



Riverside Home Designs and Drafting Services

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SHORT SPECIFICATIONS

GENERAL

1. Contractor and Sub-contractors shall verify all conditions shown on plans and at the site prior to commencing work. Any discrepancies between plans and/or site shall be brought to the attention of the Owner. No work shall commence until all discrepancies are corrected.
2. All work shall conform to the minimum standards of the latest adopted edition of the International Residential Code (IRC), International Building Code (IBC), International Plumbing Code (IPC), International Mechanical Code (IMC), National Electric Code (NEC), and any applicable local ordinances.
3. Dimensions shall take precedence over scales shown on drawings.

****SCALE DRAWINGS ONLY IF NO DIMENSIONS ARE AVAILABLE FROM THE PLANS****

4. Notes and details shall take precedence over general notes and typical details.
5. Contractor shall:
 - (a) Store all material and equipment left at the site in a secure and safe manner;
 - (b) Be responsible for disconnecting or securely locking any potentially dangerous equipment prior to leaving the premises each day;
 - (c) Be responsible for securely closing any openings giving access to the interior of the building from intrusion or the elements at the end of each work day.
6. Unless otherwise noted, Contractor is to remove all materials necessary to perform the Work as indicated on the Drawings. Contractor is to insure that all openings into areas not currently being worked on are properly sealed from dust during construction.
7. Contractor shall at all times, keep the site free from the accumulation of waste materials and leave the job broom clean at the end of each work day. Contractor shall do all things necessary to protect existing landscaping from damage during construction. Upon completion of Project, Contractor shall clean all fixtures, glass, floors, crawlspaces, driveways, parking areas, yards and all other surfaces and leave the area of work in a completed condition, ready for occupancy. All debris generated from the Work under this Contract shall be removed from site.
8. Openings, chases, trenches, holes, notches, etc. shall not be placed in beams, joists, columns, bearing or shear walls, unless specifically detailed or noted on the drawings.
9. Change orders may be made at any time without invalidating the Contract. These changes could be additions, substitutions or deletions to the Work. The contract sum and time are to be adjusted accordingly. All changes will be in writing and signed by both parties prior to

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instituting the change. Change orders are to be part of the Contract Documents. No extra work will be paid for unless this procedure is followed.

10. All materials not specifically described in these specifications or on the Drawings but are required for proper and complete installation of the work of this Section, shall be as selected by the Contractor subject, approved by Owner.
11. It is the installer's responsibility to assure that each respective system functions properly, safely, and meets all local, state and regional codes.
12. Unless otherwise provided for in writing, Contractor shall provide and install all work indicated on the drawings and as described in these specifications. Also, Contractor shall provide any incidental work not shown or specified, which can be reasonably inferred or taken as belonging to the work and necessary to provide the complete system.
13. These specifications do not constitute a complete installation guide for the work. The installers or each system shall be properly licensed and reasonably experienced in installation of their respective type of system.
14. Contractor and each Sub Contractor shall examine the areas and conditions under which their work will be installed. Correct conditions detrimental to proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.
15. Contractor and each Sub Contractor shall provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of each section of work described herein, and who shall be present at all times during progress of the work and shall direct all work performed under their responsibility.

SITE WORK

1. Perform all required excavating, filling, grading, site drainage as needed to complete the Work shown on the Drawings and as specified herein.
2. All on site fill material (if needed) shall be soil or soil rock mixture which is free from organic matter and other deleterious substance.
3. Granular cushion (drain rock) shall be clean, mineral aggregate.
4. Excavate as required to accommodate the installation of this Work. All over excavated areas to be filled solid with concrete at Contractor's expense. Remove all ruts, hummocks, and other uneven surfaces by surface grading prior to placement of fill.
5. Excavate to the established lines and grades. Cut off bottom of trenches level, and remove all loose soil until solid base is achieved.
6. Compact cohesive backfill material to a minimum degree of compaction of 90%.
7. Perform all rough and finish grading required to attain the elevations shown on the Drawings or as needed to complete the Work. Use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.
8. When necessary, provide required shoring to support excavating or existing structures.

9. Carefully place the specified granular cushion in areas to receive concrete slabs on grade or as shown on drawings, uniformly attaining the thickness indicated on the Drawings, and providing all required transition planes.
10. Prior to demolition which affects structural or environmental safety, submit written request to the Project Engineer for permission to proceed with demolition.
11. Should conditions of the Work, or schedule, indicate a required change of materials or methods for demolition or removal, so notify the Building Designer and secure his written permission prior to proceeding.

CONCRETE

1. Contractor to provide and install all concrete work in accordance with those applicable sections of Chapter 19 of the latest adopted edition of the International Residential Code (IRC).
2. Concrete shall obtain a minimum 28-day compressive strength of 2500 PSI. Use 5 sacks of cement per cubic yard.
3. Aggregate shall conform to ASTM C33 with 1" max size for all concrete.
4. Concrete shall be properly placed to assure the absence of voids in structural elements.
5. Concrete clear cover shall be as follows: Concrete cast directly against earth: 3". All other, unless otherwise noted: 2"
6. Reinforcing steel as indicated shall be properly anchored and tied in place before pouring. Reinforcing steel shall be deformed bars, conforming to ASTM 615, Grade 40. Unless otherwise noted, lap all splices a minimum of 20 bar diameters.

MISCELLANEOUS METALS

1. Provide all miscellaneous metal complete, in place, as shown on the Drawings, specified herein, or as needed for a complete and proper installation.
2. Structural iron and steel shall conform to ASTM A 36.
3. Metal connectors and miscellaneous hardware shall be as manufactured by the Simpson Co.
4. Nuts and bolts shall conform to ASTM A 307. All bolting shall conform to IRC standards. All machine bolt connections shall have cut washers under heads and nuts bearing on wood. All lag bolts shall have washers under head.
5. Paint all non primed or scratched metal with Fuller O'Brien's #5037 L 2, Chex Rust Metal Primer, or approved equal.
6. All steel and miscellaneous connectors shall be installed in strict compliance with manufacturer's written instructions.
7. All holes in lumber shall be drilled a maximum of 1/32" larger than the nominal diameter of bolt.
8. All iron and steel furnished under this section, except those embedded in concrete, shall be thoroughly cleaned of rust, scale and grease and given at least one shop coat of primer paint, worked well into joints and holes. After erection, touch up all damaged paint surfaces.

ROUGH CARPENTRY

1. The labor, execution and materials required for all carpentry work as indicated in the Drawings shall be in accordance with those applicable sections of Chapter 5 and Chapter 6 of the latest adopted edition of the International Residential Code (IRC).
2. All structural lumber to be Douglas Fir, graded in accordance with the West Coast Lumber Inspection Bureau, Western Wood Products Association, and the California Redwood Association. Lumber shall bear trademark, mill identification and grade.
3. All structural framing members shall be Douglas fir with the following minimum grades:
GLU LAM: 24F
JOISTS, STUDS, BLOCKING AND PLATES: #2 OR BETTER
POSTS, BEAMS AND HEADERS: #1
4. All joists, beams and headers shall be dry (MC less than 19%)
5. All exterior wood shall be pressure treated or redwood, appearance grade or better (see plans.)
6. Where not shown on plans, nailing shall conform to IRC Table R602.3(1).
7. All nails to be common wire. Nails that will be exposed to weather shall be hot dipped galvanized or stainless steel.
8. Building paper shall be either 15# or 30# (as indicated) asphalt saturated felt, laid horizontally board fashion with 3" laps. Carry over sills, Jambs and openings. Use flashing paper double Kraft type at all windows and doors.
9. Fire block all walls over ten feet in height.
10. Block all plywood seams in shear walls. Block at shear wall connections to roof, ceiling and floor.
11. Joists, rafters and beams to be placed with crown side up except at large cantilevers. Structural members shall not be cut for pipe, conduit, etc.

FINISH CARPENTRY

1. The materials for finish carpentry work shall be selected by the Contractor (with Owner's approval) for appearance in accordance with WIC standards. All interior and exterior lumber shall meet or exceed the standards of "Section 3 - Lumber Grades - Softwoods" of the Manual of Millwork Custom-Grade, Opaque Finish. Casework and plastic covered casework shall be in accordance with "Section 14" and Section 15" custom grade.
2. Produce joints which are true, tight and well fastened with all members assembled in accordance with the Drawings. Make all joints to conceal shrinkage. Miter exterior joints. Cope interior joints. Miter or scarf end-to-end joints. Install trim using pieces as long as possible. Install items straight, true, level, plumb and firmly anchored in place. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood. Nail exterior trim with galvanized nails, making joints to exclude water and setting in waterproof glue or sealant. On exposed work, set nails for putty.
3. Sand finished wood surfaces thoroughly as required to produce a uniformly smooth surface. Do not sand wood which is designed to be left rough. No sandpaper marks, hammer marks, or other imperfections. Back prime all exterior lumber before installing.

INSULATION, SEALANTS AND CAULKING

1. The labor, execution and materials required for all insulation, sealants and caulking work as indicated in the Drawings shall be in accordance with those applicable sections of the International Energy Conservation Code (IECC) and the latest adopted edition of the International Residential Code (IRC).
2. All new windows shall be fully weather stripped or gasketed, following the requirements of the International Energy Conservation Code (IECC).
3. All new exterior walls and those existing exterior walls that are opened during the course of construction shall be insulated. Insulate walls with R 13.
4. Fiberglass insulation shall be faced with either foil or kraft type moisture barrier. Faced side to be installed toward the interior of the building. Batt insulation shall conform to Federal Specification HH 1 521 E, Type II and III. Fire hazard classification rating shall be 25/50 or less.
5. Before caulking, insure that all joints and spaces are clean, dry, free of dust, loose particles and other foreign materials; that metals are free of all rust, mill scale, coatings, oil and grease; that aluminum surfaces that have protective coatings are cleaned wherever sealant is to be placed, and fixture surfaces are clean and labels removed in area of sealant application.
6. Caulk or otherwise seal all exterior joints around windows and door frames; between wall sole plates and floors, and between exterior wall panels; penetrations in walls, ceilings, and floors for plumbing, electrical or gas lines; openings in attic floors; all other openings in the building envelope.

SHEET METAL

1. The labor, execution and materials required for all sheet metal work as indicated in the Drawings shall be in accordance with those applicable sections of the Architectural Sheet Metal Manual of the Sheet Metal and Air Conditioning Contractor's Association, Inc.
2. Flashing and other galvanized iron shall be a minimum of 26 gauge. All exposed galvanized metal to be back primed, primed and painted. All seams in flat work shall be soldered.

COMPOSITION SHINGLE ROOFING

1. Remove existing shingles in areas to be worked on. Remove, repair and/or replace any damaged, rusting or other flashing materials that are not in a condition acceptable for installation of new roofing. Field inspect, repair and/or replace any moisture damaged roof decking/substrate in work area. Field inspect, repair and/or replace any damaged soffit in work area. Field inspect, repair and/or replace any damaged or leaking gutters and down spouts in work area - paint to match existing. Replace any damaged or missing shingles to where appropriate in work area.
2. Install underlayment, flashing and shingles in accordance with manufacturer's instructions, the latest adopted edition of the IRC and the NRCA Steep Roofing Manual. Insure no work is done that would void the manufacturer's warrantee. Provide Owner with Manufacturer's written guarantee of material.

3. Contractor shall select shingles (with Owner's approval) to match the existing shingle as closely as possible in color, style, exposure and longevity. Underlayment shall be asphalt saturated felt in thickness as required by manufacturer of shingle. Roofing nails shall be hot dipped galvanized or aluminum, sharp pointed, conventional barbed shank roofing nails, 3/8" dia. head of sufficient length to penetrate through sheathing.
4. Place all plywood sheathing with face grain perpendicular to supports and continuously over at least two supports. Center all joints accurately over supports. Stagger the end joints of plywood panels to achieve a minimum of continuity of joints. Nail per plans.
5. Form flashing to protect roofing materials from physical damage and shed water, from sections in maximum possible lengths, free from distortion or defects. Hem exposed edges of flashing minimum of 1/4 inch on underside. Verify that plumbing stacks and other roof penetrations are flashed to deck surface. Place eave and gable end metal flashing tight with fascia boards. Weather lap joints and seal with plastic cement. Secure flange with nails.
6. Install underlayment perpendicular to slope of roof. Place one ply of underlayment over unprotected area with ends and edges weather lapped and nailed. Stagger end laps of each consecutive layer. Seal items projecting through roof water tight using weather lap with plastic cement.
7. Open Valleys: place one layer of sheet metal flashing, minimum of 24" wide, centered over open valleys and crimped to guide water. Weather lap joints and nail in place. Closed Valleys: reinforce valley with two layers of smooth roll roofing (40 to 50 lb per square.) The first layer is 12" wide, and the second 24" wide. Lightly nail at the outside edge. Strip shingles on one slope are allowed to run through the valley and up the opposite slope. Do not allow any end joints of the shingles to fall in the valley. Trim shingles on one side only 2 to 3 inches from the centerline. Keep all nailing 9 to 12 inches away from the centerline of the valley. Gum all cut edges of shingles to the valley base material and to each other.
8. Install shingles in accordance with manufacturer's written instructions. Do not install in any manner that would jeopardize or void manufacturer's product warrantee. Use double course of shingles at eaves. Place shingles in straight coursing pattern with required weather exposure so as to produce double thickness over entire roof area. Extend shingles 3/4 inch over eaves and 1/2" over gable end fascia boards. Cap hips and ridges with individual shingles, maintaining weather exposure. Place so as to avoid exposed nails. Complete installation to provide a weather tight roofing system.

DOORS, WINDOWS AND SKYLIGHTS

1. The labor, execution and materials required for all glass and glazing work as indicated in the Drawings shall be in accordance with those applicable sections of Chapter 3 of the latest adopted edition of the International Residential Code (IRC).
2. New windows to be vinyl sash, clear glass, low E2 double glazed, and be labeled in accordance with the requirements of the International Energy Conservation Code (IECC). U value not to exceed 0.30. Skylights to be Velux brand, Glass package 74, U-value not to exceed 0.50.
3. Doors and panels of shower/tub enclosures and glass in wall openings within 60" above a standing surface and drain outlet shall be fully tempered, laminated safety glass or approved plastic and shall comply with IRC Section R308.

4. All sliding patio doors and all glass in other listed hazardous locations shall be tempered glass.

GYPSUM WALLBOARD

1. The labor, execution and materials required for all drywall work as indicated in the Drawings shall be in accordance with those applicable sections of Chapter 7 of the International Residential Code (IRC).
2. 1/2" gypsum wallboard shall be placed on all interior walls and 5/8" on ceilings or as indicated on the Drawings or as needed for a complete job. Use RC channel on those walls indicated on the drawings. Use water resistant gypsum board under tub surround.
3. Use 5d, cement coated, flat head, diamond point nails at 5" o/c. Perimeter and 7" o/c. intermediate.
4. Use "perfatape" joint system in accordance with manufacturer's instructions in interior spaces.
5. Apply texturing to match existing surrounding walls. Provide Owner with sample of texturing before applying.

CERAMIC TILE

1. Install all work in strict accordance with those applicable sections of the latest adopted edition of the International Residential Code (IRC).
2. Install all tile work in accordance with the standards set by the latest handbook for ceramic tile installation published by the Tile Council of America.
3. Lay all tile, horizontal and vertical in thin set mortar over either MIN. 3/4" mortar bed or 1/2" cement backer board.
4. Determine locations of all accessories before starting tile work. Lay out all tile work so as to minimize cuts less than 1/2 tile size. Locate cuts in both walls and floors or counters, so as to be least conspicuous.
5. All tile to be laid with a smooth, even surface and with all joints evenly spaced and square to each other and to the surrounding areas in accordance with the pattern shown on the Drawings. Insure tile is well fixed to the bonding surface and that no cracked or chipped tile is used. Butt edges tightly to vertical surfaces, thresholds, nosings and edgings. Scribe, cut, notch or drill tile to fit around all projections. Extend floor tile into toe spaces, door reveals or similar openings. Insure pattern of floor tile is square to room axis.
6. Install all accessory pieces, if any, with respect to tile layout being symmetrical. Appropriate tile trim pieces to be used at all required areas. Miter trim pieces if corner trims are not available.
7. Follow tile and grout manufacturer's recommendations as to grouting procedures and precautions. Remove all grout haze, using only recommended acid or chemical cleaners. Rinse tile work thoroughly with clean water before and after chemical cleaner. Polish surface with soft cloth.
8. Seal grout on glazed tiles with two coats approved silicone sealer.

9. Prohibit all foot traffic for min. of 3 days. Cover with heavy-duty construction paper, masked in place.

HARDWOOD FLOORING

1. Provide all labor and materials to install wood flooring, complete, in place and as shown on the Drawings or specified herein, and as needed for a complete and proper installation.
2. Finish Flooring: By Allowance. Underlayment: As required by flooring manufacturer. Nailing: As required by flooring manufacturer. Base: to match existing baseboard. Style and color to be selected by Owner.
3. Install flooring only after all finishing operations, including painting, have been completed. All work to be done in strict compliance with the manufacturer's written instructions. Prior to laying floor, broom clean or vacuum the entire area.
4. Lay floor in pattern shown on Drawings, or in the same manner of existing flooring if applicable. Start in center of room using principle walls as a guide. Scribe around obstructions, carry into doorways, toe spaces, etc. Butt as recommended by the manufacturer to produce neat joints, laid tight and even and in parallel lines, or symmetrical angles whichever applies. Blind nail boards whenever possible. Leave 5/8" gap between flooring and wall surfaces where baseboards are to be installed. Butt tight to all other surfaces.
5. Completely sand floor to a smooth, even surface and to remove all deleterious marks or abrasions. Seal joints with a mixture of linseed oil and matching sawdust. Apply stain and sealer in an appropriate manner in accordance with the manufacturer's written instructions. Apply minimum of four coats of finish.

RESILIENT FLOORING

1. Provide all labor and materials to install resilient flooring and underlayment, complete, in place and as shown on the Drawings or specified herein, and as needed for a complete and proper installation.
2. Finish Flooring: By Allowance. Underlayment: As required by flooring manufacturer. Adhesives: As required by flooring manufacture. Base: Stock rubber, base cove. Color to be selected by Owner.
3. Prior to start of laying of flooring, broom clean or vacuum all surfaces to be covered and inspect the sub-flooring for unacceptable conditions. Install underlayment in accordance with flooring manufacturer's written recommendations. Seal underlayment in accordance with adhesive manufacturer's written recommendations.
4. Install finish flooring after all other finishing operations are completed, including painting. Install flooring in strict compliance with the manufacturer's written instructions. Lay sheets of vinyl with adhesive cement. Butt edges tightly to vertical surfaces, thresholds, nosings, and edgings. Scribe as necessary around obstructions. Extend into toe spaces, door reveals and into closets and similar openings. Lay vinyl so that principal pattern is square to room axis. If more than one sheet is used, insure patterns line up at joints. Tightly cement sheets to sub base without open cracks, voids, raisings, and puckering or telegraphing of adhesive spreader marks through vinyl, or other surface imperfections.

5. Place resilient edge strips and rubber base tightly butted to sheet and secure with adhesive. Provide edge strips at all unprotected edges of sheet. Provide rubber base at all vertical surfaces or as indicated on the Drawings.
6. Remove excess adhesive or other surface blemishes from sheets, using neutral type cleaner, recommended by the manufacturer. Protect from damage until completion of all work.

PAINTING

1. Install all work in strict accordance with those applicable sections of the latest adopted edition of the International Residential Code (IRC). Painting work shall meet or exceed specifications of the Painting and Decorating Contractors of America, Type I.
2. Submit samples of paint colors and wood finishes to Owner for selection and approval.
3. Provide the best quality grade of the type of coatings selected and approved by the Owner, as regularly produced by manufacturer. Provide finishes of the highest durability. In so far as practical, use undercoat, finish coat and thinner material as parts of a unified system of finish. Provide undercoat produced by the same manufacturer as the finish coat or as recommended by the manufacturer. Provide thinner recommended by the manufacturer of the finish coat.
4. Mix and prepare painting materials in strict accordance with the manufacture's written instructions. Stir all materials before applying to produce a mixture of uniform density.
5. Perform all surface preparation and cleaning in strict accordance with the manufacturer's written instructions. Set nails, fill all holes, voids, cracks and blemishes not filled by other trades, with appropriate materials.
6. Remove or otherwise protect all materials not scheduled to be painted including, but not limited to: light fixtures, finish hardware, cover plates, drapery and hardware, flooring, doors and windows, etc. Plastic and glass shall be masked so as to prevent any paint or stain from coming into contact with them.
7. Paint colors shall be selected by Owner from color samples. Painter shall cooperate with the Owner in obtaining the exact colors desired to the extent of painting samples on various materials for testing. Painter to notify Owner at least two weeks before needing colors.
8. Slightly vary the color of succeeding coats. Do not apply additional coats until the complete coat has been inspected and approved by Owner. Allow sufficient drying time between coats. Modify the period as recommended by the material manufacturer to suit adverse conditions. Regardless of the method of application, all finish coats shall be worked into the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Completed work shall match the approved samples for color, texture, and coverage. Remove, refinish or repaint all work not in compliance with specified requirements.
9. Completely remove all protection materials, such as tape, newspaper, oil films, etc. Repair or repaint any area damaged by removal of these items.

HARDWARE AND ACCESSORIES

1. Provide all labor and materials to install bathroom accessories and other hardware complete, in place and as shown on the Drawings or specified herein, and as needed for a complete and proper installation.
2. Finish materials shall be by allowance. All other materials shall be as selected by Contractor and approved by Owner.
3. Install all items in accordance with their respective manufacturer's written instructions. Install all items onto solid backing - do not use Molly's or Toggles. Install all items for long life under hard usage.
4. All hardware shall be neatly and properly installed in strict accordance with manufacturer's instructions. All exterior door locksets shall be common keyed. No "Extra Work" will be allowed because of changes or corrections necessary to facilitate the proper installation of any hardware. Contractor shall be responsible for proper fabrication of all work or material to receive the hardware.
5. Adjust all doors, drawers, locksets, latches, tracks, closers, etc. to operate perfectly at the time building is occupied.
6. Install, remove and re install all hardware in areas of painting or finishing. Take all precautions to prevent finish hardware from being scratched, chipped, painted, dented, stained or otherwise damaged. Replace all damaged hardware at no cost to Owner.

PLUMBING

1. The labor, execution and materials required for all plumbing work as indicated in the Drawings shall be in accordance with those applicable sections of the latest adopted edition of the International Plumbing Code (IPC).
2. Provide all labor and materials to install plumbing and accessories, complete, in place and as shown on the Drawings or specified herein, and as needed for a complete and proper installation. Work to include but limited to:
 - a. All soil, waste and vent piping from new fixtures to existing sewer lines;
 - b. All domestic hot and cold water piping from new water heater to all new fixtures including re routing of existing plumbing to new and existing fixtures, if needed;
 - c. Relocate existing gas meter and main gas line and connection to all new and existing appliances requiring gas service;
 - d. Provide and install all appliances, fixtures, fittings, equipment and all other related plumbing items shown on Drawings, specified herein or as needed for a complete and proper job.
 - e. Provide any incidental work not shown or specified, which can be reasonably inferred or taken as belonging to the work of this Section and necessary to provide a complete, installed system.
3. All materials shall be new. No galvanized metal pipes. Above grade domestic water service shall be either Type M, copper piping with extruded copper fittings. Solder joints with 50/50 antimony solder (no lead) or PEX, cross linked polyethylene piping with system compatible fittings. Soil, waste, vent piping shall be Polyvinyl Chloride PVC pipe, conforming to ASTM D 2665 73, Schedule 40, if locally acceptable. All interior angle stops, supply tubes, escutcheon, cover plates and other miscellaneous fittings shall be of chrome plated brass.

4. Finish materials shall be by allowance. All other materials shall be as selected by Contractor and approved by Owner.
5. Pipe flashing for all roof penetrations shall extend 12" around pipe and fold into top of pipe.
6. Provide 6" air chambers at the end of all runs of water piping at the fixtures. Piping shall be properly graduated and arranged so that the using of water in any fixture will not interfere with the supply to the other fixtures. Use 3/4" pipe for runs longer than five feet or where more than one fixture is supplied. Use 1" pipe for over three fixtures. Provide accessible cutoffs for water supply lines at all fixtures.
7. All piping to be hidden in walls, floors, ceiling, crawl spaces or below grade. Pitch for all drainage and vent piping to be minimum of 1/8" per foot.
8. All fixtures to be vented - collect venting wherever possible to minimize roof penetrations.
9. Make no copper to steel connections without the use of an approved connector, EPCO or equal. Use also at water heater.
10. Adequately support all piping to prevent sagging, falling or vibration. Use insulated hangers for all water piping, and 1/2" hair felt where piping touches framework.
11. Secure water heater to the nearest practical support wall with metal "plumber's tape". Run pressure relief valve pipe to outside of house.
12. All hot water lines to be insulated as per International Energy Conservation Code (IECC) requirements.
13. Cleanouts shall be installed as required and shall be accessible.
14. Remove or make accessible all areas required for the installation of all plumbing work - patch, repair or replace those areas to conform to their original conditions. Do not make cuts in any structural member except as prescribed by code.
15. Prior to covering and on completion of work, pressure test all sewer and water lines for indications of leaks.

ELECTRICAL

1. The labor, execution and materials required for all electrical work as indicated in the Drawings shall be in accordance with those applicable sections of the latest adopted edition of the National Electric Code (NEC).
2. Provide all labor and materials to install electrical work, complete, in place and as shown on the Drawings or specified herein, and as needed for a complete and proper installation. Work to include but limited to:
 - a. Installation of new electrical meter, riser and connection to relocated power lines;
 - b. Complete electrical wiring, including new circuits and distribution panel. Wiring, up to and including connection of all electrical receptacles, outlets, switches. Wiring, up to and including connection of all electrical fixtures, smoke detectors, etc. All miscellaneous wiring, including relocating existing fixtures and switches, if necessary;
 - c. Wiring, up to and including Ground Fault Interrupter Circuits;
 - d. Wiring, up to and including connection of all electrical receptacles, outlets, switches;
 - e. Wiring, up to and including connection of all electrical appliances, fixtures, heaters, motors, fans.

- f. Wiring, up to and including connection of all secondary systems: phone, CATV and Intercom System;
 - g. All miscellaneous wiring, including relocating existing fixtures and switches, if necessary.
3. All materials shall be new and listed by U.L. Wiring, conduit and boxes as per code. Outlets shall be polarized, grounded type. Switches shall be silent type or dimmer type. Receptacle and switch cover plate color to be selected by Owner.
 4. Finish materials shall be by allowance. All other materials shall be as selected by Contractor and approved by Owner.
 5. Install all materials in strict conformance with manufacturer's written instructions and all governing codes.
 6. Identify all circuits by means of a neatly typed label on distribution panel.
 7. Unless specifically dimensioned, the location and heights of outlets as shown on the drawings should be considered as approximate only. Contractor shall study the building plans with relation to spaces surrounding each outlet in order that his work may fit the work of others, and that when fixtures, tile or other equipment is installed, they will be symmetrically or logically located according to room or finish material layout. In general, center convenience outlets 12" off floor and 44" off floor at all cabinetry, switches to be centered at 44" off floor unless otherwise noted or impractical.
 8. Where two or more switches and/or outlets are installed together, they shall have gang plates.
 9. Conceal all wiring within walls, floors, ceiling, crawl spaces or underground. No exposed wiring will be allowed without prior approval of Owner.
 10. Install all light fixtures and fans so that their weight is supported by structural members of the building, no toggles or expansion fasteners through wallboard will be accepted.
 11. Provide all lighting fixtures with lamps as shown in fixture schedule. Use long life type wherever possible. Lamps used during construction shall be replaced with new at job completion.
 12. Remove or make accessible all areas required for the installation of all electrical work - repair, patch or replace those areas to conform to their original condition.
 13. Upon completion of this Section, test all parts of the electrical system in the presence of the Owner. Demonstrate that all equipment, appliances and fixtures installed and/or connected, function in the required manner. Test all circuits for proper neutral connections. Test all GFI circuits for proper function. Provide Owner with all manufacturer's written guarantees and operating instructions.

HEATING

1. The labor, execution and materials required for all heating work as indicated in the Drawings shall be in accordance with those applicable sections of the latest adopted edition of the International Mechanical Code (IMC).
2. Provide all labor and materials to install heating equipment and accessories, complete, in place and as shown on the Drawings or specified herein, and as needed for a complete and proper installation. Work to include but not limited to:
 - a. Installation of new second forced air heating system;

- b. Installation of heat and air distribution system.
 - c. Provide any incidental work not shown or specified, which can be reasonably inferred or taken as belonging to the work of this Section and necessary to provide a complete, installed system.
3. HVAC unit: As specified in energy report or plans. Sheet Metal: Use appropriate size, gauge and type for all flue pipes, ducting and registers. Insulation: Duct insulation must meet or exceed International Energy Conservation Code (IECC) requirements.
 4. Install HVAC unit in strict conformance with the manufacturer's written instructions.
 5. Install in a neat and true manner, all duct work from new HVAC unit to all registers and cold air return, locating in the most economical manner possible. Run all ductwork between joists or studs, unless prior approval is obtained from Owner.
 6. Secure all joints and fasten all ductwork and registers to solid backing using appropriate materials.
 7. Install insulation in accordance with the energy report and International Energy Conservation Code (IECC) requirements.