# SINGLE FAMILY RESIDENCE B HOUSING AUTHORITY OF THE CHEROKEE NATION N. SHERIDAN RD. & E. 136TH ST. N. COLLINSVILLE, OK



# **PROJECT TEAM**

ARCHITECT:

TriArch www.tri-arch.com 618 E 3rd St. Tulsa OK 74120

Tony Popp tpopp@Tri-Arch.com



## ABBREVIATION

Α AB

A/C

ACP

ACT

AD

ADH

AD.

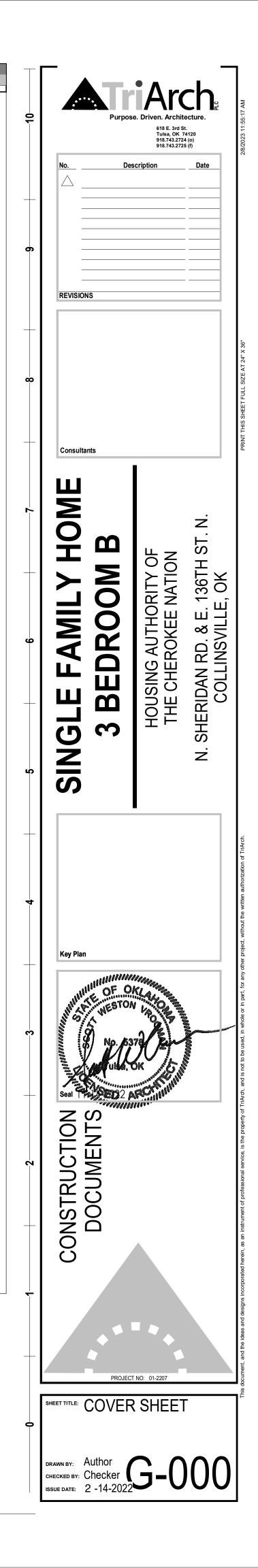
AI 1

AP

AMF ANS

	<u>AB</u>	BREVIATIONS
ANCHOR BOLT AIR CONDITIONING ACOUSTICAL PANEL ACOUSTICAL CEILING TILE AREA DRAIN ADHESIVE	<b>G</b> GA GALV GB GCMU GD	GAUGE GALVANIZED GRAB BAR GLAZED CONCRETE MASONRY UNIT GRADE
ADHESIVE ADJUSTABLE ABOVE FINISH FLOOR ALUMINUM ALTERNATE AMBULATORY AMERICAN NATIONAL	GD GL GR GSU GRNBD GYP <b>H</b>	GRADE GLASS GROMMET GLAZED STRUCTURAL UN GREEN BOARD GYPSUM
STANDARDS INSTITUTE ACCESS PANEL APPROXIMATE ARCHITECT(URAL) ASPHALT AUTOMATIC	HB H/C HC HD HDR HDW	HOSE BIBB HANDICAPPED HOLLOW CORE HEAVY DUTY HEADER HARDWARE
BOARD BITUMINOUS BUILDING WINDOW BLINDS BLOCKING	HK HM HORZ HP HR HT	HOOK HOLLOW METAL HORIZONTAL HORSEPOWER HOUR HEIGHT
BENCH MARK, BEAM BY OWNER, BY OTHERS BRACKET BEARING BACK TO BACK	hvac hwd I Insul	HEATING, VENTILATING, AIR CONDITIONING HARDWOOD INSULATION
BUILT-UP ROOFING CABINET CATCH BASIN CEMENTITIOUS	INT <b>J</b> JAN JB JOH	INTERIOR JANITOR'S CLOSET JUNCTION BOX JAMB OPENING HEIGHT
BACKING BOARD CUBIC FEET CUBIC FEET PER MINUTE CORNER GUARD CAST IRON CAST IN PLACE	JOW <b>K</b> KD KG KIT KO	JAMB OPENING WIDTH KNOCKDOWN KILOGRAM KITCHEN KNOCKOUT
CONTROL JOINT CENTERLINE CEILING CLEAR(ANCE) CONSTRUCTION MANAGER CONCRETE MASONRY UNIT	KVA KW L LAM	KILOVOLT AMPERES KILOWATTS LENGTH LAMINATE(D)
COLUMN CONCRETE CONSTRUCTION CONTINUOUS CORRIDOR CARPET CASEMENT	LAV LBS LKR LL LLH LLV LVR	LAVATORY POUNDS LOCKER LIVE LOAD LONG LEG HORIZONTAL LONG LEG VERTICAL LOUVER
CERAMIC TILE CUBIC YARD DRAIN	LVT L/G <b>M</b> M	LUXURY VINYL TILE LIGHTWEIGHT METER
DOUBLE DEGREES DEMOLISH, DEMOLITION DOUBLE HUNG DIAMETER DIAGONAL DIMENSION	MAINT MAX MBR MC MECH MEZZ MFR	MAINTENANCE MAXIMUM MEMBRANE MEDICINE CABINET MECHANICAL MEZZANINE MANUFACTURER
DIVISION DEAD LOAD DOWN DAMPPROOFING DOOR DOWNSPOUT DRAWING	MH MIN MISC MKBD MLDG MM	MANHOLE MINIMUM MIRROR MISCELLANEOUS MARKER BOARD MOULDING MILLIMETER
DRAWER EAST EXPANSION BOLT EXPANSION JOINT	MO MPU MR MTG MTL MULL	MASONRY OPENING MULTIPURPOSE UNIT MOP RACK MOUNTING MATERIAL MULLION
ELEVATION ELECTRIC(AL) ELEVATOR, ELEVATION ENGINEER EQUAL EQUIPMENT EACH SIDE	N NE NIC NOM NTS NW	NORTH NORTHEAST NOT IN CONTRACT NOMINAL NOT TO SCALE NORTHWEST
EACH WAY EXHAUST EXPOSED EXTERIOR EXISTING	NPS O OC OD OH	ON CENTER OUTSIDE DIAMETER OVERHEAD
FIRE ALARM FACE BRICK FLOOR DRAIN FIRE EXTINGUISHER FIRE EXTINGUISHER CABINET	oto oz <b>p</b> PBD P/C	OUT TO OUT OUNCE PARTICLEBOARD PRECAST (CONCRETE)
FACTORY FINISH FURNITURE, FIXTURES, & EQUIPMENT FINISH FLOOR LINE FIRE HOSE CABINET FLOOR/ FLOORING	PC PCF PE PEJ PFB	POLISHED CONCRETE POUNDS PER CUBIC FOC PORCELAIN ENAMEL PREFORMED EXPANSION JOINT PREFABRICATED
FACE OF CONCRETE FACE OF FINISH FACE OF MASONRY FACE OF STUDS FIREPROOF	PL PLAM PLBG PLYWD PNL PR	PLATE, PROPERTY LINE, PLASTIC LAMINATE PLUMBING PLYWOOD PANEL(S) PAIR
FIRE RETARDANT TREATED FLEXIBLE SHEET ROOFING FOOT, FEET FOOTING FURRING FURNITURE	PSF PSI PT PART PVC PVG	POUNDS PER SQUARE FC POUNDS PER SQUARE IN PAINT, POINT PARTITION POLYVINYL CHLORIDE PAVING

<u>NS</u>		
	<b>Q</b> QT	QUARTZ
D	R	
NCRETE JNIT	R RA	RADIUS RETURN AIR
	rb RD	RUBBER BASE ROOF DRAIN
	REF REINF	REFERENCE, REFRIGERATOR REINFORCING,
UCTURAL UNIT .RD	REQ	REINFORCEMENT REQUIRED
	RES REV	resilient revision
°ED	RF RFG	RUBBER FLOOR ROOFING
ORE Y	RM RO	ROOM ROUGH OPENING
	ROW	RIGHT-OF-WAY
ETAL	RPM RS	REVOLUTIONS PER MINUTE ROLLER SHADES
L	RTU RV	ROOF TOP UNIT (HVAC) ROOF VENT PENETRATION
ER	<b>S</b> S	South
ENTILATING,	satb SC	Sound attenuation blanket Solid core, sealed concrete
IONING D	SCH	SCHEDULE, SCHLUTER
	SD SE	STORM DRAIN SOUTHEAST
	sect sf	SECTION SQUARE FOOT
CLOSET	sgl sim	SAFETY GLASS SIMILAR
BOX IING HEIGHT	SNR SP	SANITARY NAPKIN RECEPTACLE SOUNDPROOF
ING WIDTH	specs sq	SPECIFICATIONS SQUARE
VN	SR SS	SHOWER ROD SERVICE SINK, STAINLESS STEEL,
	STD	SOLID SURFACE STANDARD
MPERES	STG STL	SEATING STEEL
	STOR	STORAGE
D)	STP STRUC	STANDPIPE STRUCTURAL
	SW SYM	southwest symmetrical
	SYS T	SYSTEM
HORIZONTAL VERTICAL	tb t/C	TILE BASE TOP OF CURB
YL TILE	TD TDWR	TOWEL DISPENSER TOWEL DISPENSER & WASTE
HT IILL	TEL TEMP	TELEPHONE TEMPERATURE
	TGL TH	TEMPERED GLASS TOWEL HOOK, THICK (NESS)
ICE	THR TLT	THRESHOLD TOILET
CABINET	TOPO	TOPOGRAPHY MAP
AL	TTD TRT	TOILET TISSUE DISPENSER TREATED (PRESERVATIVE)
URER	T/SL T/STL	TOP OF SLAB TOP OF STEEL
	TV T/W	TELEVISION TOP OF WALL
eous Ard	TYP T&B	typical Top and bottom
	T&G U	TONGUE AND GROVE
DPENING DSE UNIT	UC UH	UNDERCUT UNIT HEATER
	UNFIN US	UNFINISHED UTILITY SHELF
	UTIL V	UTILITY
	V VB	VENT VAPOR BARRIER
	VCT VERT	VINYL COMPOSITION TILE VERTICAL
NTRACT	VIN VJ	VINYL (SHEET) V-JOINTED(ED)
LE	VOL	VOLUME
IPE SIZE	W W	WEST, WIDTH
AMETER	W/ WC	WITH WATER CLOSET, WALL COVERING
T	WD WH	WOOD WATER HEATER
	WM W/O	wire mesh without
OARD ONCRETE)	WP WSCT	WATERPROOFING WASTE RECEPTACLE
ONCRETE R CUBIC FOOT	WT WWF	WEIGHT WELDED WIRE FABRIC
ENAMEL	Y Yd	YARD
JOINT ATED		
PERTY LINE, MINATE		
r square foot r square inch		
IT		



## **DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS**

- 000101 PROJECT DESCRIPTION Project Identification: 3 bedroom 2 bath, single family home, 2 car garage
  - Owner: Housing Authority of the Cherokee Nation.
  - 3. Location: Collinsville, Oklahoma 74021.
  - 918.743.2724. Attention: Tony Popp.
- 5. General Contractor: Not selected. 007200 CONTRACT AND GENERAL CONDITIONS
- 1. Contract for Construction: AIA A104-2017 Standard Abbreviated Form of Agreement Between Owner and Contractor (for use on limited-scope projects with a stipulated sum). General Conditions: AIA-A201-2017. 3. Supplementary Conditions: None.

## **DIVISION 01 - GENERAL REQUIREMENTS**

- 011000 SUMMARY
- 1. Project consists of construction of duplex residential housing units. Included in the work is site development including grading, utilities, and driveway paving and sidewalks. a. Occupancy Group: R-Residential.
- b. Construction Classification: V-B, no fire suppression. 012000 PAYMENT PROCEDURES
- 1. Submit requests for payment using AIA Document G702 and AIA Document G703 as form. 2. Submit proposed Change Orders on CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail," or other form acceptable to Architect.
- 3. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.
- 013000 SUBMITTALS 1. Submit product literature and data sheets, and shop drawings using PDF electronic methods. Submit
- closeout in binders if requested by Architect, or one set of electronic data files if approved by Owner and Architect.
- 014000 QUALITY REQUIREMENTS
- as indicated on Drawings plumb, level and true, or as otherwise indicated. 0177000 PROJECT CLOSEOUT
- 1. During progress of the Work, submit shop drawings and samples to Architect for review, approval, and comment
- 2. At completion of Project, submit 2 copies to the Architect of approved submittals, annotated Drawings, and specification. Submit two copies of maintenance manuals and emergency procedures manuals, and warranties

#### DIVISION 02 - EXISTING CONDITIONS (Not Used)

- DIVISION 03 CONCRETE
- 033000 CAST-IN-PLACE CONCRETE:
- Concrete: Refer to specifications found on Drawings.
- film. Install sheets on top of minimum 4-inch thick crushed rock drainage course. Tape joints. Repair or tape small penetrations and cuts.
- 3. Smooth trowel finish new concrete, suitable to received new resilient tile flooring. 4. Apply concrete sealer only onto slabs which will be exposed and do not receive any floor finish material.

## **DIVISION 04 - MASONRY**

- 042000 BRICK MASONRY: 1. Manufacturer: Acme Brick Co.
- Series and color selected by Architect and Owner/Contractor.
- 3. Size: Standard modular (7-5/8 inches by 2-1/4 inches by 3-5/8 inches). 4. Type 1: FBX.
- 5. Pattern: Running bond, with soldier courses where shown on Drawings, and batts at corners.
- 6. Mortar: Type N, unless load-bearing or below grade. Portland-cement lime-mortar; no calcium chloride laaiiive
- Accessories:
- a. Screw-attached masonry wall anchors suitable for attaching to wood wall framing. Hohman and Barnard 165 Adjustable Truss Seismiclip Interlock System. Others: Dayton-Superior; Heckman Bldg.
- Products.
- b. Cavity Drainage Material: Mortar Net USA Ltd.; Mortar Net. Weep Vent: Mortar Net USA, Ldt; Mortar Net Weep Vents.
- d. Embedded Flashing: Rubberized-Asphalt Flashing, 0.030 inch thick.

#### DIVISION 05 - METALS (Not Used)

## **DIVISION 06 - WOOD, PLASTICS AND COMPOSITES**

061000 ROUGH CARPENTRY

- 1. Refer to specifications found on Drawings. for walls and roofs, and for wall and roof sheathing. 064100 EXTERIOR ARCHITECTURAL WOODWORK:
- 1. Exterior Lumber Trim, Species and Grade: Smooth -textured, 2 Common hem-fir, Premium or 2 Common, or Southern pine, pressure-preservative treated; B & B SPIB. Maximum moisture content 19 percent. 2. Exterior Cement-Fiberboard Soffits: James Hardie "Hardiesoffit Panels," Vented smooth.
- 064100 INTERIOR ARCHITECTURAL WOODWORK: 1. Standing and Running Trim: Clear poplar, in shapes indicated, complying with AWI standard: custom
- grade or better. Prime and paint finish in field. 064113 WOOD-VENEER-FACED ARCHITECTURAL CABINETS: Quality Standard: AWI "Architectural Woodwork Standards.
- 2. Materials: Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.
- 3. Wood Cabinets for Transparent Finish: Custom grade. a. Type of Construction: Frameless.
- b. Cabinet Door and Drawer Style: Flush overlay. c. Wood Species for Exposed Surfaces: White birch, maple, alder, other approved or selected by
- Architect and Owner. d. Cut: Plain sliced/plain sawn.
- e. Grain Direction: Vertically for doors and fixed panels, horizontally for drawer fronts.
- Matching of Veneer Leaves: Slip match.
- a. Veneer Matching within Panel Face: Center-balance match.
- Semiexposed Surfaces Other Than Drawer Bodies: Same species and cut indicated for exposed surfaces.
- i. Solid plywood box drawer with  $\frac{1}{2}$ -inch thick finished wood side and backs. Drawer bottoms: thermoset decorative panels.
- Where and if surfaces are melamine clad balanced construction is mandatory. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea
- formaldehyde. 4. Hardware: Provide complete hardware including, but not limited to, the following: a. Box Drawer Slides: BHMA A156.9, B05091. Grade 1.
- . Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch diameter.
- d. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081. e. Finishes: Satin-finish aluminum or similar exposed hardware finishes. Bright chrome otherwise.
- Countertops and Splashes: Plastic-laminate-clad %-inch thick MDF or particle board countertops.
- 6. Shop Finishing of Wood Cabinets: a. Finishes: Custom grade.
- b. Finish cabinets at the fabrication shop; defer only final touchup until after installation.
- c. Transparent Finish: Catalyzed polyurethane. d. Sheen: Satin.

4. Architectural documents prepared by Tri-Arch, 7320 S Yale, Tulsa, Oklahoma 74136. Telephone

- three samples for approval or verification. Submit three copies warranties and maintenance data at
- 1. Construct project using new and first-class materials and equipment. Install all elements of construction
- 2. Under-Slab Vapor Retarder: 15 mil thick, Stego reinforced vapor barrier. Option: 15-mil thick polyethylene

## **DIVISION 07 - THERMAL AND MOISTURE PROTECTION**

- 072100 INSULATION: 1. Acoustical Insulation, Walls: 3-inch thick unfaced fiberglass acoustical batt insulation unit seperation 2. Thermal Insulation, Exterior Walls: R-19, nominal 6-inch thick faced installed where indicated on drawings.
- Fiberglass batts fabricated without formaldehyde or phenols. 3. Thermal Insulation, Ceilings: R-30, nominal 9-inch thick faced batts applied where indicated on drawings. Fiberglass batts fabricated without formaldehyde or phenols.

## 073113 ASPHALT SHINGLES

- 1. Glass-Fiber-Reinforced Asphalt Shingles: Laminated, multi-ply overlay construction, mineral-granule surfaced, and self-sealing. ASTM D 3462, complying with requirement of ASTM D 3161 for wind resistance. a. Exposure: 5 to 5-5/8 inches.
- b. Color: Selected by Architect. c. Flat-tabbed shingle.
- Manufacturer and Line: Tamko, "Heritage," Basis-of-Design.
- Ridge and Hip Shingles: Manufacturer's standard units to match asphalt shingles.
- 4. Ridge Vent: Tamko "Roll Vent Ridge Vent" (Basis-of-Design). 5. Underlayment:
- a. Felts: ASTM D 226 or ASTM D 4869, Type II, asphalt-saturated organic felts, nonperforated. b. Self-Adhering Sheet Underlayment, Granular Surfaced: ASTM D 1970, minimum of 60-mil- thick sheet; glass-fiber-mat-reinforced, SBS-modified asphalt; mineral-granule surfaced; with release paper backing; cold applied.
- 6. Accessories:
- a. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free. b. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle
- c. Metal Flashing and Trim: Drip edge, in lengths not exceeding 10 feet with 2-inch roof-deck flange and 1-1/2-inch fascia flange with 3/8-inch drip at lower edge.

#### 074633 VINYL SIDING

- 1. Exterior Vinyl Siding: Provide one of the following as selected by Architect and Owner:
- a. Horizontal Pattern: 6-1/2- or 7-inch exposure in beaded-edge style, integrally colored. b. Horizontal Pattern: 8-inch (203-mm) exposure in plain, single board style. Integrally colored.
- c. Color: Selected by Architect.
- d. Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
- e. Provide accessories made from same material as matching color and texture of adjacent siding unless otherwise indicated.
- 2. Decorative Accessories: Where indicated or as directed by Owner, provide the following: Corner posts with fluted faces; door and window casings with fluted faces; louvers; lattice; fasciae; moldings and
- 3. Exterior Soffits: Same as siding. Orient with grooves parallel to wall. Install aluminum soffit vents if vented vinyl soffits are not installed.

#### 076200 SHEET METAL FLASHING AND TRIM 1. Gutters and Downspouts:

- a. Materials: Metallic-Coated Steel Sheet: Galvanized steel sheet, or aluminum-zinc alloy-coated steel sheet, coating designation, Grade 40.
- b. Gutter Thickness: 0.022-inch (0.56-mm) thickness.
- c. Downspout Thickness: 0.022-inch (0.56-mm) thickness. Rectangular, supported by wall-hung straps. d. Finish: Manufacturer's standard two-coat fluoropolymer system with color coat containing not less than 70 percent PVDF resin by weight.
- e. Concealed Finish: Manufacturer's standard white or light-colored acrylic or polyester backer finish. f. Limit length of gutters sections to 10 feet, unless fabricated from continuous runs. Allow for expansion accordingly. Overlapping hooked flanges at joints, and seal overlapping joints with elastomeric sealant. Allow no seam within 2 feet of any corner. Fabricate corners on solders L-shapes.
- Wall Flashing Installation: a. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and
- b. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.
- 079200 JOINT SEALANTS:
- Exterior Sealants at wall joints and openings: Silicone (Dow 795). Interior sealants in wet areas: mold- and mildew-resistant silicone.
- Interior sealants, general: Latex.
- 4. Horizontal Sealants in floor slabs. (Class T): Urethane.
- Concealed sealants in specified locations (thresholds, etc.): Butyl.
- Select Low VOC sealants. Clean and prime all joint substrates except glass; clean glass substrates. 7. Provide medium modulus sealants in vertical walls and joint around doors and windows up to approximately 7 feet AFF, and low-modulus sealants above that elevation.
- **DIVISION 08 OPENINGS**
- 081416 DOORS:
- 1. Wood frames, exterior and interior 2. Exterior:
- A. Vinyl clad fiberglass door with polyurethane core, Provide style indicated on Drawings. Prepare doors for installation of hardware.
- 3. Interior: A. Hollow-core, paint-grade MDF, poplar, or birch veneers. Wood edges at stiles and rails. Prepare doors for installation of hardware.
- 4. Construction: AWI Custom grade or better. Factory prepared for hardware. Prepared for passage sets and hinges.
- 085200 VINYL WINDOWS
- Product Standard: AAMA/WDMA/CSA 101/I.S.2/A440. Performance Standards: Performance Class: R; performance grade: 15.
- Operating Types: Double hung.
- 4. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with
- AAMA/WDMA/CSA 101/I.S.2/A440.Finish: Integral color, selected by Owner from manufacturer's full range. 5. Gypsum Board Returns: Provide at interior face of frame. a. Insulating-Glass Units: ASTM C 1036, Type 1, Class 1, q3. Kind: Fully tempered. Tint: Clear.
- b. Lites: Two.
- c. Filling: Fill space between glass lites with dehydrated air.
- d. Low-E Coating: Pyrolytic on second surface.
- e. Manufacturer's standard factory-glazing system that produces weathertight seal.
- 6. Hardware, General: Manufacturer's standard corrosion-resistant material. Weather Stripping: Provide full-perimeter weather stripping for each operable sash.
- Muntin/Mullion Bars: As indicated on Drawings.
- 087100 DOOR HARDWARE:
- Unit Locks: Shlage or appoved equal 2. Satin chrome finish.



Following NEC Code Standards are typical and may not be current or accurate for all applications or jurisdictions. Always contact your local building authority for complete and up to date code information.

14. U.L. listed anti-oxidant compound shall be used on all aluminum conductor terminations, unless product information specifically states that it is not required.

14. Any underground wiring shall be rated for underground use. Any splicing of underground wiring shall use wire splicing means specifically intended for underground use.

14. Only one conductor shall be installed under a terminal screw. In boxes with more than one ground wire, the ground wires shall be spliced with a wire tail, or pig tail attached to the grounding terminal screw.

3. All conductors of the same circuit, including grounded conductors, shall be contained in the same raceway, cable, or trench. 4. In both exposed and concealed locations, where cables are

installed through bored holes in joists, rafters, or wood framing

members, the holes shall be bored so that the edge of the hole is not less than 1 1/4 inch from the nearest edge of the wood member. Where this distance cannot be maintained, the cable shall be protected from penetration by screws or nails by a steel plate at least 1/16th inch thick and of appropriate length and width, protective sleeves, or equivalent. 14. At all boxes there shall be a minimum wire length of 6 inches, with at least 3 inches outside the box.

15. All splices, including ground wires, shall be made with an approved splice cap or wire nut and shall be made in approved electrical boxes or enclosures.

22. Wiring is only permitted to travel through the cold-air returns but not other ducts, plenums, or other air handling spaces. If Type NM cable must be installed in spaces used for cold air returns, NM is only permitted to pass through perpendicular to the long dimension of such spaces.

4. All electrical equipment, metal boxes, cover plates, and plaster rings shall be grounded. All switches, including dimmer switches, shall be arounded.

16. Each wire entering a box and terminating or splicing therein is counted as one wire. Interior box clamps all count as one conductor. Each device shall count as two conductors based on the largest conductor connected to it.

17. Unused openings in boxes shall be effectively closed. When openings in non-metallic boxes are broken out and not used, the entire box must be replaced.

17. Outer jacket of NM cable shall extend into the box a minimum of 1 19. Junction boxes shall be installed so that the wiring contained in

them can be rendered accessible without removing any part of the building.

23. All electrical boxes shall be rigidly secured to the building structure. 25. In completed installations, each lighting box shall have a lampholder, canopy or device with an appropriate cover plate. 27. When boxes are used as the sole support for a ceiling paddle fan, they shall be listed and labeled for such use. Fans that exceed 50 pounds must be supported independently of the box.

24. Bends is Romex cable shall be made so the radius of the curve of the inner edge of the bend is not smaller than 5 times the diameter of the cable.

18. Type NM (nonmetallic) cable shall be secured at intervals not exceeding 4 1/2 feet and within 12 inches of each box. However, if a single gang device box without a clamp is used, the cable shall be secured within 8 inches of the box

26. Maximum bends of conduit shall not exceed 360 degrees total.

370 2. Nonmetallic sheathed cable shall be supported every 4.5 feet and within 12 inches of every box.

4. Metal boxes, cover plates, and plaster rings shall be grounded. Switches, including dimmer switches, shall be grounded and shall provide a means to around metal cover plates. 16. The volume of electrical boxes shall be sufficient for the number of

conductors, devices, and cable clamps contained within the box. Nonmetallic boxes are marked with their cubic inch capacity: Conductor Size 

Conductor Size	14 gauge	12 gauge
For each separate insulated wire	2 cu in	2.25 cu in
All ground wires (combined)	2 cu in	2.25 cu in
For each device (switch/receptacle)	4 cu in	4.5 cu in
All internal cable clamps (combined)	2 cu in	2.25 cu in

23. All electrical boxes shall be securely supported by the building structure.

25. In a completed installation, all outlet boxes shall have a cover, canopy for a lighting fixture, or device with an appropriate plate. 29. Do not conceal junction boxes in walls, ceilings, or non-accessible attics and under-floor areas.

#### 404

2. Switches or circuit breakers shall not disconnect the grounded conductor of a circuit.

9. All electrical equipment, metal boxes, cover plates, and plaster rings shall be grounded. All switches, including dimmer switches, shall be grounded.

## 422

33. Cord connected, built-in kitchen appliances are allowed, but the receptacle must be accessible without removing the appliance.

## Electrical specifications

Part 1 - general A. Scope

- 1. Furnish and install a completely wired and operational electrical system as shown on the drawings and specified herein, including but not limited to, these major items.
- A. Lighting fixtures as indicated and specified on the plans.
- C. Telephone outlets and as indicated.
- D. and outlets for alarm, computer, and security systems as indicated. E. Control wiring for electrical systems.
- 2. Provide permits and inspections as required. B. Codes, regulations and standards
- latest adopted edition of the following codes and with the requirements of the power and telephone companies
- furnishing services to this installation. 2. The following industry standards, specifications and codes are minimum requirements: A. NEMA-national electrical manufacturer's association.
- B. NEC-national electrical code C. UI-underwriter laboratories incorporated standards
- D. Ansi-american national standards institute
- E. IEEE-institute of electrical and electronics engineers
- F. NESC-national electrical safety code Inspection of site
- . Prior to submitting a bid for electrical work, the electrical contractor shall visit the site of the proposed construction and shall thoroughly acquaint himself with existing utilities and working conditions to be encountered, etc. Allowance will not be made for non-compliance with this condition after bidding. General workmanship
- 1. All work shall be executed and finished in a practical manner and shall present a neat and workmanlike appearance when completed.
- 2. All work must be acceptable to the owner. Where a detailed method of installing the work is not specified or indicated, install work as directed by the owner.
- E. Related work by others 1. Electrical drawings identify utility service requirements for power, telephone, and cable tv within and up to five feet outside the building. Utility electrical service transformer(s), where shown on the site plan, are for information only and indicate the preferred point of service. Utility systems, pull boxes, and other structures, where shown on the site plan, are also for information only and indicated preferred routing. The electrical contractor shall refer to utility service drawings for actual utility service requirements for this project. Utility systems shall be constructed in accordance with the approved utility service drawings. It shall be the electrical contractor's responsibility to contact and follow-up with all utility companies to obtain both preliminary and final design drawings for this
  - proiect. A. The electrical contractor shall coordinate the installation of the electrical service entrance, meet all power company requirements, and shall pay all utility company charges. B. The local telephone company will furnish and install all telephone wiring and equipment and will make all final
  - telephone connections. The electrical contractor shall coordinate the installation of the telephone service entrance, meet all telephone requirements, and shall pay all utility company charges C. The electrical contractor shall coordinate the installation of the cable service entrance, meet all cable company requirements, and shall pay all utility company charges.
- Cooperation with other contractors 1. Cooperate with the other trades so that the installation of the electrical outlets and equipment will be properly coordinated., fixtures, and other equipment locations shall be checked with the other trades to avoid conflict with
- the piping, ductwork, steel beams, or other obstructions. 2. Carefully check the locations of the outlet boxes and determine that they have not been disturbed during the
- installation of materials of other trades. 3. Coordinate the location of trenches and conduits for utility services and other disciplines with the general contractor.
- G. Mechanical and electrical coordination
- 1. Any device which carries the full load current of the electrically driven machinery, as opposed to the control of instrumentation current in the holding coil, is a power circuit and is the responsibility of the electrical contractor. Control or instrumentation circuits connecting holding coils to the control system as specified by the mechanical engineer are the responsibility of the mechanical contractor. 2. The power circuit is defined as all devices necessary to operate, and as required by code to protect and service
- the unit, including branch circuit protective devices, disconnects, magnetic motor starters with running overload and single phasing protection, magnetic contactors, etc. 3. The control or instrumentation circuit is defined as all devices necessary to interface the electrical power circuit
- with the control system as specified by the mechanical engineer including , boxes, fittings, conductors, electricpneumatic switches, pneumatic-electric switches, electrical and pneumatic relays, pneumatic tubing, etc. 4. The electrical contractor shall be responsible to provide 120v duple receptacles within 25 feet of all roof mounted equipment, per NEC 210.63.
- H. Drawings 1. The drawings indicate the general arrangement and locations of the electrical work. Information presented on these drawings are as accurate as planning can determine, but tield veritication ot all dimensions, locations, levels etc., to suit field conditions is required. Review all architectural, structural, and mechanical drawings and adjust all work to meet the requirements of conditions shown. The architectural drawings shall take precedence over all other drawings. Discrepancies between different plans, or between drawings and specifications, or regulations and codes governing the installation shall be brought to the attention of the engineer in writing before the date of bid opening. Where discrepancies or conflicts occur, the bid shall reflect the most stringent requirements. Electrical contractor shall be responsible to field measure and confirm mounting heights and location of electrical equipment with respect to counters, etc. Do not scale distances off the electrical drawings. Use actual building dimensions.
- 2. Upon completion of the work under these drawings and specifications, the electrical contractor shall provide the owner with a complete set of marked-up electrical drawings showing the "as-built" condition of the work. Bond prints of the drawings required will be furnished by the owner, for this purpose. 3. All operating instructions, parts lists and spare parts for material and equipment furnished and/or installed by the
- electrical contractor shall be turned over to the owner (three copies). I. Shop drawings and approvals 1. Submittals shall consist of detailed shop drawings, specifications, block wiring diagrams, "catalog cuts" and data sheets containing physical and dimensional information, performance data, electrical characteristics, materials used in fabrication, and material finish. Clearly indicate by arrows or brackets precisely what is being submitted on
- and those optional accessories which are included and those optional accessories which are included and those which are excluded 2. Each submittal shall be accompanied shall bear a stamp stating that the submittal must be thoroughly reviewed by the contractor and is in full compliance with the requirements of contract documents. Cover letters shall list in full the items and data submitted. Failure to comply with these requirements shall constitute grounds for rejection of
- data. 3. The contractor shall submit detailed drawings of all electrical equipment and generator rooms, yards, and utility areas. Minimum scale: 1/4"-1'-0".
- 4. As part of the equipment submittals, the manufacturer shall provide anchorage calculations for floor and wall mounted electrical equipment. Structural calculations shall be prepared and signed by registered structural engineer in California.
- 5. All resubmittals shall include a cover letter that lists the action taken and revisions made to every drawing and equipment data sheet in response to submittal review comments. Failure to include this cover letter will constitute rejection of the resubmittal package.
- 6. Contractor shall submit short circuit and coordination studies signed by a registered electrical engineer. Studies shall be performed in acceptance with IEEE guidelines. Contractor shall be submitted for architect-engineer review prior to ordering and installing any equipment. Contractor shall ensure that the actual feeder lengths match studies (revise studies if necessary). Service equipment markings as required per NEC 110.24 shall be based on contractor submitted studies.
- 7. Submit conduits; fittings; outlet pull and junction boxes; safety switches; fuses; transformers; panelboards; switchboards; circuit breakers; lighting control system/devices; and fire alarm systems. J. Substitutions
- 1. All requests for substitutions shall conform to the general requirements and procedure outlined in division 1.
- 2. Where items are noted as "or equal", a product of equal design, construction and performance will be considered. 3. Substitutions shall be equal, in the opinion of the owner's representative, to the specified product. 4. The burden of proof of equality of a proposed substitution for a specified item shall be upon the electrical contractor. Electrical contractor shall support its request with sufficient test data, photometric analysis, detailed
- breakdown defining cost savings, and other means to permit the architect and/or engineer to make a fair and equitable decision on the merits of the proposed substitution. Any item by a manufacturer other than those specified, or a of brand name or model number will be considered a substitution. The architect and/or engineer will be the sole judge of whether or not the substitution is equal in quality, utility and economy to that specified.
- 5. Approval of a substitution shall not relieve electrical contractor from responsibility for compliance with all requirements of the contract documents. Electrical contractor shall bear the expense for any changes in other parts of this work or other work caused by the proposed substitution.
- 6. If architect and/or engineer rejects electrical contractor's substitute item on the first submittal, electrical contractor may make only one additional request for substitution in the same category.
- K. Guarantee & testing 1. Guarantee all material furnished and all workmanship performed for a period of one year from the date of final acceptance of the work. Any defects developing within this period, traceable to material furnished as part of this
- section or workmanship performed hereunder, shall be corrected as necessary at no cost to the owner. 2. System shall be tested for proper operation. If test show that work is defective, electrical contractor shall make corrections as necessary at no cost to the owner.
- L. Labeling
- 1. Provide engraved name plates on switchboards, panel boards, disconnect switches, motor control centers, transformers, etc., indicating equipment designated (or designation of equipment served) and voltage. M. Housekeeping pads
- 1. Provide 4-inch-high concrete equipment pads for all floor-mounted equipment including switchboards, motor control center, transformers, etc.

B. Electrical panels, controls, service, disconnects, conduit wiring, etc., for all outlets and equipment.

1. The installation shall comply with applicable local and state codes and ordinances, with the regulations of the

N. Materials

- 1. All materials shall be new and of quality as specified on the plans or specifications and must carry the underwriter's laboratories approval covering the purpose for which they are used, in addition to meeting all recruitments of the current applicable codes and regulations.
- 2. Electrical contractor shall be responsible for replacing equipment which is damaged due to incorrect field wiring provided under this section or factory wiring in equipment provided under this section. O. Storage and handling of material
- 1. Deliver materials and equipment to the project in the manufacturer's original, unopened, labeled containers. Protect against moisture, tampering, or damage from improper handling or storage. Electrical contractor shall protect and be responsible for any damage to work or materials until final acceptance by the owner, and shall make good without cost to the owner, any damage or loss that may occur during this period. 2. Arrange for timely delivery of materials and equipment to the jobsite in order to minimize the length of time
- between delivery and installation. 3. Arrange for timely delivery of owner supplied materials and equipment to the jobsite in order to minimize the length
- of time between delivery and installation. 4. Cover and protect any material which may be affected by the weather while in transit or stored at the project site. Any material found defective or not installed in accordance with the contract documents may be rejected by the
- enaineer 5. No electrical work shall be installed in areas where other trades' work might cause physical damage to wires, , equipment, boxes, or fittings until the other trade's work has been completed. Any equipment or materials which become damaged shall be removed and replaced at no extra cost to the owner.
- P. Clean-up 1. Keep the premises free from accumulation of waste materials, or rubbish caused by employees or work under this division of the specifications. At the completion of the work, remove all surplus materials, tools, etc., and leave the premises "broom-clean".
- Q. Excavation, cutting and fitting
- 1. Perform the excavation, cutting, fitting, repairing, and finishing of the work necessary for the installation of electrical equipment. However, no cutting of the work of other trades or of any structural member shall be done without the consent of the architect.
- R. Excavation and backfill 1. Perform all excavation and backfilling required for work performed under this division of the specifications. Trench bottoms shall be graded true and free from stones or soft spots. Use excavated materials for backfill unless off site materials are deemed necessary by the architect. Trenching and backfilling for electrical and telephone utility services to building shall be provided by the electrical contractor in accordance with utility company requirements.
- 2. Verify location of existing underground utilities prior to trenching.

Part 2 - products and execution

- A. Conduit a. Instead of using conduit, Non-Metallic sheathed cable (NM-B) may be used in residential applications in compliance with IRC allowable wiring methods.
- b. GRC may be used in all areas. IMC may be used in indoor locations not in contact with earth. EMT may be used in indoor locations not in contact with earth, not in concrete slabs or walls and not subject to damage. PVC may be used in or below concrete and direct buried in earth. Liquid-tight flexible steel conduit shall be for outdoor final connections to equipment not to exceed 36".
- c. Cover metallic conduit in contact with earth or fill with polyethylene tape spiral wrapped, 1/2" lapped to provide double thickness. Tape shall be scotch no. 50 tape. Conduit and ducts not under buildings and feeder ducts shall be installed per NEC 300.5, except that the bends in conduit larger than 1" in diameter shall be made with galvanized steel conduit treated as noted above. Make joints with compound to be watertight.
- d. Any installed conduit sizes shall be as required by code and as indicated or specified on drawings. No conduit smaller than 3/4-inch trade size shall be used.
- e. Penetration through floor slabs where subject to damage shall be in wrapped rigid steel. Schedule 40 PVC elbows and penetrations may be used in slab on grade where penetrations occur in protected areas (walls, electrical rooms, etc.).
- f. Wire, Conduits and outlets shall be concealed with the building structure, except that certain motor and lighting feeder conduits may be run exposed in certain areas as indicated on the drawings. Conduit shown to be installed in cabinets, counters, and casework shall be run as directed by the architect.
- g. Any conduit serving roof mounted equipment and devices including HVAC equipment, GFCI maintenance receptacles and duct type smoke detectors shall be routed in the ceiling space. Conduit shall penetrate roof at equipment locations only no wiring or conduit shall be installed horizontally across roof surface. h. Any flexible metallic and non-metallic conduit systems shall have a code sized copper ground conductor.
- Increase conduit size as required. i. Any empty conduit systems shall have a 200-pound test pull cord installed to facilitate installation of future wire. B. Fittinas
- 1. EMT-fittings and conduit bodies shall be steel, malleable iron or die cast compression or set screw type. 2. IMC and GRC-shall be steel or malleable iron type and shall engage a minimum of five (5) threads. C. Outlet, pull and junction boxes
- . Pull and/or junction boxes shall be installed wherever shown on the drawings or as required by code.
- 2. Each Switch, Light, Receptacle, Junction, Pull and Outlet box shall be of the one-piece, knockout type, in general 4-inch square, 2 1/8-inch with plaster ring. Plaster rings shall be set to provide not more than 1/8" from wall surface to ring. In no case shall plaster ring project beyond surface of wall. Single gang rings similar to steel city 52050 shall be used for 4" boxes in unfinished brick. Number 180 boxes may be used for unfinished masonry flush wall outlets. Center all outlet boxes in block course.
- 3. Boxes installed in poured cement floors shall be flush type cast iron with watertight gasketed covers gray metallic finish. Where boxes are installed in floors with tile or carpet floor covering, covers shall be of the recessed type to accommodate the floor covering
- 4. Boxes installed for the alarm, computer and security system shall be provided with appropriate cover plates. 5. Pull boxes shall be the types, size and design as approved by the NEC for the class of installation required.
- 6. Pull boxes and outlet boxes shall be sized by the electrical contractor as required by the NEC based on number of conductors, yokes, straps, etc., used in the installation.
- D. Wire
- 1. Match building standards if applicable in an existing building condition, unless otherwise follow the specifications below. 2. Conductor size shown on the drawings based on copper wire. Unless otherwise specified, all wire shall be 75-
- degree c type thwn or xhhw. All branch circuit and feeder wiring shall be copper. Where raceway and cables exposed to direct sunlight on or above rooftops, provide type xhhw-2 insulated conductors.
- 3. Wires shall be marked with color to simplify circuit identification. Unless otherwise required by local ordinances, identification shall be as follows: A. 120/208v and 120/240v - phase a: black, phase b: red, phase c: blue, neutral: white, ground: green.
- B. 277/480v phase a: brown, phase b: orange, phase c: yellow, neutral: gray, ground: green. 4. The wire shall be #12 AWG unless otherwise indicated.
- 5. No wire shall be installed in a conduit system until the conduit system is complete. Use U.I. Approved lubricant to
- facilitate the installation of the conductors in the conduit system. 6. Conductors no. 10 AWG and smaller shall be solid. Conductors larger than no. 10 AWG shall be stranded. 7. MC cable is approved only for light fixture "whips" no longer than 6".
- E. Wiring devices 1. Switches: wall switches shall be specification grade ac silent type switches 20a, 120 - 277 volt. Hubbell 1221 (sp), 1222 (dp), 1223 (3-way) and 1224 (4-way). Dimmers shall be specification grade with reset slide control. Color shall
- be as approved by the architect/owner. Match building standard (if existing). 2. Receptacles: duplex type outlets shall be heavy duty, specification grade NEMA 5-20r, 20a, 120v grounded type equal to hubbell 5362. Isolated ground outlets shall be equal to hubbell ig5362. Special application receptacles shall be as indicated on plans and verified with equipment supplier. Color shall be as approved by the architect/owner. Match building standard (if existing).
- Weatherproof receptacles: covers shall be hubbell wpfs26 with 5362 duplex outlet or equal.
- 4. GFCI receptacles: shall be hubbell gf5362. GFCI receptacles shall be used in all outdoor applications as well as
- those placed within 6' of water source and all other NEC required locations. 5. Mounting heights: switches - +48 inches. Receptacles - +18 inches. Communication devices - +18 inches. Fire alarm devices - as required by ADA, NFPA 72 or authority having jurisdiction. All mounting heights are to centerline of
- device. 6. Device plates shall be equal to sierra smooth-line plastic wall plates. Color shall be as approved by the
- architect/owner. Match building standard (if existing). 7. In all cases, switches controlling lighting are to be located on the strike side of doors. Locations indicated for switch and outlets are approximate. Owner may make minor relocations at no additional charge.
- F. Lighting fixtures 1. Coordinate the final location of fixtures shown diagrammatically on the drawings with other trades in order to avoid interferences. Relocate fixtures as required as part of the work under this division if new location is within a
- five-foot radius of location shown. 2. Provide all lighting fixtures, wired and connected. The drawings indicate the fixtures for each location. Electrical contractor shall verify fixture locations, mounting requirement and u.l. Labeling of all fixtures prior to ordering.
- Include all accessories need for a complete installation including mounting clips, plaster framers, hangers, and hardware in base bid. Provide lamps for all fixtures. Verify ceiling construction before ordering recessed units. 3. Adjustable fixtures shall be located and properly aimed as directed by the architect or the lighting designer.
- 4. Support recessed fixture from ceiling structural support per adopted building codes. 5. All fixtures to bear the U.I. Label. All outdoor fixtures shall be U.I. Labeled for wet or damp location as defined by NEC article 100.

- Ρ.

G. Lamps

H. Led drivers

J. Fuses

Κ.

1. Lamps shall be by the same manufacturer. Lamps shall be manufactured by GE, Philips, Ushio, Nichia, Samsung led or cree

2. All lamps shall be light emitting diode (led) type - minimum 80 cri indoors and 70 cri outdoors, 3500k (u.n.o.), 50,000 rated lamp hours. LEDs must be from the same manufacturer and batch.

1. Drivers shall be easily accessible without the use of special tools. Luminaires shall be capable of being operated by standard motion/vacancy sensors, daylight sensors, and dimmers. Dimming for 0-10 volt dc control circuits minimum. Drivers shall be specifically compatible with lighting control system being provided. 2. Temperature rating; -20 degrees Celsius minimum starting temperature. Luminaires accessories shall be able to withstand temperatures in excess of 110 Fahrenheit degrees.

90-percent minimum power factor, 50-60 hz frequency, total harmonic distortion less that 20-percent, led and driver life expectancy of 50,000 minimum projected hours at 6,000 hours testing for both LEDs and drivers; luminaries in contact with insulation material sall be ic rated; rated for dry and damp locations 4. Approved driver manufacturers include Osram, Philips, Kenall, Eldoled, general electric, and other only if approved.

Safety switches 1. Safety switches shall be general duty type, 250 volt for 208 volt equipment and heavy duty type, 600 volt for 480 volt equipment. Safety switches shall have the number of poles required. Wire terminations shall be listed as specified by the NEC. Safety switches for air conditioning use shall be of the fusible type where recommended by equipment manufacturer. Fusible switches shall accept class 'r' fuses only and will reject all other types. The switch size, number of poles and voltage rating shall be as required by code and as indicated on the drawings. Where outside the building, the switches shall be type NEMA 3r weatherproof. All switches shall be lockable. 2. Provide dymo-tape tag inside cover of each fusible switch, indicating size and type of fuses provided.

1. Fuses shall be dual element time delay type, as manufactured by bussman mfg. Company, or as indicated or required by equipment supplied.

2. Provide two (2) sets of three (3) spare fuses for each size and type provided on this project. Install fuses in a hinged door, sheet metal storage cabinet equipment with clips or cubicles, each marked with size and type of fuse stored therein. Provide nameplate "spare fuses." install in location as directed by owner.

Service entrance 1. The service entrance equipment size, voltage and rating shall be as indicated on the drawings. Provide copper busing unless otherwise noted or permitted. Equipment shall carry the u.l. Label and shall conform to the power company regulations

2. Electrical contractor is responsible to verify and confirm that equipment submitted shall fit within the allotted space requirements shown on the plans. Drawings indicate maximum dimensions for the switchboards including clearances between switchboards on adjacent surfaces and other items. Comply with maximum dimensions. If any space or size discrepancies are anticipated, it is the electrical contractor's responsibility to notify the engineer prior to submittal. Once the submittals have been approved it is the electrical contractor's responsibility to install the equipment within the allotted space at no additional cost to the owner.

3. Service entrance equipment shall be manufactured by general electric, square d, cutler-hammer, siemens or approved equal. 4. All overcurrent protection devices and electrical distribution equipment shall be fully (100%) rated for available

fault current indicated. Series rated devices are note acceptable. Transformers

1. Transformers shall be dry type with copper windings, 115-degree temperature rise, and doe10 cfr part 431 appendix a of subpart k 2016. Energy efficiency under doe 2016 requirements is to be energy verified by u.l. 2. All transformers shall be provided with class 220-degree Celsius insulation system and shall be completely enclosed

except for ventilation openings. 3. Transformers shall be 115-degree temperature rise above 40-degree Celsius ambient temperature. 4. Transformers shall be equipment with 2-1/2% (2 above and 2 below normal voltage) primary taps. M. Panelboards

1. Circuit breaker type as indicated on drawings. All panels shall have panelboard type construction with bolt-on circuit breakers. Panels indicated as load centers shall have plug-on circuit breakers.

2. Busing shall be copper unless otherwise noted or permitted. 3. Manufacturers shall be general electric, square d, cutler-hammer, siemens with voltage, sizes and rating as indicated on drawings. All panelboards in the facility shall be by the same manufacturer.

4. The circuit breakers shall be operable in any position and be removable from the front of the panelboard without disturbing the adjacent units. Branch breakers shall be of such design that combination of single-pole, double-pole and three-pole breakers can be assembled on the same panel. Each branch circuit shall be clearly numbered. Branch and main terminals shall be of the solderless type. Handle ties to form multi-pole breakers are note acceptable.

5. Wire termination for panelboards, load centers and circuit breakers shall be listed as specified by the NEC. 6. Provide a printed circuit index behind clear plastic cover on inside of door. Information shall include room and type of load served. All circuit breakers shall be identified, including spares. Index card frame shall be metal, secured to

7. Where panelboards are installed flush with the walls, extend empty conduits from the panelboard to an accessible space above or below. Provide 3/4" (minimum size) conduit for every three single spare circuit breakers or space or equivalent multi-pole arrangement, or fraction thereof, but not less than two conduits for each panelboard. N. System grounding

1. Grounding shall comply with requirements of article 250. All exposed noncurrent-carrying metallic parts of electrical equipment, metallic raceway systems, metallic cable armor, grounding conductor of nonmetallic sheathed cables, grounding conductor in nonmetallic raceways, and grounded conductors of the wiring system shall be grounded.

2. The grounded conductor (neutral) of the wiring system shall be connected to the system grounding conductor at a single place in each system by removable bonding umpers, sized according to the applicable provisions of the NEC. The grounded conductor (neutral) to the grounding conductor connection shall be located in the enclosure for the system's overcurrent protection or where otherwise indicated on the plans or specifications. 3. Ground bus separate from the neutral bus shall be provided in all switchboards and panelboards. Ground bus shall

be retorqued (checked) prior to energizing equipment per manufacturer's recommendations. 4. Ground buses and neutral buses in all distribution panels, switchboards, panelboards and those provided in any equipment shall be isolated except where required to be connected as specified above for the service entrance and in transformer terminal compartments.

5. When indicated on the drawings, equipment grounding conductors shall be extended from the ground bus in the distribution equipment to the receptacle, fixture or device lugs where they are provided. When not provided, they shall be connected to equipment enclosures. The connection shall be arranged such that removal of the receptacles, the equipment ground conductors, or the ground jumpers from ground busing shall not affect the ground system.

6. Raceways may not be used as a grounding conductor for power and lighting circuits. Every conduit supplying power and lighting circuits shall have a separate code sized green ground wire installed in the conduit to ensure a continuous grounding path.

7. In inaccessible locations make connections by exothermic weld process. 8. In accessible locations, connection shall be made with approved bolted bronze grounding devices.

O. Equipment connections

1. All motors shall be wired to conform with manufacturer's recommendations and with applicable codes. Furnish necessary materials, such as wire, fittings, etc. Required to connect motor. However, motors, controls, etc. Shall be furnished by the supplier of the driven equipment. Verify equipment location and sizes with the trade supplying the motor before installing the wiring or outlets.

2. Final connection to all HVAC or motor loads from load side of disconnect shall be made using copper wire only, aluminum wire is not acceptable.

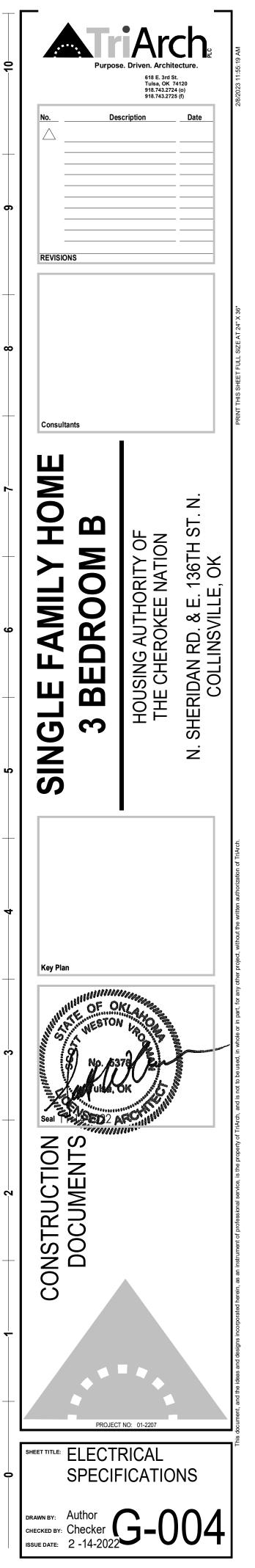
Communication systems

1. For all communication outlets provide double gang back box with single gang plaster ring. Provide blank cover plates for all unused boxes.

2. Provide 3/4" fire rated plywood for telephone terminal.

# ELECTRICAL LAYOUT AND DESIGN IS **DELEGATED TO SUBCONTRACTOR.** SUBMIT LAYOUT FOR REVIEW AND **COORDINATION WITH OTHER TRADES**

**PROVIDED ELECTRICAL PLAN IS FOR BIDDING REFERENCE ONLY** 



## <u>General:</u>

General provisions of the contract including general and supplementary conditions and general requ of this section.

## Scope:

The base bid includes furnishing all materials, labor, tools, and equipment and the performance of al a complete heating and air conditioning system as outlined herein.

## Quality assurance:

Provide a complete installation in conformance with the following standards. Aga american gas association

Ashrae american society of heating, refrigerating and air conditioning engineers Nfpa

national fire protection association Smacna sheet metal and air conditioning contractors national association.

Statewide building code

Imc international mechanical code

Work not included:

the following work is not included under this contract: -electric power wiring of motors

-starters and disconnect switches except as hereinafter specified -field painting of equipment except as hereinafter specified

#### Permits, fees, inspections, laws, and regulations:

permits and fees of every nature required in connection with this work shall be obtained and paid for shall also pay for all the installation fees and similar charges. Laws and regulations, which bear upon branches of this work shall be complied with by this contractor and are hereby made a part of this co such laws require to be inspected, shall be submitted to the proper public official for inspection and approval must be furnished.

#### <u>Work in existing spaces:</u>

- A. General: care shall be taken when working in existing spaces so as not to damage existing w work is being performed.
- B. Ceilings: where work is being performed above ceilings, and the architectural drawings do no modificationsby the general contractor, it shall be the responsibility of this contractor to remov ceilings where work is being performed. In those instances, all repair and installation of new shall be the responsibility of this contractor. Match existing finishes.
- C. Walls & floors: it shall be the responsibility of this contractor to patch existing walls and floors of finishes where work is being removed or installed and patching is being performed, unless not architectural drawings.

Tests and adjustments:

A. No ducts, piping, fixtures or equipment shall be concealed or covered until they have been in by the architect and the inspector who shall be notified by the contractor when the work is re B. Work shall be completely installed, tested and leak tight before inspection is required. All test the satisfaction of those making the inspection.

## Metal ductwork

Ductwork materials Exposed ductwork materials: No Exposed ductwork Sheet metal: No sheet metal ductwork

Miscellaneous ductwork materials

- A. Volume dampers: integrated into diffusors. B. Fittings: provide radius type fittings fabricated of multiple sections with maximum 15 deg. Chc section. Unless specifically detailed otherwise, use 45 deg. Laterals and 45 deg. Elbows for bra connections. Where 90 deg. Branches are indicated, provide conical type tees.
- C. Duct sealant: non-hardening, non-migrating mastic, or liquid elastic sealant, type applicable fabrication/installation detail, as compounded and recommended by manufacturer specific seams in ductwork.
- D. Duct cement: non-hardening migrating mastic or liquid neoprene-based cement, type applic fabrication/installation detail, as compounded and recommended by manufacturer specific components, or longitudinal seams in ductwork.
- E. Ductwork support materials: except as otherwise indicated, provide hot-dipped galvanized rods, straps, trim and angles for support of ductwork.

### Hard ducts used through out:

- 1. Either spiral-wound spring steel with flameproof vinyl sheathing, or corrugated aluminum. Flex i relief or exhaust applications. The Hard ducts indicated for use in the HVAC. System shall confe of ul 181 for class 0 or class 1 Hard air ducts and shall be so identified.
- 2. Hard ducts: where installed in unconditioned spaces other than return air plenums, provide Continuous flexible fiberglass sheath with vinyl vapor barrier jacket. 3. Not Used

Fabrication Not Used

#### Lined duct Not Used

Duct liner adhesive:

Not Used

Installation of metal ductwork Not Used

	Installation of duct liner Not Used	Part 2 -p
equirements apply to work	Installation of Hard ducts Maximum length: for any duct run using Hard ductwork. Installation shall have smooth full radius turns down to diffuser.	Equipm A. Indo horizoni
f all work required to install	<u>Access panels:</u> Furnish all access panels required for proper servicing of equipment. Provide access panels for all concealed valves, vents,	system. contac conder
	controls and cleanout doors, and sprinkler devices required by NFPA. Provide frame as required for finish. Furnish panels to general contractor. Exact locations to be approved by the architect. Minimum size to be 12" x 12", units to be 16-gauge steel, locking device shall be screwdriver cam locks.	B. Base 1.1. Cal 1.2. Cal
	Hangers and supports: Contractor to hire a structural engineer to verify the integrity of the roof deck and existing RTU sub framing, if any exists. Additional structural requirements are the responsibility of this contractor. Submit to the landlord in writing a signed and sealed letter from a licensed structural engineer indicating adequate structural support beneath the RTU's. Include drawings and calculations for any supplemental framing required. Do not place units until authorized by the landlord.	immobi astm sto 1.3. Unit have co toward
	Support all piping, ductwork and equipment by hangers or brackets. Furnish structural steel members where required to support piping and equipment. No portion of piping or valves shall be supported by equipment.	1.4. Unit from eit
	Ductwork -support by means of hangers as follows: Duct width hanger size and type max. Spacing 30 or less (#16 gage) 8 31 to 60 (#14 gage) 8 61 to 90 3/8" dia. Rod 8	C. Coils 1.1. Coi expansi same si 1.2. Coi
for by this contractor who on or affect the various	A pair of hangers shall be located at every transverse joint and elsewhere according to the table. <u>Ceiling air diffusers:</u>	externa 1.3. Coi to the c
contract. All work, which d a certificate of final	<u>Diffuser faces:</u> Round: Not Used Square: square housing, core of square concentric louvers, square or round duct connection.	D. Moto 1.1. Fan factory
walls and ceilings where	Linear: Not Used <u>Diffuser mountings:</u>	1.2. Inde protect are des
o not indicate ceiling nove and replace existing v grid, ceiling panels, etc	Surface mount: diffuser shall have rolled edge below finished ceiling for surface mounting or diffuser shall be furnished with accessory plaster frame. Lay-in: Not Used	rating th 1.3. All i energy
rs and match existing loted otherwise on the	<u>Diffuser dampers:</u> Opposed blade dampers: multiple opposed blade dampers connected to linkage adjustable from face of diffuser with key. Integral: combination volume control and pattern adjustment for linear diffusers.	E. Speci 1.1. Alte externa 1.2. Exte
n inspected and approved	Diffuser acoustic performance NC less than or equal to 25	F. Electr
n inspected and approved ready for inspection. ests shall be repeated to	<u>Diffuser accessories:</u> Plaster ring: perimeter ring designed to act as plaster stop and diffuser anchor. Titus trm frame kit	supplied agency wiring, 2 supplied
	<u>Diffuser finishes:</u> White enamel: semi-gloss white enamel prime finish.	vertical distribut
	<u>Manufacturer</u> : Subject to compliance with requirements, provide diffusers of one of the following:	1.3. Ret
Change of direction per oranch takeoff	Anemostat products div., dynamics corp. Of America. Metal-aire Titus products div., philips industries, inc. Tuttle and bailey.	1.1. Cor 1.2. Cor throttlin 1.3. Cor
ble for fically for sealing joints and	Price <u>Ceiling &amp; wall registers &amp; grilles:</u>	and wit Install p
plicable for fically for cementing fitting	Steel construction: manufacturer's standard stamped sheet steel frame and adjustable blades.	Genero A. Syste
d steel fasteners, anchors,	Opposed blade: adjustable opposed-blade damper assembly, key operated from face of register.	1.1. Out rooftop conder
ex is not allowed for return,	White enamel: semi-gloss white enamel prime finish. Register and grille acoustic performance: nc less than or equal to 25	as the c 1.2. Unit 1.3. Unit
nform to the requirements	<u>Manufacturer</u> : subject to compliance with requirements, provide diffusers of one of the following: Anemostat products div., dynamics corp. Of america.	operati
e 1" thick 1-1/2 lb.	Metal-aire Titus products div., philips industries, inc. Tuttle and bailey. Price	B. Quali 1.1. Unit 1.2. Unit 1.3. Unit
	Split system dx with auxilliary electric heat or equal (submittal required)	1.4. Unit 1.5. Air-( 1980 ps
	<u>Warranty:</u> Warranty on compressor and heat exchanger: provide written warranty, signed by manufacturer, agreeing to replace/repair, within warranty period, compressors and heat exchangers with inadequate and defective materials and workmanship, including leakage, breakage, improper assembly, or failure to perform as required; provided manufacturer's	1.6. Unit C. Deliv
	instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period. Replacement is limited to component replacement only, and does not include labor for removal and reinstallation. Warranty period: 5 years from date of owner acceptance.	1.1. Unit recomr D. Oper
	Part 1 -general System description	1.1. Who and do Unit shc
	A. Indoor, 1.1. Split-system air-handling unit for use in commercial or residential split systems. Unit shall have a multi-position design and shall be capable of horizontal installation in a ceiling, without ductwork.	<u>Electric</u> <u>Heaters</u>
	1.2. Unit must be designed to operate with r-410a refrigerant circuit with a matching air-cooled condensing unit, for matched systems approved by the manufacturer.	Genera non glo disconr
	B. Quality assurance 1.1. All coils shall be designed and tested in accordance with ASHRAE 15 safety code for mechanical refrigeration, latest edition.	Provide Manufc Berko
	<ol> <li>1.2. Unit shall be constructed in accordance with ul and etl, Canada, standards and shall carry the ul and Canada, labels.</li> <li>1.3. Unit insulation and adhesive shall comply with nfpa-90a requirements for flame spread and smoke generation. Insulation shall contain an epa-reaistered immobilized antimicrobial agent to effectively resist the arowth of bacteria and fungi as</li> </ol>	Qmark Markel Raywal

shall contain an epa-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with ASTM standards g21 and 22. 1.4. Unit shall be manufactured in a facility registered to the iso 9001:2000 manufacturing quality standard.

1.5. Direct-expansion coils shall be leak tested at 150 psig and pressure tested at 650 psig and qualified to ul burst test at 1980 1.6. Unit will be certified for capacity and efficiency and listed in the latest ahri consumer's directory of certified efficiency

ratings.

Delivery and storage

A. Units shall be stored and handled per manufacturer's recommendations.

## MECHANICAL LAYOUT AND DESIGN IS DELEGATED TO SUBCONTRACTOR. SUBMIT LAYOUT FOR REVIEW AND **COORDINATION WITH OTHER TRADES**

# PROVIDED MECHANICAL PLAN IS FOR BIDDING REFERENCE ONLY

Part 2 -products (indoor unit)

### Equipment

A. Indoor mounted, draw-thru, split-system air-handling unit that can be used with or without ductwork in a suspended horizontal configuration or free-standing vertical configuration. Unit shall be indoor component of a gas heat exchanger system. Unit shall consist of forward-curved belt-driven centrifugal fan(s), motor and drive assembly, prewired fan motor contactor, factory-installed refrigerant metering devices, bypass check valves, cooling coil, 2-in. Disposable air filters, and condensate drain pans for vertical or horizontal configurations.

#### B. Base unit:

astm standards g21 and 22.

C. Coils: same side of the coil. external adjustment.

#### D. Motor:

1.1. Fan motor of the size and electrical characteristics specified on the equipment schedule shall be factory-supplied and factory-installed. 1.2. Indoor-fan Motor shall have permanently lubricated, sealed bearings and inherent automatic-reset thermal overload protection (motors smaller than 5 hp) or manual reset calibrated circuit breakers (motors equal or larger than 5 hp). Motors are designed and qualified in the "air-over" location downstream of the cooling coil and carry a maximum continuous bhp rating that is the maximum application bhp rating for the motors; no "safety factors" above that rating may be applied. 1.3. All indoor fan motors 5 hp and larger shall meet the minimum efficiency requirements as established by the most recent energy policy enacted by department of energy.

E. Special features: (refer to schedule for applicable options) 1.1. Alternate motor and drive: an alternate motor and medium or high-static drive shall be available to meet the airflow and external static pressure requirements specified on the equipment schedule. 1.2. External paint cabinet: where conditions require, units shall be painted with an American sterling gray finish.

F. Electric heaters (when scheduled on plan): 1.1. Heaters for nominal power supply (refer to schedule) shall be factorysupplied for field installation as shown on the equipment drawings. Electric heat assembly shall be ul and etl, canada; agency approved, and shall have single-point power wiring. Heater assembly shall include contactors with 24-v coils, power wiring, 24-v control wiring terminal blocks, and a hinged access panel. 1.2. Air discharge plenum: plenum shall be factorysupplied to provide free-blow air distribution for vertical floor-mounted units. A grille with moveable vanes for horizontal or vertical airflow adjustment shall be included. Plenum housing shall be field-installed on the unit's fan deck for blow-thru air distribution.

1.3. Return air grille: grille shall be factory-supplied for field installation on the unit's return air opening.

#### G. Connections:

1.1. Connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit. 1.2. Connect supply and return water coil with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection. 1.3. Connect supply and return condenser connections with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection. Install piping adjacent to unit to allow service and maintenance.

General (outdoor unit)

A. System description

operation down to 0°f.

B. Quality assurance

1.2. Unit construction shall comply with ansi/ashrae 15 safety code latest revision and comply with nec. 1.3. Unit shall be constructed in accordance with ul 1995 standard and shall carry the ul and ul, canada label. 1.4. Unit cabinet shall be capable of withstanding 500-hour salt spray exposure per astm b117 (scribed specimen). 1.5. Air-cooled outdoor coils shall be leak tested at 150 psig and pressure tested at 650 psig and qualified to ul burst test at

1980 psig.

C. Delivery, storage and handling recommendations.

D. Operating characteristics: Unit shall operate at +/-10% from rated voltage

## Electric heating terminals

<u> Heaters (refer to schedule):</u> General: provide a heavy duty fan forced wall heater. Heating grid shall be made up of rugged steel fins, copper brazed to non glowing, steel sheathed elements. Unit to have built in, tamper proof thermostat or remote thermostat, built in disconnect switch. Front cover shall be decorative 16 gauge welded bar grille. Fan delay and thermal cutout are standard. Provide all required control transformers. Manufacturers: subject to compliance with requirements, provide wall heaters of one of the following:

Qmark

Markel Raywall

Installation of heating terminals:

# <u>Grounding:</u>

Field quality control: Upon completion of installation of electric heating terminals, and after building circuitry has been energized, test heating terminals to demonstrate capability and compliance with requirements. Where possible, field correct malfunctioning units, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting. Replace electric heating terminals and accessories which are damaged and remove damaged items from construction site.

#### 1.1. Cabinet shall be constructed of mill-galvanized steel.

1.2. Cabinet panels shall be fully insulated with 1/2-in. Fire-retardant material. Insulation shall contain an epa-registered immobilized antimicrobial agent to effectively resist the growth of bacteria and fungi as proven by tests in accordance with

1.3. Unit shall contain corrosion-free condensate drain pans for both vertical and horizontal applications. Drain pans shall have connections on right and left sides of unit to facilitate field connection. Drain pans shall have the ability to be sloped toward the right or left side of the unit to prevent standing water from accumulating in pans. 1.4. Unit shall have factory-supplied 2-in. Throwaway-type filters installed upstream from the cooling coil. Filter access shall be from either the right or left side of the unit

1.1. Coils shall consist of 3 rows or 4 rows of copper tubes with sine-wave aluminum fins bonded to the tubes by mechanical expansion. Coil tubing shall be internally rifled to maximize heat transfer. Refrigerant line connections shall be made on the

1.2. Coils shall feature factory-installed thermostatic expansion values (txvs) for refrigerant control. The txvs shall be capable of

1.3. Coils shall have a factory-installed bypass line and check valve assembly around the txvs to allow liquid flow from the coil to the outdoor unit during heating mode.

1.1. Outdoor-mounted, electrically controlled, air-cooled split system gas heat exchanger suitable for on-the-ground or rooftop installation. Unit shall consist of a scroll air-conditioning compressor assembly, an air-cooled coil, propeller-type condenser fans, and a control box. Unit shall discharge supply air upward as shown on contract drawings. Unit shall function as the outdoor component of a gas heat exchanger system. 1.2. Unit must be designed with a r-410a refrigerant circuit to match indoor air handler.

1.3. Unit shall have reversing valve and low-temperature air cut-off thermostat. 1.4. Unit shall have low ambient kit to permit

#### 1.1. Unit shall be rated in accordance with ari standard 340/360.

1.6. Unit shall be manufactured in a facility registered to iso 9001:2000 manufacturing quality standard.

1.1. Unit shall be shipped as single package only, and shall be stored and handled according to unit manufacturer's

1.1. When combined with the matching condensing unit the system shall be capable of starting and running up to 125 f (52 c) and down to 0°f (-18 c) ambient outdoor temperature.

A. Install electric heating terminal units including components as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices; complying with applicable installation requirements of nec and neca's "standard of installation". B. Coordinate with other electrical work, including wiring/cabling, as necessary to properly interface installation of

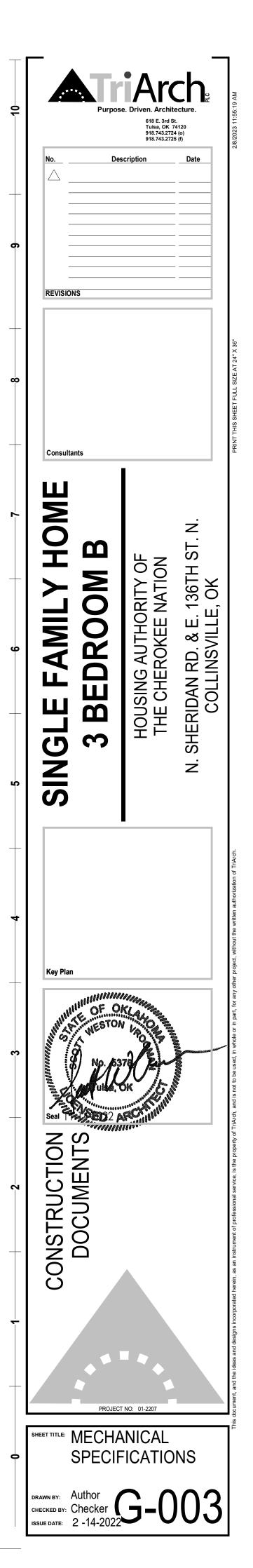
heating terminal units with other work.

C. Clean dust and debris from each heating terminal as it is installed to ensure cleanliness.

D. Comb out damaged fins where bent or crushed before covering elements with enclosures E. Touch-up scratched or marred heating terminal enclosure surfaces to match original finishes.

F. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in ul std 486a.

Provide equipment grounding connections for electric heating terminals as indicated. Tighten connections to comply with tightening torque values specified in ul std 486a to assure permanent and effective grounding.



#### <u>General</u>

The general conditions, supplementary conditions and instructions to bidders shall apply to and be part of this specification. Contractor shall comply with all applicable codes, rules and regulations. Contractor shall obtain and pay for all permits, certificates of inspection and approvals

#### <u>Scope of work</u>

required.

Water piping systems Soil, waste, and vent piping systems Gas piping (Not Used) Plumbing fixtures

Plumbing equipment Painting and electrical work is not part of this contract.

## <u>General standards</u>

The applicable provisions of the following standards shall govern: American society for test materials (astm); American standards association (asa); Underwriters laboratories (ul);

#### National fire protection association (nfpa); State building code.

The installation of all plumbing work shall conform to the applicable local plumbing codes and statues.

#### Excavation and backfill

Do all excavation and backfilling. Lay sewer and underground piping lines on 6" compacted sand. Backfill under building andall drives, roads and walks with bank-run gravel.

#### <u>Water piping systems</u>

Domestic cold-water piping Domestic hot-water piping

Trap primers for floor drains (Not Used)

### Interior water piping:

Tube size 2" and smaller: *PEX* tube. Wall thickness: type I, hard-drawn temper. Fittings: *PEX*, solder-joints. Tube size 2-1/2" and larger: *PEX* tube. Wall thickness: type I, hard-drawn temper. Fittings: *PEX*, solder-joints.

Where allowed by codes and owner: Pex distribution system: astm f877, astm f1960, sdr 9 tubing.

Pex tubing fitting tube shall be per astm f1960 and astm 2080, with metal-insert type with copper or stainless-steel crimp rings and matching pex tube dimensions.

Manifold: multiple-outlet, cooper assembly complying with astm f877, with brass or bronze full port ball valve for each outlet.

PEX piping shall not be installed where is exposed to direct sunlight. No joints or unions shall be installed below the building slab. PEX tubing shall be insulated to maintain smoke and fire spread per astm e 84 when installed in

return air plenum. Provide tubing with nominal inside diameter in accordance with astm f876.

The domestic water piping system shall be flushed with clean potable water until contaminated water does not appear at the outlet and shall be filled with a solution containing fifty (50) parts per million of chlorine and allowed to stand as required by code before flushing. The system shall be flushed completely with clear water until all residual chlorine content is removed. Chlorination shall be performed after all piping and final connections and pressure testing has been completed.

#### Testing

Domestic cold water piping systems shall be tested at a hydrostatic pressure of not less than 100 pounds per square inch gauge (before insulation applied) and proved tight at this pressure for not less than 30 minutes in order to permit inspection of all joints. Soil, waste and vent piping shall be tested with water before installing plumbing fixtures.

#### Soil, waste and vent/gas piping system

Furnish and install a complete soil, waste and vent system in the building and on the site as indicated on the drawings and as specified herein. Above ground soil, waste and vent piping within buildings including soil stacks, vent stacks, horizontal branches, traps, and connections to fixtures and drains.

Underground building drain piping including mains, branches, traps, connections to fixtures and drains, and connections to stacks, terminating at connection to arobic system.

## Interior piping:

Pipe and fittings: Provide sch.40 pvc plastic piping with drainage pattern fittings and Solvent-cemented joints per ansi/astm d1789 & d2729.

Piping alignment shall be as indicated on the drawings using approved y branches or eight bands for direction changes and shall be surely supported or secured to maintain such alignment.

Pitch of piping shall be uniform at a minimum of 1/4" per foot for building drains and as indicated on the drawings for sewers.

Protection shall be given all footings, other structural elements during underground work adjacent to such items. Refer to structural drawings.

Vent all fixtures, connect branch vents to main vent risers at least three feet and six inches above vented fixtures. Pitch vent lines back to soil or waste pipe, free of drops and sags.

Cleanouts shall be full size of pipe up to 4", and 4" for larger sizes. For underground and concealed lines, provide cleanouts in accessible positions at each right angle turn and at intervals not to exceed fifty feet. In floors, install flush with finish floor with extension pipe from cleanout "y".

#### Hangers and support:

Furnish and install hangers, clamps, inserts, etc. Necessary for the Installation of all pipes and equipment. Soil, waste and vent stacks shall be well supported at the base of the riser. Supports for copper pipes shall be placed on 8 foot centers. Support for vertical pipe shall be placed at top and bottom of each floor. Insulation shall run continuous through all hangers and supports.

#### Floor drains Refer to schedule on drawings.

(Where shown on plan) the plumbing contractor shall provide and install trap primers for all floor drains. Trap primer shall be equal to PPP inc. Model "Oregon #1" trap primer valve.

Plumbing fixtures (refer to schedule)

Water closets. Lavatories.

Service sinks. Water coolers.

Fixture schedule

See plumbing drawings for fixture schedule.

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#### Plumbing equipment Water heaters

### Acceptable manufacturers

A. Fixtures: water closet, urinals, lavatories, seats, flush valves, showers, service sinks, mop basins.

• Manufacturers: kohler, American Standard, Zurn, Crane & Eljer, Olsonite, Beneke, Sloan, Delaney, Fiat, and Stern-Williams.

- B. Electric water coolers
  Manufacturers: Elkay, Halsey And Haws.
- C. Stainless steel sinks (contractor furnished)
- Manufacturers: Elkay And Just. D. Fixtures: carriers
- Manufacturers: JAY R. SMITH, JOSAM, WADE, ZURN.

E. Fixtures: hydrant & hose bibsManufacturers: jay r. Smith, Chicago, Woodford, Zurn, Josam.

#### Cathodic protection

Provide dielectric insulation at points where copper or brass pipe comes in contact with ferrous piping, reinforcing steel or other dissimilar metal in structure.

#### Shock absorbers

Remove shock conditions from all piping. Provide and install shock absorbers on all piping serving flush valve fixtures.

#### <u>Valves</u>

Main shut off valves shall be installed as shown on the plans. Shut off valves shall be nibco s/t 580 ball valves or equal. Valves shall have blowout proof stem, the seats and brass ball. Pressure rating of all main valves shall have a rating of at least 400 psi working pressure.

Valves shall be installed as shown on the plans. When valves are not shown in detail on the plans, the contractor shall furnish and install all valves necessary for the control operation and isolation of equipment. Pitch all pipe to low points and install drain valves.

Gate valves or ball valves shall be used in services requiring the valves to be fully opened or tightly closed. Globe or angle valves shall be used where throttling or flow control is desired, or in by-pass lines. Globe and angle valves shall be equipped with the appropriate disc material for the intended service. Cold water globe valves shall have rubber disc; hot water shall have composition disc.

This contractor shall furnish and install shut-off valves to isolate each fixtures, item or unit at the fixture items or unit whether furnished by this contractor or by others.

Fixtures, item or units furnished by the manufacturer with integral stops or stops specified with the fixture are considered to be properly valved off at the fixtures.

Access shall be provided to all valves.

#### Pipe joints and connection

All cutting and patching of finished construction of building shall be performed by this contractor under the section of specifications covering these materials.

Any minor adjustment in location of alignment of new work or to connect to existing utilities shall be performed as directed by the architect without additional cost to the owner.

The contractor shall be responsible for damages to the grounds, walks, road, building, piping systems, electrical systems, and their equipment and contents, caused by leaks in the piping systems being installed or having been installed by him. He shall repair at his expense all damaged so caused. All repair work shall be done as directed by and in such manner as satisfactory to the architect.

Owner reserves the right to make emergency repairs as required to keep equipment in operation without voiding the contractor's guarantee bond nor relieving the contractor of his responsibilities during the bonding period.

#### Pipe insulation (Only required in unconditioned & uninsulated locations)

Fiberglass piping insulation: astm c 54/, class I flexible closed cell elastomeric piping insulation: astm c 534, type i, (equal to armaflex).

Encase pipe fittings insulation with one-piece pre-molded pvc fitting covers.

Vapor barrier material: paper-backed aluminum foil, except as otherwise indicated, strength and permeability rating equivalent to adjoining pipe insulation jacketing.

Staples, bands, wires, and cement: as recommended by insulation manufacturer for

# applications indicated.

Adhesives, sealers, and protective finishes: as recommended by insulation manufacturer for applications indicated.

Cover all cold water and condensate (if routed inside the building) piping with 1/2" thick flexible closed cell elastomeric insulation, having a "k" value of .25.

Cover all hot water piping with 1" thick jacketed glass fiber preformed insulation with jacket sealed and taped, having a "k" value of .25.

Flexible closed cell elastomeric installation: slit tubular sections onto pipe. On areas where pipe end is open, slide full sections onto pipe. All edges shall be clean cut. Insulation shall be pushed onto pipe, never pulled. All seams and butt joints shall be adhered and sealed using adhesive equal to armaflex 520 adhesive.

#### Interruption of services

When it is required to interrupt existing services, this contractor shall first notify the architect that an interruption is required. It should be noted that facilities must by kept in operation as much as possible.

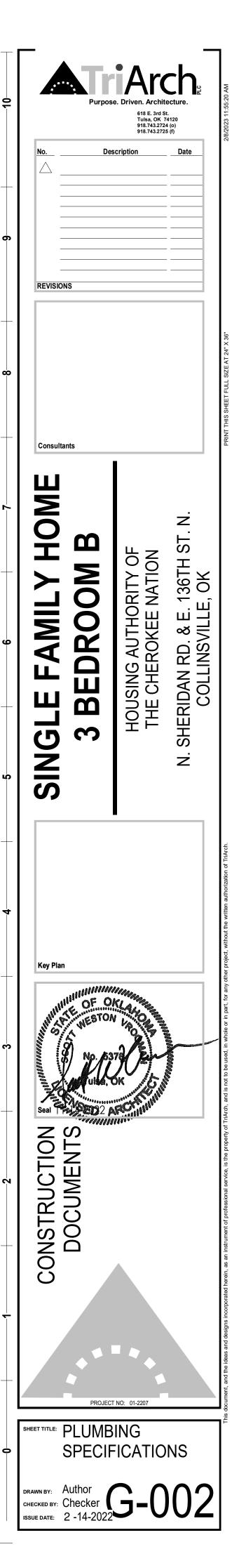
This contractor shall advise the architect of the length of time the service will be interrupted and shall get permission from the architect before proceeding with the work.

#### Warranty

This contractor shall warrant that all work under this section shall be free of defective work, materials and parts for a period of one year after acceptance of the work and shall repair, revise, and replace, at no cost to the owner, any such defects occurring within the warranty period

# PLUMBING LAYOUT AND DESIGN IS DELEGATED TO SUBCONTRACTOR. SUBMIT LAYOUT FOR REVIEW AND COORDINATION WITH OTHER TRADES

## PROVIDED PLUMBING PLAN IS FOR BIDDING REFERENCE ONLY



# *3N PARAMETERS*

#### DE: 2015 INTERNATIONAL RESIDENTIAL CODE

<u></u>	20 PSF (UNIFORM)
/IND SPEED (3 SECOND GUST) JRE CLASSIFICATION AL PRESSURE COEFFICIENT ANCE FACTOR	- C - 0.18
DS: AL RESPONSE ACCELERATION AT PERIOD), Ss	0.063 0.193 0.100 D
ANCE FACTOR, I DESIGN CATEGORY TRUCTURAL SYSTEM AND SEISMIC RESISTING SYSTEM ISE MODIFICATION FACTOR, R I OVER-STRENGTH FACTOR, W TION AMPLIFICATION FACTOR, Cd	<ul> <li>B</li> <li>LIGHT FRAME WOOD WALL WITH STRUCTURAL WOOD SHEAR PANEL</li> <li>7</li> <li>2.5</li> <li>4.5</li> </ul>

AND CONTINUOUS FOOTINGS BEARING ON APPROVED NATIVE SOILS OR STRUCTURAL FILL HAVE BEEN DESIGNED FOR AN ALLOWABLE NET PRESSURE OF 1.800 PSF PER THE RECOMMENDATIONS PROVIDED IN THE REFERENCED GEOTECHNICAL REPORT.

# RAL

RAL DRAWINGS ARE NOT STAND-ALONE DOCUMENTS AND ARE INTENDED TO BE USED IN CONJUNCTION WITH CIVIL, ARCHITECTURAL, AL, ELECTRICAL, AND DRAWINGS FROM OTHER DISCIPLINES. THE CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS OF THE CONTRACT TS INTO THE SHOP DRAWINGS AND FIELD WORK. )NFLICT EXISTS AMONG VARIOUS PARTS OF THE STRUCTURAL CONTRACT DOCUMENTS, STRUCTURAL DRAWINGS, GENERAL NOTES, AND

TIONS, THE STRICTEST REQUIREMENTS, AS INDICATED BY THE ENGINEER, SHALL GOVERN. TURAL ELEMENTS OF THE PROJECT HAVE BEEN DESIGNED BY THE STRUCTURAL ENGINEER TO RESIST THE REQUIRED CODE VERTICAL AND ORCES THAT COULD OCCUR IN THE FINAL COMPLETED STRUCTURE ONLY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL BRACING DURING CONSTRUCTION TO MAINTAIN THE STABILITY AND SAFETY OF ALL STRUCTURAL ELEMENTS DURING THE CONSTRUCTION UNTIL THE LATERAL LOAD RESISTING OR STABILITY-PROVIDING SYSTEM IS COMPLETELY INSTALLED AND THE STRUCTURE IS COMPLETELY

CTURE HAS BEEN DESIGNED FOR THE LOADS IDENTIFIED WITHIN THESE STRUCTURAL DRAWINGS THAT ARE ANTICIPATED TO BE APPLIED TO STRUCTURE ONE COMPLETED AND OCCUPIED. THE CONTRACTOR SHALL NOT OVERLOAD THE STRUCTURE DURING CONSTRUCTION. THE FOR SHALL BE RESPONSIBLE FOR CHECKING THE ADEQUACY OF THE STRUCTURE TO SUPPORT ANY APPLIED CONSTRUCTION LOADS, 3 THOSE DUE TO CONSTRUCTION VEHICLES OR EQUIPMENT, MATERIAL HANDLING OR STORAGE, SHORING AND RESHORING, OR ANY OTHER CONSTRUCTION LOADS THAT ARE IN EXCESS OF THE STATED DESIGN LOADS. THE STRUCTURAL ENGINEER IS NOT RESPONSIBLE TO R CHECK THE STRUCTURE FOR LOADS APPLIED TO THE STRUCTURE FOR ANY CONSTRUCTION ACTIVITY.

OF MECHANICAL EQUIPMENT SHOWN ON THE STRUCTURAL PLANS ARE FOR UNITS SPECIFIED BY THE MECHANICAL ENGINEER. CONTRACTOR RIFY WEIGHTS AND ANY SUBSTITUTIONS THAT RESULT IN INCREASED WEIGHT SHALL BE APPROVED BY THE STRUCTURAL ENGINEER OF

AND LOCATION OF EQUIPMENT PADS AND PENETRATIONS THROUGH THE STRUCTURE FOR MECHANICAL, ELECTRICAL, AND PLUMBING WORK VERIFIED BY THE CONTRACTOR. OPENINGS AND PENETRATIONS NOT SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE TO APPROVAL BY THE STRUCTURAL ENGINEER OF RECORD.

FABRICATION AND/OR ERECTION OF ANY MATERIALS, THE CONTRACTOR SHALL FIELD VERIFY ALL PERTINENT EXISTING DIMENSIONS, NS, AND CONDITIONS AND SHALL REPORT ANY DISCREPANCIES TO THE STRUCTURAL ENGINEER OF RECORD OR THE ARCHITECT ELY UPON DISCOVERY.

RIALS OR PRODUCTS SUBMITTED FOR APPROVAL THAT ARE DIFFERENT FROM THE MATERIAL OR PRODUCTS SPECIFIED IN THE STRUCTURAL I DOCUMENTS WILL BE APPROVED ONLY IF THE FOLLOWING CRITERIA ARE SATISFIED:

COST SAVINGS TO THE OWNER IS DOCUMENTED AND SUBMITTED WITH THE REQUEST. HE MATERIAL OR PRODUCT HAS BEEN APPROVED BY THE INTERNATIONAL CODE COUNCIL (ICC) AND THE ICC REPORT IS SUBMITTED WITH HE REQUEST.

JEER SHALL NOT HAVE CONTROL NOR CHARGE OF, AND SHALL NOT BE RESPONSIBLE FOR, CONSTRUCTION MEANS, METHODS, TECHNIQUES, ES, OR PROCEDURES, FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSION OF THE FOR, SUBCONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT ( IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

SITE OBSERVATION BY FIELD REPRESENTATIVES OF 360 ENGINEERING GROUP, LLC. IS SOLELY FOR THE PURPOSE OF BECOMING GENERALLY NITH THE PROGRESS AND QUALITY OF THE WORK COMPLETED AND DETERMINING, IN GENERAL, IF THE WORK OBSERVED IS BEING ED IN A MANNER INDICATING THAT THE WORK, WHEN FULLY COMPLETED, WILL BE IN ACCORDANCE WITH THE STRUCTURAL CONTRACT TS. THIS LIMITED SITE OBSERVATION SHOULD NOT BE CONSTRUED AS EXHAUSTIVE OR CONTINUOUS TO CHECK THE QUALITY OR QUANTITY ORK, BUT RATHER PERIODIC IN AN EFFORT TO GUARD THE OWNER AGAINST DEFECTS OR DEFICIENCIES IN THE WORK OF THE CONTRACTOR.

# DATIONS

HALL BEAR EITHER ON COMPETENT NATIVE SOIL OR COMPACTED STRUCTURAL FILL.

ERIMETER FOOTINGS SHALL BEAR NOT LESS THAN 24 INCHES BELOW FINISH GRADE UNLESS OTHERWISE SPECIFIED BY A AL ENGINEER AND/OR BUILDING OFFICIAL. IF THE SOIL AT THE BEARING ELEVATIONS SHOWN IS OF QUESTIONABLE BEARING STRUCTURAL ENGINEER OF RECORD OR ARCHITECT SHALL BE NOTIFIED IMMEDIATELY.

11NIMUM OF A 4-INCH CLEAN, FREE-DRAINING GRANULAR SUBBASE FILL BELOW ALL INTERIOR SLABS-ON-GRADE UNLESS NOTED ) OTHERWISE. SUBBASE SHALL MEET GRADATION REQUIREMENTS OF ASTM C-33 SIZE NO. 67, UNLESS SPECIFICALLY NOTED

IMUM POLYETHYLENE FILM VAPOR RETARDER, MEETING THE REQUIREMENTS IN THE SPECIFICATIONS, SHALL BE PLACED BELOW R SLABS-ON-GRADE. CTOR IS CAUTIONED AGAINST LOADING SLAB-ON-GRADE WITH CONSTRUCTION EQUIPMENT. THE SLAB HAS NOT BEEN DESIGNED

LUCTION EQUIPMENT AND MAY REQUIRE AN INCREASE IN SLAB THICKNESS AND/OR REINFORCEMENT. IF THE CONSTRUCTION CEEDS THE DESIGN LOADS SHOWN IN THE DESIGN CRITERIA, THE CONTRACTOR IS REQUIRED TO SUBMIT CALCULATIONS SIGNED BY A REGISTERED STRUCTURAL, CIVIL, OR GEOTECHNICAL ENGINEER IN THE STATE WHERE THE PROJECT IS LOCATED HE ADEQUACY OF THE SLAB.

DOTINGS FOR STAIRS AND RAMPS SHALL BEAR AT OR BELOW MINIMUM BEARING DEPTH. VALLS SHALL HAVE ADEQUATE TEMPORARY BRACING INSTALLED BY THE CONTRACTOR BEFORE BACKFILL IS PLACED AGAINST ORARY BRACING SHALL NOT BE REMOVED UNTIL WALL IS PERMANENTLY BRACED.

# GENERAL NOTES

# **DIVISION 3 - CONCRETE**

- ALL CONCRETE SHALL CONFORM TO THE SPECIFICATIONS FOR STRUCTURAL CONCRETE, ACI 301.
- CONTRACTOR SHALL FOLLOW ACI 306.1 FOR COLD WEATHER CONCRETE PLACEMENT AND CURING GUIDELINES.
- ARRANGEMENTS AND DETAIL OF REINFORCING BENDS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF PUBLICATION SP-66, "ACI DETAILING MANUAL" AND ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE." UNLESS NOTED OTHERWISE, BAR SPLICES SHALL BE CLASS B TENSION LAPS AND SHALL BE LAPPED WITH MINIMUM LENGTHS AS LISTED IN THE LAP LENGTH SCHEDULE, WHERE REQUIRED IN REINFORCING. SHORTER LAPS MAY BE ACCEPTABLE IF SPECIFIC LOCATIONS OF ALTERNATE LAPS ARE SHOWN ON THE REINFORCING PLACEMENT DRAWINGS AND CALCULATIONS ARE SUBMITTED BY A REGISTERED PROFESSIONAL ENGINEER, LICENSED TO PRACTICE IN THE STATE IN WHICH THE PROJECT IS LOCATED, JUSTIFYING THE ALTERNATE LAP LENGTHS.
- PROVIDE SUITABLE WIRE SPACERS, CHAIRS, TIES, ETC. FOR SUPPORTING REINFORCING STEEL IN THE PROPER POSITION BEFORE PLACING CONCRETE. DO NOT "WET STICK" DOWELS. ALL WELDED WIRE FABRIC SHALL BE LAPPED A MINIMUM OF 12" AT THE SIDES AND ENDS.
- LOCATIONS AND SIZES OF OPENINGS, SLEEVES, ETC. REQUIRED FOR OTHER TRADES MUST BE VERIFIED BY THESE TRADES BEFORE PLACING CONCRETE.
- 8. ALL SLOTS, SLEEVES, TRENCHES AND OTHER EMBEDDED ITEMS SHALL BE SET AND SECURED AGAINST MOVEMENT BEFORE THE CONCRETE IS PLACED. SEE ARCHITECTURAL, ELECTRICAL, MECHANICAL, PLUMBING, AND VENDOR DRAWINGS FOR SIZES, AND LOCATIONS. COORDINATE LOCATIONS, SPACINGS, AND SIZES WITH THE STRUCTURAL ENGINEER OF RECORD PRIOR TO PLACING CONCRETE
- AS PART OF THE SUBMITTAL PROCESS, THE ELECTRICAL AND MECHANICAL CONTRACTOR(S) SHALL SUBMIT PROPOSED ROUTING PLAN FOR ALL PIPES, CONDUITS, OR OTHER DEVICES TO BE EMBEDDED IN THE CONCRETE. THE SUBMITTAL SHALL SHOW SPECIFIC SIZES AND LOCATIONS OF ALL PROPOSED EMBED ITEMS REFERENCING PROXIMITY TO BEAM, COLUMN, AND SLAB EDGES. NO ITEMS SHALL BE ALLOWED TO BE EMBEDDED IN THE CONCRETE WITHOUT PRIOR WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER OF RECORD. 10. CONDUITS AND PIPES EMBEDDED IN CONCRETE SLABS MAY BE NO LARGER THAN 1/3 OF THE SLAB THICKNESS (BASED ON THE MAXIMUM OUTSIDE
- DIAMETER) AND SHALL HAVE A CENTER-TO-CENTER SPACING NO LESS THAN THREE (3) CONDUIT DIAMETERS. REGARDLESS OF DIAMETER, THE MINIMUM CLEAR SPACING BETWEEN CONDUITS OR REINFORCING SHALL BE (1) INCH. 11. NO MORE THAN FOUR CONDUITS MAY BE PLACED ADJACENT TO EACH OTHER WITHOUT PRIOR APPROVAL IN WRITING FROM THE STRUCTURAL
- ENGINEER OF RECORD. 12. NO ALUMINUM CONDUITS, DEVICES, OR FIXTURES MAY BE EMBEDDED INTO THE CONCRETE SO THAT THE ALUMINUM IS IN DIRECT CONTACT WITH THE CONCRETE.
- 13. CORNER BARS SHALL BE PROVIDED FOR ALL HORIZONTAL REINFORCING BARS AT THE INTERSECTIONS AND CORNERS OF ALL STRIP FOOTINGS, BEAMS. AND WALLS UNLESS NOTED OTHERWISE. CORNER BARS SHALL BE OF THE SAME SIZE AND GRADE AS THE HORIZONTAL REINFORCING THEY
- CONNECT. MINIMUM LAP LENGTHS SHALL BE AS INDICATED ABOVE UNLESS NOTED OTHERWISE. 14. FOR EXTERIOR RETAINING WALLS AND BUILDING STEM WALLS EXPOSED TO VIEW ACROSS THE LENGTH OF WALL, PROVIDE FORMED "V" CONTROL JOINTS AT 15'-0" OC MAX.

LAP LENGTHS FOR SPLICES				
BAR SIZE	TOP BARS**	OTHER		
#3	1'-5"	1'-4"		
#4	1'-11"	1'-5"		
#5	2'-4"	1'-10"		
#6	2'-10"	2'-2"		
#7	4'-7"	3'-7"		
#8	5'-10"	4'-6"		
#9	7'-2"	5'-6"		

BASED ON MINIMUM CONCRETE COVER OF 1 1/2", A MINIMUM CENTER-TO-CENTER BAR SPACING OF THREE BAR DIAMETERS, AND 3,000 PSI CONCRETE.

TOP BARS ARE HORIZONTAL BARS WITH MORE THAN (12) INCHES OF CONCRETE CAST BELOW

<b>REQUIRED CONCRETE STRENGTHS (28</b>	DAY)
CONCRETE ELEMENT	ťc (PSI)
FOOTINGS AND STEM WALLS	3,000
FOUNDATION WALLS AND PEDESTALS	4,000
INTERIOR SLABS-ON-GRADE	3,500
SLABS ON COMPOSITE DECK	3,000
STEEL STAIR PANS (SLABS ON NON-COMPOSITE DECK)	3,000
BUILDING FRAME MEMBERS	4,000
BUILDING WALLS	4,000
EXTERIOR EXPOSED CONCRETE (AIR ENTRAINED)	4,500

<b>REINFORCEMENT MATERIALS</b>	

REINF ELEMENT	ASTM	Fy (KSI)	Fu (KSI)
TYP REINFORCING	A615	60	90
WELDED AND BENT REINF	A706	60	80
WELDED WIRE REINFORCING, SMOOTH	A185	65	75
WELDED WIRE REINFORCING, DEFORMED	A497	70	80

REINFORCEMENT COVER REQUIREMENTS	
LOCATION	COVER (IN)
COLUMNS, GIRDERS, AND BEAMS	1 1/2
CONCRETE CAST AGAINST EARTH	3
CONCRETE CAST IN FORMS, EXPOSED TO WEATHER OR EARTH	2
CONCRETE CAST ON VOID FORMS WITH MASONITE OR PLYWOOD COVERING	2
JOISTS	1 1/2
SLABS OR WALLS NOT EXPOSED TO EARTH OR WEATHER	1

# **DIVISION 6 - WOOD ROOF SHEATHING**

- 4. UNLESS NOTED OTHERWISE, PLYWOOD STRUCTURAL PANELS NOTED ON THE DRAWINGS SHALL CONFORM TO U.S. DEPARTMENT OF COMMERCE USE PANELS (DOC PS 2), AND TO BE IDENTIFIED BY THE MARK OF AN APPROVED TESTING AND GRADING AGENCY.

# **DIVISION 6 - WOOD FRAMING**

- 1. ALL WOOD PLATES BEARING ON CONCRETE OR MASONRY SHALL BE PRESSURE TREATED LUMBER. 2. ALL METAL CONNECTORS SHALL MEET THE FOLLOWING: A. CLIPS AND FASTENERS SHALL BE CORROSION RESISTANT B. RATED TO PROVIDE LOAD RESISTANCE EQUAL TO CLIP SHOWN ON THE PLANS. APPROVED BY I.C.C. AND OTHER REQUIRED LOCAL CODE AGENCIES. D. INSTALLED AS RECOMMENDED BY THEIR MANUFACTURER. APPROVED EQUAL, UNO. ELEMENTS USING ACCEPTED FRAMING PRACTICES. 8. MINIMUM WOOD FRAMING MATERIAL SPECIFICATIONS ARE AS FOLLOWS: A. FRAMING 2-4 INCHES THICK, 2 INCHES AND WIDER, DOUGLAS FIR SOUTH #2 PER 2005 NDS 1. Fb = 850 PSI (SINGLE MEMBER USE) 2. Ft = 525 PSI 3. Fc = 1350 PSI (PARALLEL TO GRAIN) 4. Fc = 520 PSI (PERPENDICULAR TO GRAIN) 5. Fv = 180 PSI
  - 6. E = 1,200,000 PSI B. LAMINATED VENEER LUMBER (LVL)
  - 1. Fb = 2,600 PSI
  - 2. Ft = 1555 PSI 3. Fc = 2510 PSI (PARALLEL TO GRAIN)
  - 4. Fc = 750 PSI (PERPENDICULAR TO GRAIN)
  - 5. Fv = 285 PSI 6. E = 1,900,000 PSI

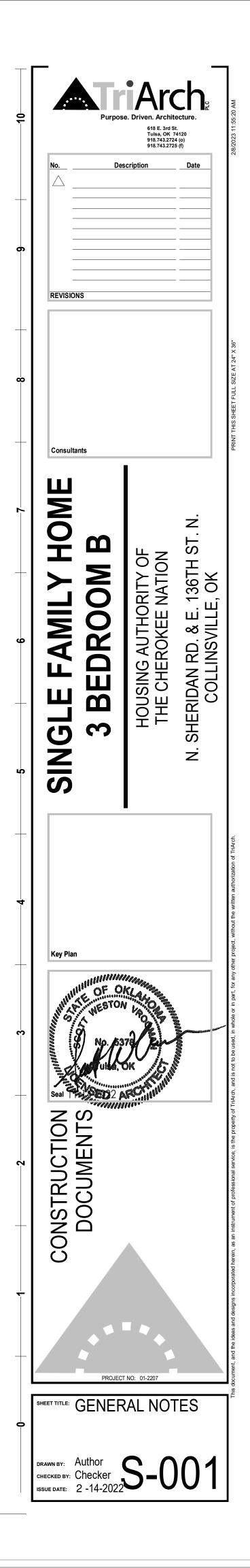
1. ALL ROOF SHEATHING SHALL BE PLACED IN SUCH A MANNER TO STAGGER ALL END JOINTS OF PANELS AND WITH LONG DIRECTION PERPENDICULAR TO SUPPORTS. ALUMINUM PANEL CLIPS SHALL BE PLACED AT MID-SPAN OF PANELS BETWEEN EACH TRUSS AS DECKING IS BEING LAID. INSTALLER SHALL LEAVE 1/8" SPACE AT ALL PANEL EDGES AND END JOINTS, UNLESS OTHERWISE RECOMMENDED BY MANUFACTURER. 2. FASTENING REQUIREMENTS FOR DECKING TO SUPPORTS SHALL BE IN COMPLIANCE WITH THE AMERICAN PLYWOOD ASSOCIATION'S (APA) RECOMMENDED MINIMUM FASTENING SCHEDULE FOR APA PANEL ROOF (OR WALL) SHEATHING AS STATED HEREIN. SEE ROOF FRAMING PLAN (S-201) FOR ROOF SHEATHING FASTENING REQUIREMENTS. CLIPS AND FASTENERS SHALL BE CORROSION RESISTANT. 3. COVER SHEATHING AS SOON AS POSSIBLE WITH ROOFING FELT FOR PROTECTION AGAINST EXCESSIVE MOISTURE PRIOR TO ROOFING APPLICATION. PROTECTION MATERIAL MUST BE APPROVED BY I.C.C. AND FOLLOW OTHER REQUIRED LOCAL CODE AGENCIES.

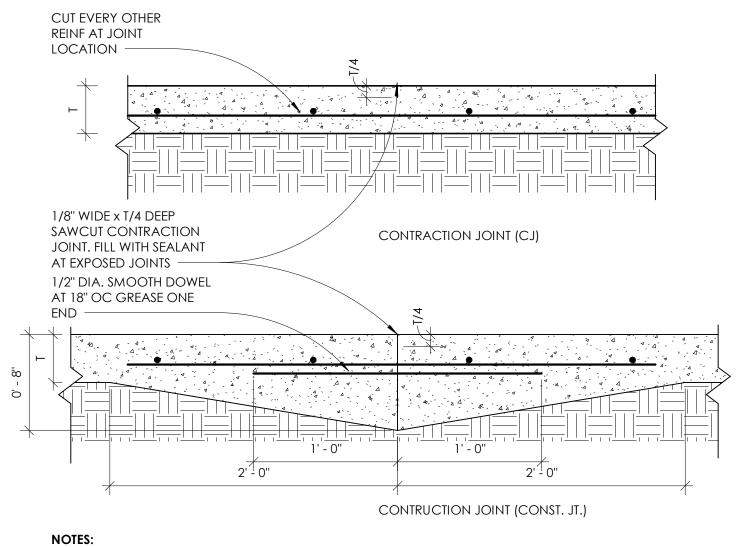
VOLUNTARY PRODUCT STANDARDS, PS 1, STRUCTURAL PLYWOOD (DOC PS 1), OR PS 2, PERFORMANCE STANDARD FOR WOOD-BASED STRUCTURAL-

3. ALL WOOD TRUSSES OR JOIST AND RAFTERS SHALL BE FASTENED TO TOP PLATE WITH ONE (1) SIMPSON H3 AND ONE (1) SIMPSON A34 METAL CLIP OR

4. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR FASTENING OF HANGERS IN ORDER TO ACHIEVE THE REQUIRED ALLOWABLE LOADS SHOWN ON THE PLANS. WHERE REQUIRED ALLOWABLE LOADS ARE NOT SHOWN, USE THE MAXIMUM RATED STRENGTH OF THE HANGER. WHEN CONNECTORS ARE NOT SHOWN, TABLE 2304.9.1 FASTENING SCHEDULE OF THE INTERNATIONAL BUILDING CODE SHALL APPLY.

6. WHEN HEADERS ARE NOT SHOWN, TABLE 2308.9.5 AND 2308.9.6 HEADER DESIGN CHART OF THE INTERNATIONAL BUILDING CODE SHALL APPLY. 7. PROVIDE SUPPLEMENTAL STRUCTURAL FRAMING AND BLOCKING AS REQUIRED TO ACHIEVE SOLID AND SOUND STRUCTURAL AND NON-STRUCTURAL

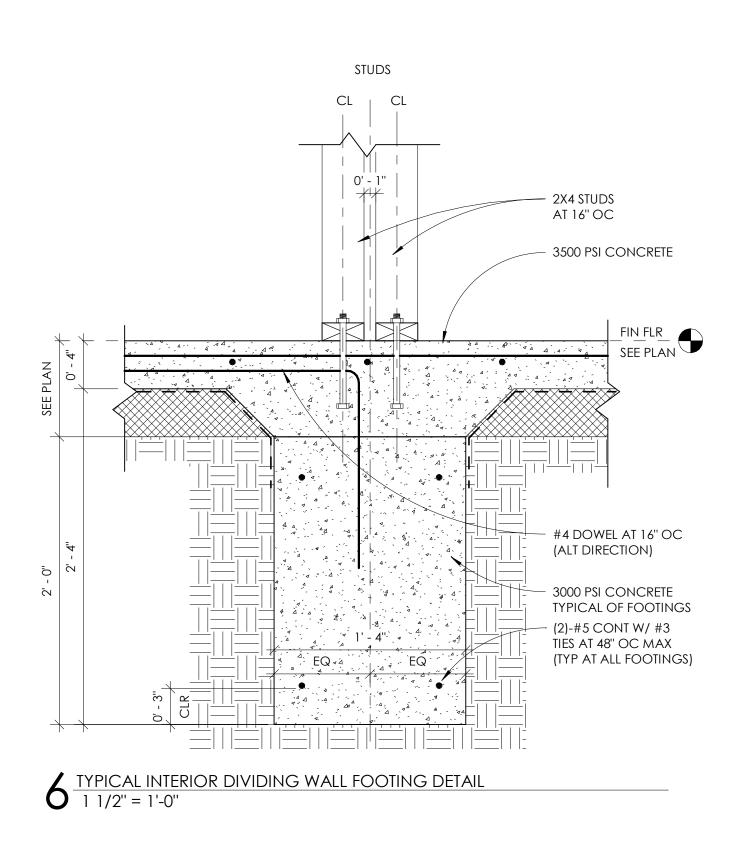


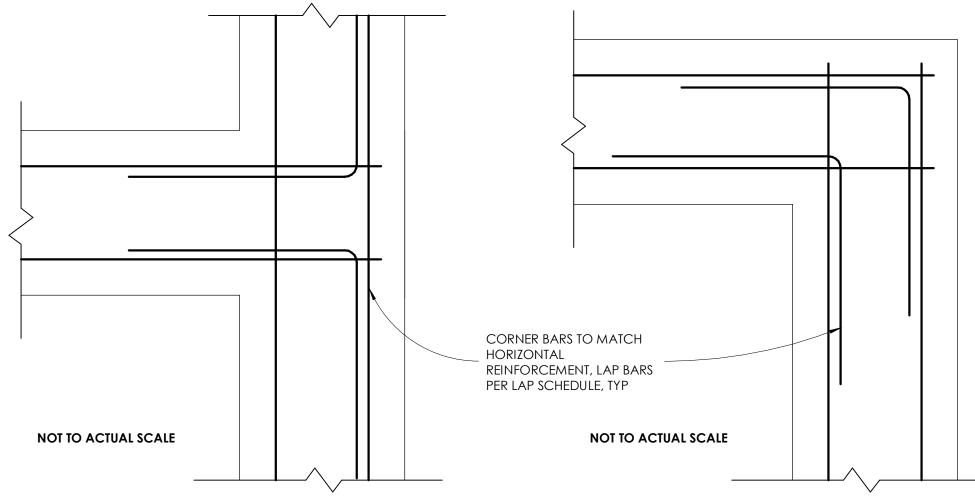


- SEE FOUNDATION PLAN FOR ADDITIONAL SLAB INFORMATION, INCLUDING DEPTH AND FEINFORCING
   THE SAWCUTTING SHOULD BE DONE AS SOON AS THE CONCRETE HAS HARDENED SUFFICIENTLY TO PERMIT
- 2. THE SAWCUTTING SHOULD BE DONE AS SOON AS THE CONCRETE HAS HARDENED SUFFICIENTLY TO PERMIT CUTTING W/O CHIPPING, SPALLING OR TEARING BUT NOT MORE THAN 8 HOURS AFTER CASTING
- 3. DOWELS SHALL BE APRALLEL TO THE SLAB'S TOP SURFACE AND PERPENDICULAR TO THE SLAB JOINT.
- DOWELS SHALL BE A MINIMUM OF 6" FROM ANY SLAB EDGE.

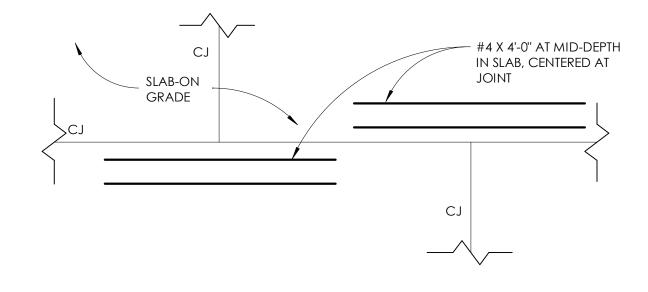
 $4 \frac{\text{JOINT DETAILS}}{1 \text{ 1/2"} = 1'-0"}$ 

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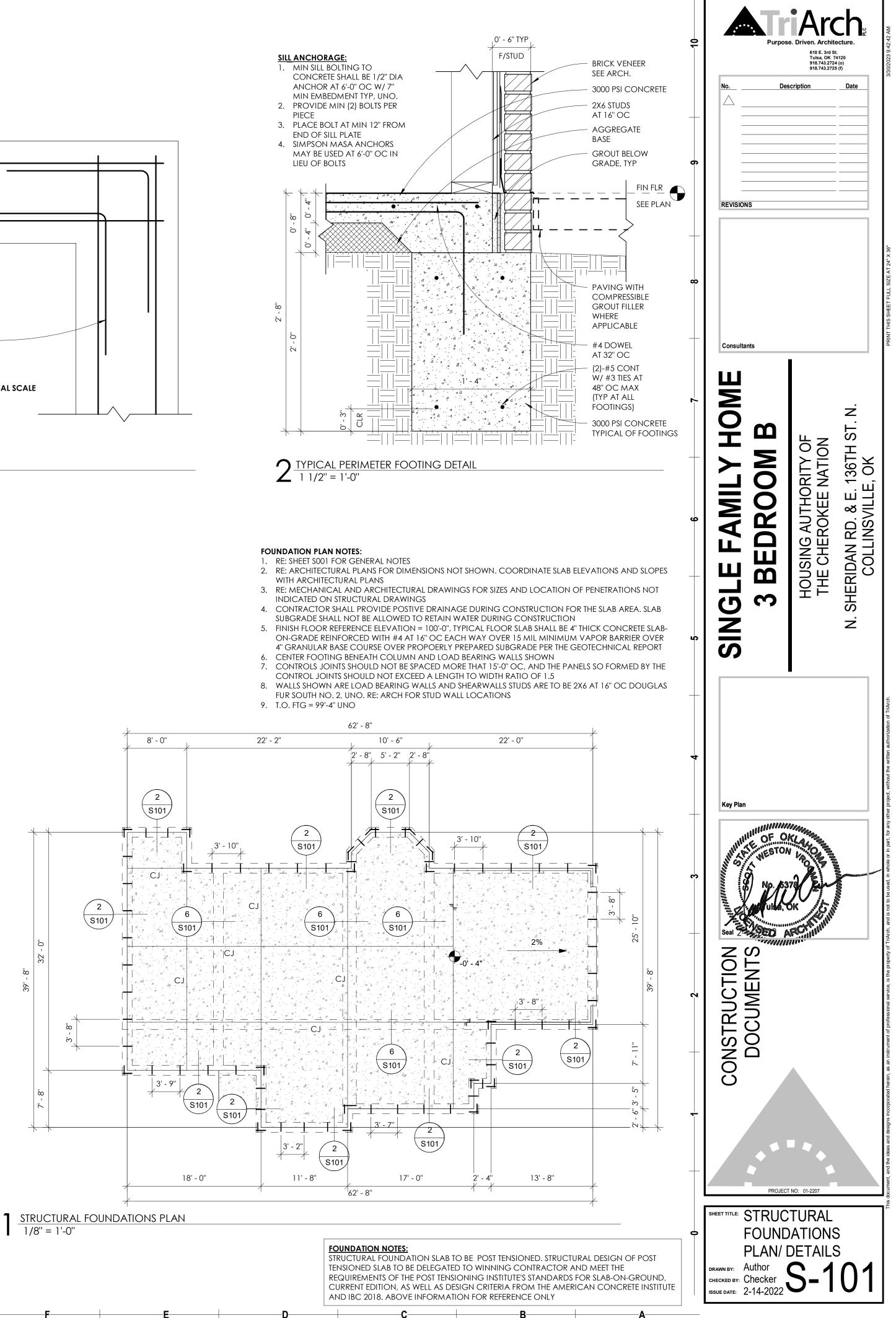


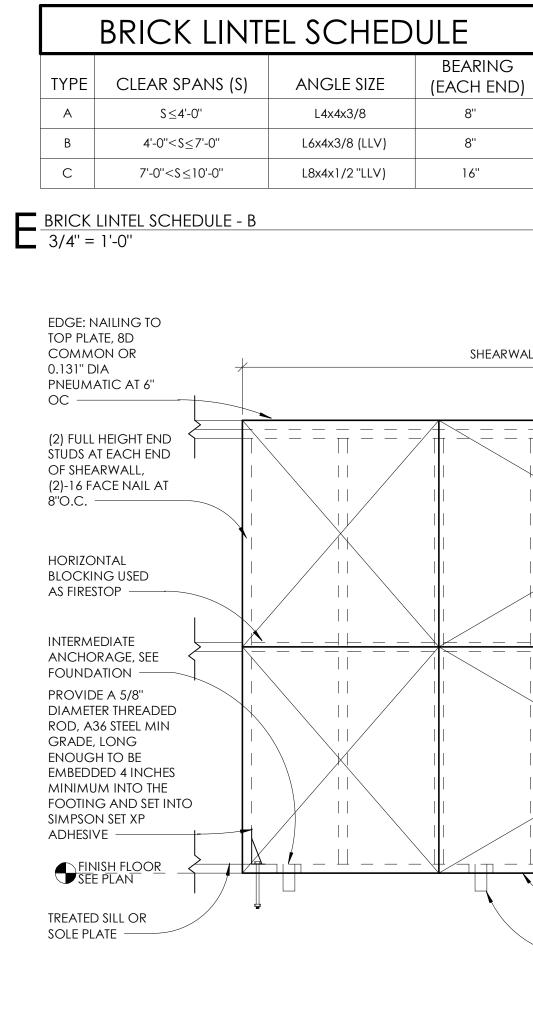


 $\frac{\text{DETAIL CORNER BAR DETAILS}}{1 1/2" = 1'-0"}$ 



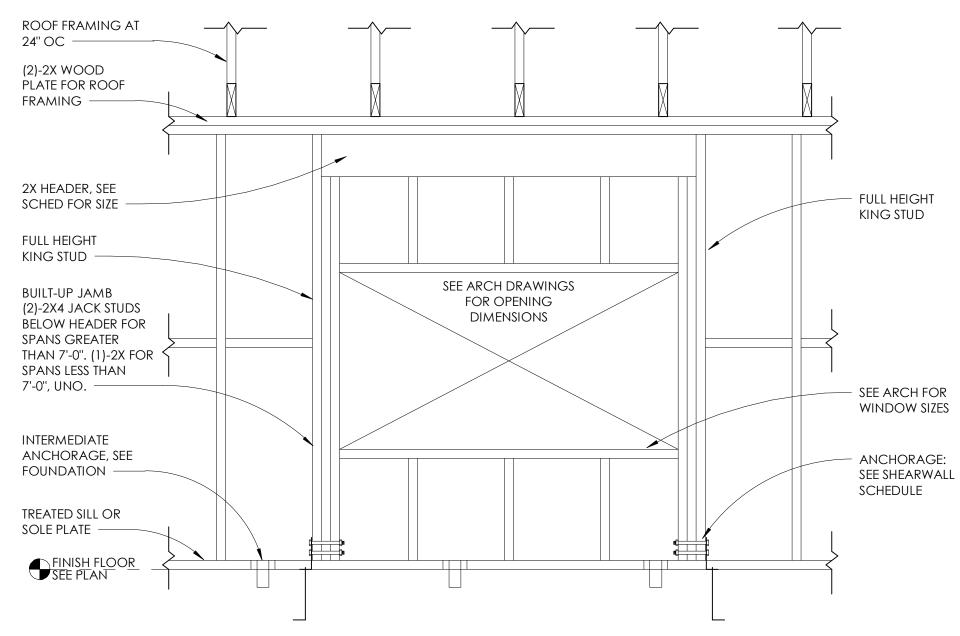
 $5^{\frac{\text{REINFORCING AT SLAB JOINT}}{1 1/2'' = 1'-0''}}$ 



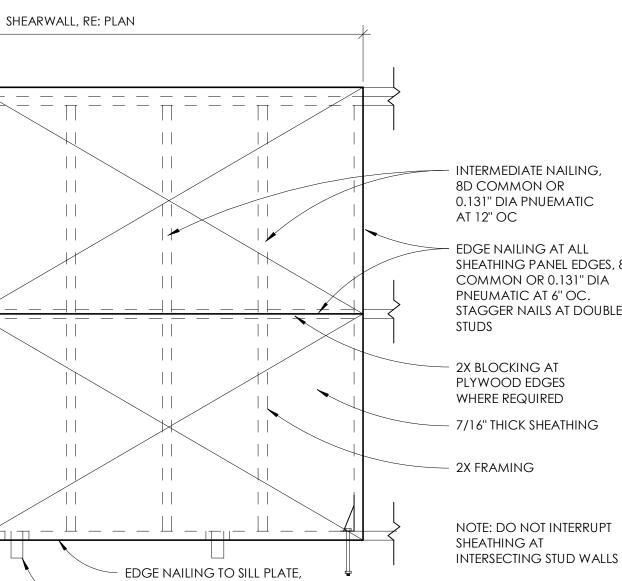




 $D \frac{\text{SHEARWALL CONSTRUCTION AND SCHEDULE - B}}{3/4'' = 1'-0''}$ 



B EXTERIOR LINTEL ELEVATION AT BEARING WALL - B 3/4" = 1'-0"



8D COMMON OR 0.131" DIA

SILL ANCHORAGE, (1)-1/2" DIA

32" W/ 3 1/4" EMBEDMENT

SIMPSON TITEN HD ANCHOR AT

PNEUMATIC AT 6" OC

INTERMEDIATE NAILING,

8D COMMON OR 0.131" DIA PNUEMATIC AT 12" OC

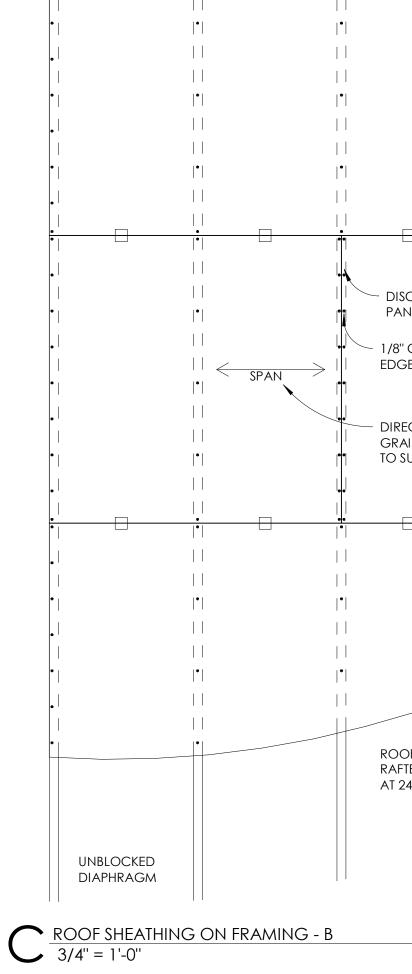
EDGE NAILING AT ALL SHEATHING PANEL EDGES, 8D COMMON OR 0.131" DIA PNEUMATIC AT 6" OC.

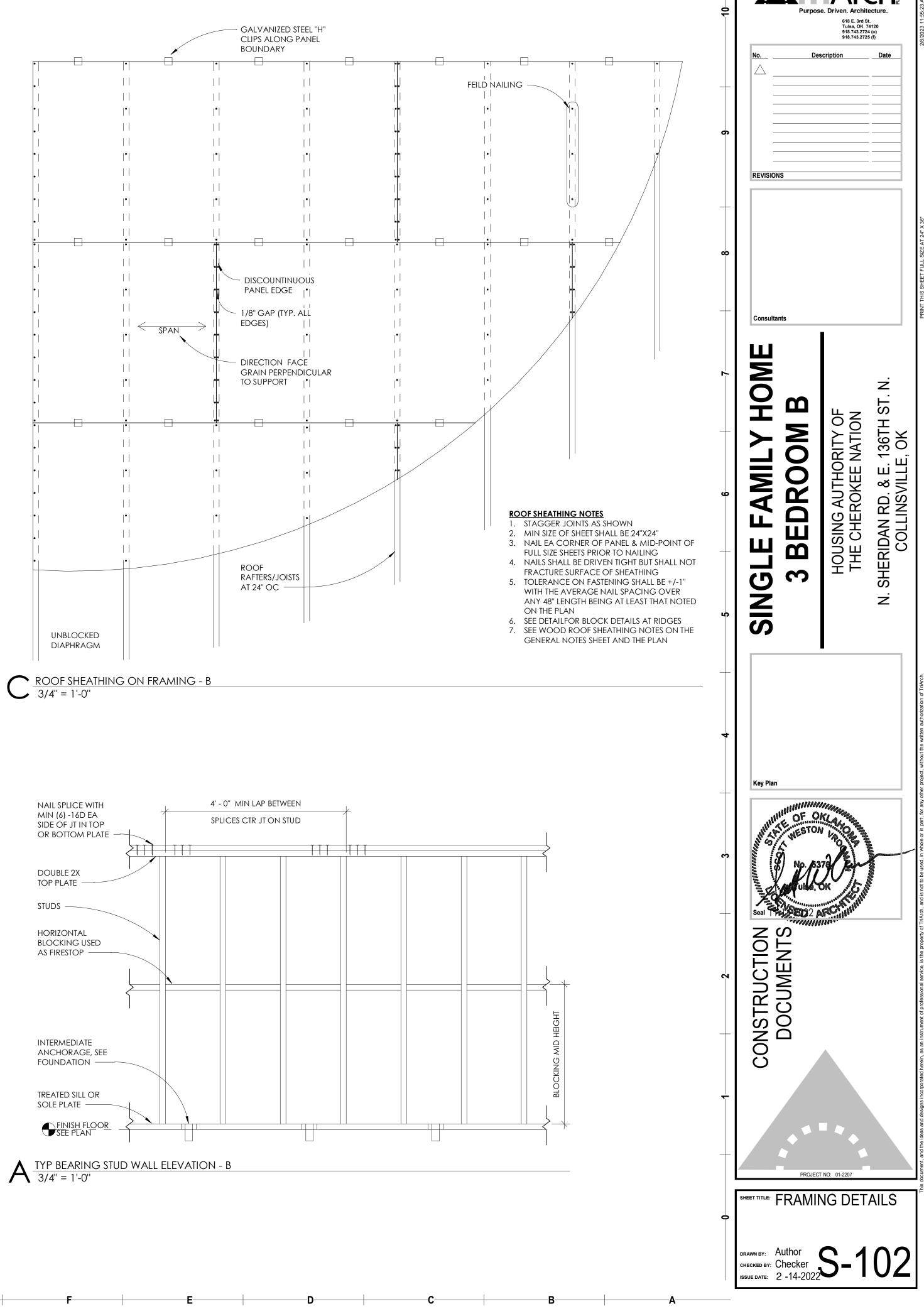
STAGGER NAILS AT DOUBLE

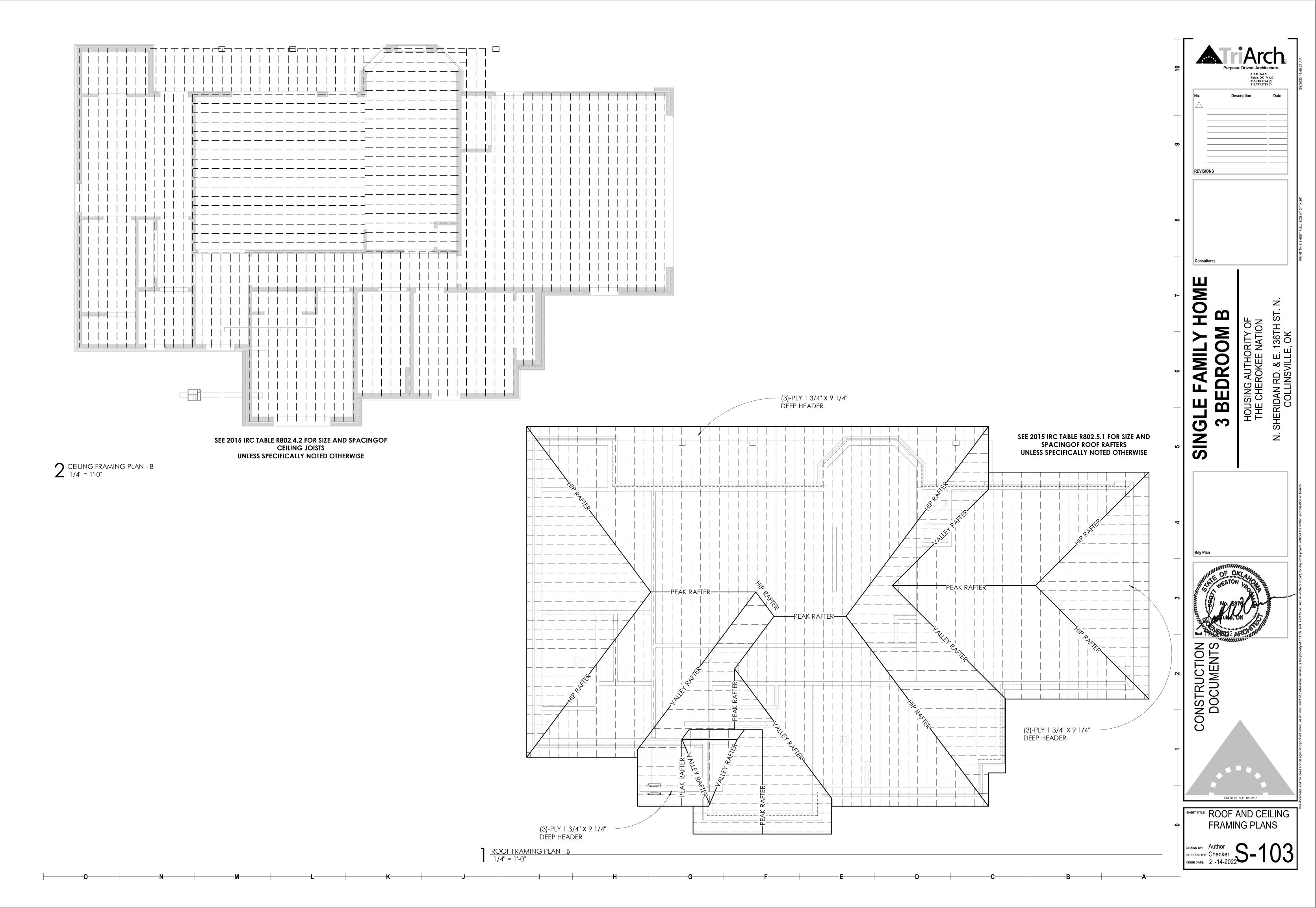
2X BLOCKING AT PLYWOOD EDGES

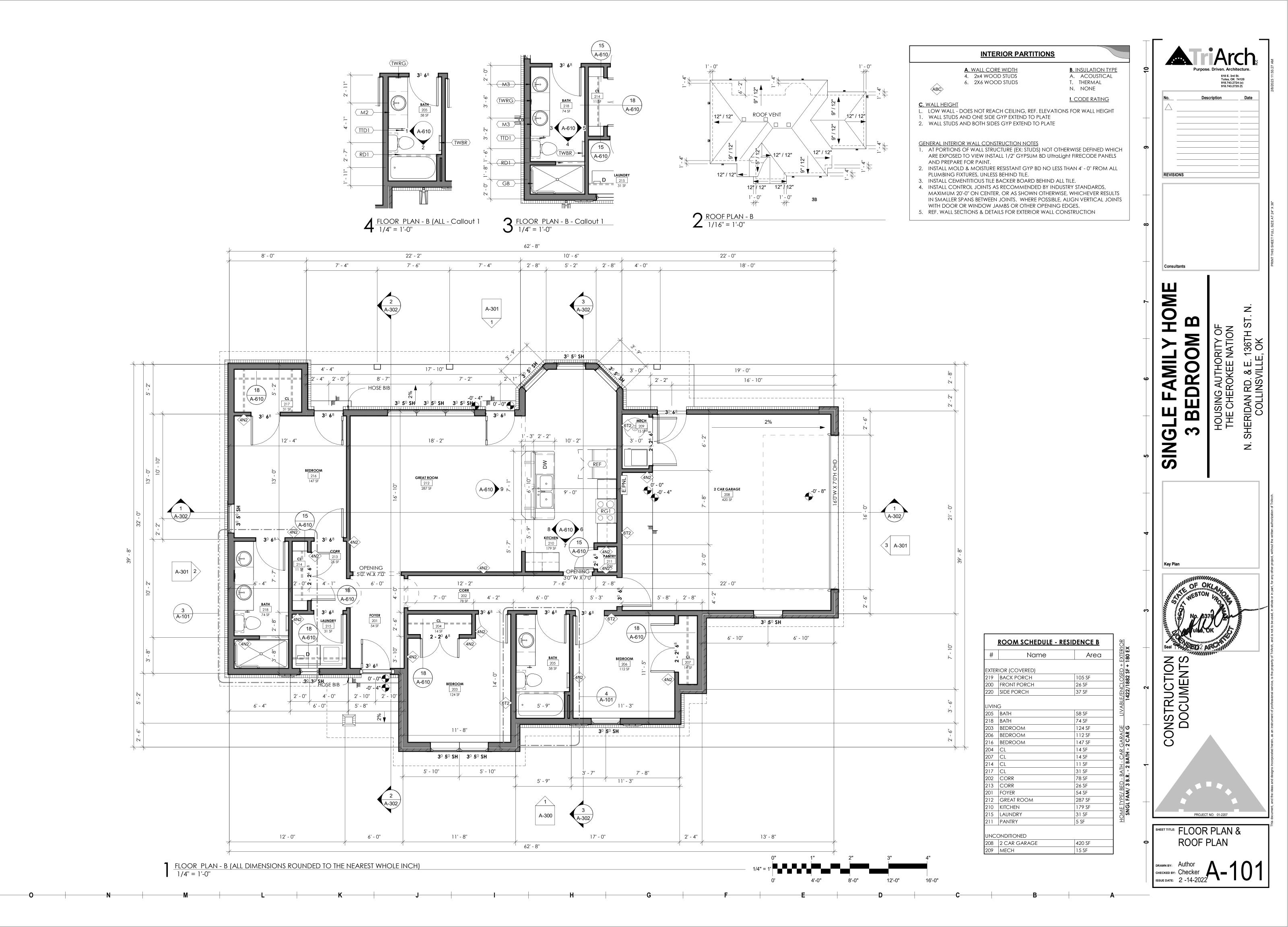
WHERE REQUIRED

- 7/16" THICK SHEATHING



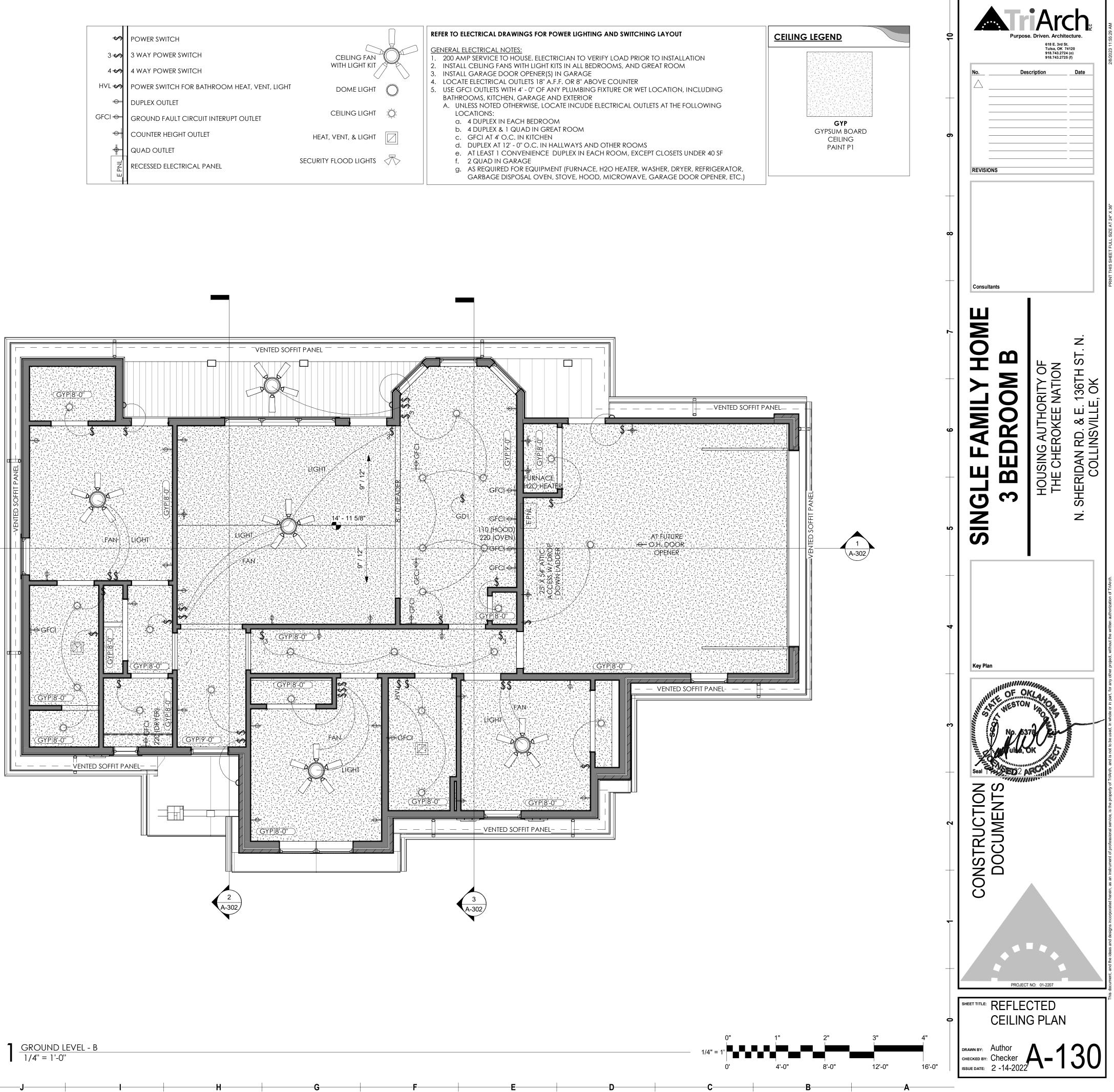


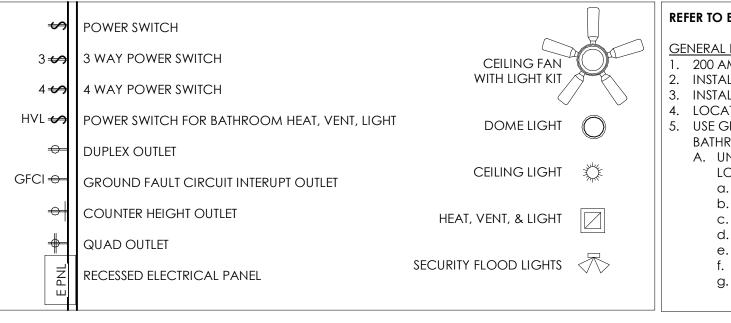




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HORIZONTAL SIDING
PAINTED WOOD FASCIA
SHINGLE ROOF

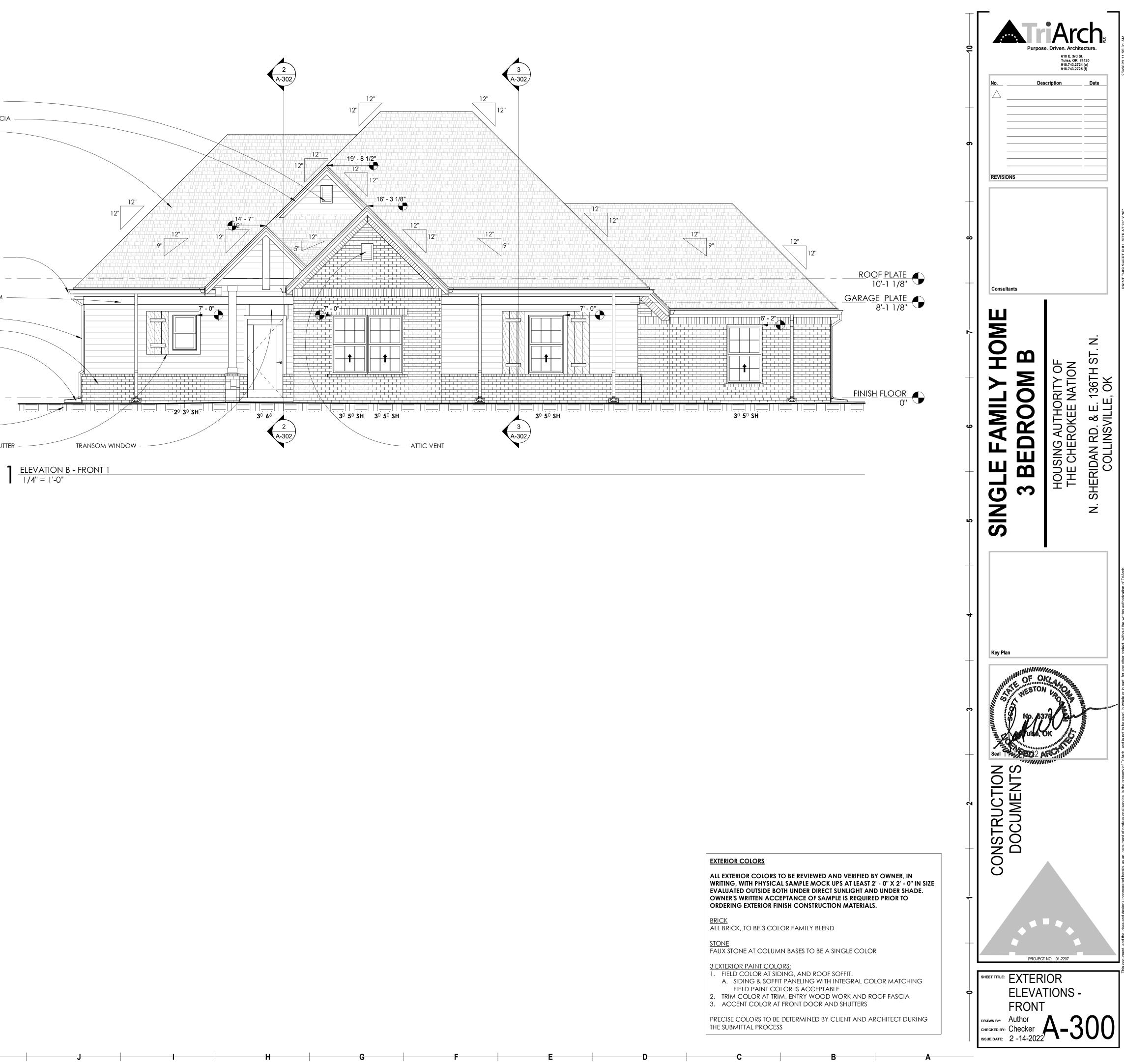
GUTTER PREFINISHED	_
PAINTED WOOD TRIM	
DOWNSPOUT	_
BRICK WAINSCOT	_
SPLASH BLOCK	

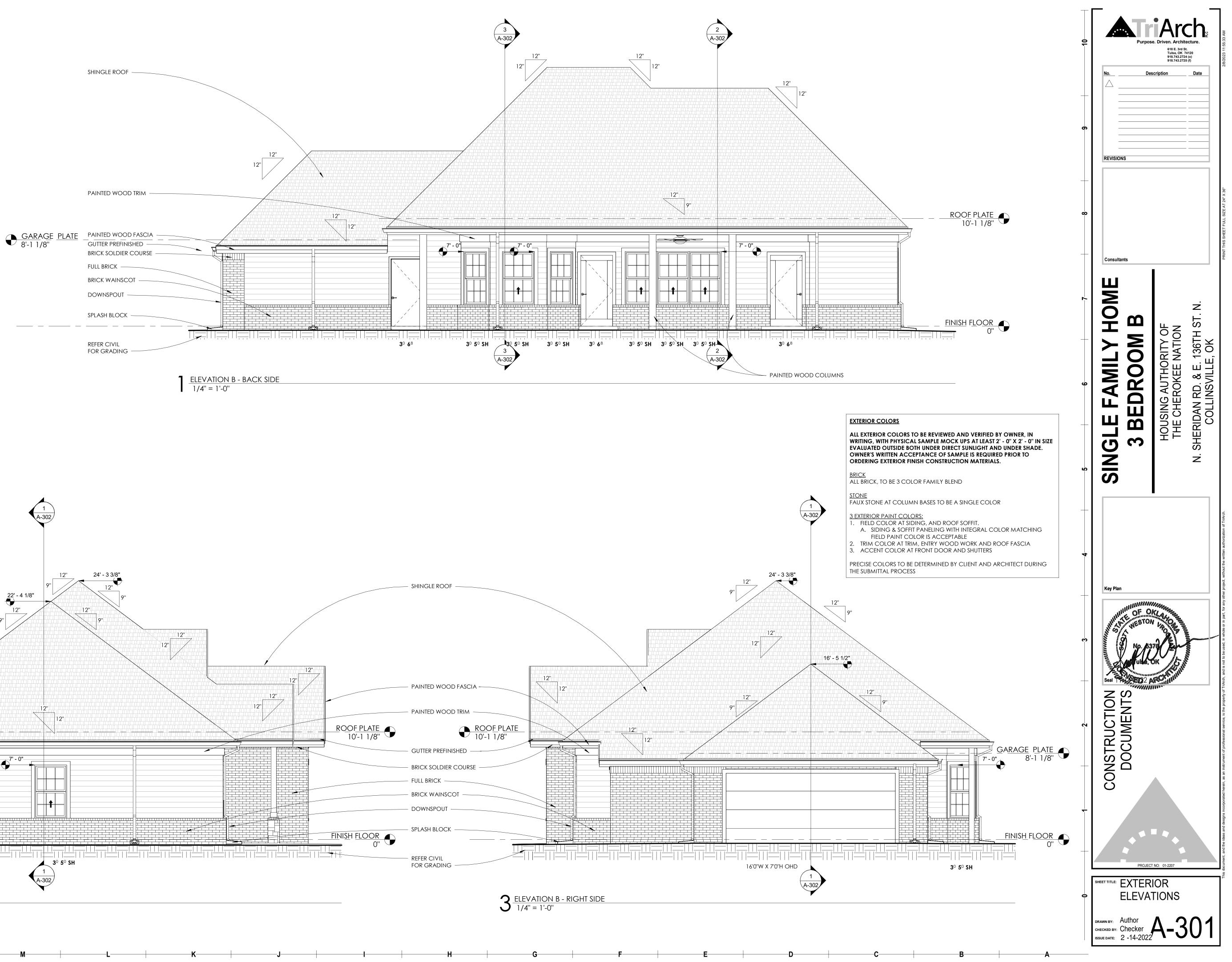
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FOR GRADING	

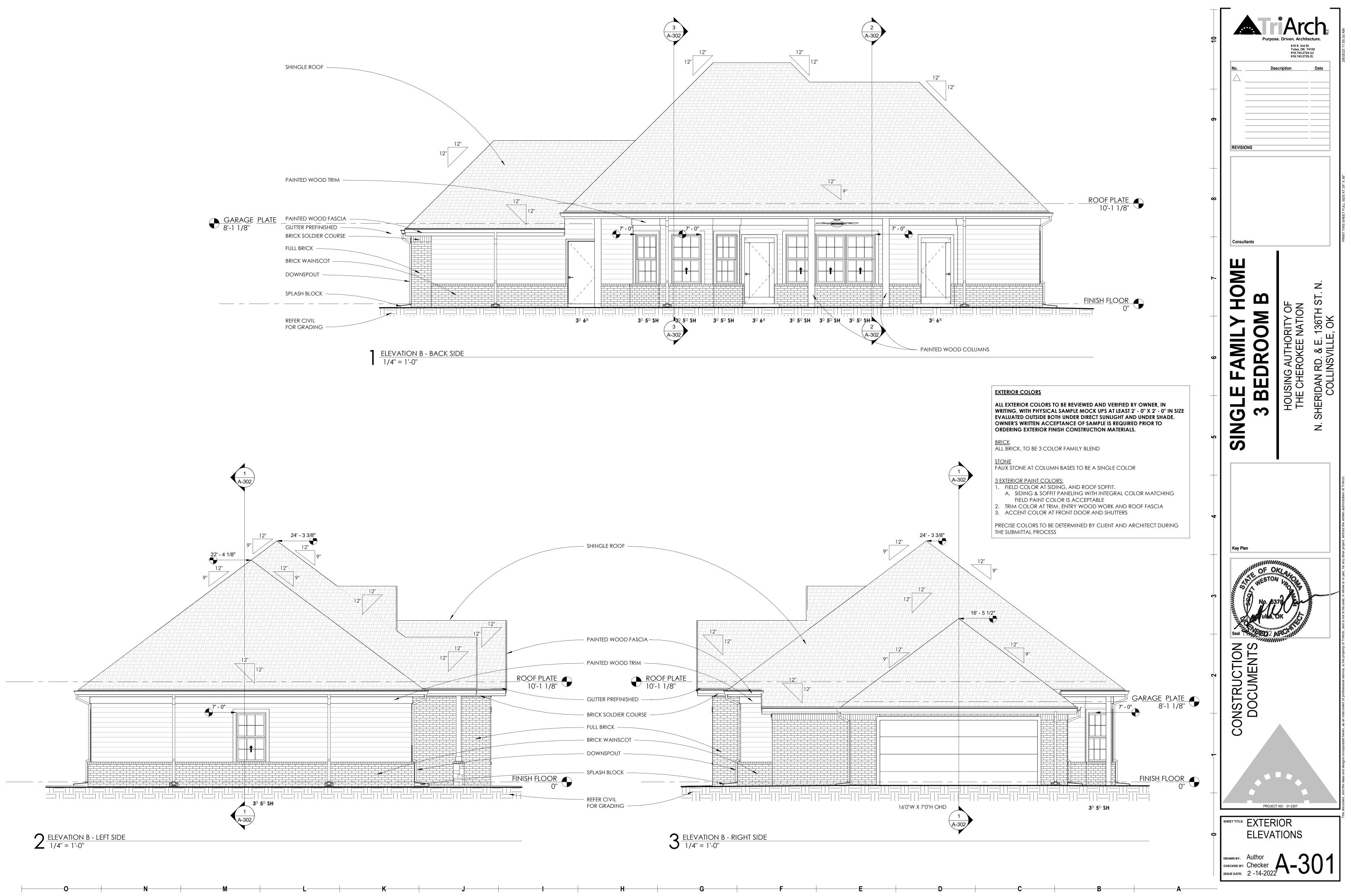
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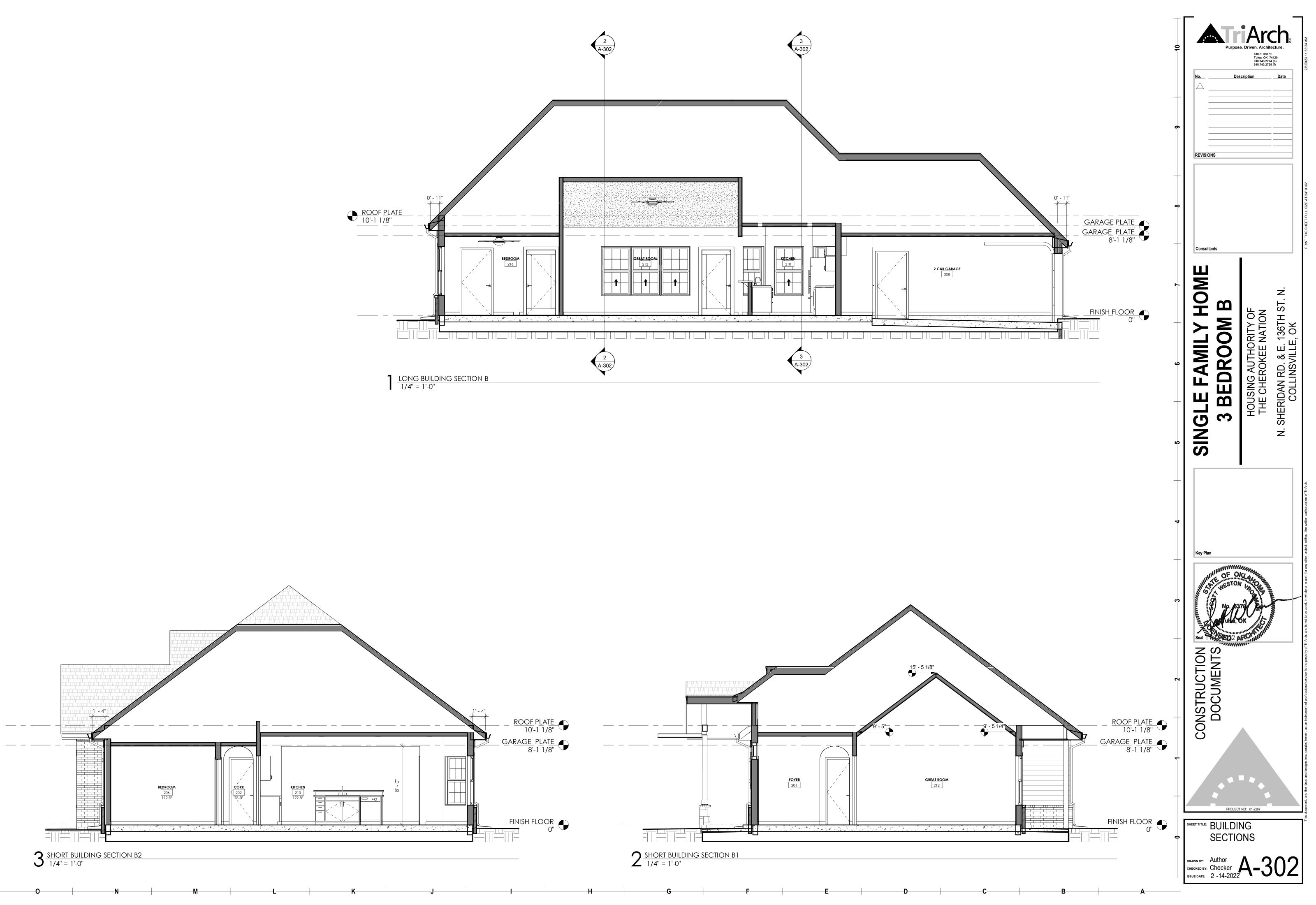
PAINTED WOOD SHUTTER

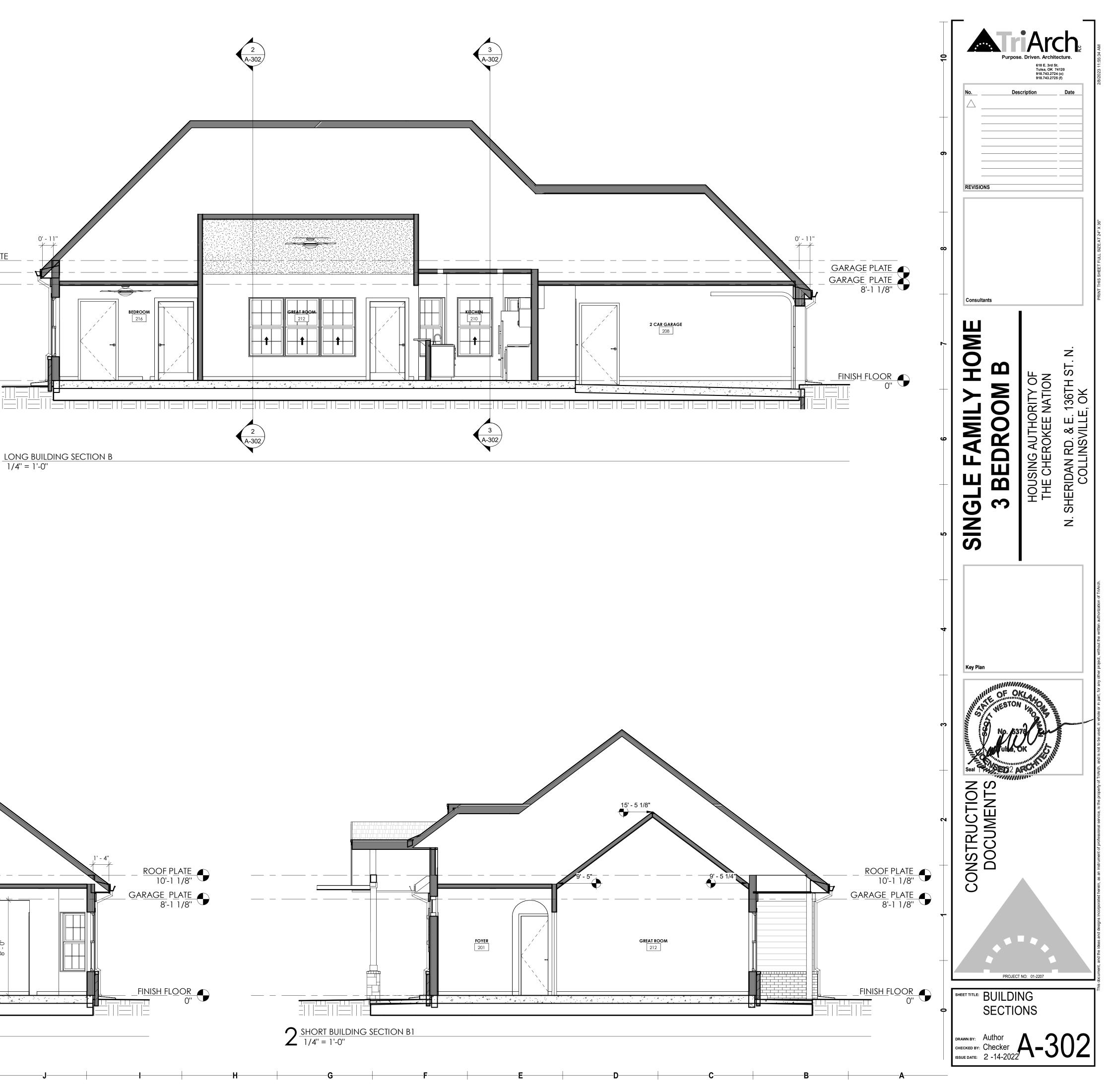


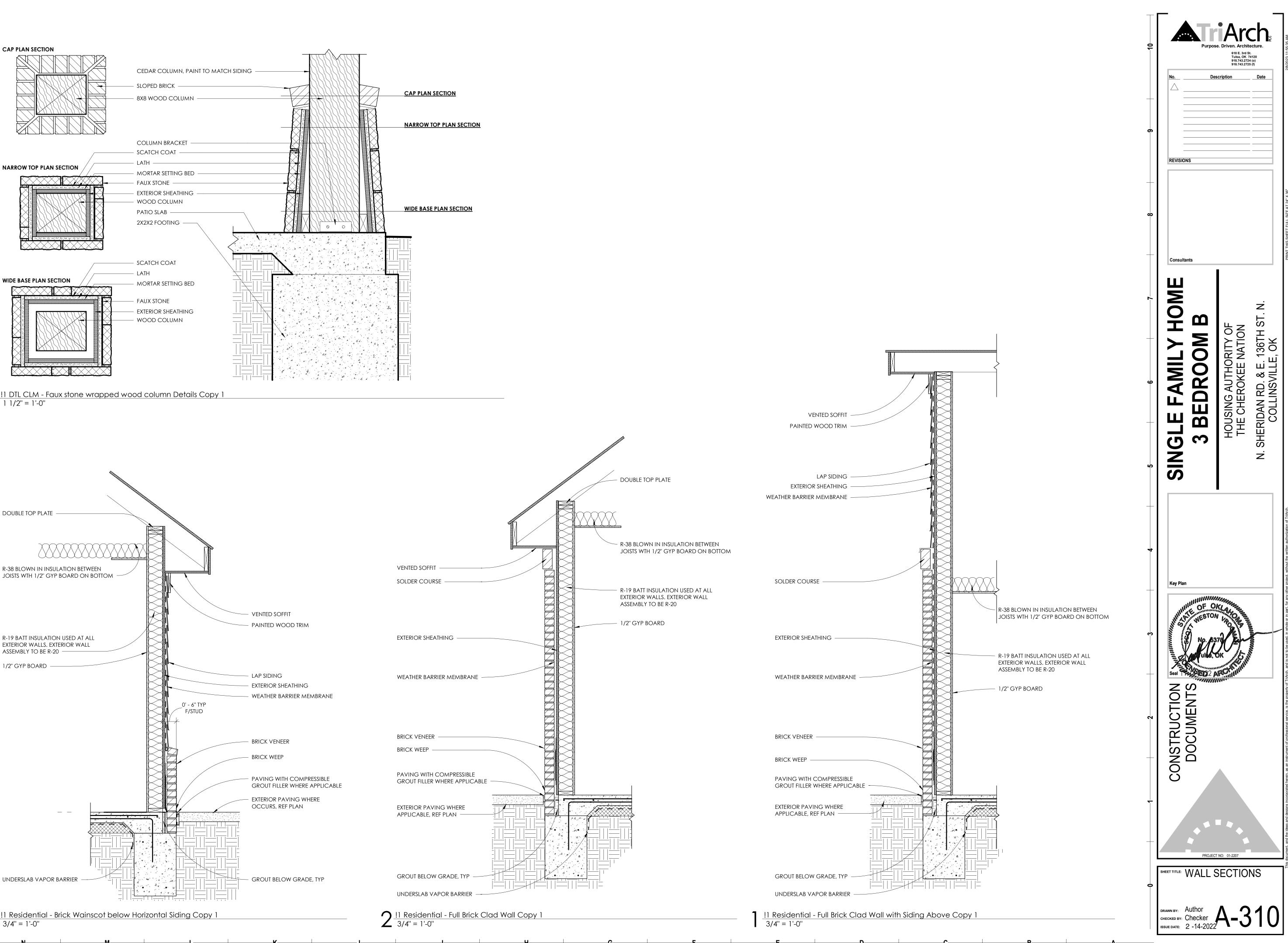




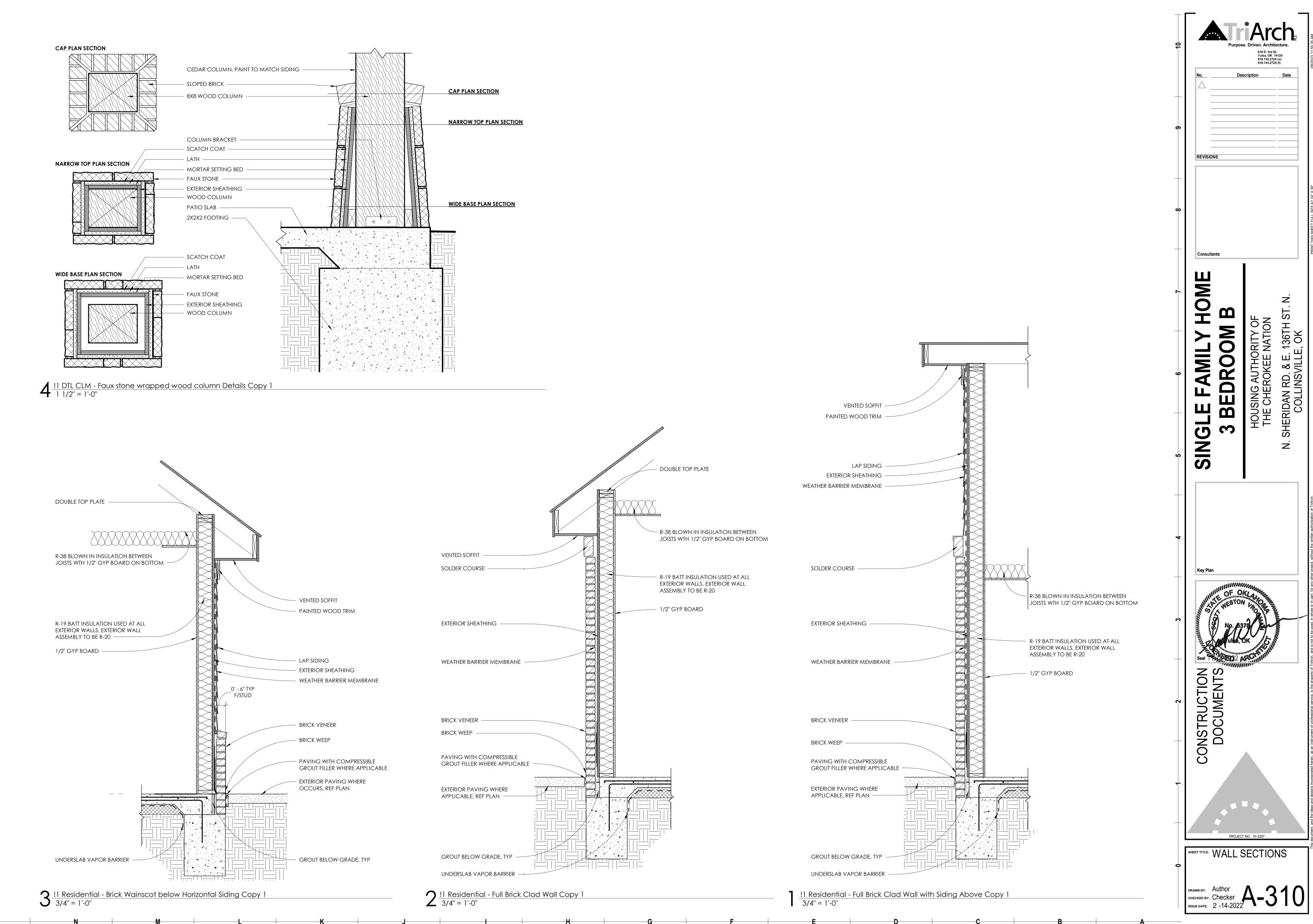






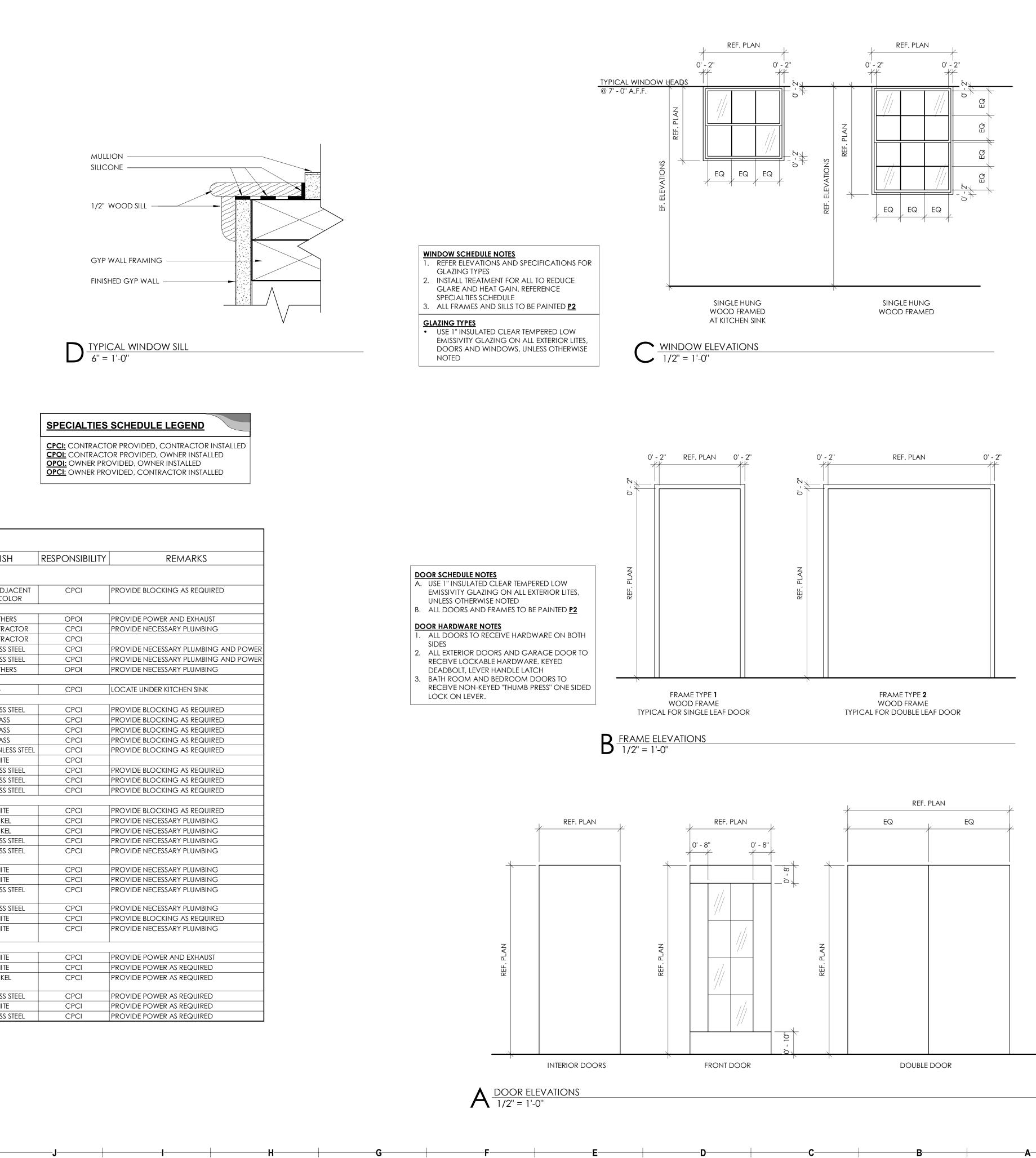


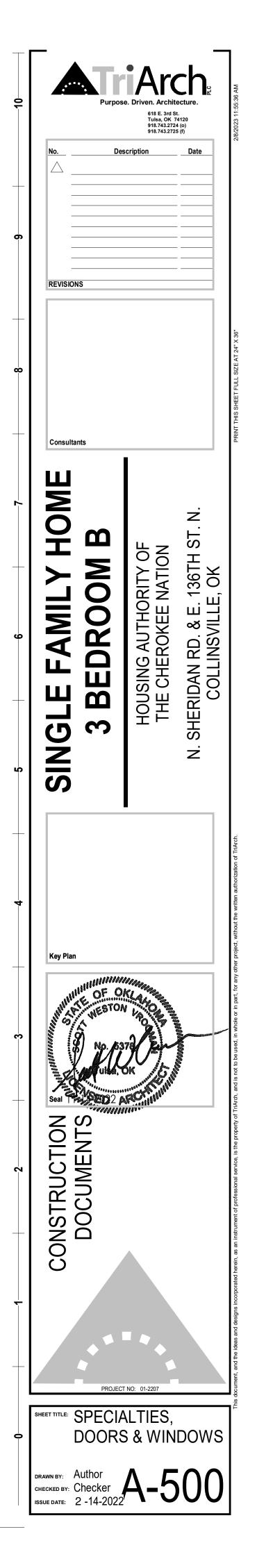




		SPECIALTIES SCHEDULE				
MARK	DESCRIPTION	MFGR.	MFGR. #	DIMENSIONS	FINISH	
BR1	- ARCHITECTURAL WOODWORK	TMI SYSTEMS	A7453	3"W x AS REQUIRED	MATCH ADJACEN	
DKI	METAL COUNTER SUFFORT BRACKET	1/VII 3131E/VI3	A7455		WALL COLOR	
DIVISION 10	) - APPLIANCES			I	I	
DRY	DRYER	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	
DW	DISHWASHER	BY CONTRACTOR	BY CONTRACTOR	BY CONTRACTOR	BY CONTRACTOR	
GD1	GARBAGE DISPOSAL	BY CONTRACTOR	BY CONTRACTOR	BY CONTRACTOR	BY CONTRACTOR	
REF	REFRIDGERATOR	AMANA	ART308FFDW	30''W X 29''D X 66''H	STAINLESS STEEL	
RG	RANGE & OVEN	AMANA	AER6603SMS	30''W X 28''D X 47''H	STAINLESS STEEL	
WASH	WASHER	BY OTHERS	BY OTHERS	BY OTHERS	BY OTHERS	
DIVISION 10	- FIRE PROTECTION SPECIALTIES			ļ	ļ	
FE	FIRE EXTIGUISHER	LARSEN'S	RE: SPECS	RE: SPECS	-	
DIVISION 10	) - TOILET AND BATH ACCESSORIES	1		I		
GB	SHOWER GRAB BAR	ASI	3550	1 1/2" dia	STAINLESS STEEL	
M1	MIRROR	BY CONTRACTOR	BY CONTRACTOR	48''W X 30''H	GLASS	
M2	MIRROR	BY CONTRACTOR	BY CONTRACTOR	60'' W X 30''H	GLASS	
M3	MIRROR	BY CONTRACTOR	BY CONTRACTOR	36'' W X 30''H	GLASS	
RD1	SHOWER CURTAIN ROD	ZENNA HOME	72F2ALBNL	ADJUSTABLE	SATIN STAINLESS STE	
SS1	MOBILE SHOWER SEAT	BY CONTRACTOR	BY CONTRACTOR		WHITE	
TTD1	TOILET TISSUE DISPENSER	FRANKLIN BRASS	MAX51-SN	7''L	STAINLESS STEEL	
TWBR	TOWEL BAR	FRANKLIN BRASS	MAX18-SN	18" L	STAINLESS STEEL	
TWRG	TOWEL RING	FRANKLIN BRASS	MAX46-SN	8"L	STAINLESS STEEL	
	2 - PLUMBING FIXTURES			-		
BS	BATHTUB SURROUND	STERLING	71374800-0	60''W X 30''D X 73''	WHITE	
F1	KITCHEN FAUCET	MOEN	87233SRS	14.5"H	NICKEL	
F3	BATHROOM FAUCET	MOEN	84603SRN	-	NICKEL	
S1	KITCHEN SINK	ELKAY	LWDB332284N	33''W X 22''D S 8''H	STAINLESS STEEL	
\$2	KITCHEN SINK ADA	AMERICAN STANDARD	20DB.8332284S.075	33''W X 22''D S 8''H	STAINLESS STEEL	
\$3	BATHROOM SINK	AQUASOURCE	ML-20507-B	19"W X 19"D X 8.3"H	WHITE	
SHO	BATHTUB	STERLING	71341810-0	60''W X 29''D X 17.25''H	WHITE	
SHC	SHOWER CONTROLS, FAUCET, AND HEAD	DELTA	BT13410-SS	-	STAINLESS STEEL	
SHH	SHOWER HEAD ADA	DELTA	75490	_	STAINLESS STEEL	
SW	SHOWER SURROUND	SWAN	SS0489601.011	48''W X 96''H X .25''D	WHITE	
T	TOILET	AMERICAN	731AA001S.20	18"W X 31.25D X 31"H	WHITE	
		STANDARD	, 01, 1, 00, 10, 20			
DIVISION 26	- ELECTRICAL FIXTURES					
HVL	HEAT VENT LIGHT	UTILITECH	7123-02-L	11"S X 15"D X 6"H	WHITE	
LC	CAN LIGHT	UTILITECH	MQTL1116-L10.5K9027	7.5"DIA X 3"H	WHITE	
LD	DOME LIGHT	DESIGNERS FOUNTAIN	1360M-BN	14"DIA X 5"H	NICKEL	
LF	FAN WITH LIGHT KIT	KICHLER	300044BSS	56"DIA X 16"H	STAINLESS STEEL	
LS	SECURITY LIGHT	LITHONIA	OFTH300PR120WHM12	5"W X 6"D X 5"H	WHITE	
LW	EXTERIOR WALL LIGHT	LUTEC	5510808001	5''W X 4''D X 6''H	STAINLESS STEEL	

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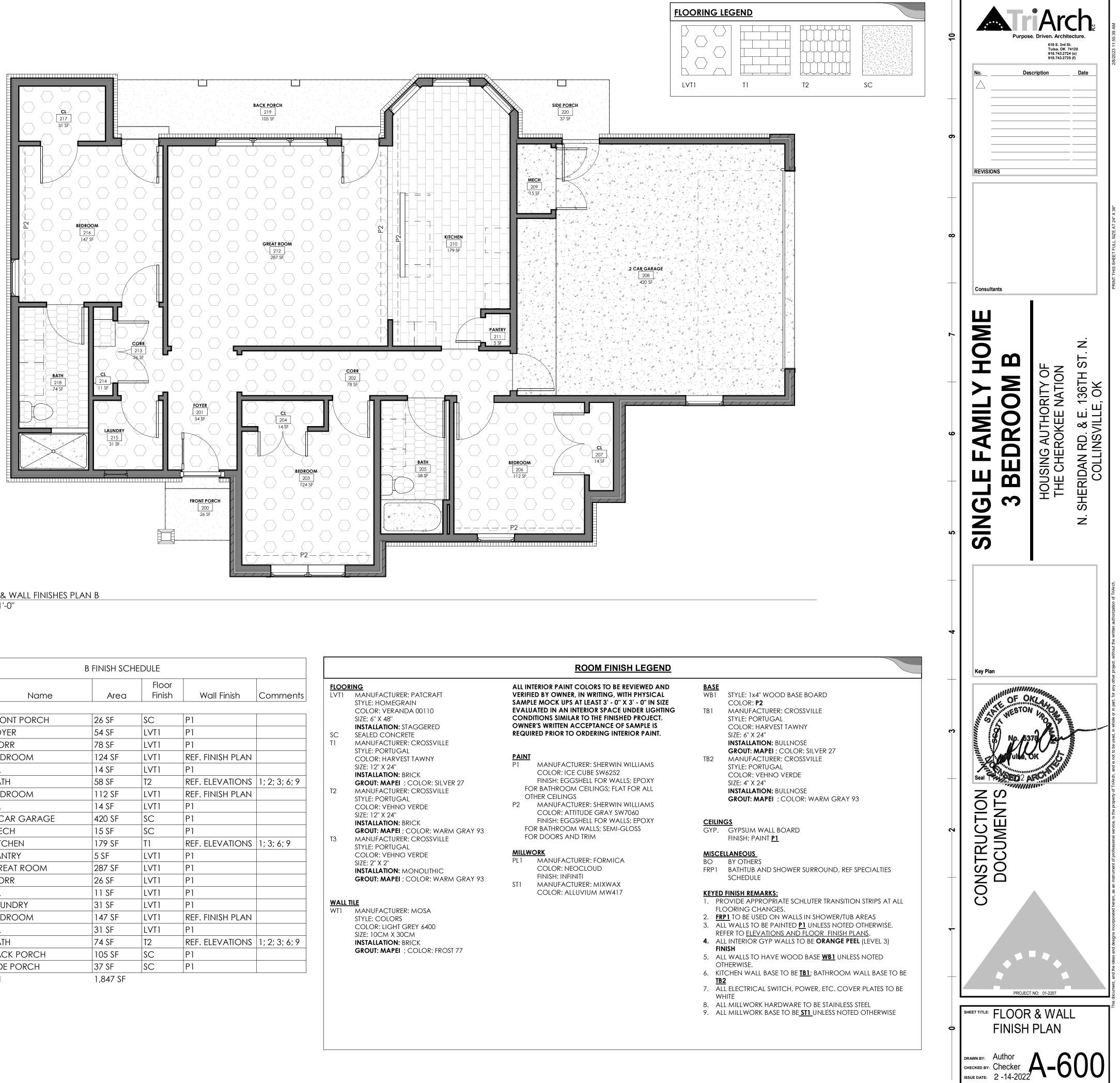




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## ROOM

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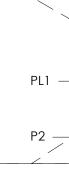
 $\frac{FLOOR \& WALL FINISHES PLAN B}{1/4'' = 1'-0''}$ 

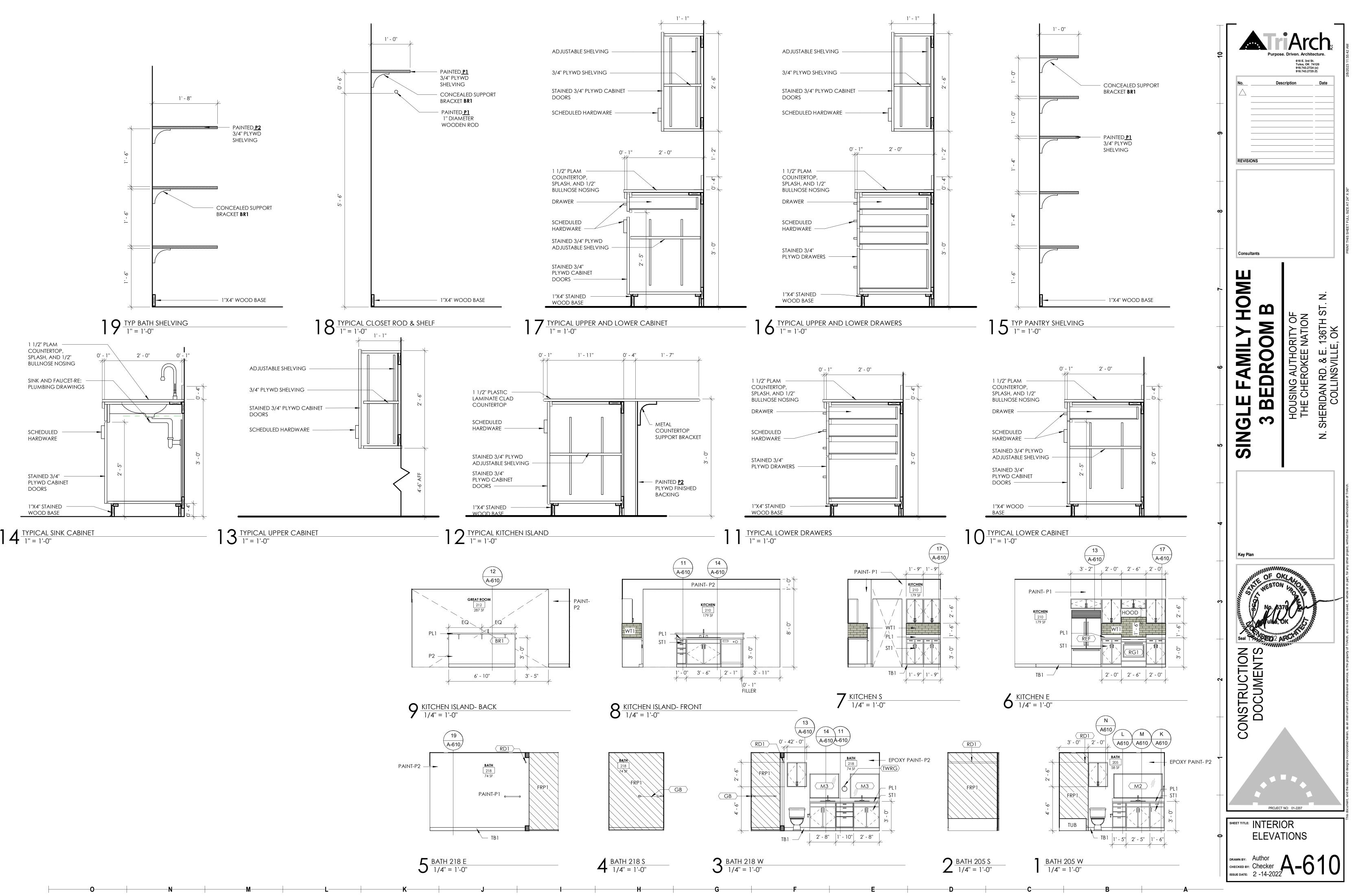
<b>\</b> #	Name	Area	Floor Finish	Wall Finish	Comments
	FRONT PORCH	26 SF	SC	P1	
	FOYER	54 SF	LVT1	P1	
	CORR	78 SF	LVT1	P1	
	BEDROOM	124 SF	LVT1	REF. FINISH PLAN	
	CL	14 SF	LVT1	P1	
	BATH	58 SF	T2	REF. ELEVATIONS	1; 2; 3; 6; 9
	BEDROOM	112 SF	LVT1	REF. FINISH PLAN	
	CL	14 SF	LVT1	P1	
	2 CAR GARAGE	420 SF	SC	P1	
	MECH	15 SF	SC	P1	
	KITCHEN	179 SF	T1	REF. ELEVATIONS	1; 3; 6; 9
	PANTRY	5 SF	LVT1	P1	
	GREAT ROOM	287 SF	LVT1	P1	
	CORR	26 SF	LVT1	P1	
	CL	11 SF	LVT1	P1	
	LAUNDRY	31 SF	LVT1	P1	
	BEDROOM	147 SF	LVT1	REF. FINISH PLAN	
	CL	31 SF	LVT1	P1	
	BATH	74 SF	T2	REF. ELEVATIONS	1; 2; 3; 6; 9
	BACK PORCH	105 SF	SC	P1	
	SIDE PORCH	37 SF	SC	P1	
tota	1:21	1,847 SF			

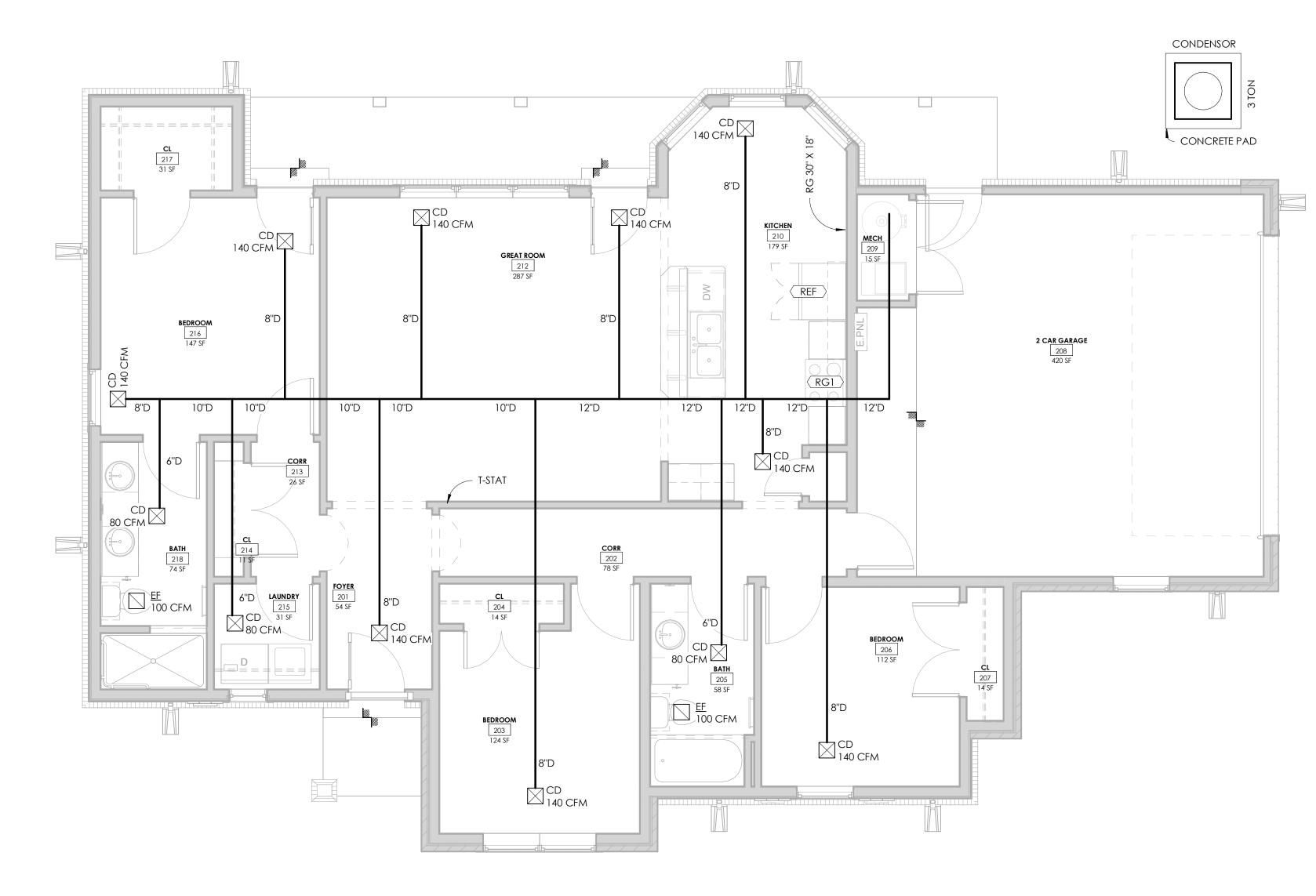
FLOO	<u>RING</u>	ALL II	NTERIOR P
LVT1	MANUFACTURER: PATCRAFT		IED BY O
	STYLE: HOMEGRAIN	SAMI	PLE MOCK
	COLOR: VERANDA 00110		UATED IN
	SIZE: 6" X 48"		DITIONS S
	INSTALLATION: STAGGERED		ER'S WRIT
SC	SEALED CONCRETE	REQU	IRED PRIC
T1	MANUFACTURER: CROSSVILLE		
	STYLE: PORTUGAL		_
	COLOR: HARVEST TAWNY	PAIN	-
	SIZE: 12" X 24"	P1	MANU
	INSTALLATION: BRICK		COLO
	GROUT: MAPEI ; COLOR: SILVER 27		FINISH:
T2	MANUFACTURER: CROSSVILLE		or bathr
	STYLE: PORTUGAL		THER CEI
	COLOR: VEHNO VERDE	P2	MANU
	SIZE: 12" X 24"		COLO
	INSTALLATION: BRICK		FINISH:
	GROUT: MAPEI ; COLOR: WARM GRAY 93		or bathr
T3	MANUFACTURER: CROSSVILLE	F	OR DOOR
	STYLE: PORTUGAL		
	COLOR: VEHNO VERDE		VORK
	SIZE: 2" X 2"	PL1	MANU
	INSTALLATION: MONOLITHIC		COLOF
	GROUT: MAPEL : COLOR: WARM GRAY 93		FINISH:
		ST1	MANU
			COLOF
WALL	<u>TILE</u>		
WT1	MANUFACTURER: MOSA		
	STYLE: COLORS		
	COLOR: LIGHT GREY 6400		
	SIZE: 10CM X 30CM		
	INSTALLATION: BRICK		
	GROUT: MAPEI ; COLOR: FROST 77		





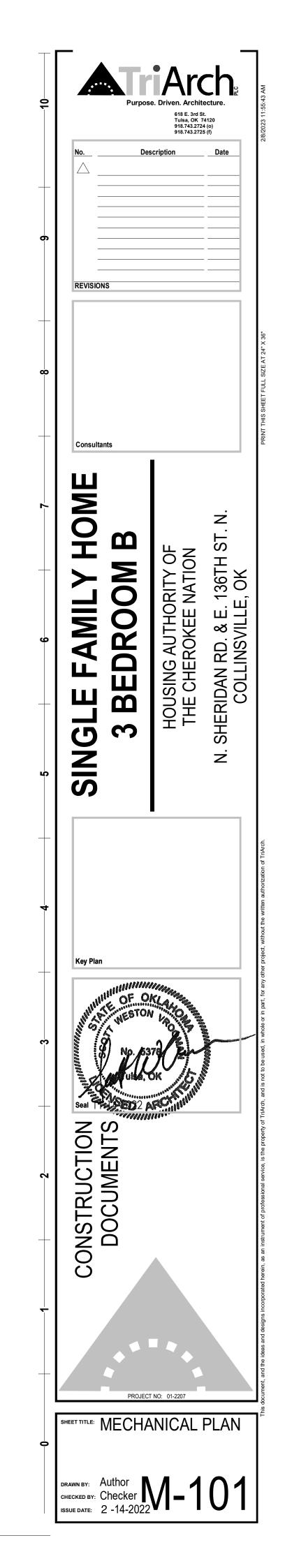






 $\frac{FLOOR PLAN - B (MECHANICAL)}{1/4'' = 1'-0''}$ 

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<u>AIR DEVICES NOTES</u> HART & COOLEY OR EQUAL

# CEILING DIFFUSERS TYPE 500 • 6X6 75 CFM OR LESS • 8X8 75 - 120 CFM • 10X10 120 -175 CFM • 12X12 175 - 300 CFM

- SIDEWALL FURNACE (FAN COIL) RETURN GRILLE TYPE 672 30X12 800 CFM (2T) 30X18 1200 CFM (3T) 30X24 1600 CFM (4T)

- <u>UNDERCUT DOORS NOTES</u>
   <u>UC</u> = INDICATES DOOR IS UNDERCUT BY 1"
   TYPICAL INTERIOR DOORS ARE ALL UNDERCUT, UNLESS INSTALLED IN AN INSULATED WALL.
   EXTERIOR DOORS, AND DOORS TO GARAGES ARE NOT UNDERCUT.

GENERAL HVAC NOTES:
1. USE HARD DUCT THOUGHOUT, NOT FLEX DUCT.
2. VERIFY HEAT SOURCE WITH CONSTRUCTOR (GAS, ELECTRIC

- **RESISTANCE**, AIR TO AIR HEAT PUMP) 3. HEAT PUMP FAN COIL UNITS TO BE PROVIDED WITH SUPPLEMENTAL ELECTRIC HEATER (SIZED TO PROVIDE SUPPLY AIR TEMPERATURE ABOVE 95 DEGREE FORTHRIGHT WITH HEAT PUMP OPERATION AT 0 DEGREES FOR NIGHT OUTSIDE AIR TEMPERATURE)
- 4. PROVIDE FLUE AND COMBUSTION AIR DUCTING FOR GAS FIRED FURNACE

FURNACE NOTES A. ESTIMATE 12,000 BTU PER 500 SF 1025/500=3 3\*1200= B. **36,000 BTU MINIMUM SIZE** 

- INPUT FAN COIL (EH)-MIN 15kw, 2 STAGE FAN COIL (HTP)-MIN 10kw, 2 STAGE
- 3. INSTALL FURNACE ON PLENUM STAND

DRYER EXHAUST NOTES
1. DRYER EXHAUST

- A. INSTALL DRYER EXHAUST DUCT IN WALL BOX WITH BOTTOM OF BOX AT FLOOR LEVEL.
  B. PROVIDE DRYER EXHAUST WALL
- CAP WITH BACK DRAFT DAMPER C. 4" DIAMETER W/ TAPED JOINTS (NO SCREWS)

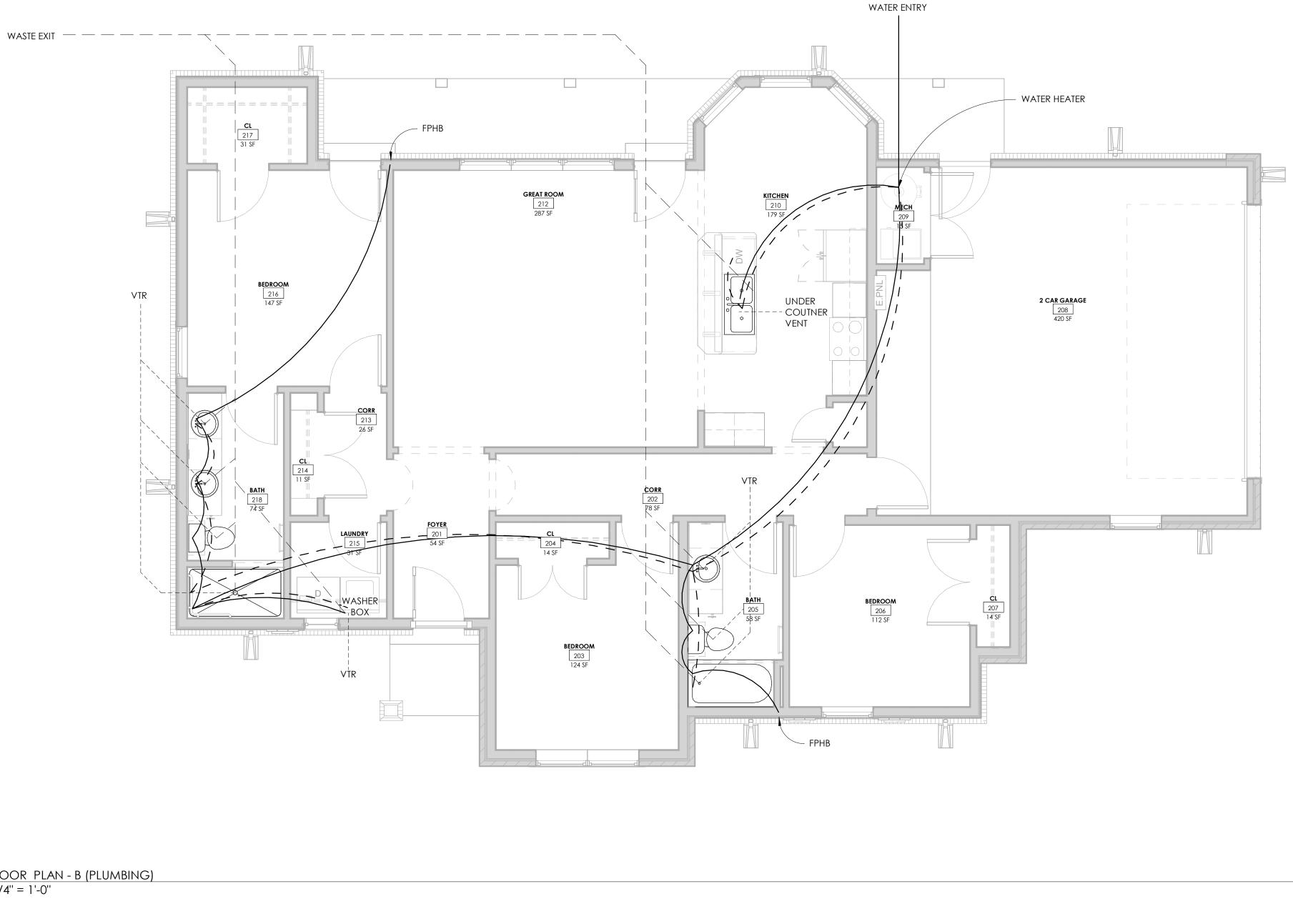
 $\frac{FLOOR PLAN - B (PLUMBING)}{1/4'' = 1'-0''}$ 

## DOMESTIC WATER SUPPLY NOTES

# <u>Service entrance</u> locate water service entrance & Shut off valve adjacent

- WATER HEATER WATER HEATER TO BE 50 GALLON TANK
- SUPPLY WATER HEATER WITH MIN 1" COLD WATER LINE
- DOMESTIC FIXTURES RUN 3/4" HOT AND COLD WATER LINES FROM SERVICE ENTRY TO
- all sinks and showers
- PLAN FOR LOCATION
- <u>DISH WASHER</u> IF INSTALLED, RUN HOT WATER LINE TO DISHWASHER. SIZE
   ACCORDING TO MANUFACTORER REQUIREMENTS.

- HOSE BIBS INSTALL 2 FREEZE PROOF HOSE BIBS, REF PLAN FOR LOCATION
- RUN 3/4" COLD WATER LINE TO EACH FREEZE PROOF HOSE BIB
- - - - - HOT SUPPLY — — — — WASTE ----- VENT



- EXTEND WATER SERVICE TO SITE UTILITY OR PRIVATE WELL SYSTEM
- WASHER BOX
  RUN 3/4" COLD AND 1/2" HOT WATER LINES TO WASHER BOX. REF
- INSTALL BALL SHUT OFF VALVE AT FREEZE PROOF HOSE BIBS

PLUMBING SYSTEM DESIGN IS DELEGATED TO THE WINNING CONTRACTOR. PROVIDED DESIGN IS FOR REFERENCE ONLY. SIZING AND LAYOUT OF PIPES ETC. BY SUBCONTRACTOR. FOLLOW NOTES AND INDUSTRY STANDARDS.

## WASTE AND VENT NOTES

<u>SERVICE EXIT</u>
EXTEND SANITARY SEWER TO SITE UTILITY OR PRIVATE DISPOSAL SYSTEM INSTALL FLOOR DRAIN AT WATER HEATER

- <u>SANITARY SEWER NOTES</u>
  INSTALL MINIMUM 3" WASTE LINES AT WATER CLOSET
- INSTALL MINIMUM 2" WASTE LINES AT SHOWERS & BATH TUBS
  INSTALL MINIMUM 1 1/2" WASTE LINES AT LAVATORIES
- DISHWASHER WASTE TO TIE IN TO GARBAGE DISPOSAL
- WHERE POSSIBLE COMBINE WASTE LINES. ENLARGE COMBINED LINES AS NEEDED AND REQUIRED BY CODE

- <u>VENT NOTES</u>
  INSTALL 1 1/2" VENT AT SHOWER DRAINS
  INSTALL 1 1/2" VENT AT WATER CLOSET DRAINS
- INSTALL 1 1/2" VENT AT LAVATORY DRAINS
- INSTALL 1 1/2" VENT AT KITCHEN SINK, DISHWASHER, AND GARBAGE DISPOSAL DRAINS WHERE POSSIBLE COMBINE VENTS BEFORE PENETRATING ROOF. ENLARGE COMBINED VENTS AS NEEDED AND

REQUIRED BY CODE

- <u>CLEANOUTS</u>
  INSTALL INTERIOR WALL CLEANOUTS AT KITCHEN SINK (UNDER CABINET) LAUNDRY ROOM (ADJACENT WASHER BOX) AND NEAR SERVICE EXIT.
- INSTALL EXTERIOR CLEANOUTS AT EACH LOCATION WHERE Sanitary sewer exits the building

