

RESIDENTIAL UNIT

HEATING AND COOLING LOAD CALCULATIONS

HEATING AND COOLING LOADS HAVE BEEN CALCULATED UTILIZING THE "CARRIER" HOURLY ANALYSIS PROGRAM (VERSION 5.10) BASED ON ASHRAE PROCEDURES WHICH IS EQUIVALENT TO ACCA MANUAL J.

HEATING AND COOLING EQUIPMENT HAS BEEN SIZED IN ACCORDANCE WITH ACCA MANUAL S.

UNIT NO. OR ZONE	CALCULATED LOADS		CAPACITY PROVIDED	
	HEATING MBTUH	SENSIBLE COOLING (MBTUH)	HEATING MBTUH	SENSIBLE COOLING (MBTUH)
MAIN RESIDENCE	65.64	152.95	+177.16	175.76
GARDEN HOUSE	8.11	16.24	+16.9	17.89

* SMALLEST CAPACITY AVAILABLE WITHIN EQUIPMENT OPTIONS.

MECHANICAL NOTES

- FURNISH ALL LABOR, MATERIALS, TOOLS EQUIPMENT, FEES, PERMITS, CERTIFICATE OF INSPECTION, ETC., NECESSARY OR REASONABLE, REQUIRED FOR THE COMPLETE INSTALLATION OF ALL AIR CONDITIONING WORK. THE WORK SHALL BE IN STRICT ACCORDANCE WITH ASHRAE GUIDE, AND ALL LOCAL AND STATE CODES, ORDINANCES AND REGULATIONS.
- DUCTS SHALL BE FABRICATED OF PRIME GALVANIZED LOCK FORMING QUALITY STEEL SHEETS, OR A GAUGE IN ACCORDANCE WITH THE FOLLOWING TABLE:
 - DUCTS WITH LONGEST SIDE NOT MORE THAN 12" IN WIDTH.....26 GA
 - DUCTS WITH LONGEST SIDE 13" TO 30" IN WIDTH.....24 GA
 - DUCTS WITH LONGEST SIDE 31" TO 40" IN WIDTH.....22 GA
 - DUCTS WITH LONGEST SIDE OVER 40".....20 GA
- PROVIDE RADIUS ELBOWS, TURNING VANES, AND SPLITTER DAMPERS IN BRANCHES AND EXTRACTORS WHERE APPLICABLE.
- DUCT SIZES SHOWN ARE "CLEAR INSIDE" DIMENSIONS.
- ALL DUCTWORK TO BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH "ASHRAE GUIDE AND SMACNA OR IMC STANDARDS". SEAL ALL DUCTWORK, LONGITUDINAL AND LATITUDINAL JOINTS WITH DP-1010 SEALANT (PER IECC).
- EXACT PLACEMENT OF CEILING DIFFUSERS AND WALL REGISTERS TO BE COORDINATED WITH ARCHITECTURAL.
- CONTRACTOR TO VERIFY LOCATION OF ALL AIR EQUIPMENT SO THAT NO INTERFERENCE ARE ENCOUNTERED WITH OTHER EQUIPMENT OR WITH STRUCTURAL ELEMENTS.
- MECHANICAL CONTRACTOR TO VERIFY THAT ALL DUCTWORK WILL FIT WHERE INDICATED WITHOUT INTERFERENCE.
- CONTRACTOR AND ARCHITECT TO VERIFY T-STAT LOCATIONS.
- MECHANICAL CONTRACTOR SHALL INSULATE ALL NEW SUPPLY AND RETURN AIR DUCTWORK LOCATED WITHIN AN ATTIC SPACE WITH MIN. R-6 INSULATION, ALL NEW SUPPLY AIR DUCTWORK LOCATED WITHIN A PLENUM SPACE WITH MIN. R-6 INSULATION AND/OR ANY DUCTWORK EXPOSED TO THE EXTERIOR WITH MIN. R-8 INSULATION (PER IECC). INSULATION NOT REQUIRED FOR SUPPLY/RETURN AIR DUCTWORK LOCATED WITHIN A PLENUM SPACE WHERE THE ENVELOPE INSULATION IS MIN. R-8 OR ANY EXHAUST DUCT.
- HVAC CONTRACTOR SHALL REPLACE ALL FILTERS UPON COMPLETION OF CONSTRUCTION. THIS INCLUDES FILTERS AT ALL NEW UNITS AND FILTERS AT ALL EXISTING UNITS AFFECTED BY CONSTRUCTION.

SPLIT SYSTEM HEAT PUMP SCHEDULE

MARK	MANUF./ MODEL #		INDOOR UNIT					OUTDOOR UNIT		SEER2	HSPF2	CYCLE	HEATING/COOLING CAPACITIES						UNIT WEIGHT LBS		REMARKS
	INDOOR	OUTDOOR	TOTAL CFM	OA CFM	ESP IWG	HP	VOLT/Ø	MCA/MOCP	VOLT/Ø				ENT DB	AIR WB	AMBIENT DB	WB	TOTAL BTUH	SENS.	INDOOR	OUTDOOR	
5	CARRIER FJ4DNXB30L00	CARRIER 25SCA524A003	800	-	0.5	1/2	208/1	14.5/25	208/1	15.2	7.8	COOL	80	67	100	65	23.37	17.89	148	159	①②③
1-4	CARRIER FJ4DNXD60L00	CARRIER 25SCA560A003	2000	-	0.5	3/4	208/1	33.2/50	208/1	14.3	7.5	HEAT	70	-	31	-	16.9	-	-	-	①②③
												COOL	80	67	100	65	56.21	43.94	210	260	①②③
												HEAT	70	-	31	-	44.29	-	-	-	①②③

- PROVIDE MEDIA FILTER CABINET WITH MERV 10 CARTRIDGE STYLE FILTER.
- PROVIDE 7 DAY PROGRAMMABLE SMART THERMOSTAT WITH REMOTE SENSOR CAPABILITY. COORDINATE EXACT MAKE/MODEL WITH OWNER. COORDINATE EXACT LOCATION OF T-STATS AND REMOTE SENSORS WITH OWNER PRIOR TO FINAL ROUGH-IN.
- SECONDARY CONDENSATE DRAIN LINE WITH AUTOMATIC FLOAT SWITCH TO SHUT A/C UNIT OFF.

GRILLE, REGISTER & DIFFUSER SCHEDULE

MARK	MANUF./ MODEL #	DESCRIPTION	FRAME	STYLE	FINISH	MATERIAL	DAMPER	MAX. NC	REMARKS
LD-1	TITUS FLOWBAR	HIGH THROW LINEAR SUPPLY	BY ARCH.	LINEAR	BY ARCH	ALUM.	OBD	25	①②③
SR-1	TITUS 300RL	DOUBLE DEFLECTION SUPPLY	BY ARCH.	LOUVER	BY ARCH	STEEL	OBD	25	
RG-1	TITUS 355RL	RETURN GRILLE	BY ARCH.	LOUVER	BY ARCH	STEEL	OBD	25	
CD-1	TITUS OMNI	CEILING SUPPLY DIFFUSER	BY ARCH.	PLAQUE	BY ARCH	STEEL	OBD	25	
-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	

- LENGTH AND SLOT WIDTH AS SHOWN ON DRAWINGS. COORDINATE BORDER TYPE WITH OWNER/ARCHITECT PRIOR TO PURCHASE.
- PROVIDE MANUFACTURES INSULATED SUPPLY AIR PLENUM. 24" DIFFUSER PLENUMS TO FIT BETWEEN 24"O.C. TRUSSES.
- PROVIDE FACE OPERATED INLET DAMPER ON ALL ENGINEERED PLENUMS.

MECHANICAL LEGEND

SINGLE	DOUBLE	ABBR.	DESCRIPTION
		RD	RECTANGULAR DUCT (NEW)
		TR	TRANSITION
		RD	ROUND DUCT (NEW) (OR OVAL) Ø RD OVAL
		RD	RECTANGULAR DUCT (EXISTING)
		RD	ROUND DUCT (EXISTING)
		45	45 DEG. TAP USE AT BRANCH DUCTS ONLY
		DS	DUCT SPLIT W/DAMPER USE AT ELBOWS AND TEES: PROPORTION DUCT AREAS BY CFMS
		CE	CURVED ELBOW-MIN. RADIUS R: 1.5 WIDTH
		40	40 DEG. ELBOW WITH SINGLE RADIUS TURNING VANES
		FD	FLEXIBLE DUCT CONNECTION
		VD	VOLUME DAMPER W/LOCKING QUADRANT
		SIF	SPIN-IN FLEX DUCT TAKE-OFF W/DAMPER
		SD	SPLITTER DAMPER WITH LOCKING QUADRANT
		SA	SUPPLY AIR
		EXH	EXHAUST AIR
		RA	RETURN AIR
		REL	RELIEF AIR
		OSA	OUTSIDE AIR
		NC	NEW CONNECTION TO EXISTING
		TA	TRANSFER AIR
		ER	EXHAUST REGISTER
		ED	EXHAUST DUCT
		AFF	ABOVE FINISHED FLOOR
		BFF	BELOW FINISHED FLOOR
		NTS	NOT TO SCALE
		EH	EXHAUST HOOD
		T	THERMOSTAT
		F/S	COMBINATION FIRE/SMOKE DAMPER
		SD	SMOKE DUCT DETECTOR
		FS	FIRE STAT SET AT 165°
		OAS	OUTSIDE AIR STAT
		S	SENSOR

2015 International Residential Code Compliance DUCTWORK SYSTEMS

- Duct installation shall comply with Sections M1601.4.1 through M1601.4.7 of the 2015 IRC and ACCA Manual D.
- Metal ducts shall be supported by 1/2-inch-wide (13 mm) 18-gauge metal straps or 12-gauge galvanized wire at intervals not exceeding 10 feet (3048 mm) or other approved means. Nonmetallic ducts shall be supported in accordance with the manufacturer's installation instructions.
- All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC Duct Construction Standards-Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards. All joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes.
- Vibration isolators installed between mechanical equipment and metal ducts shall be fabricated from approved materials and shall not exceed 10 inches (254 mm) in length.
- Factory-made air ducts or duct material shall be approved for the use intended, and shall be installed in accordance with the manufacturer's installation instructions. Each portion of a factory-made air duct system shall bear a listing and label indicating compliance with UL 181 and UL 181A or UL 181B.
- Metallic ducts shall be fabricated in accordance with SMACNA Duct Construction Standards Metal and Flexible.
- Outdoor air inlets shall be covered with screens having openings that are not less than 1/4 inch (6.4 mm) and not greater than 1/2 inch (12.7 mm).

DRYER EXHAUST

- The size and maximum length of the exhaust duct shall be determined by the dryer manufacturer's installation instructions. The code official shall be provided with a copy of the installation instructions for the make and model of dryer at the concealment inspection. In the absence of fitting length calculations from the clothes manufacture, Table 1502.4.5.1 shall be used.
- Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination.

ENERGY EFFICIENCY

- The interior design temperatures used for heating and cooling load calculations are 72F (22C) for heating and 75F (24C) for cooling.
- Thermostats shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. Thermostats shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55F (13C) or up to 85F (29C). The thermostat shall initially be programmed with a heating temperature set point no higher than 70F (21C) and a cooling temperature set point no lower than 78F (26C).
- Supply ducts in attics shall be insulated to a minimum of R-8. All other ducts shall be insulated to a minimum of R-6.
- Building framing cavities shall not be used as ducts or plenums.

MECHANICAL VENTILATION MAIN RESIDENCE - 2015 IRC, SECTION N1103.6

MAIN HOUSE - 5,055 S.F. LIVABLE, 3 BEDROOMS PER TABLE M1505.4.3(1) - 90 CFM REQUIRED

120 CFM O.S.A. PROVIDED BY WAY OF CONTINUOUS EXHAUST FROM (4) EF-1'S

2015 INTERNATIONAL RESIDENTIAL CODE COMPLIANCE EFFICIENCY REQUIREMENTS

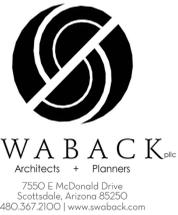
- Provide minimum 78% AFUE (Annual Fuel Utilization Efficiency) for weatherized gas heating equipment. Non-weatherized equipment minimum 80% AFUE. (T.N1105.5.2 (1)g)
- Provide minimum 14 SEER (Seasonal Energy Efficiency Ratio) for air conditioning equipment. (T.N1105.5.2 (1)h)

GENERAL REQUIREMENTS

- Registers, diffusers and grilles shall be mechanically fastened to rigid supports or structural members on at least two opposite sides in addition to being connected to the ductwork they serve.
- Dryer exhaust ducts shall conform to the requirements of Sections (M1502.4.5 amended), M1502.4.1 thru M15.2.4.6.
- Exhaust air from kitchen, bathrooms and toilet rooms shall not be recirculated within a residence or to another dwelling unit, shall not discharge into an attic and/or crawl space and shall be exhausted directly to the outdoors. (M1507.2)

ENERGY REQUIREMENTS

- At least one thermostat shall be provided for each separate heating and cooling system. (N1103.1)
 - The building shall be provided with ventilation that meets the requirements of Section M1507 or with other approved means of ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating. (N1103.5)
 - The building shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Testing shall be conducted by an approved third party, (BPI or RESNET certified). A written report of the results of the test shall be signed by the party conducting the test and provided to the building official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope. (N1102.4.2)
 - Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with Section M1601.4.1. All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC Duct Construction Standards-Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards. All joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes.
 - Provide duct tightness testing conducted by an approved third party testing agency (BPI or RESNET certified) and the signed written results shall be submitted to the Code Official prior to the Building Final. (N1103.2.2) Duct tightness shall be verified by either of the following:
 - Post-construction test: Total leakage shall be less than or equal to 4 cfm per 100 square feet of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during test.
 - Rough-in test: Total leakage shall be less than or equal to 4 cfm per 100 square feet of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure. All registers shall be taped or otherwise sealed during test. If the air handlers is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm per 100 square feet of conditioned floor area.
- Supply and return ducts shall be insulated to a minimum R-8. Ducts in floor trusses shall be insulated to a minimum R-6. (N1103.2.1)



PROJECT PHASE	
<input type="checkbox"/>	CONSTRUCTION DOCUMENTS
<input type="checkbox"/>	JURISDICTION REVIEW
<input type="checkbox"/>	ISSUE FOR BID SET
<input type="checkbox"/>	ISSUE FOR CONSTRUCTION

REVISIONS		
NO.	DESCRIPTION	DATE

SMITH RESIDENCE
 PARCEL: 105-21-001M, E LOMA LN.
 SIERRA VISTA (COCHISE COUNTY), AZ 85650
MECHANICAL COVER SHEET



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DRAWN	SP/GH
CHECKED	MJP
DATE	05.01.2024
SCALE	AS SHOWN
JOB NO.	2137
SHEET	MO.1

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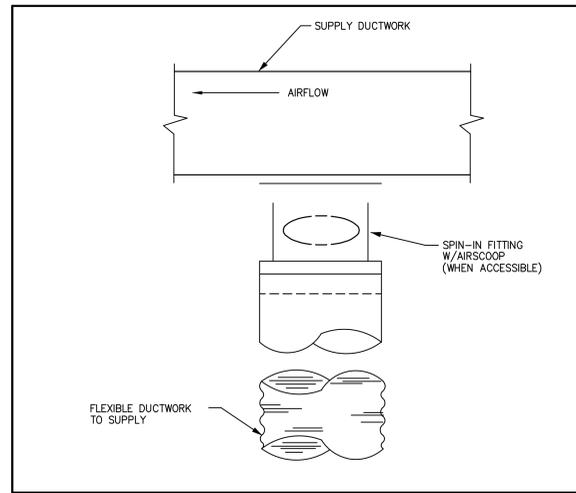


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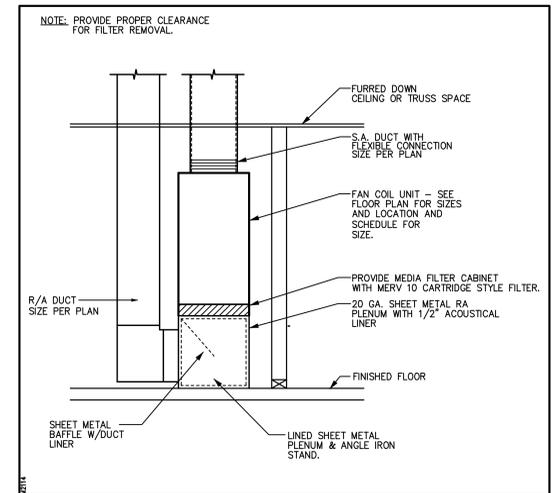


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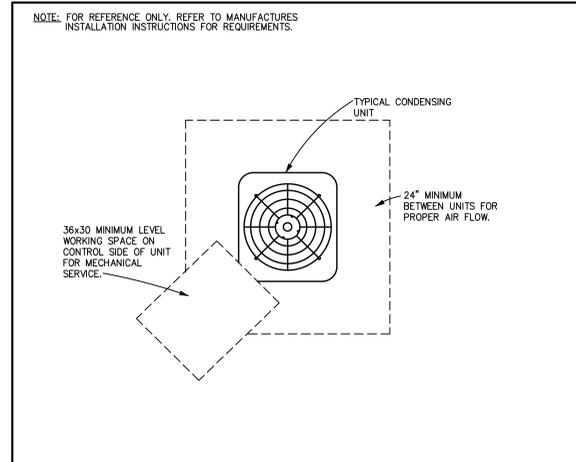
REVISIONS		
NO.	DESCRIPTION	DATE



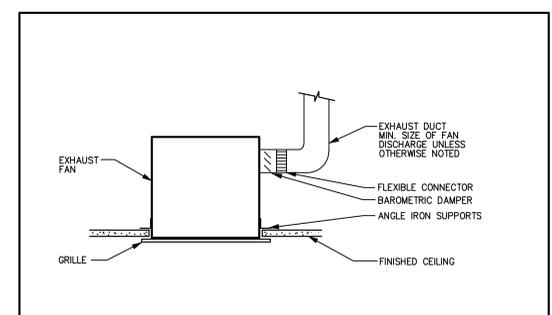
3 BRANCH DUCT TAKE-OFF DETAIL NTS



1 FAN COIL - SIDE RETURN DETAIL NTS



4 CONDENSING UNIT MECHANICAL SERVICE CLEARANCE REQUIREMENTS NTS



2 EXHAUST FAN DETAIL NTS



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MECHANICAL DETAILS

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SHEET	M0.2

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HEATING, VENTILATING, AND AIR CONDITIONING

PART 1 GENERAL

1.1 SCOPE OF WORK

A. The work included under this section consists of furnishing all materials, equipment and labor, and the performing of all functions, except as otherwise specified herein or shown on the drawings to be performed by others, for the installation of all heating and cooling equipment, and associated piping, ductwork, grilles, registers, controls, etc. for a complete and operating system. It shall further include furnishing and installing all miscellaneous items required for the operation of the system, whether specifically called out or not.

1.2 CODES

A. All materials, equipment and installation must comply with all applicable laws, codes, rules, and regulations, required by the City, County and State, as well as Federal requirements.

1.3 DRAWING AND DATA

A. Drawings are generally diagrammatic and are intended to convey the scope of Work and to indicate the general arrangement of equipment, piping, and fixtures. Do not scale Drawings.
B. The Mechanical Contractor shall review the architectural drawings include in his bid on amount to furnish and install any equipment which is shown in addition to equipment that is shown on Mechanical Drawings. Such amount to include all material necessary for a functional installation.
C. The intent of the Mechanical Contract Document is to include all items necessary for the proper execution and completion of the Work by the Contractor. All Contract Documents are complementary, and what is required by one shall be binding as if required by all.
D. The Contractor shall visit the job site and familiarize himself with all existing conditions which may affect his bid. No allowances will be made after the bid for existing conditions or the Contractor's failure to verify existing conditions.

1.4 INSPECTION AND TESTS

A. Furnish Architect with certificate of inspection and approval by local authorities and required test reports prior to final acceptance of the project by the Architect. All work must be inspected and tested per local code requirements.

1.5 GUARANTEE

A. The Contractor shall guarantee all materials, equipment, and workmanship from defect and shall replace or repair, without additional cost, to the Owner, all defective material and workmanship for a period of one (1) year after date of final acceptance.

1.6 COORDINATION

A. All Contractors shall be responsible for coordinating Work with other trades and for cutting and re-fitting of existing walls, floors, solid and suspended ceilings, etc., where required by Work shown and noted herein. Install all Work to clear new and existing architectural and structural members. Items such as pipe, fittings, etc., shall not be installed in conflict with equipment. Coordinate all cutting and patching with the General Contractor. Subcontractor shall be responsible for all cutting and patching of his Work. Obtain written permission of Architect before proceeding with any cutting or patching of structural systems.
B. The Contractor shall coordinate with Electrical Subcontractor to insure proper electrical hookup for all mechanical equipment.
C. Coordinate exact location of ceiling outlets with lighting plan and Architectural Drawings.

1.7 RECORD DRAWINGS

A. Provide two (2) sets of "Record" drawings and two (2) bound sets of all operations manuals, diagram service contracts, guarantees, etc., one for the Owner and one for Building Operations Department. Obtain a complete set of Record drawings of existing construction from the Owners for information on existing conditions. Incorporate any existing conditions on new record drawings required to show the "installed" installation.

1.8 PRODUCTS

A. All products shall be new and unused of established and reputable American manufacturers. Items of equipment used for the same purpose shall be of the same manufacturer.
B. Systems shall be complete and operable. Any accessories required for the operation of the system shall be included as though specifically indicated to be provided. Such accessories would include filters, condensate drains, relief valves, service valves, thermostats, vibration insulators, balancing valves, etc. Motor starters for provided equipment (and other protection and control devices) are also included in this specification.
C. Specific reference to a manufacturer's product is only to establish type, quality, and performance required. These qualifications are in addition to the requirements shown on the drawings. Listing of alternate equipment manufacturers shall not be construed as an unconditional approval of the products of those manufacturers. Alternate equipment, if utilized, shall meet or exceed specified capacities.
D. All equipment shall be U.L. Listed.

1.9 MAINTENANCE SERVICE

A. Furnish complete service and maintenance of air conditioning equipment for one year from Date of Substantial Completion.
B. Provide maintenance service with a two month interval as maximum time period between calls. Provide 24-hour emergency service on breakdowns and malfunctions.
C. Include maintenance items as outlined in manufacturer's operating and maintenance data, including minimum of six filter replacements, minimum of one fan belt replacement, and controls check-out, adjustments, and recalibrations.
D. Submit copy of service call work order or report, and include description of work performed.

2.1 EXTRA MATERIALS

A. Provide two sets of filters under provisions of Division 1.

2.2 APPROVED MANUFACTURERS

A. The following manufacturers are approved for use in this project under the terms and conditions shown on the plans and in these specifications.
B. Requests for "prior approval" for manufacturers not listed in these specifications shall be made in writing according to the provisions set forth in Division 1.
C. Manufacturers:
1. Split System Heat Pumps: Trane, Carrier, Ruud, York, Lennox.
2. Exhaust Fans: Greenheck, Cook, Penn, Acme.
3. Controls: Owner's Controls, Equipment Manufacturer's Standard Controls.
4. Grilles, Registers, and Diffusers: Titus, Kreuzer, Price.

2.3 SUBMITTALS

A. Submit under provisions of Division 1.
B. This Contractor is responsible for the submittal of Division 15 equipment. Arrangements for this procedure shall be made through the General Contractor at the time of the "Notice to Proceed".
C. Required Submittal List:
1. Split System Heat Pumps.
2. Exhaust Fans.
3. Controls.
4. Grilles, Registers, and Diffusers.
D. Submit shop drawings and product data grouped to include complete submittals of related systems, products, and accessories in a single submittal. Parallel submittals will not be reviewed.
E. Provide a Division 15 Contractor's review stamp indicating that a subcontractor's review has occurred and that the submittal meets or exceeds the requirements of the plans and specifications. Failure to review and stamp submittals will result in rejection of submittals by the Engineer.
F. Mark dimensions and values in units to match those specified.
G. Mark all discrepancies or deviations from contract documents. Failure to do so will not alleviate Contractor's responsibility to comply with project requirements. Any additional costs incurred by other trades due to non-compliance with this paragraph shall be the responsibility of the submitting Contractor.

2.4 SUBSTITUTIONS

A. Substitutions of materials or products shown herein shall be at the Owner's, Architect, or Engineer's written approval only with copies of approval sent to the project file. Any deviation from these drawings will not be allowed.

2.5 TEMPERATURE CONTROLS AND WIRING

A. Wiring 120 volts and above is included under the electrical division of the specifications. Wiring below 120 volts and all integral starters, controls, relays and other devices are included under the mechanical division. All equipment, devices and wiring shall conform to the national electrical code. All controls shall be furnished and properly identified with instructions for proper connections. Responsibility for proper connections and operation is included under the Mechanical Contractor's responsibility. Verify all voltages, phases and electrical connections with the Electrical Contractor before ordering any equipment, and if discrepancies occur, they shall be brought to the attention of the Architect/Engineer for resolution.
B. Provide space temperature controls as indicated.
1. Room thermostat shall incorporate:
a. Automatic switching from heating to cooling.
b. Preferential rate control to minimize overshoot and deviation from set point.
c. Set-up for four separate temperatures per day.
d. Instant override of set point for continuous or timed period from one hour to three hours.
e. Short cycle protection.
f. Programming based on weekdays, Saturday and Sunday.
g. Switch selection features including imperial or metric display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on-auto.
2. Room thermostat display shall include:
a. Time of day.
b. Actual room temperature.
c. Programmed temperature.
d. Programmed time.
e. Duration of timed override.
f. Day of week.
g. System mode indication: Heating, cooling, auto, off, fan auto, fan on.
h. Stage (heating or cooling) operation.

2.6 DUCTWORK

A. All ductwork and plenums shall be galvanized sheet metal. Fabricate and install all ductwork in strict conformance with the latest SMACNA and IMC (2003) manual for low pressure duct construction standards. (2" SP and below).
B. Each duct system shall be complete with all required ductwork fittings, turning vanes, splitter dampers supports. Provide extractors at all right angle takeoffs and tees.
C. Ductwork shall be galvanized, prime-grade, lock-forming quality steel (LFG) having a galvanized coating of 1-3/4 ounces to total for both sides of one square of a sheet.
D. Crossbreak all sides of all ducts. Ductwork shall have no objectionable noise, and Contractor shall provide any additional stiffeners required.
E. All longitudinal seams shall be Pittsburgh lock seam, hammered flat, with all transverse joints taped with 8 oz. Canvas and sealed airtight.
F. Provide double thickness, factory fabricated galvanized sheet steel turning vanes with airfoil contour in all right angle elbow, bullhead tees, and elbows with radius less the 1-1/2 times the width of the duct.
G. All round duct branch takeoffs shall be provided with spin-in type fittings with airscope balancing damper.
H. Duct sizes shown on the drawings are clear inside dimension. Increase sizes of ducts as required to accommodate acoustical insulation and thermal insulation as specified.
I. Ductwork shall conform to dimensions on the drawings unless location of structural members prohibited. In case of changes in dimensions, cross sectional areas shall be maintained. Attach hangers to the top cord of trusses.
J. All ducts shall be substantially supported with hangers to the structure or otherwise depending on location conditions, placing supports not over 8 feet apart along the length of the duct. Hangers shall conform to all SMACNA and IMC (2003) requirements.
K. Flexible round ducts to outlets shall be UL 181, Class 1, with a maximum length of 25'-0" long. Provide rigid takeoffs from main duct (Length as required) to accommodate maximum flex length.

2.7 GENERAL INSULATION

A. General: All insulation, material, covering, adhesive, vapor-barriers and tapes shall conform to NFPA 90a, with a flame spread classification not to exceed 25 and a smoke development rating not to exceed 30.
2.8 ACOUSTICAL INSULATION
A. General: All insulation, material, covering, adhesive, vapor-barriers and tapes shall conform to NFPA 90a, with a flame spread classification not to exceed 25 and a smoke development rating not to exceed 30.
B. All supply and return sheet metal ducts, 15'-0" from units minimum, to be lined with 1" acoustical liner, minimum 1-1/2 lb. Neoprene or heavy density coated fiberglass duct liner suitable for velocities up to 4,000 FPM complying with NFPA 90A.
C. Applications: Coated duct liner shall be cut to assure overlapped and compressed longitudinal corner joint. Apply liner with coated surface facing the air stream and adhered with 100% coverage fire retardant adhesive. Coat all exposed leading edges and transverse joints with fire retardant adhesive. The liner shall be additionally secured with mechanical fasteners which shall compress the duct liner sufficiently to hold it firmly in place per SMACNA and UMC (1994) standards.
D. Installation for velocities to 2,000 FPM: Fasteners shall start within 3" of the upstream transverse edges of the liner and 3" from the longitudinal joints and shall be spaced at a maximum of 12" O/C around the perimeter of the duct, except that they may be a maximum of 12" from a corner break. Elsewhere, they shall be maximum of 18" O/C except that they shall be placed not more than 6" from a longitudinal joint and 12" from a corner break. Coat all exposed joints and edges of transverse joints with a fire retardant adhesive.

2.9 THERMAL INSULATION (DUCT LINER)

A. All rectangular supply and return ductwork shall be lined with 1" Type I mat faced or permacote air side faced, flexible, non-combustible duct liner suitable for velocities up to 4,000 FPM, complying with NFPA 90A.
B. Outdoor ductwork shall be insulated internally with 2" ductliner. Install per manufacturers instructions. All outdoor ductwork joints shall be sealed with silicone sealant and made completely weatheright and leak proof.

2.10 THERMAL INSULATION (DUCT WRAP)

A. General: All insulation, material, covering, adhesive, vapor-barriers and tapes shall conform to NFPA 90a, with a flame spread classification not to exceed 25 and a smoke development rating not to exceed 30.
B. All rectangular ducts and round ducts shall be insulated with 3/4" thick .75 lb. Density fiber glass blanket with FRK (foil reinforced kraft) vapor barrier facing. Insulation shall have a conductivity not to exceed 0.27 BTU per inch per square foot per degree Fahrenheit per hour at 75 degree Fahrenheit mean temperature.
C. Insulation shall be wrapped tightly on the ductwork with all circumferential joints butted and longitudinal joints overlapped a minimum of 2". Adhere insulation to metal on the bottom of rectangular ductwork over 24" wide with 4" strip of insulation bonding adhesive, Benjamin Foster 85-15, or equal and additionally secure insulation with mechanical fastener at not more than 18" O/C. On all joints the 2" flange of the facing or the 2" overlap shall be secured using 9/16" flare-door staples applied 6" O/C and taped with minimum 6" wide foil reinforced kraft tape. All pin penetrations or punctures in facing shall also prevent slipping.
D. Exhaust ducts shall not be insulated.

3.1 NOTE USED

3.2 GRILLES, REGISTERS AND DIFFUSERS

A. Furnish and install all grilles, registers, ceiling diffusers and door grilles where indicated. They shall be of size and model called for on the drawings.
B. All grilles, registers, and ceiling diffusers must be set flush and true to wall or ceiling to prevent air leakage around edges. All units shall be provided with neoprene gasketing around the inside of the frame.
C. All unit shall be factory finished, of color selected by the Architect, or as otherwise indicated.
D. Paint all ductwork, turning vanes, insulation, etc., that is visible through grilles, registers, or ceiling diffusers flat black.

3.3 CONDENSATE DRAIN PIPING MATERIAL

A. Copper tubing - ASTM B88, Type M, hard drawn.
B. Fitting: AMME B16.18, cast bronze, or ASME B16.22, wrought copper and bronze.
C. Joints: ASTM B52, Grad 95TA.

3.4 REFRIGERANT PIPING

A. Copper Tubing: ASTM B280, Type ACR hard drawn or annealed.
1. Fittings: ASME B16.22 wrought copper.
2. Joints: Bronze, AWS A5.8 B30P silver/phosphorus/copper alloy with melting range 1180 to 1480 degrees F (640 to 805 degrees C).
B. Copper Tubing to 7/8 inch OD: ASTM B88, Type K, annealed.
1. Fittings: ASME B16.26 cast copper.
2. Joints: Flared.
C. Pipe Supports and Anchors:
1. Conform to ASME B31.5 and ASTM F708 MSS SP58.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.
D. Preparation
1. Ream pipe and tube ends. Remove burrs.
2. Remove scale and dirt on inside and outside before assembly.
3. Prepare piping connections to equipment with flanges or unions.
E. Installation
1. Install refrigeration specialties in accordance with manufacturer's instructions.
2. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
3. Install piping to conserve building space and not interfere with use of space.
4. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.
5. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
6. Pipe Hangers and Supports:
a. Install in accordance with [ASTM B31.5] and [ASTM F708].
b. Support horizontal piping as scheduled.
c. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
d. Place hangers within 12 inches of each horizontal elbow.
e. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
f. Provide copper plated hangers and supports for copper piping.
7. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.
8. Provide clearance for installation of insulation and access to valves and fittings.
9. Provide access to concealed valves and fittings. Coordinate size and location of access doors with Section 08305.
10. Flood piping system with nitrogen when brazing.
11. Insulate piping refer to Section 15260.
12. Follow ASHRAE 15 and E.P.A. procedures for charging and purging of systems and for disposal of refrigerant.
13. Fully charge completed system with refrigerant after testing.

3.5 FINAL TESTS

A. Before acceptance and final payment, it shall be demonstrated that all apparatuses are functioning properly and efficiently. The Contractor shall make a through test of each supply, return and exhaust systems to assure that each diffuser and register has the proper quantity of air in accordance with AABC standards.
B. A written report of test results shall be submitted to Architect.
C. All control dampers including fire and fire/smoke shall be tested as part of final air balance.



PROJECT PHASE table with rows for Construction Documents, Jurisdiction Review, Issue for Bid Set, and Issue for Construction.

REVISIONS table with columns for NO., DESCRIPTION, and DATE.

Table with multiple empty rows for notes or additional information.

SMITH RESIDENCE
PARCEL: 105-21-001M, E LOMA LN, SIERRA VISTA (COCHISE COUNTY), AZ 85650
MECHANICAL SPECIFICATIONS



Peterson Associates logo and contact information: 7201 N. Dreamy Drive Suite 200, Phoenix, Arizona 85020, (602) 943-6118, Fax: (602) 943-2507, www.peterson.com, Job No. 237390

Table with project details: DRAWN SP/GH, CHECKED MJP, DATE 05.01.2024, SCALE AS SHOWN, JOB NO. 2137, SHEET MO.3

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PROJECT PHASE

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<input type="radio"/>	ISSUE FOR CONSTRUCTION

REVISIONS

NO.	DESCRIPTION	DATE

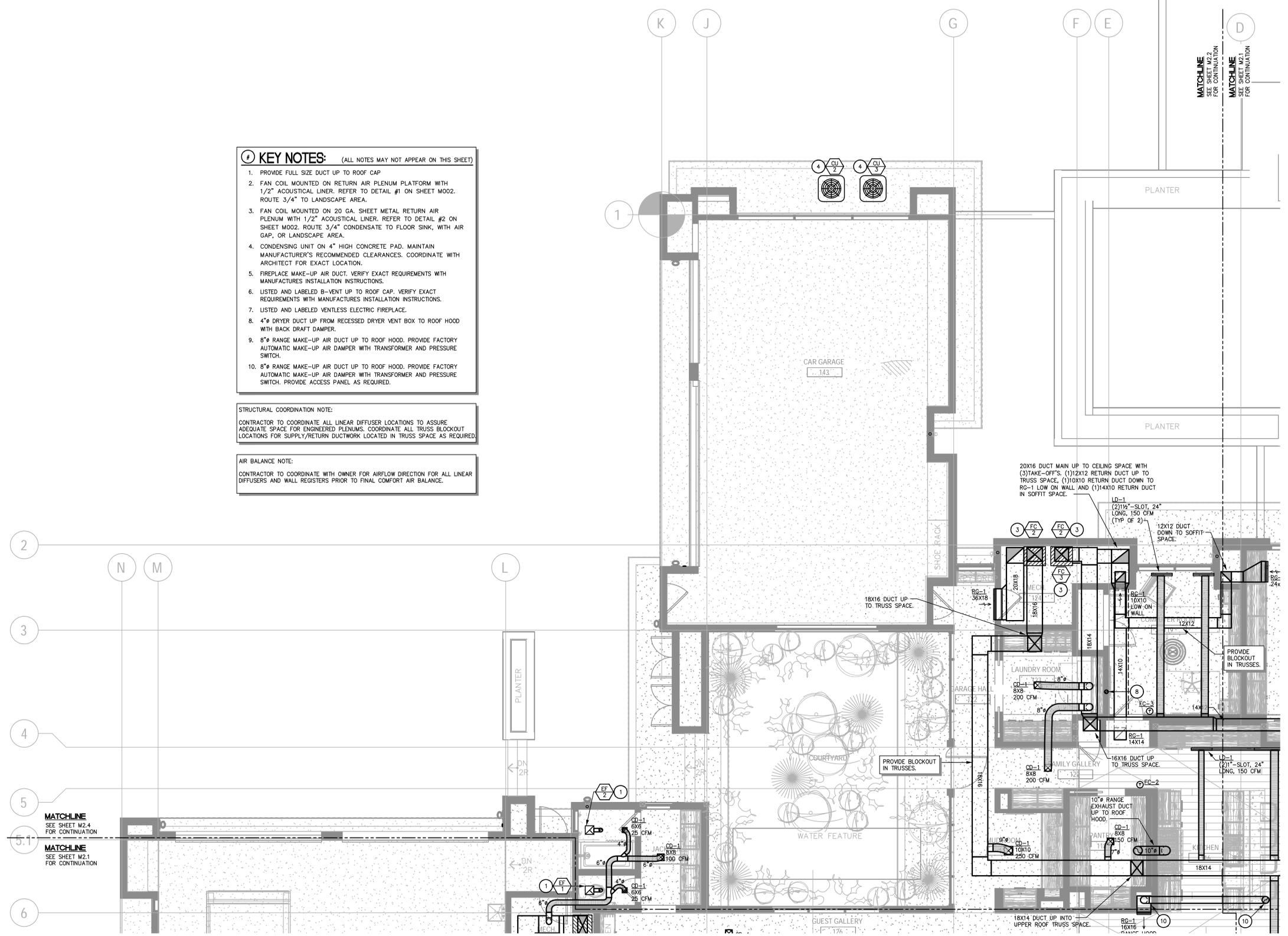
SMITH RESIDENCE
PARCEL: 105-21-001M, E LOMA LN.
SIERRA VISTA (COCHISE COUNTY), AZ 85650
MECHANICAL FLOOR PLAN

DRAWN	SP/GH
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DATE	05.01.2024
SCALE	AS SHOWN
JOB NO.	2137
SHEET	M2.1

- KEY NOTES:** (ALL NOTES MAY NOT APPEAR ON THIS SHEET)
- PROVIDE FULL SIZE DUCT UP TO ROOF CAP
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 - 4" DRYER DUCT UP FROM RECESSED DRYER VENT BOX TO ROOF HOOD WITH BACK DRAFT DAMPER.
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STRUCTURAL COORDINATION NOTE:
CONTRACTOR TO COORDINATE ALL LINEAR DIFFUSER LOCATIONS TO ASSURE ADEQUATE SPACE FOR ENGINEERED PLENUMS. COORDINATE ALL TRUSS BLOCKOUT LOCATIONS FOR SUPPLY/RETURN DUCTWORK LOCATED IN TRUSS SPACE AS REQUIRED.

AIR BALANCE NOTE:
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MECHANICAL FLOOR PLAN
1/4"=1'-0"



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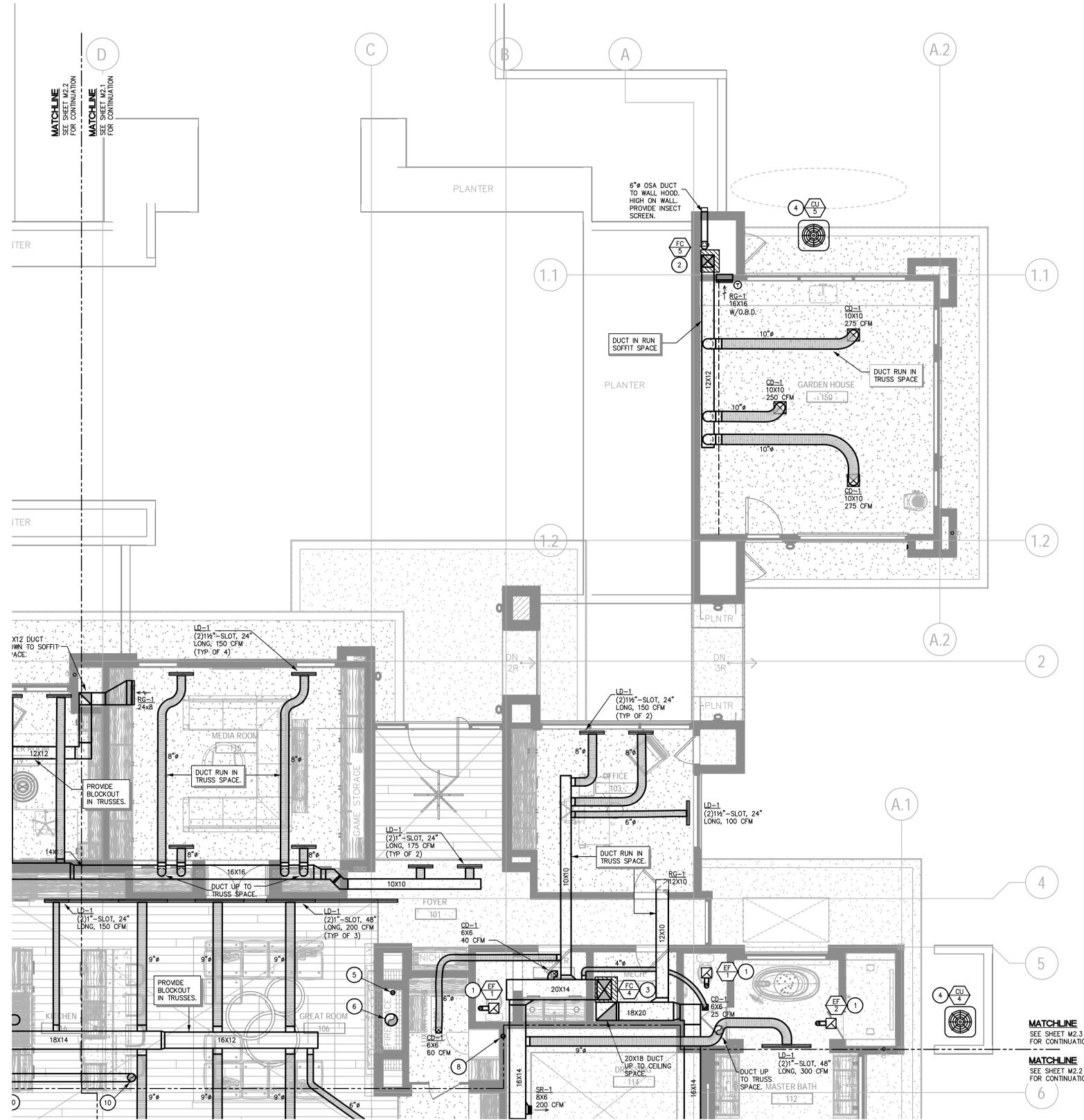
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MECHANICAL FLOOR PLAN
1/4"=1'-0"

MATCHLINE
SEE SHEET M2.3
FOR CONTINUATION



SMITH RESIDENCE
PARCEL: 105-21-001M, E LOMA LN,
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MECHANICAL FLOOR PLAN

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SHEET	M2.2

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PROJECT PHASE

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REVISIONS

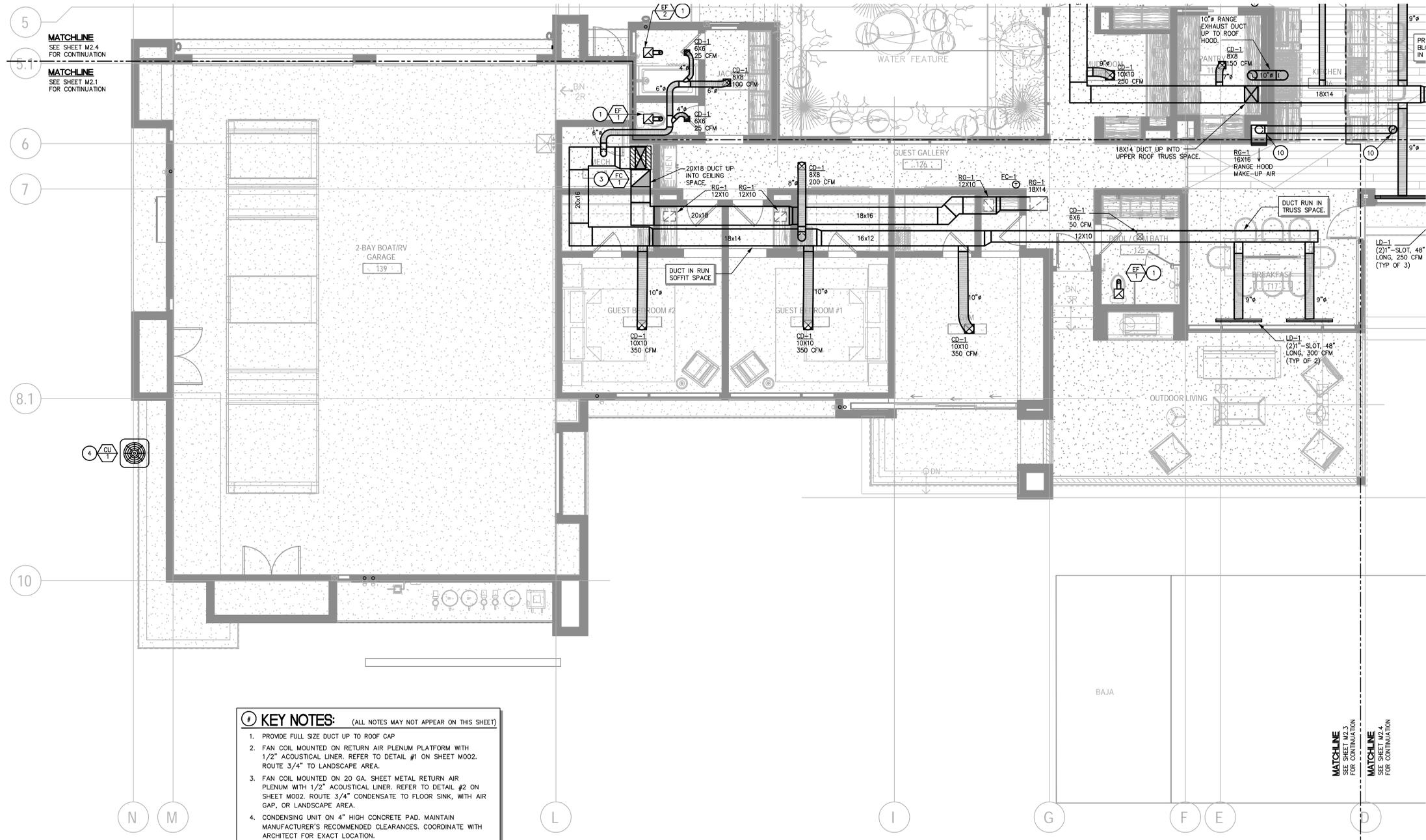
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