRACTOR WILL REINSTALL SIGNAGE, DOOR HARDWARE, AND ACCESSORIES IN THE ORIGINAL LOCATIONS.
6. THIS CONTRACTOR WILL CLEAN AND REINSTALL LIGHT FIXTURES IN THE ORIGINAL LOCATIONS.
7. IF THE EXISTING ELECTRICAL PANEL IS REMOVED AS PART OF THIS WORK, IT SHALL BE REINSTALLED WITH ALL CIRCUITING RECONNECTED AS ORIGINALLY INSTALLED. THE TEMPORARY POWER, IF USED, WILL BE REMOVED AND THE CONNECTION POINT MADE SAFE AND RESTORED TO ORIGINAL CONDITION.
8. EXISTING PIPING WILL BE REINSTALLED, OR NEW PIPING OF EQUAL QUALITY INSTALLED. INSULATION AND HANGERS WILL BE INSTALLED TO MATCH THE EXISTING. ALL CONNECTIONS AT REINSTALLED OR NEW PIPING SECTIONS WILL BE TESTED FOR LEAKS PRIOR TO RE-INSULATING.
9. PIPE LABELS AND SHIELDS WILL BE INSTALLED ON ALL PIPING IMPACTED BY THIS SCOPE OF WORK AND REGARDLESS OF WHETHER THEY EXIST ON THE PIPING PRIOR TO THIS WORK.
10. TEMPERATURE CONTROL COMPONENTS SHALL BE REINSTALLED AND OPERATION TESTED.
11. THE ENTIRE DISTRIBUTION OF THIS MAKE-UP AIR/EXHAUST UNIT SHALL BE REBALANCED TO ORIGINAL INSTALLATION QUANTITIES. PLANS WILL BE MADE AVAILABLE THROUGH THE OFFICE OF CAPITAL PROJECTS.
12. SMOKE DETECTORS AND OTHER FIRE ALARM DEVICES WILL BE REINSTALLED/READDRESSED BY A LICENSED CONTRACTOR AND TESTED TO THE SATISFACTION OF THE OWNER. IF NECESSARY THE SENSING TUBE FOR THE DUCT SMOKE DETECTORS SHALL BE REPLACED.



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Sheet Title: PARTIAL FOURTH FLOOR PLAN, NOTES & MECHANICAL DETAILS

Project No:	201190/201273
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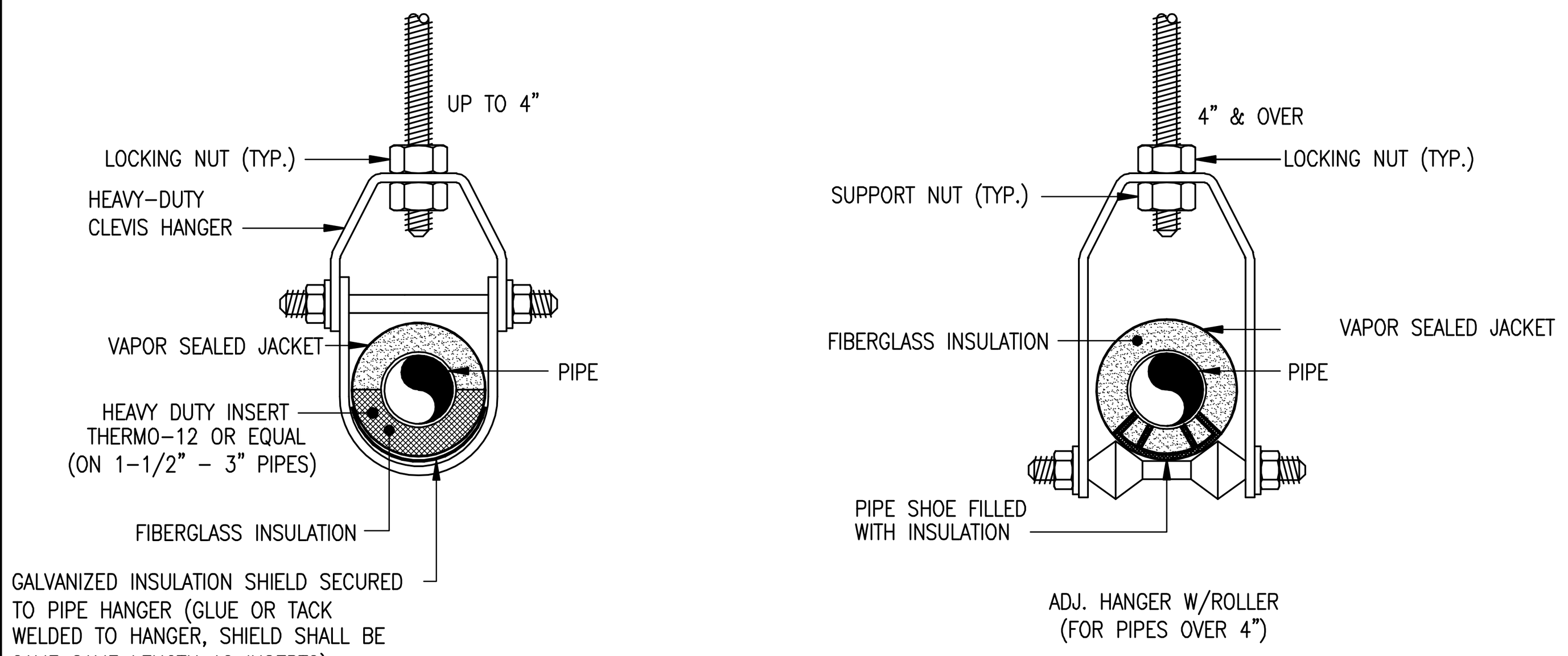
Sheet 2 of 3



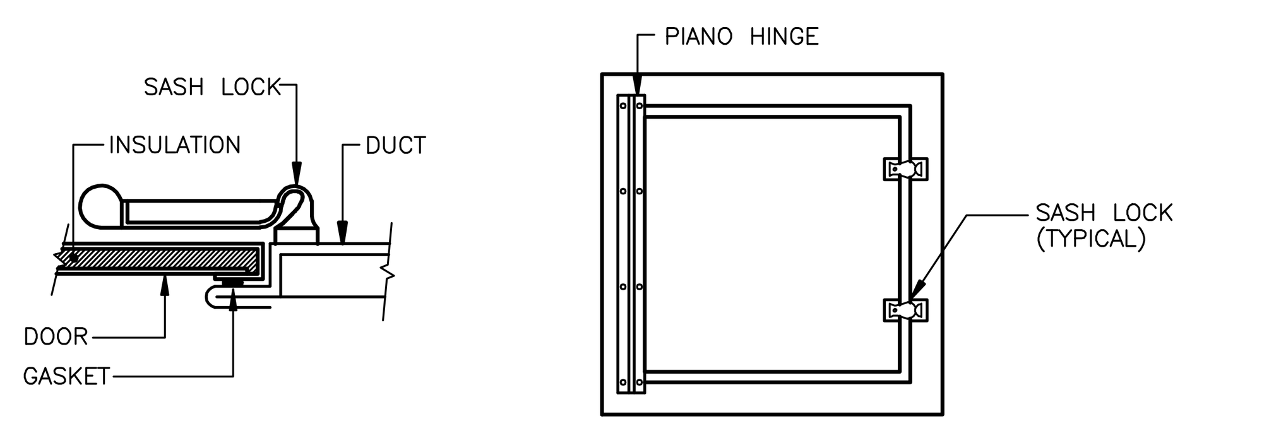
VERTICAL PIPING HANGER SCHEDULE	
PIPE MATERIAL	MAX. VERTICAL SPACING
CAST IRON	15'-0"
COPPER	10'-0"
GALVANIZED STEEL	15'-0"
PVC	4'-0"
CPVC	3'-0"

HANGER & SUPPORT SCHEDULE			
PIPE SIZE	ROD SIZE	MAXIMUM SPACING	
		COPPER	STEEL
3/4"	3/8"	5'-0"	7'-0"
1"	3/8"	6'-0"	7'-0"
1-1/4"	3/8"	7'-0"	7'-0"
1-1/2"	3/8"	8'-0"	9'-0"
2"	3/8"	8'-0"	10'-0"
2-1/2"	1/2"	9'-0"	11'-0"
3"	1/2"	10'-0"	12'-0"
4" - 5"	5/8"	12'-0"	14'-0"
6" - 8"	3/4"	14'-0"	17'-0"

INSULATION INSERTS	
PIPE SIZES	LENGTH
1 1/2" TO 2 1/2"	10"
3" TO 6"	12"
8" TO 10"	16"
12" AND OVER	22"

PIPING SUPPORT DETAIL

NOT TO SCALE

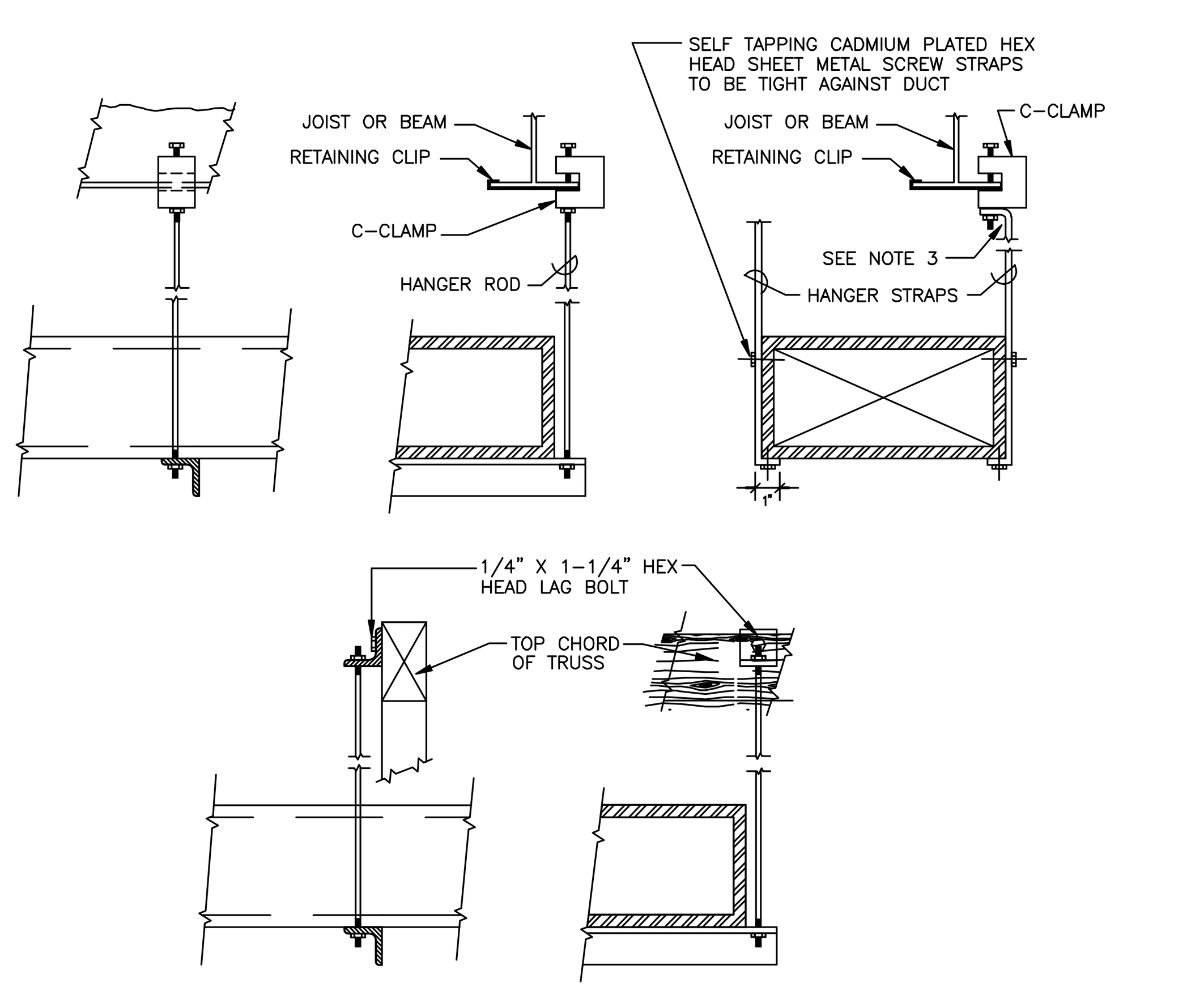


TYPICAL DUCT ACCESS PANEL DETAIL

NOT TO SCALE

HANGER SIZES FOR RECTANGULAR DUCT			
MAX SIDE	HANGER	HORIZONTAL SUPPORT ANGLE	MAXIMUM SPACING
30"	1" x 18 GA. STRAP	NONE REQUIRED	10'-0"
36"	1/4" ROUND ROD	1-1/2"X1-1/2"X1/8"	8"-0"
48"	1/4" ROUND ROD	2" X 2" X 1/8"	8'-0"
60"	5/16" ROUND ROD	2" X 2" X 1/8"	8'-0"
84"	3/8" ROUND ROD	2" X 2" X 1/8"	8'-0"

NOTE:
1. ALL SUPPLY AIR DUCT SHALL BE WRAPPED EXTERNALLY AS PER SPECIFICATIONS.
2. NO POP RIVETS ALLOWED.
3. PREVENT BENDING OF STRAP AT 90° BEND UNDER LOAD.



DUCT STRAP HANGER DETAIL

NOT TO SCALE

SPECIFICATIONS

PART 1 - GENERAL REQUIREMENTS

1.01 GENERAL REQUIREMENTS:

A. SCOPE OF WORK SHALL INCLUDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TRANSPORTATION, HOISTING, RIGGING, INSURANCE, ETC., TO PERFORM THE WORK AS INDICATED ON THE DRAWINGS AND HEREIN SPECIFIED FOR A COMPLETE INSTALLATION. ALL WORK SHALL BE IN ACCORDANCE WITH NATIONAL, STATE AND LOCAL CODES AND ORDINANCES HAVING JURISDICTION, AS INTERPRETED BY THE ARCHITECT/ENGINEER.

B. NO EXITS SHALL BE CLOSED WITHOUT THE WRITTEN PERMISSION OF THE OWNER AND LOCAL AUTHORITIES HAVING JURISDICTION.

C. ANY UTILITY OUTAGES OR SYSTEM SHUTDOWNS FOR CONSTRUCTION SHALL BE SCHEDULED WITH THE ARCHITECT/OWNER PRIOR TO COMMENCING OF WORK.

D. APPLY AND PAY FOR ALL NECESSARY INSPECTION FEES, LICENSES AND PERMITS REQUIRED BY THE PROPER AUTHORITIES HAVING JURISDICTION.

E. "PROVIDE" AND "INSTALL" ALL MATERIALS, LABOR AND EQUIPMENT ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR COMPLETE AND OPERABLE SYSTEMS AS INDICATED ON THE DRAWINGS OR HEREIN SPECIFIED.

F. ALL CUTTING AND PATCHING WILL BE DONE BY THIS CONTRACTOR.

G. ALL MATERIALS SHALL BE NEW. ALL EQUIPMENT SHALL BEAR THE U.L. LABEL.

H. COORDINATE LOCATIONS OF ALL NEW PIPING AND WITH EXISTING EQUIPMENT, LIGHTING, OTHER TRADES, AND THE OWNER PRIOR TO INSTALLATION OR FABRICATION OF SAME.

I. CONTRACTOR TO GUARANTEE THE QUALITY OF ALL MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF OWNER ACCEPTANCE. ALL DEFECTIVE MATERIAL AND WORKMANSHIP SHALL BE REPLACED AT CONTRACTOR'S EXPENSE DURING THIS TIME.

J. ENGINEER SHALL NOT BE RESPONSIBLE FOR THE SAFETY OF CONTRACTOR'S EMPLOYEES, MATERIALS OR EQUIPMENT.

K. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY INJURIES OR DAMAGE DONE TO BUILDING PREMISES OR ADJOINING AREAS OR WORK RESULTING FROM EXECUTION OF HIS PART OF WORK IN ANY MANNER. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER PROTECTION OF HIS WORK AT HIS OWN EXPENSE.

L. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR ALL EQUIPMENT SPECIFIED HEREIN AND AS SHOWN ON THE DRAWINGS PRIOR TO ORDERING, FABRICATING OR INSTALLING SAME.

M. THIS CONTRACTOR, PRIOR TO SUBMITTING BID SHALL VISIT THE PROJECT SITE TO BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND TO INSPECT THAT ALL PROVISIONS HAVE BEEN MADE FOR ALL ASPECTS OF THIS PROJECT. IF DISCREPANCIES EXIST BETWEEN DRAWING AND/OR SITE CONDITIONS, THE HVAC CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE OWNER PRIOR TO SIGNING OF CONTRACT. REQUESTS FOR COMPENSATION FOR EXTRA WORK, WHICH WOULD HAVE BEEN EVIDENT BY COMPLIANCE WITH THE PREVIOUS STATEMENT, WILL NOT BE CONSIDERED. THE CONTRACTOR SHALL CONDUCT A THOROUGH FIELD INVESTIGATION TO VERIFY WORK SHOWN ON THE DRAWINGS. THE DRAWINGS REFLECT THE BEST AVAILABLE INFORMATION FROM EXISTING PLANS AND SITE INVESTIGATIONS.

1.02 GUARANTEE:

A. ALL WORK, MATERIALS AND EQUIPMENT SHALL BE GUARANTEED AGAINST DEFECTS RESULTING FROM THE USE OF INFERIOR MATERIALS, EQUIPMENT, OR WORKMANSHIP FOR ONE YEAR FROM THE DATE OF FINAL COMPLETION OF THE CONTRACT, OR FROM FULL ACCEPTANCE BY THE OWNER, WHICHEVER IS EARLIER. ALL DEFECTIVE MATERIAL OR WORKMANSHIP AS WELL AS DAMAGES TO THE WORK OF ALL TRADES RESULTING FROM SAME SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

B. THE GUARANTEE PERIOD SHALL BE FOR ONE (1) YEAR FROM THE DATE OF ACCEPTANCE, WHICH SHALL BE THE DATE OF FINAL PAYMENT OR THE DATE OF FORMAL NOTICE OF ACCEPTANCE, WHICHEVER IS EARLIER.

C. CERTIFICATION SHALL BE SUBMITTED BY THE CONTRACTOR ATTESTING TO THE FACT THAT SPECIFIED PERFORMANCE CRITERIA ARE MET BY ALL EQUIPMENT.

D. IF, WITHIN ANY GUARANTEE PERIOD, REPAIRS OR CHANGES TO GUARANTEED WORK ARE REQUIRED AS A RESULT OF THE USE OF DEFECTIVE MATERIALS OR EQUIPMENT, INFERIOR WORKMANSHIP OR WORK THAT IS NOT IN ACCORDANCE WITH THE TERMS OF THE CONTRACT, AND UPON RECEIPT OF NOTICE FROM THE OWNER, THE FOLLOWING SHALL BE DONE WITHOUT EXPENSE TO THE OWNER:

1. REPAIR ALL DAMAGE TO THE BUILDING OR SITE/EQUIPMENT OR CONTENTS THEREOF WHICH IS THE RESULT OF THE USE OF DEFECTIVE MATERIALS OR EQUIPMENT OR INFERIOR WORKMANSHIP, OR OF WORK NOT IN ACCORDANCE WITH THE TERMS OF THE CONTRACT.
2. MAKE GOOD ANY WORK OR MATERIALS, OR THE EQUIPMENT AND CONTENTS OF SAID BUILDING OR SITE DISTURBED IN FULFILLING ANY SUCH GUARANTEE.
3. IN FULFILLING THE REQUIREMENTS OF THE CONTRACT OR OF ANY GUARANTEE EMBRACED IN OR REQUIRED THEREBY, ANY WORK GUARANTEED UNDER ANOTHER CONTRACT IS DISTURBED, RESTORE SUCH DISTURBED WORK TO ORIGINAL CONDITION AND GUARANTEE SUCH RESTORED WORK TO THE SAME EXTENT AS IT WAS GUARANTEED UNDER SUCH OTHER CONTRACT.
4. IF UPON FAILURE TO PROCEED PROMPTLY AFTER NOTICE TO COMPLY WITH THE TERMS OF THE GUARANTEE, THE OWNER MAY HAVE THE DEFECTS CORRECTED AND CONTRACTOR AND HIS SURETY SHALL BE LIABLE FOR ALL EXPENSES INCURRED.

1.03 CONTRACTORS RESPONSIBILITIES:

A. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY INJURIES TO PEOPLE, EMPLOYEES OR DAMAGE DONE TO BUILDING PREMISES OR ADJOINING AREAS OR TO OTHER WORK RESULTING FROM EXECUTION ON HIS PART OF WORK, IN ANY MANNER WHATSOEVER.

B. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER PROTECTION OF HIS WORK, MATERIALS, PEOPLE OR EMPLOYEES FROM INJURY OR LOSS DONE BY OTHERS AND SHALL MAKE GOOD SUCH INJURY AT HIS OWN EXPENSE.

C. DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.

D. ENGINEER SHALL NOT BE RESPONSIBLE FOR THE SAFETY OF CONTRACTOR' EMPLOYEES, MATERIALS OR EQUIPMENT.

1.04 COORDINATION AND INTERPRETATION OF DRAWINGS:

A. THIS CONTRACTOR, PRIOR TO SUBMITTING BID SHALL VISIT THE PROJECT SITE TO BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND TO INSPECT THAT ALL PROVISIONS HAVE BEEN MADE FOR ALL ASPECTS OF THIS PROJECT.

B. IF DISCREPANCIES EXIST BETWEEN DRAWINGS AND/OR SITE CONDITIONS, THE HVAC CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE OWNER PRIOR TO SIGNING OF CONTRACT. REQUESTS FOR COMPENSATION FOR EXTRA WORK, WHICH WOULD HAVE BEEN EVIDENT BY COMPLIANCE WITH THE PREVIOUS STATEMENT, WILL NOT BE CONSIDERED.

C. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO STUDY ALL DRAWINGS AND DETAILS SO THAT THE INSTALLATION OF ALL NEW WORK CAN BE FULLY COORDINATED. COORDINATE WITH ALL TRADES TO AVOID INTERFERENCE OF EQUIPMENT.

D. HVAC WORK IS INDICATED DIAGRAMMATICALLY. EXACT LOCATION OF ALL COMPONENTS ARE TO BE DETERMINED IN THE FIELD AND BY THE ACTUAL BUILDING CONDITIONS. EQUIPMENT, DUCTS OR PIPES INTERFERING WITH OTHER INSTALLATIONS SHALL BE RELOCATED AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.

E. HVAC CONTRACTOR SHALL COORDINATE ALL WALL, CEILING, FLOOR, ROOF AND BEAM PENETRATIONS WITH ARCHITECT, STRUCTURAL ENGINEER, OWNER, AND EXISTING CONDITIONS.

1.05 DEMOLITION:

A. CONTRACTOR SHALL VISIT SITE AND IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK OF THIS SECTION. DEMOLITION WORK WILL REQUIRE CAREFUL SITE EXAMINATION PRIOR TO BIDDING.

B. PRIOR TO COMMENCING DEMOLITION, CONTRACTOR SHALL IDENTIFY WITH OWNER ANY EQUIPMENT TO BE RETURNED TO THE OWNER AFTER DEMOLITION. ALL OTHER DEBRIS SHALL BE DISPOSED OF BY THIS CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.

C. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE DISCONNECTION/REMOVAL AND REINSTALLATION OF ALL EXISTING CEILINGS, WALLS, PLUMBING PIPING, ELECTRICAL, TEL/DATA, AND FIRE ALARM WORK, AND MECHANICAL EQUIPMENT, DUCTWORK, PIPING, VALVES, ETC., IN DESIGNATED AREAS AND AS REQUIRED TO COMPLETE THE NECESSARY WORK.

D. THIS CONTRACTOR SHALL PROTECT WORK AGAINST INJURY OR DAMAGE; AND CAREFULLY STORE MATERIAL AND EQUIPMENT TO BE RELOCATED. OPEN ENDS OF WORK SHALL BE CLOSED WITH TEMPORARY COVERS OR PLUGS DURING STORAGE AND CONSTRUCTION TO PREVENT ENTRY OF OBSTRUCTING MATERIAL.

1.06 EXECUTION:

A. ALL ROUGH CUTTING, CORE DRILLING AND FINISH PATCHING REQUIRED TO ACCOMPLISH THE SCOPE OF WORK SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR. COORDINATE ALL WORK FOR A COMPLETE AND FINISHED INSTALLATION.

B. INSTALL ALL MATERIALS, ACCESSORIES AND EQUIPMENT ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR A COMPLETE AND OPERABLE SYSTEMS AS INDICATED ON THE DRAWINGS AND MANUFACTURER'S INSTRUCTIONS.

C. INSTALLATION OF ALL SYSTEMS SHALL PERMIT ACCESSIBILITY FOR SERVICE AND/OR REPLACEMENT OF NEW AND EXISTING EQUIPMENT.

D. ALL MISCELLANEOUS STRUCTURAL SUPPORTS REQUIRED FOR DUCTWORK, PIPING, LIGHTING, CONDUIT AND EQUIPMENT INSTALLATION SHALL BE PROVIDED BY EACH TRADE'S CONTRACTOR.

E. WHERE DUCTWORK PENETRATES ANY SMOKE AND/OR FIRE RATED PARTITIONS PROVIDE UL LISTED DYNAMIC FIRE AND/OR SMOKE DAMPERS PER NFPA GUIDELINES. INSTALL PER MANUFACTURER'S INSTRUCTIONS INCLUDING AN APPROVED ACCESS PANEL.

F. ALL CEILING MOUNTED EQUIPMENT SHALL BE INSTALLED IN SUCH A WAY THAT LIGHTS, PIPING, AND DUCTWORK DO NOT BLOCK ACCESS TO UNITS AND RELATED ACCESSORIES.

G. EXACT LOCATION OF LIGHTS, CEILING DIFFUSERS, GRILLES AND REGISTERS TO BE DETERMINED BY THE EXISTING REFLECTED CEILING PLAN. ENGINEER'S SHALL APPROVE FINAL LOCATION IF LOCATION OF CEILING DIFFUSERS SHOWN ON THE MECHANICAL PLANS ARE DIFFRENT THEN THE EXISTING BY MORE THEN ONE CEILING TILE.

1.07 EQUIPMENT:

A. PRODUCTS REQUIRED BY CONSTRUCTION BUT NOT SPECIFICALLY DESCRIBED HEREIN SHALL BE AS SELECTED BY THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE A/E.

B. PROVIDE ALL MATERIALS, LABOR, AND ACCESSORIES FOR A COMPLETE AND OPERABLE SYSTEMS AND AS REQUIRED BY THE EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS.

C. PROVIDE VOLUME DAMPERS OR ACCEPTABLE AIR BALANCING DEVICES AT EACH BRANCH FROM MAIN DUCT RUN OUT RESPECTIVE OF WHETHER DAMPER IS INDICATED ON PLANS.

D. PROVIDE ALL HANGERS AND SUPPORTS AS REQUIRED TO SUPPORT ALL NEW AND EXISTING RE-INSTALLED PIPING, DUCTWORK, CONDUIT AND EQUIPMENT.

1.08 SMOKE AND FIRESTOPPING:

A. FIRESTOP ALL PENETRATIONS BETWEEN FLOORS & FIRE RATED WALLS WITH APPROVED FIRE STOPPING ASSEMBLIES AS MANUFACTURED BY 3M INDUSTRY, DOW CORNING, OR HILTI. THE ASSEMBLIES SHALL COMPLY WITH THE LATEST APPLICABLE REQUIREMENTS OF THE: BUILDING CODE, NFPA STANDARDS AND OWNERS INSURANCE COMPANY. PROVIDE UL LISTED DETAIL FOR EACH TYPE OF PROPOSED APPLICABLE ASSEMBLIES WITH OF THE MECHANICAL EQUIPMENT SUBMITTAL.

B. ALL PIPING PASSING THROUGH FIRE-RATED WALLS, SLABS, FLOORS, ETC. SHALL HAVE STEEL SLEEVES EXTENDING 2" BEYOND SURROUNDING SURFACE. THE SPACE BETWEEN THE PIPES AND THE SLEEVES SHALL BE COMPLETELY PACKED WITH AN APPROVED FIRESTOPPING MATERIAL. AFTER FIRESTOPPING MATERIAL HAS BEEN INSTALLED AROUND PIPES, A 26" GAUGE SHEET METAL COLLAR SHALL BE SECURED AROUND THE PIPE TO INSURE TIGHTNESS.

1.09 EQUIPMENT, VALVE, AND PIPE IDENTIFICATION:

A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PRODUCTS ARE LIMITED TO SETON, BRADY OR BRIMAR WHOM HAVE A MINIMUM OF 5 YEARS EXPERIENCE IN THE MANUFACTURING OF MECHANICAL IDENTIFICATION PRODUCTS.

B. PLASTIC PIPE MARKERS

1. SNAP-ON TYPE: PROVIDE MANUFACTURER'S STANDARD PRE-PRINTED, SEMI-RIGID SNAP-ON, COLOR-CODED PIPE MARKERS, COMPLYING WITH ANSI A13.1.
2. FOR EXTERNAL DIAMETERS LESS THAN 6" (INCLUDING INSULATION IF ANY), PROVIDE FULL-BAND PIPE MARKERS, EXTENDING 360 DEGREES AROUND PIPE AT EACH LOCATION, FASTENED BY SNAP-ON APPLICATION OF PRE-TENSIONED SEMI-RIGID PLASTIC PIPE MARKER.
3. THE FOLLOWING DESCRIPTION AND COLORS SHALL BE USED FOR PIPING IDENTIFICATION WITH FLOW ARROWS UNLESS NOTED OTHERWISE:

LEGEND	SERVICE	COLOR
HWS	HEATING HOT WATER SUPPLY	YELLOW
HWR	HEATING HOT WATER RETURN	YELLOW
DCW	DOMESTIC COLD WATER	GREEN
DHW	DOMESTIC HOT WATER	GREEN
DHWR	DOMESTIC HOT WATER RETURN	GREEN
SANITARY	SANITARY SEWER	GREEN
VENT	VENT	GREEN
GAS	FUEL GAS	YELLOW

COLOR BANDING SHALL MEET LATEST EDITION OF NSI AND OSHA REQUIREMENTS.

C. WHERE AIR OR HYDRONIC SYSTEMS HAVE BEEN BALANCED, THE CONTRACTOR SHALL PERMANENTLY MARK, ON THE DEVICE, THE CORRECT BALANCING SETTLING OF EACH VALVE, DAMPER, OR SIMILAR DEVICE.

PART 2 - PRODUCTS

2.01 DUCTWORK:

A. ALL NEW DUCTWORK SHALL BE OF TOP GRADE GALVANIZED STEEL, CONSTRUCTED FROM **16 GAUGE** STEEL, CONSTRUCTED AND SUPPORTED AS PER S.M.A.C.N.A. STANDARDS, SQUARE THROAT, ROUND HEEL ELBOWS ARE NOT ACCEPTABLE. ALL ELBOWS SHALL BE SQUARE WITH ACOUSTICAL TURNING VANES OR LONG RADIUS TYPE. ALL JOINTS, SEAMS, AND FITTINGS SHALL BE AIR AND WATER TIGHT AND SHALL BE FORMED TO PROVIDE A MINIMUM RESISTANCE TO THE AIR FLOW.

B. DISSIMILAR METAL JOINTS SHALL BE INSULATED WITH FIBER GASKETS AND BOLTS WITH FERRULES AND WASHERS SO THERE WILL BE NO CONTACT BETWEEN METALS.

C. ALL RECTANGULAR DUCTS TO BE INSULATED SHALL BE PANELED FOR STIFFENING. ALL OTHER DUCTWORK SHALL BE CROSS BROKEN TO PREVENT VIBRATION.

D. DUCT SUPPORTS SHALL BE SPACED NOT MORE THAN 8'-0" O.C. AND SHALL BE STEEL STRAP HANGERS, (PERFORATED STRAP NOT PERMITTED) FOR DUCTS UP TO 30" WIDE; ANGLE HANGERS FOR OVER 20" WIDE. STRAP HANGERS SHALL BE 1" X 16" GAUGE MINIMUM EXTENDING ON BOTH SIDES OF DUCT AND TURNING UNDER 2", FASTENED TO SIDES AND BOTTOM WITH SHEET METAL SCREWS.

E. DUCTWORK DIMENSIONS INDICATED ON DRAWINGS ARE OVERALL OUTSIDE DIMENSIONS. SIZING HAS BEEN INCREASED TO ALLOW FOR THE LINING THICKNESS OF 2".

F. PROVIDE 6" HEAVY-DUTY NEOPRENE FLEXIBLE CONNECTORS AT ALL DUCTWORK CONNECTIONS TO MOTORIZED EQUIPMENT. EXTERNALLY INSULATE AROUND FLEX CONNECTOR WITH 2" RIGID BOARD INSULATION. (REFER TO DETAILS & SPECIFICATIONS FOR ADDITIONAL INFORMATION)

F. ALL DUCTWORK SEAMS AND JOINTS SHALL BE SEALED WITH MASTIC BEFORE INSULATION IS INSTALLED. INSPECTION OF THIS SHALL BE COMPLETED BY OWNER BEFORE INSULATION IS INSTALLED.

G. NO FLEXIBLE DUCT WILL BE ACCEPTABLE.

2.02 ACOUSTICAL DUCT LINER

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: JOHNS MANVILLE OR ENGINEER APPROVED EQUAL

B. ALL NEW SUPPLY & RETURN DUCTWORK SHALL BE LINED INTERNALLY SOUND LINED WITH 2" ACOUSTICAL DUCT LINER BY JOHNS MANVILLE MODEL R-300. 2" LINER SHALL HAVE AN INSTALLED R-VALUE OF 8.7 AND BE SUITABLE FOR VELOCITIES UP TO 6000 FPM. INSTALL IN STRICT ACCORDANCE WITH THE MANUFACTURES WRITTEN INSTALLATION INSTRUCTIONS AND DETAILS INDICATED ON THE CONTRACT DOCUMENTS.

2.03 ACOUSTICAL DUCT BOARD

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: JOHNS MANVILLE OR ENGINEER APPROVED EQUAL

B. ALL SUPPLY & RETURN FLEX CONNECTORS SHALL BE EXTERNALLY INSULATED WITH 2" SUPERDUCT RC ACOUSTICAL DUCTBOARD AS MANUFACTURED BY JOHNS MANVILLE. INSTALL IN STRICT ACCORDANCE WITH THE MANUFACTURES WRITTEN INSTALLATION INSTRUCTIONS AND DETAILS INDICATED ON THE CONTRACT DOCUMENTS.

2.04 EXTERNAL DUCTWORK INSULATION

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: JOHNS MANVILLE OR ENGINEER APPROVED EQUAL

B. ALL INSULATION SHALL CONFORM WITH ALL FIRE HAZARD RATINGS AS DETERMINED BY NFPA 255, "METHOD OF TEST OF SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS", ASTM E84 OR UL 723. IN GENERAL, THE FIRE HAZARD RATING SHALL NOT EXCEED A FLAME SPREAD RATING OF 25 OR SMOKE DEVELOPED RATING OF 50.

C. NEW/EXISTING (WHERE INSULATION WAS REMOVED) UNLINED SUPPLY & RETURN DUCTWORK SHALL BE INSULATED WITH 1-1/2" THICK, 3/4# DENSITY FIBERGLASS. INSULATION SHALL HAVE A FOIL-FACED VAPOR BARRIER.

D. EXTERIOR OF DUCT IN CONCEALED SPACES: WRAP TIGHTLY, BUTT CIRCUMFERENTIAL JOINTS AND OVERLAP LONGITUDINAL JOINTS A MINIMUM OF TWO INCHES. ADHERE TO DUCT WITH FOUR-INCH STRIPS OF INSULATION BONDING ADHESIVE 8" OC. DUCTWORK OVER 24" WIDE: SECURE WITH MECHANICAL FASTENERS NOT MORE THAN 18" OC. CIRCUMFERENTIAL JOINTS: SECURE THE TWO-INCH FLANGE OF THE FACING WITH 9/16" FLARE DOOR STAPLES 6" OC AND TAPE WITH MINIMUM OF THREE-INCH-WIDE, FOIL REINFORCED KRAFT TAPE. TAPE PIN PENETRATIONS AND PUNCTURES. IN EXPOSED APPLICATIONS, COVER JOINTS WITH THREE-INCH-WIDE, FOIL REINFORCED KRAFT TAPE.

E. AT DAMPER AND DUCT ACCESS DOOR LOCATIONS, CUT INSULATION BACK TO EXPOSE DAMPER ADJUSTER AND ACCESS DOOR. TAPE SEAL INSULATION TO DUCT. PROVIDE AN INSULATION "DOOR" TO COVER THE ACCESS POINT AND MARK THE "DOOR" WITH HIGHLY VISIBLE MARKER OR TAPE.

2.05 VOLUME DAMPERS

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: RUSKIN OR ENGINEER APPROVED EQUAL

B. FURNISH AND INSTALL, AT LOCATIONS SHOWN ON PLANS OR IN ACCORDANCE WITH SCHEDULES, OPPOSE MULTI-BLADE MANUAL BALANCING DAMPERS THAT MEET OR EXCEED THE FOLLOWING MINIMUM CONSTRUCTION STANDARDS: FRAME SHALL BE 16 GAGE (1.6) GALVANIZED STEEL FORMED INTO STRUCTURAL HAT CHANNEL SHAPE WITH TABBED CORNERS FOR REINFORCEMENT. THE BLADES SHALL BE SINGLE SKIN, 16 GAGE (1.6) GALVANIZED STEEL WITH THREE LONGITUDINAL GROOVES FOR REINFORCEMENT. BEARINGS SHALL BE CORROSION RESISTANT, MOLDED SYNTHETIC SLEEVE TYPE TURNING IN AN EXTRUDED HOLE IN THE DAMPER FRAME. AXLES SHALL BE HEXAGONAL POSITIVELY LOCKED INTO THE DAMPER BLADE.

C. BRACKETS SHALL BE GALVANIZED METAL, SECURED TO DUCTWORK WITH SHEET METAL SCREW WITH LOCKING QUADRANT ARMS. PROVIDE 2" HANDLE EXTENSION FOR ALL DAMPERS ON EXTERNALLY INSULATED DUCTWORK.

D. DAMPERS 12" AND LARGER IN HEIGHT SHALL BE EQUIVALENT TO RUSKIN MODEL MD35.

2.06 TURNING VANES

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: DUCTMATE INDUSTRIES INC. OR ENGINEER APPROVED EQUAL

B. PROVIDE 4" DOUBLE WALL ACOUSTICAL TURNING VANES MODEL 4AVGA24 AS MANUFACTURED BY DUCTMATE INDUSTRIES INC. VANE SHALL BE CONSTRUCTED FROM 24 GAUGE G-60 GALVANIZED STEEL & INSULATED WITH 1.3 LB INSULATION FOR SOUND ABSORPTION. VANES SHALL BE INSTALLED WITH THE PRO-RAIL SYSTEM MANUFACTURED BY DUCTMATE INDUSTRIES INC. INSTALL IN STRICT ACCORDANCE WITH THE MANUFACTURES WRITTEN INSTALLATION INSTRUCTIONS AND DETAILS INDICATED ON THE CONTRACT DOCUMENTS.

2.07 FLEXIBLE CONNECTOR

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: DUCTMATE INDUSTRIES, INC OR ENGINEER APPROVED EQUAL.

B. MATERIALS: FLAME-RETARDANT OR NONCOMBUSTIBLE FABRICS.

C. COATINGS AND ADHESIVES: COMPLY WITH UL 181, CLASS 1.

D. METAL-EDGED CONNECTORS: FACTORY FABRICATED WITH A FABRIC STRIP 3-1/2 INCHES WIDE ATTACHED TO 2 STRIPS OF 2-3/4-INCH- WIDE, 0.028-INCH- THICK, GALVANIZED SHEET STEEL OR 0.032-INCH-THICK ALUMINUM SHEETS. PROVIDE METAL COMPATIBLE WITH CONNECTED DUCTS.

E. INDOOR SYSTEM, FLEXIBLE CONNECTOR FABRIC: GLASS FABRIC DOUBLE COATED WITH NEOPRENE. MINIMUM WEIGHT: 26 OZ./SQ. YD, TENSILE STRENGTH: 480 LBF/INCH IN THE WARP AND 360 LBF/INCH IN THE FILLING, SERVICE TEMPERATURE: MINUS 40 TO PLUS 200 DEG F.

2.08 PIPING INSULATION:

A. FIBERGLASS PIPE INSULATION SHALL BE BY OWENS CORNING TYPE SSL-II OR APPROVED EQUAL BY JOHNS MANVILLE OR CERTAINTEED. INSULATION SHALL HAVE FACTORY APPLIED ALL-SERVICE JACKET (ASJ) AND TWO-COMPONENT ADHESIVE CLOSURE SYSTEM, RATED FOR A MAXIMUM SERVICE TEMPERATURE OF 850'F. FOR LARGE PIPE SIZES WHERE SSL-II IS NOT AVAILABLE, THE SINGLE ADHESIVE SSL CLOSURE MAY BE SUBSTITUTED. CIRCUMFERENTIAL JOINTS SHALL BE SEALED BY BUTT STRIPS HAVING A TWO-COMPONENT SEALING SYSTEM.

1. PIPING 1-1/2" AND SMALLER SHALL HAVE A MINIMUM INSULATION THICKNESS OF 1".
2. PIPING LARGER THAN 1-1/2" SHALL HAVE A MINIMUM INSULATION THICKNESS OF 2".
3. INSULATION THICKNESS IS BASED ON A "K" VALUE NOT EXCEEDING 0.27 BTU PER INCH/H*SQ.FT.*F.

B. FITTINGS AND VALVES SHALL BE INSULATED WITH PRE-FORMED FIBERGLASS FITTINGS. THICKNESS SHALL BE EQUAL TO ADJACENT PIPE INSULATION. FINISH SHALL BE WITH PRE-FORMED PVC FITTING COVERS.

C. FLANGES, COUPLINGS AND VALVE BONNETS SHALL BE COVERED WITH AN OVERSIZED PIPE INSULATION SECTION SIZED TO PROVIDE THE SAME INSULATION THICKNESS AS ON THE MAIN PIPE SECTION. AN OVERSIZED INSULATION SECTION SHALL BE USED TO FORM A COLLAR BETWEEN THE TWO INSULATION SECTIONS WITH LOW-DENSITY BLANKET INSULATION BEING USED TO FILL GAPS. JACKETING SHALL MATCH THAT USED ON STRAIGHT PIPE SECTIONS. WHERE FITTINGS ARE TO BE LEFT EXPOSED, INSULATION ENDS SHOULD BE BEVELED AWAY FROM BOLTS FOR EASY ACCESS.

2.09 PIPE HANGERS AND SUPPORTS:

A. COPPER TUBING SHALL BE SUPPORTED WITH SPLIT RING HANGERS, COPPERIZED WITH SUPPORTING ROD.

B. CAST IRON SOIL PIPE SHALL BE HUNG ONE HANGER FOR EACH PIPE LENGTH, CLOSE TO HUB.

C. PVC PIPE SHALL BE SUPPORTED NO MORE THAN 4'-0" ON CENTER.

D. USE INSULATION PROTECTION SADDLES OR SHIELDS FOR ALL INSULATED COLD PIPING AND WHERE HANGER IS OUTSIDE THE INSULATION. SECURE ALL SADDLES AND SHIELDS TO THE INSULATION TO PREVENT SLIPPAGE OR SHIFTING THAT MAY CAUSE THE SHIELD TO FALL TO THE GROUND. SADDLES SHALL BE SPOT WELDED TO HANGERS.

E. PIPE HANGERS AND SUPPORTS

F. CLEVIS TYPE HANGERS, GRINNELL, FIG. 260, SHALL BE USED EXCEPT AS OTHERWISE NOTED IN SECTION 15050 - VIBRATION ISOLATION AND SEISMIC RESTRAINT. SUPPORT PIPES FOUR INCHES AND OVER WITH GRINNELL, FIGURE 181 OR 171 ADJ., PIPE ROLL WITH PIPE COVERING PROTECTION SADDLE.

G. PERFORATED BAND IRON, WIRE, CHAIN OR OTHER PIPING SHALL NOT BE USED AS SUPPORTS NOR SHALL HANGER RODS PIERCE DUCTWORK.

H. VERTICAL PIPING SUPPORTS SHALL BE PROVIDED WHERE REQUIRED, EQUAL TO GRINNELL STEEL EXTENSION PIPE CLAMPS, FIGURE 261, OR SOMERVILLE MANUFACTURE.

I. USE COPPERIZED EQUIPMENT ON COPPER PIPE AND PVC COATED FOR PVC PIPE.

J. ON PIPING CONVEYING FLUID OR GASSES AT TEMPERATURES BELOW 60?. F, SUPPORT SHALL BE OUTSIDE THE PIPE INSULATION. USE INSULATION PROTECTION SADDLES FOR EACH SUPPORT; SIZE SHALL BE AS PER MANUFACTURER'S RECOMMENDATION FOR EACH SIZE AND SERVICE OF PIPE.

K. WHERE SUBJECTED TO CORROSIVE ATMOSPHERES USE STAINLESS STEEL PRODUCTS.

PART 3 - EXECUTION

3.01 BALANCING, ADJUSTING, TESTING, & CLEANING:

A. ALL HVAC SYSTEMS SHALL BE BALANCED BY AN INDEPENDENT TESTING AND BALANCING AGENCY CERTIFIED BY AABC. ALL TESTING SHALL BE IN ACCORDANCE WITH AABC & NATIONAL STANDARDS FOR FIELD MEASUREMENT AND INSTRUMENTATION, FORM #81266. SYSTEMS SHALL BE ADJUSTED TO FLOW AND AIR QUANTITIES DESIGNED. A WRITTEN REPORT SHALL BE SUBMITTED FOR REVIEW.

B. PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS AND SERVICES FOR BALANCING OF THE MAU-2 FOR QUANTITIES INDICATED ON THE ORIGINAL INSTALLATION PROJECT DRAWINGS (AVAILABLE FROM THE UNIVERSITY'S OFFICE OF CAPITAL PROJECTS) UPON COMPLETION OF INSTALLATION. BALANCE SYSTEMS IN ACCORDANCE WITH CODES, STANDARDS, REGULATIONS AND AUTHORITIES HAVING JURISDICTION. CONTRACTOR SHALL USE RECENTLY CALIBRATED EQUIPMENT COMPATIBLE WITH INSTALLED EQUIPMENT AND SUBMIT BALANCING REPORT TO THE ENGINEER.

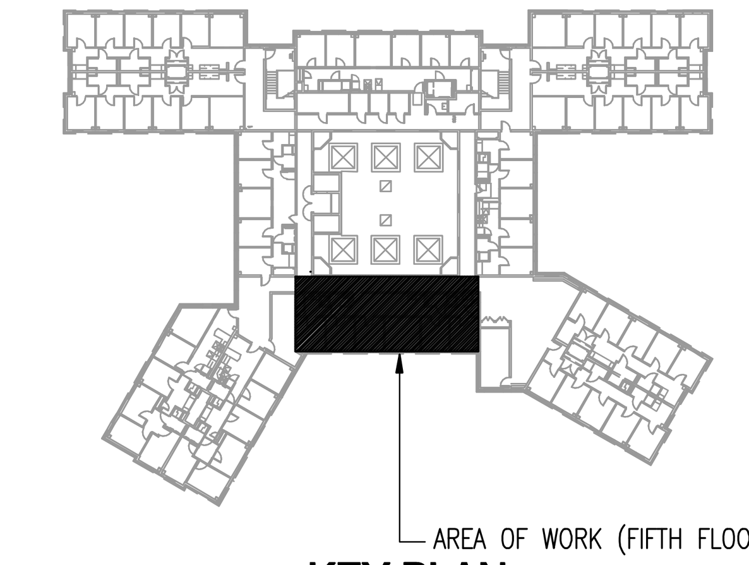
C. AIR BALANCING: PROVIDE COMPLETE BALANCING AND ADJUSTING OF ALL AFFECTED AIR SYSTEMS INCLUDING SETTING THE FLOW THROUGH ALL DIFFUSERS, VOLUME DAMPERS AND GRILLES. RECORD ALL FAN MOTOR CURRENTS AND NAMEPLATE DATA. TEST AND ADJUST FLOW AT EACH DIFFUSER AND VOLUME DAMPER. LIST DESIGN AND MEASURED FLOWS AND TEMPERATURES.

D. HYDRONIC BALANCING: BALANCE SYSTEM TO GPM FLOWS INDICATED. TAG EACH BALANCING DEVICE WITH GPM OF FINAL BALANCE AND POSITION OF BALANCE POINT.

E. ALL HVAC SYSTEMS SHALL BE TESTED AND FOUND TIGHT. ANY LEAKS DEVELOPED SHALL BE CORRECTED PRIOR TO OWNER'S ACCEPTANCE OF THE NEW SYSTEMS.

3.02 PROJECT CLOSE-OUT:

A. RESTORE EXISTING FACILITIES USED DURING CONSTRUCTION TO ORIGINAL CONDITION. CLEAN PORTIONS OF THE SITE AFFECTED BY WORK OF THIS CONTRACT. REMOVE WASTE AND SURPLUS MATERIALS FROM THE SITE.



KEY PLAN

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Status: ISSUED FOR CONSTRUCTION

No.	Revision/Issue	Date

Sheet Title: MECHANICAL DETAILS & SPECIFICATIONS

Project No: 201190/201273
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Scale: AS NOTED
Date: 2/21/2013

Drawing No: M-3.0

Sheet 3 of 3