

REQUEST FOR QUOTATION

Title: Mokelumne River Fish Hatchery Modular Home

Contract ID# 17-566-01

PART A

The District proposes to contract out for work in accordance with the attached Summary of Work (Exhibit A), Drawings/Sketches, Specifications and Forms (Exhibit B), and Standard Contract Conditions (Exhibit C). The construction cost of this project is estimated to be less than \$70,000. This work will require a current and active General Building Contractor license from the California Contractors State License Board.

The proposer's offer shall be submitted to Tim Fuelle, Facilities Engineering Section, MS 505, 375 11th Street, Oakland, CA 94607 no later than Monday, August 21 at 4:00 p.m. If you have any questions email Tim Fuelle at timothy.fuelle@ebmud.com at least 5 days prior to opening of bids, to provide time for issuing and forwarding an addendum should the District consider an addendum necessary.

There will be a non-mandatory pre-bid jobsite inspection tour August 8, 2017 at 1:00 p.m. Prospective bidders shall meet at the job site at the Mokelumne River Fish Hatchery, 25700 North McIntire Road, Clements, CA 95227. Contact Michelle Workman at 209-365-1467 for questions regarding the pre-bid jobsite inspection.

This contract is a public work. Prevailing wages are required on this contract. The prevailing wage rates are available on the Internet at <http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm>. A copy of the prevailing wage rates is on file and available for inspection by any interested party on request at the District's Specifications and Engineering Support Section. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

All Contractors bidding on a public works project and all Subcontractors of any tier shall be registered with the State Department of Industrial Relations pursuant to Section 1725.5 of the Labor Code. Provide registration number/certificate with bid documents.

PART B (To Be Completed By Contractor)

SMALL BUSINESS AND DISABLED VETERAN BUSINESS (SB/DVB) DISCOUNT SMALL BUSINESS ENTERPRISE

A small business is defined as an independently owned and operated business which is not dominant in its field of operation and has fewer than 100 employees and average annual gross receipts of fourteen million dollars (\$14,000,000) or less over the previous three tax years or is a manufacturer with 100 or fewer employees; or a Disabled Veteran Business Enterprise.

DISABLED VETERAN BUSINESS ENTERPRISE

7/27/17

Contract # 17-566-01

RFQ - 1

Mokelumne River Fish Hatchery
Modular Home

A disabled veteran business is defined as an independent business that is at least 51% owned and operated by one or more disabled veteran(s) who are citizens or lawful permanent residents of the United States and meets all the followings:

- A veteran of the U.S. military, naval, or air service;
- The veteran must have a service-connected disability of at least 10% or more; and
- The veteran must reside in California.

Bidders who are small businesses (SBs) or Disabled Veteran Businesses (DVBs) will be granted a bid discount resulting in an ***Effective SB/DVB Bid*** which will be used solely for comparison of the bids submitted by small businesses/disabled veteran businesses against those submitted by non-small businesses/non-disabled veteran businesses. Bidders with both Small Business and Disabled Veteran Business status will receive only one 5% discount. The ***Effective SB Bid/DVB Bid*** is calculated as follows:

- ***Effective SB/DVB Bid*** = (SB bid amount or DVB bid amount) - ***discount amount***
- ***discount amount*** = 5% of the apparent lowest responsive, and responsible bid

To be eligible for the SB/DVB discount, bidders must check the Small Business and/or Disabled Veteran Business box below:

The Bidder is a:

☐

Small Business and/or Disabled Veteran Business, as described above.

The District reserves the right to request support documentation, such as tax records, articles of incorporation and board minutes to verify composition of ownership and business size.

ADDENDA - Receipt of the following addenda is hereby acknowledged:

Addendum Number

Date

I hereby offer a firm fixed price for the work as described in these RFQ documents as follows:

Base Bid \$ _____

Additive Bid A \$ _____

=====

Bid Total \$ _____

(Base Bid + Additive Bid A)

The price includes all State, Federal, and other taxes applicable to the project, and it is a firm offer for a period of SIXTY (60) days after the date of bid opening. I certify that I am

7/27/17

Contract # 17-566-01

RFQ - 2

Mokelumne River Fish Hatchery
Modular Home

thoroughly familiar with the local conditions affecting the performance of the work and have fully inspected the site and reviewed all the contract documents.

FIRM'S NAME: _____

CONTRACTOR LICENSE #: _____

LICENSE EXPIRATION DATE: _____

STATE DEPT. OF INDUSTRIAL RELATIONS

REGISTRATION NUMBER: _____

FIRM'S ADDRESS: _____

NAME: _____

SIGNATURE: _____

TITLE: _____

PHONE: _____ **DATE:** _____

Bidders' bid submittal must include the following forms:

1. Declaration of Eligibility to Work on Public Works Projects
2. Declaration of Noncollusion
3. Designation of Subcontractors
4. Employment Data and Certification

PART C (To be completed by EBMUD)

<p>District point of contact for contract administration</p> <p>Name: Tim Fuelle</p> <p>Phone # (510) 287-1324 Email: timothy.fuelle@emud.com</p> <p>P.O. #: _____</p>	<p>The District accepts your offer to perform the work as specified. No work is authorized without signed Purchase Order and a Notice to Proceed</p> <p>Date: _____</p> <p>Name: _____</p> <p>Signature _____</p> <p>Title: _____</p>
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7/27/17

Contract # 17-566-01

RFQ - 3

Mokelumne River Fish Hatchery
Modular Home

BID EVALUATION
Contract 17-566-01
Mokelumne Fish River Hatchery
Modular Building

- A. The number of bid items to be awarded will be based on the District's budgetary amount.
- B. The District reserves the right to award the contract to one Contractor with the lowest responsive bid for the combination of bid items or to award no contract at all. The following evaluation in successive order will be performed to determine the lowest bid:
 - 1. The lowest responsive bid will be determined by first comparing the total amount bid for **Bid Total** (Base Bid + Additive Bid A) and the District's budgetary amount. If the **Bid Total** is less than or equal to the District's budgetary amount, then the lowest total amount bid for **Bid Total** will be recommended for award.
 - 2. If the total amount bid for **Base Bid + Additive Bid A** is greater than the District's budgetary amount, then the amount bid for **Base Bid** will be compared and the lowest amount bid for **Base Bid** will be recommended for award.

SUMMARY OF WORK

The scope of work under this RFQ includes: the removal of an existing single-wide manufactured home located at 25700 McIntire Rd, Clements CA; the installation of a new two-wide manufactured home; and the reconnection of existing utilities to the new manufactured home. An additive bid item also includes the installation of a two car garage.

The two-wide manufactured home will be supplied by the District and delivered to the site upon the Contractor completing the site work for the home as identified in Exhibit B. The District will provide material for the detached garage which includes: prefabricated sheathed panels 8 feet wide by 10 feet high, trusses, roofing paper, shingles, doors, windows, drip edge flashing, and fascia boards. The District will install the concrete slab for the garage.

The District will pay and obtain the building permits to install the new manufactured home from the County of San Joaquin. Any other permits required will need to be provided in the base bid.

BASE BID:

- Remove and dispose the existing manufactured home as identified in Exhibit B including all work associated with off hauling the unit such as: installing the towing tongue, axles, and tires; obtaining appropriate hauling permits; and providing the transporter.
- Install District furnished two-wide manufactured home as identified in Exhibit B.
- Provide all foundations, fasteners, and accessories required to complete installation.

ADDITIVE BID ITEM A:

- Install a two car garage from a material kit supplied by District as described above. Contractor shall provide fasteners, mastic, sealant, electrical wires, and outlets, roll-up door, and mud seal. The garage footprint is provided in Exhibit B.

DRAWINGS/SKETCHES, SPECIFICATIONS & FORMS

A. Drawings/Sketches:

100-Sketch-1	List of Drawings, General Notes, and Vicinity Map
100-Sketch-2	Demolition Site Plan
100-Sketch-3	Site Plan & Installation List
100-Sketch-4	Sections and Detail
100-Sketch-5	Single Line Diagram and Details
100-Sketch-6	Floor Plan
28-12890	Centerline Support Requirements (to be updated by Manufacturer)

B. Specifications:

Skyline Corporation Manufactured Home Installation Manual, 12-22-16

C. General Conditions and Forms:

General conditions

Forms:

1. Declaration of Noncollusion (to be submitted with the proposal)
2. Declaration of Eligibility to Work on Public Works Projects (to be submitted with the proposal)
3. Designation of Subcontractors (to be submitted with the proposal)
4. Employment Data and Certification (to be submitted with the proposal)
5. Faithful Performance Bond (sample only)
6. Payment Bond (sample only)
7. Certificate of Workers' Compensation Insurance (sample only)
8. Certificate of Liability Insurance (sample only)
9. Certificate of Pollution Liability (sample only)
- 10.** Certificate of Builder's Risk Insurance (sample only)

07/06/17

Contract # 17-566-001

Exhibit B - 1

Mokelumne River Fish Hatchery
Manufactured Home

PROJECT SKETCHES

- 100-SKETCH-1 LIST OF DRAWINGS, GENERAL NOTES, AND VICINITY MAP
100-SKETCH-2 DEMOLITION SITE PLAN
100-SKETCH-3 SITE PLAN AND INSTALLATION LIST
100-SKETCH-4 SECTIONS AND DETAILS
100-SKETCH-5 SINGLE LINE DIAGRAM AND DETAILS

PROJECT LOCATION

25700 MCINTIRE ROAD
CLEMENTS CA 95227

PROJECT DESCRIPTION

TO INSTALL A MANUFACTURED HOME WHICH COMPLIES WITH THE HUD MODEL
MANUFACTURED HOME INSTALLATION STANDARDS.

OWNER

EAST BAY MUNICIPAL UTILITY DISTRICT
375 ELEVENTH STREET
OAKLAND CA 94607
1-800-403-2683

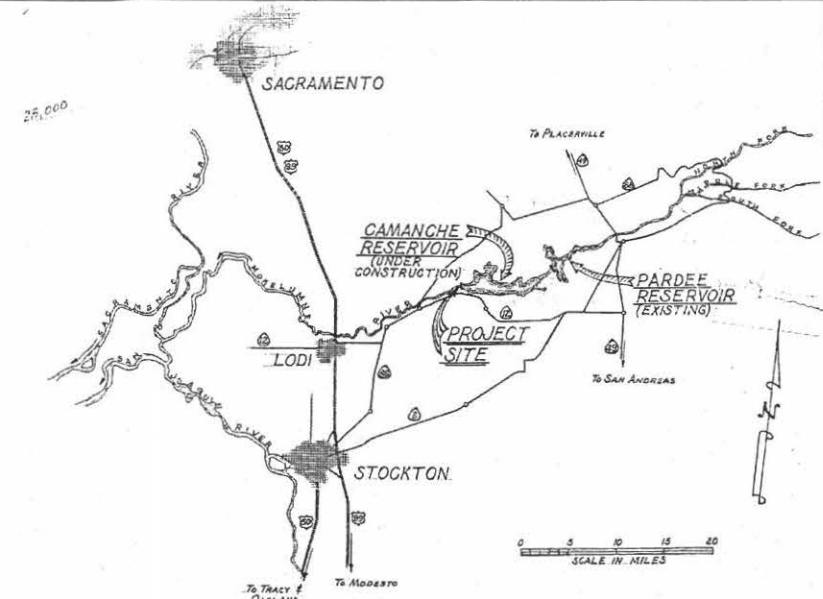
CONTACT PERSON

MICHELLE WORKMAN SUPERVISING FISHERIES WILDLIFE BIOLOGIST
TELEPHONE NO. 209-365-1467

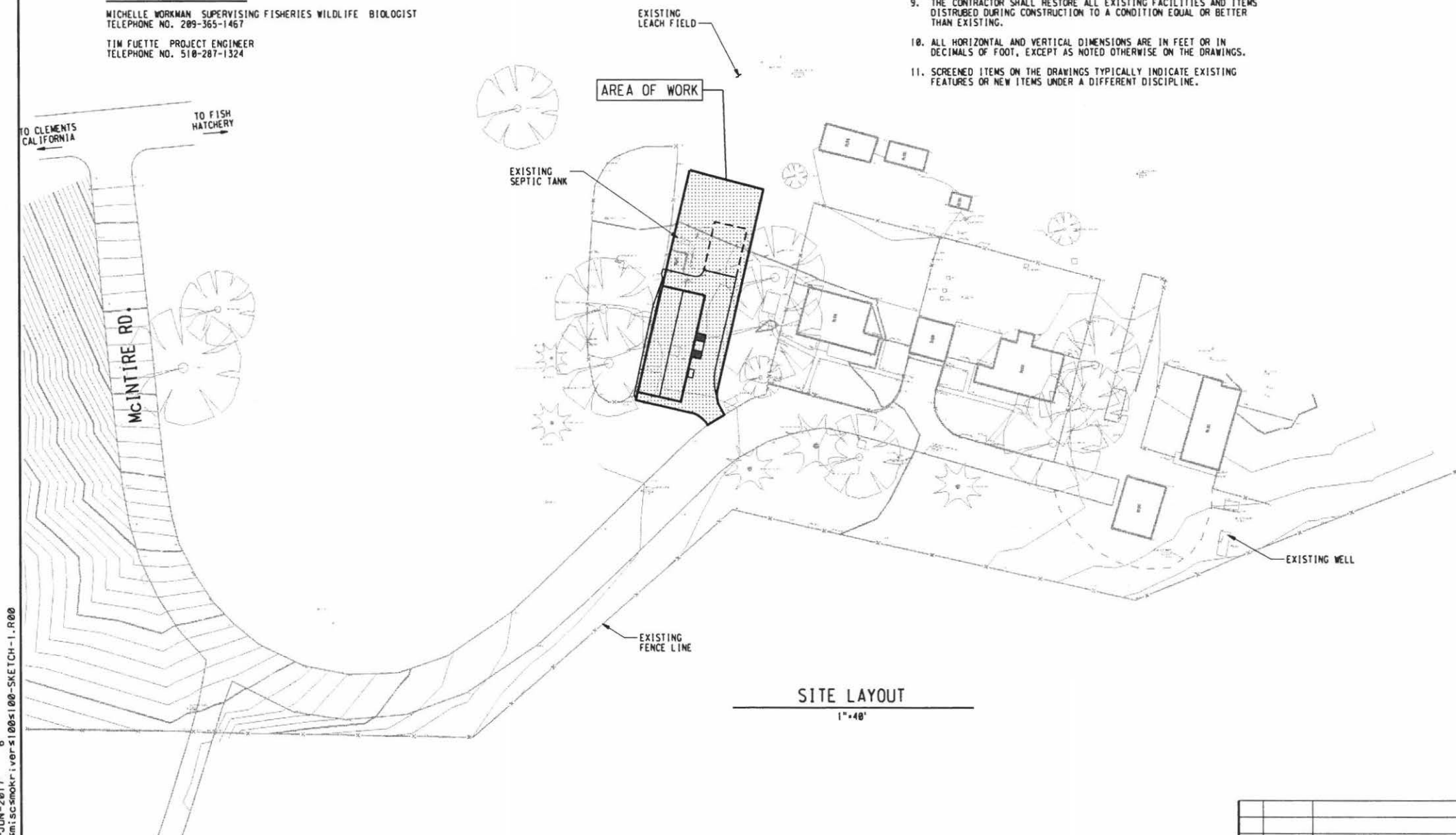
TIM FUETTE PROJECT ENGINEER
TELEPHONE NO. 510-287-1324

GENERAL NOTES

1. THE INSTALLATION OF THE HOME AND ALTERATIONS MADE TO THE HOME SHALL CONFORM TO THE REQUIREMENTS OF THE FEDERAL MANUFACTURED HOME CONSTRUCTION AND SAFETY STANDARDS AS WELL AS THE US DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT MODEL MANUFACTURED HOME INSTALLATION STANDARDS.
2. THE HOME INSTALLER MUST FOLLOW THE PROCEDURES DESCRIBED IN THE INSTALLATION MANUAL OR OTHER PROCEDURES APPROVED BY THE MANUFACTURER.
3. QUALIFICATIONS: THE INSTALLER MUST POSSESS A VALID INSTALLATION LICENSE AS A MANUFACTURED HOME INSTALLER.
4. AS A QUALIFIED PROFESSIONAL IN THE FIELD OF MANUFACTURED HOME INSTALLATION, INSTALLERS ARE THE EXPERTS AND MUST BE AWARE OF THE HAZARDS AND CONDITIONS FACED. CONSTRUCTION CREWS SHOULD BE TRAINED IN THE SKILLS REQUIRED AND BE SUPERVISED BY EXPERIENCED PERSONNEL.
5. SECTIONS AND DETAILS ARE DESIGNATED BY FRACTIONAL SYMBOLS SUCH AS: $\frac{A}{C-001}$; $\frac{3}{N-001}$
THE NUMERATOR IDENTIFIES THE SECTION OR DETAIL:
LETTERS IDENTIFY SECTIONS.
NUMERALS IDENTIFY DETAILS.
THE DENOMINATOR IS THE SHEET REFERENCE NUMBER:
IN A PARENT VIEW, IT IDENTIFIES THE SHEET ON WHICH THE SECTION OR DETAIL VIEW IS SHOWN.
IN THE CAPTION OF A SECTION OR DETAIL VIEW, IT IDENTIFIES EACH SHEET ON WHICH THE PARENT VIEW IS SHOWN.
5. WRITTEN DIMENSIONS TAKE PRIORITY OVER SCALED DRAWING DIMENSIONS.
6. CONTRACTOR SHALL VERIFY ALL CONTROLLING EXISTING DIMENSIONS PRIOR TO ORDERING OR FABRICATION MATERIALS.
7. CONTRACTOR SHALL FIELD LOCATE ALL EXISTING UTILITIES OF EVERY NATURE AND PROTECT THEM FROM DAMAGE DURING CONSTRUCTION. HAND POT-HOLING SHALL BE USED TO LOCATE BURIED UTILITIES.
8. THE CONTRACTOR SHALL BRING TO THE ATTENTION OF THE ENGINEER ANY DISCREPANCIES BETWEEN PROJECT CONDITIONS AND INFORMATION INCLUDED IN THESE SKETCHES.
9. THE CONTRACTOR SHALL RESTORE ALL EXISTING FACILITIES AND ITEMS DISTURBED DURING CONSTRUCTION TO A CONDITION EQUAL OR BETTER THAN EXISTING.
10. ALL HORIZONTAL AND VERTICAL DIMENSIONS ARE IN FEET OR IN DECIMALS OF FOOT, EXCEPT AS NOTED OTHERWISE ON THE DRAWINGS.
11. SCREENED ITEMS ON THE DRAWINGS TYPICALLY INDICATE EXISTING FEATURES OR NEW ITEMS UNDER A DIFFERENT DISCIPLINE.

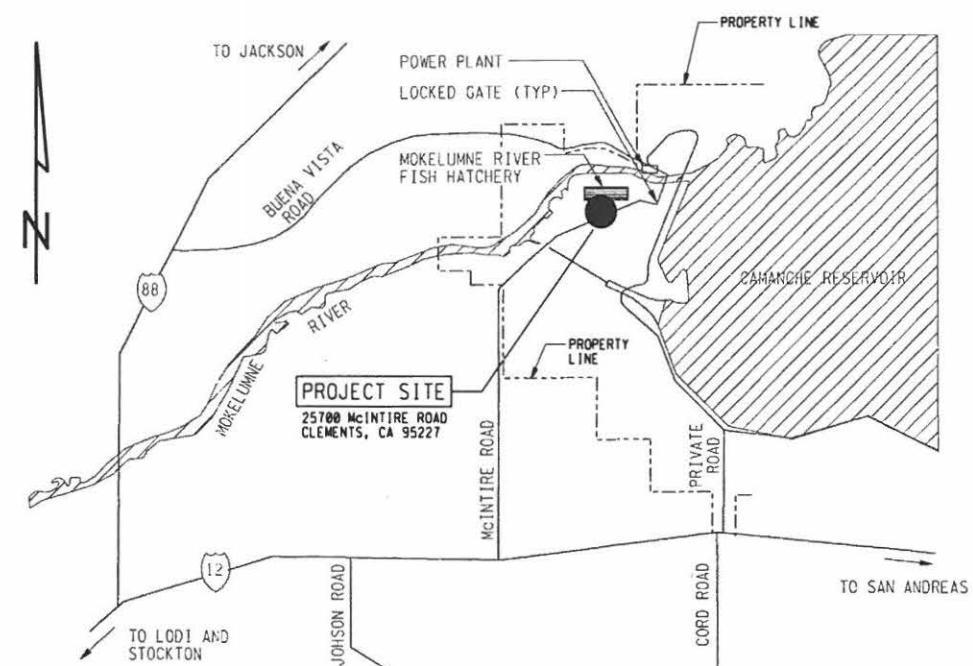


LOCATION MAP



SITE LAYOUT

1"=40'



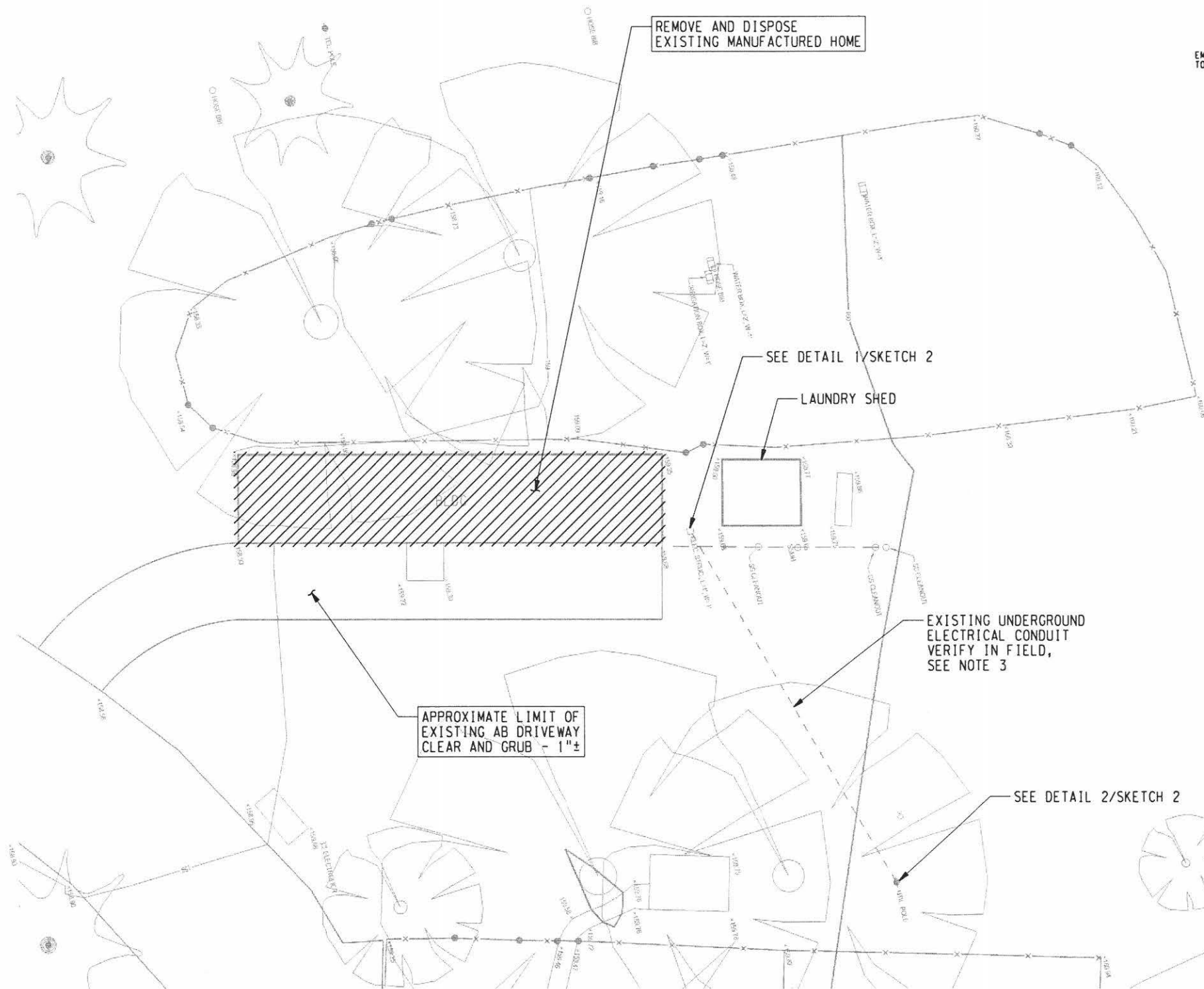
VICINITY MAP

NO SCALE


DESIGNED BY	<i>Timothy G. Fiette</i>	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
DESIGN CHECKED BY		MOKELUMNE RIVER FISH HATCHERY MANUFACTURED HOME GENERAL			
DATE		LIST OF DRAWINGS AND GENERAL INFORMATION			
NO.	DATE	REVISION	BY	REC.	APP.
APPROVED:					
RECOMMENDED:					
PROJ. NO.	100-SKETCH-1				0
SCALE	AS SHOWN				
DATE	STRUCT.				DISC.
		NUMBER		REV.	

SIGNATURES
NOT VALID

3" ON ORIGINAL DOCUMENT

DEMOLITION SITE PLAN
1"=10'3" ON ORIGINAL DOCUMENT
0 1 2 3EMPTY CONDUIT
TO OLD MOBILE HOME
CONDUIT FROM
SERVICE PANEL,
NOTE 3
CONCRETE
PEDESTALPARTIAL DEMOLITION OF
OUTSIDE EQUIPMENTDETAIL 1
NO SCALE SKETCH-2

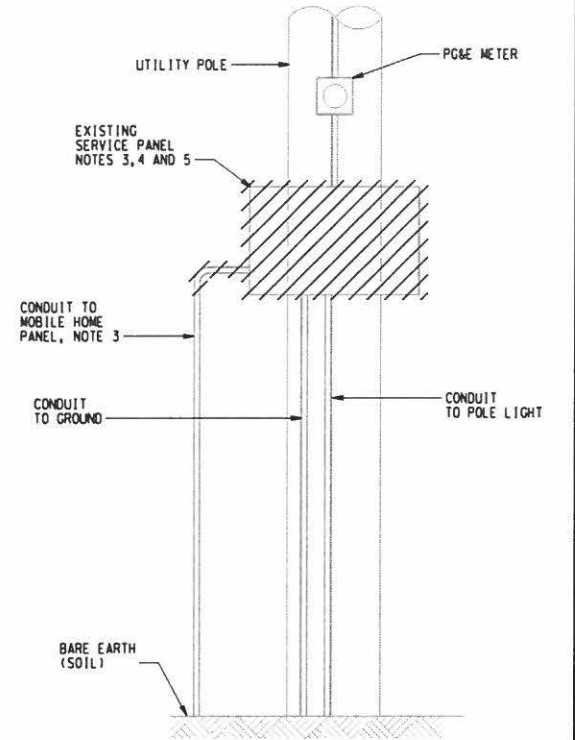
DEMOLITION NOTES

1.  - ITEMS TO BE DEMOLISHED.

DEMOLITION DRAWING

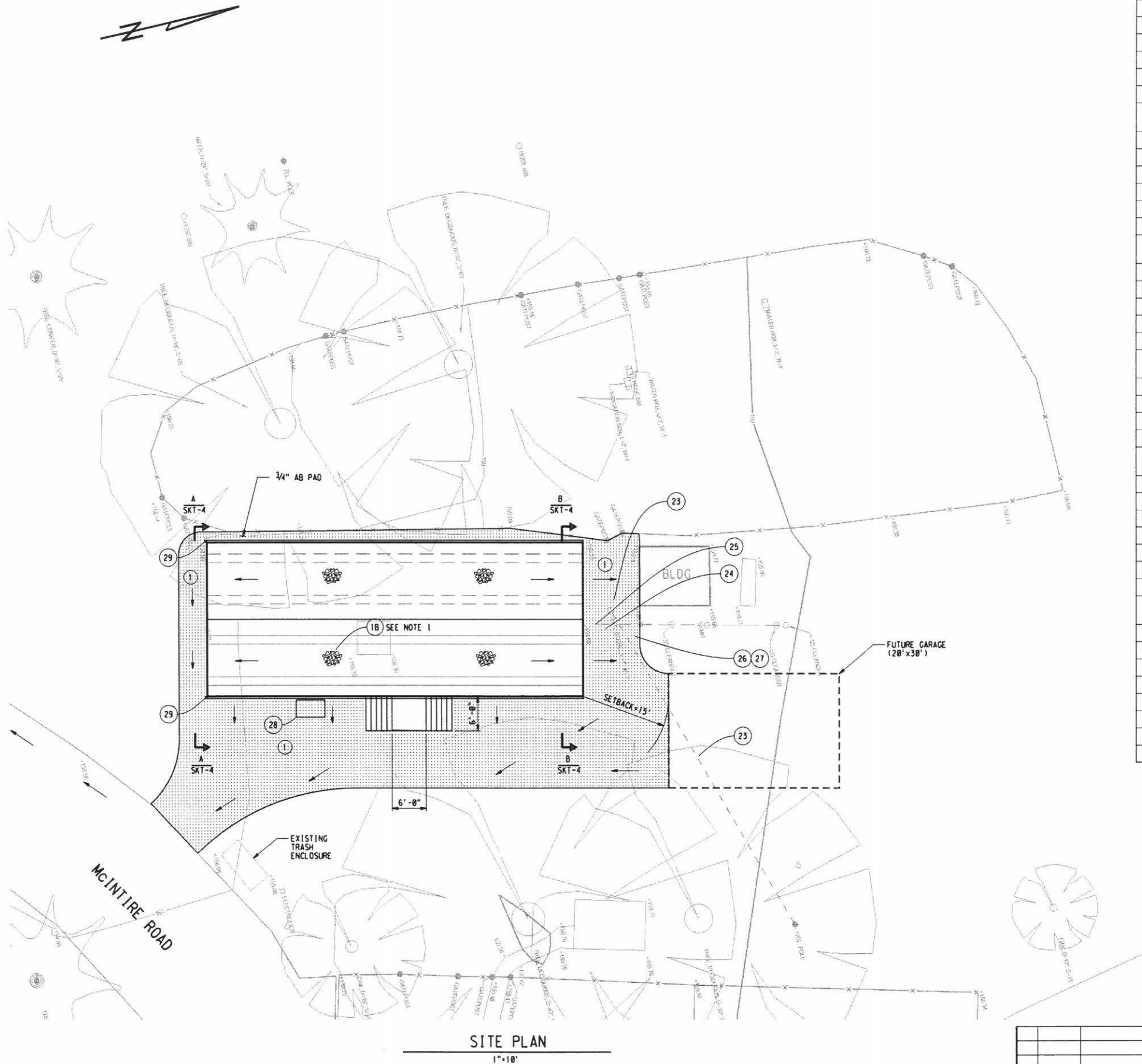
DESIGNED BY	Timothy G. Foyette
DESIGN CHECKED BY	
DRAWN BY	FACILITY DRAFTING
RECOMMENDED BY	
APPROVED BY	
DATE	

EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
MOKELUMNE RIVER FISH HATCHERY MANUFACTURED HOME CIVIL			
DEMOLITION SITE PLAN AND ELECTRICAL DEMOLITION			
PROJ. NO.	100-SKETCH-2	STRUCT.	DISC.
SCALE	1"=10'	NUMBER	REV.
DATE			

PARTIAL DEMOLITION OF
EQUIPMENT AT SERVICE PANEL
ON UTILITY POLEDETAIL 2
NO SCALE SKETCH-2

DEMOLITION NOTES

1. REMOVE EXISTING PULL BOX, CONDUIT BETWEEN PULL BOX AND MOBILE HOME PANEL.
2. REMOVE WIRING FROM MOBILE HOME PANEL TO PANEL INSIDE LAUNDRY SHED.
3. DISCONNECT AND REMOVE EXISTING CONDUCTORS FROM MOBILE HOME PANEL TO THE SERVICE PANEL ON THE UTILITY POLE. USE EXTRA CAUTION TO PROTECT EXISTING CONDUIT AS IT WILL BE RE-USED.
4. DISCONNECT CONDUCTORS FROM SERVICE PANEL TO THE LIGHT POLE. SALVAGE AND PROTECT THE WIRING TO BE RE-USED.
5. REMOVE EXISTING SERVICE PANEL LOCATED ON UTILITY POLE.



3" ON ORIGINAL DOCUMENT
0 1 2 3

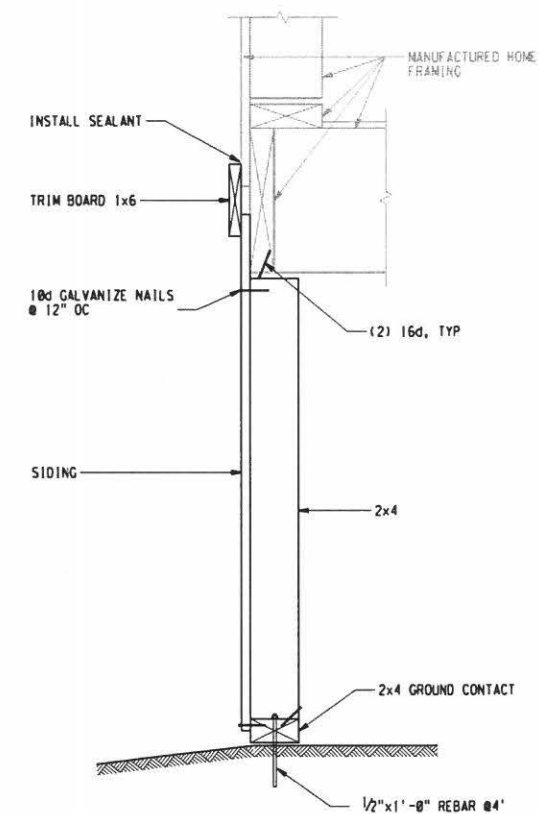
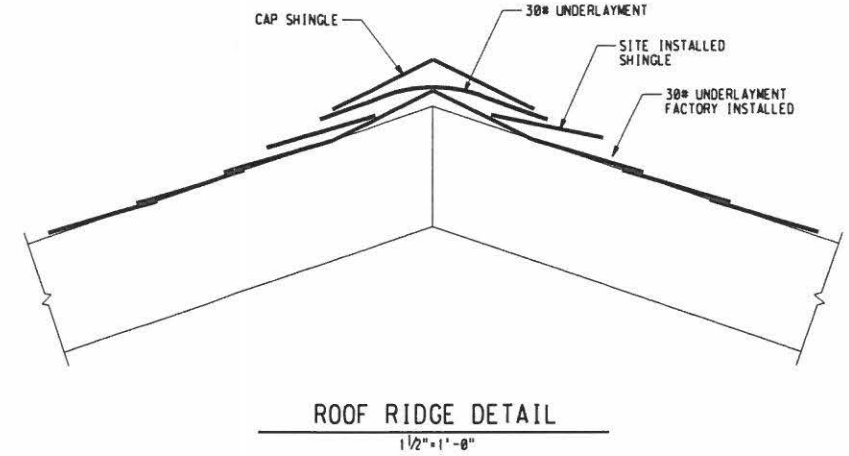
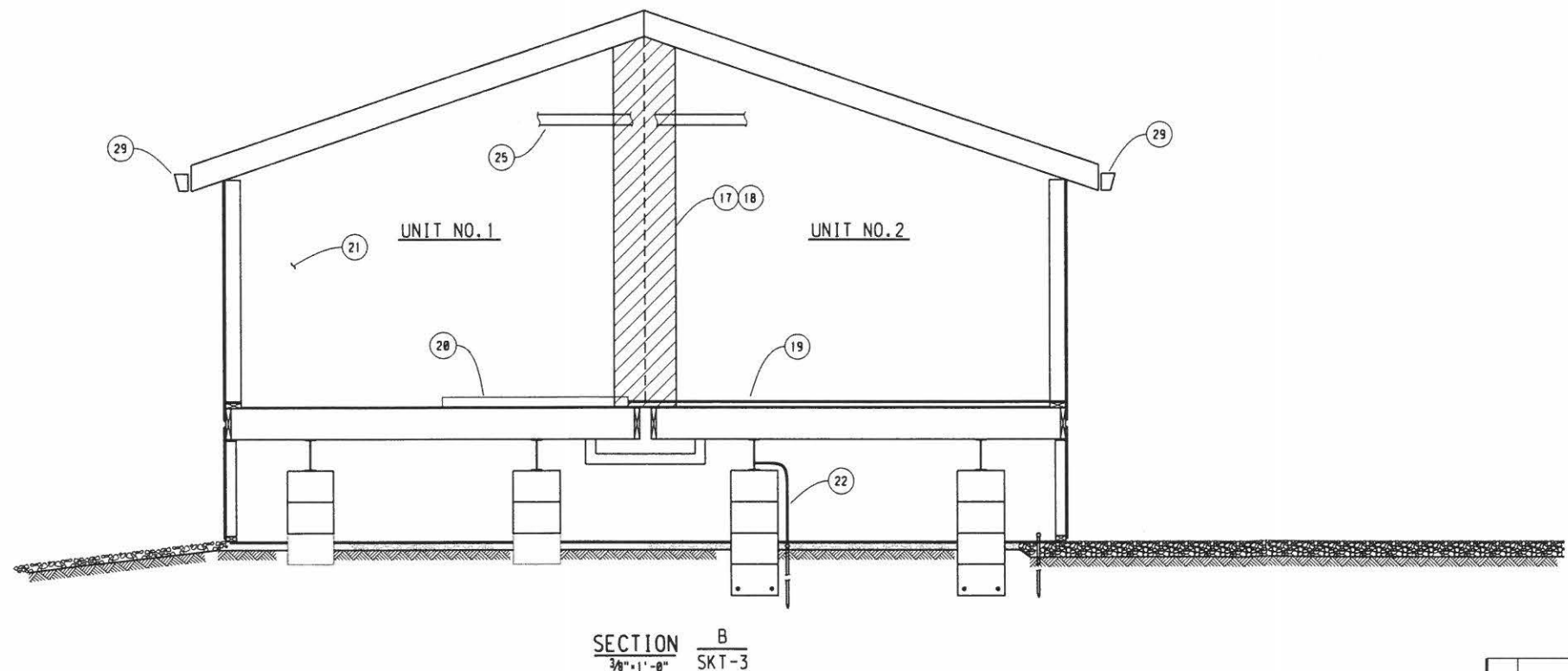
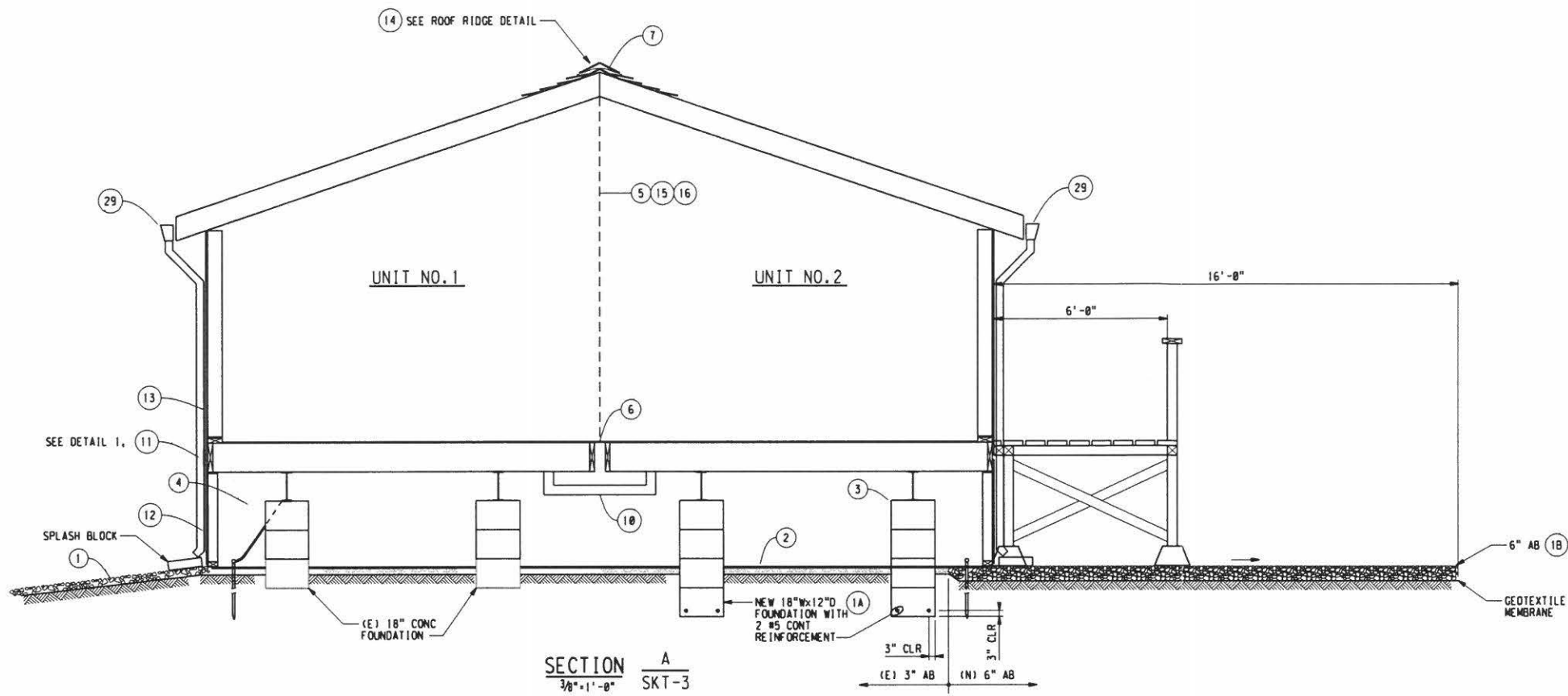
INSTALLATION LIST

ITEM	REQUIRED	DESCRIPTION	REMARKS
FOUNDATION			
1A		CONCRETE FOUNDATION STRIP 18"x12"	
1B		INSTALL 3/4" AB COMPACTED	DISTRICT FURNISHES 50 CY
2		INSTALL PLASTIC VISQUEEN (6 MIL MIN)	
3		INSTALL PRE-CAST CONCRETE PIERS WITH SHIMS	
4		INSTALL ANCHOR SYSTEM	
MULTI UNIT CONNECTION			
5		POSITION HOME SECTIONS PER INSTALLATION MANUAL	
6		CONNECT FLOORS WITH FASTENERS, 3/8"x3" LAG SCREWS @2'-0"	
7		CONNECT ROOF WITH FASTENERS, 3/8" LAG SCREWS W/ WASHERS, 3/8"x5" @ 24"	
8		CONNECT WALLS WITH FASTENERS, PER INSTALLATION MANUAL	
9		INSTALL OTHER FASTENERS AS REQUIRED PER INSTALLATION MANUAL	
UNDER THE HOME			
10		INSTALL UTILITY CROSSOVER SYSTEMS	
11		INSTALL SKIRTING SYSTEM	DISTRICT FURNISHES SIDING
12		INSTALL VENTS	
13		INSTALL UTILITY VENTS FOR DRYER, AC, WATER HEATER, COOKING RANGE EXHAUST	
ROOF & END WALLS			
14		INSTALL ROOF RIDGE SYSTEM	
15		INSTALL FASTENERS & SIDING	
16		INSTALL CLOSE-UP TRIM WITH SEALANT	
INTERIOR WORK			
17		CONNECT WALL CROSSOVERS, ELECTRICAL, TELEPHONE...	
18		INSTALL GYPSUM PANE, MUD, PAINT ON END WALLS AND CEILINGS	
19		INSTALL CARPET	
20		INSTALL TRIM	
21		INSTALL SHIP LOOSE ITEMS SUCH AS APPLIANCES, DOOR (1), WINDOW CASEMENT, MIRRORS, DOOR STOPS, CLOSET SHELVES AND HARDWARE	
UTILITY CROSSOVER AND CONNECTIONS			
22		INSTALL ELECTRICAL BONDING	
23		CONNECT ELECTRICAL TO EXISTING ELECTRICAL PANEL	SEE SKETCH 5
24		CONNECT WATER LINE TO EXISTING HOSE BIBB	
25		CONNECT DRAIN, WASTE, AND VENT LINES TO EXISTING OUTLET	
26		CONNECT GAS LINES TO EXISTING GAS OUTLET	
27		CONNECT TELEPHONE TO EXISTING	
28		INSTALL AC UNIT WITH CONCRETE PAD	
29		INSTALL 4 INCH GUTTER AND DOWNSPOUTS (2)	

NOTES

1. RESTORE AB TO ENSURE WATER PONDING DOES NOT OCCUR UNDER MANUFACTURED HOME.

DESIGNED BY <i>Tim Fuchs</i> TIMOTHY G. FUCHS	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA
DESIGN CHECKED BY	MOKELUMNE RIVER FISH HATCHERY MANUFACTURED HOME CIVIL
DRAWN FACILITY DRAFTING	SITE PLAN AND INSTALLATION LIST
RECOMMENDED:	PROJ. NO. 100-SKETCH-3
APPROVED:	SCALE 1"=10'
NO. DATE REVISION BY REC. APP.	DATE STRUCT. DISC. NUMBER REV.

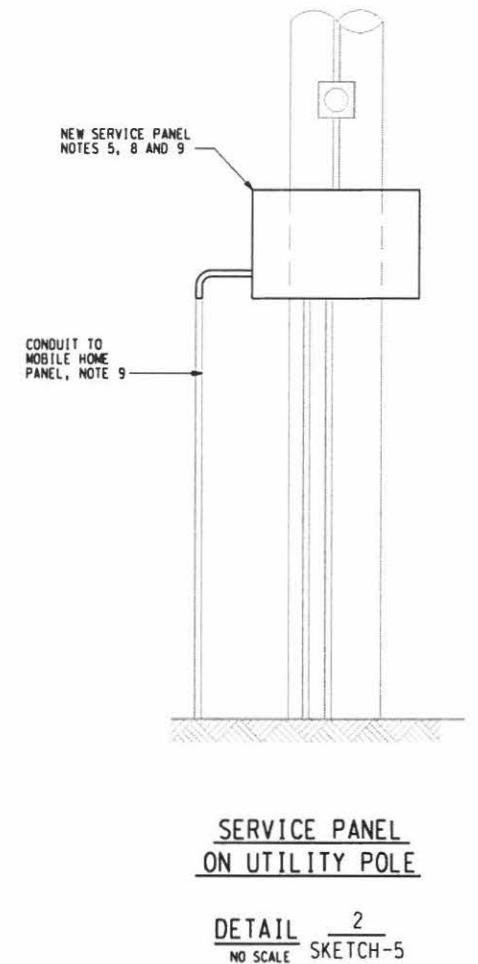
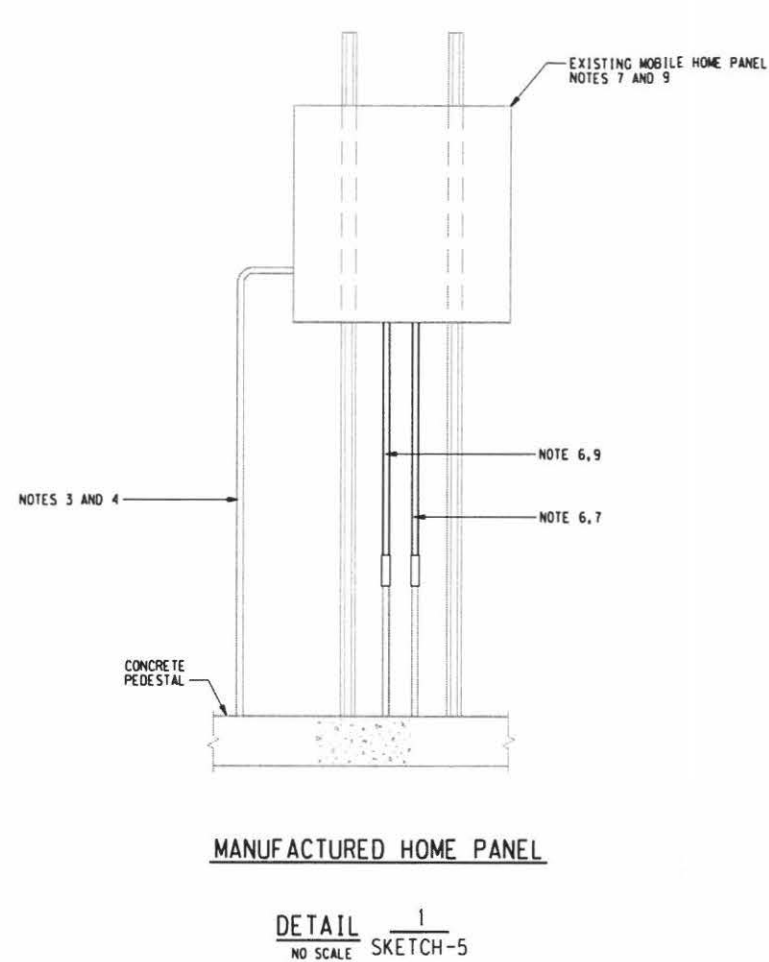
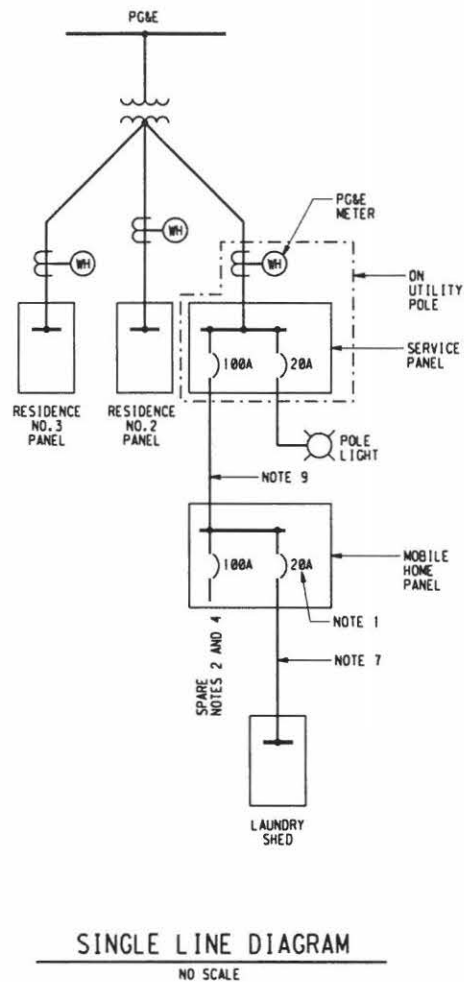


NOTES
1. REFER TO SKETCH 3 FOR INSTALLATION LIST AND ITEM NUMBERS.

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

DESIGNED BY TIMOTHY G. FLETTE	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA
DESIGN CHECKED BY J. DIEGO	MOKELUMNE RIVER FISH HATCHERY MANUFACTURED HOME STRUCTURAL
APPROVED BY H.P.E. NO. C59851	SECTIONS AND DETAILS
PROJ. NO. Z-	100-SKETCH-4
SCALE AS SHOWN	
DATE	STRUCT. DISC. NUMBER REV.



GENERAL NOTES

- CONDUCTORS SHALL BE STRANDED COPPER TYPE XHHW-2 SELF LUBRICATING INSULATION RATED AT 90 DEGREES CELSIUS IN WET AND DRY LOCATIONS. SOUTHWIRE SIMPULL TYPE XHHW-2, CERROWIRE SLIPWIRE XHHW-2, OR EQUAL.

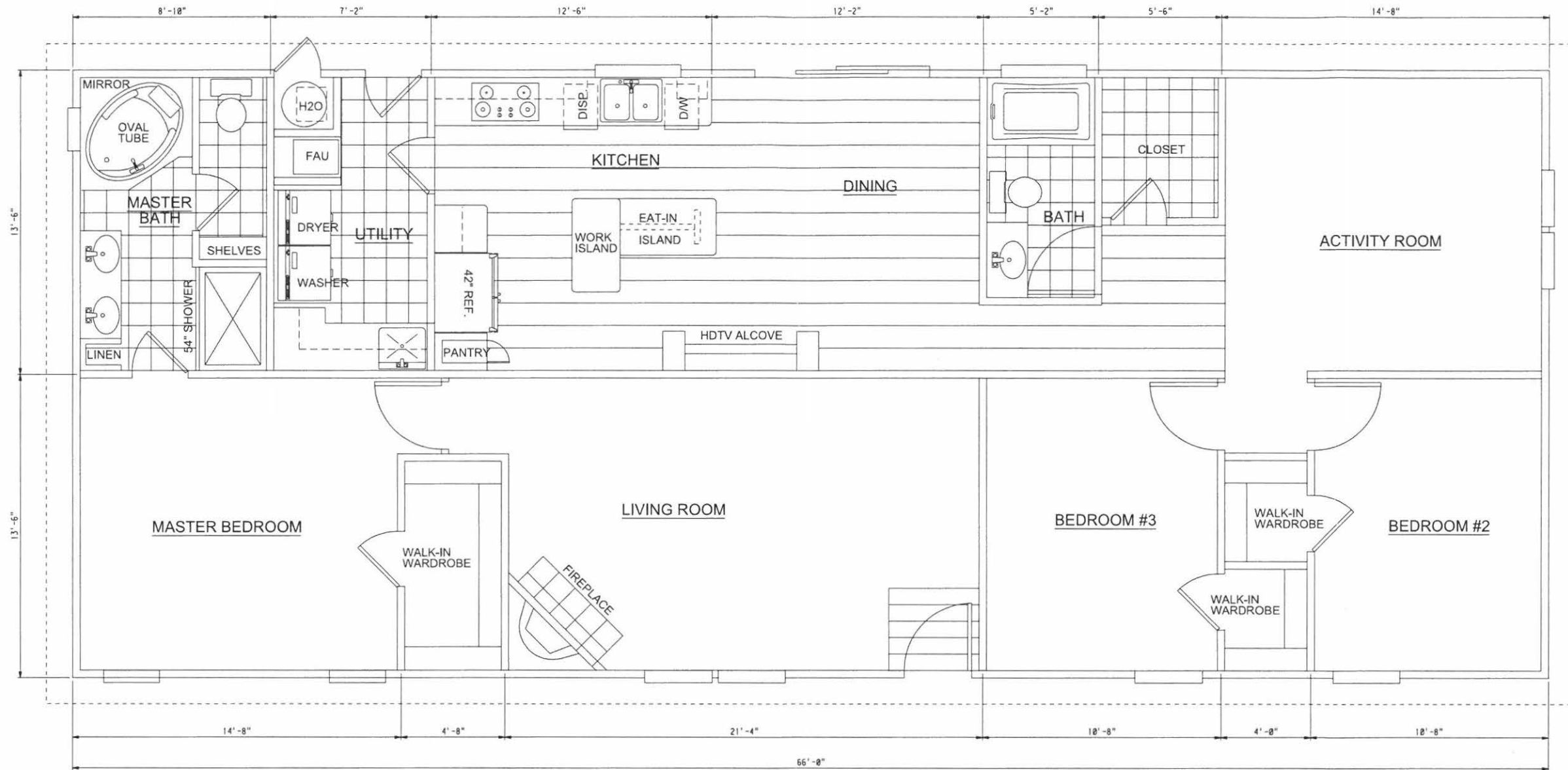
NOTES

- REPLACE EXISTING 60A BREAKER WITH 20A BREAKER. NEW BREAKER TYPE AND MANUFACTURER TO MATCH EXISTING EQUIPMENT.
- SPARE BREAKER FOR CONNECTION TO NEW MOBILE HOME.
- INTERCEPT EXISTING CONDUIT. PROVIDE CONDUIT EXTENSION TO CONNECTION POINT ON NEW MOBILE HOME APPROXIMATELY 10 FEET AWAY. COORDINATE WORK WITH ENGINEER IN THE FIELD.
- PROVIDE NEW CONDUCTORS, 3 #2, #20 FROM MOBILE HOME PANEL TO NEW MOBILE HOME.
- RECONNECT CONDUCTORS FOR LIGHT POLE ON THE NEW SERVICE PANEL.
- PROVIDE NEW GALVANIZED RIGID STEEL CONDUITS FROM EXISTING CONDUIT STUB-UPS TO EXISTING MOBILE HOME PANEL. CONDUIT SIZE TO MATCH EXISTING STUB UPS.
- PROVIDE NEW CONDUCTORS, 3#6, #40, FROM MOBILE HOME PANEL TO PANEL INSIDE LAUNDRY SHED.
- PROVIDE NEW SERVICE PANEL AT SAME LOCATION AS EXISTING ONE ON THE UTILITY POLE. SERVICE PANEL SHALL BE RATED FOR 120/240V, 125A 1-PHASE IN NEMA 3R ENCLOSURE WITH 100A MAIN BREAKER, 100A 2-POLE AND 20A 1-POLE BRANCH BREAKERS. SERVICE PANEL SHALL BE SQUARE D CAT. # Q012M125RB OR EQUAL. COORDINATE WORK WITH PG&E AND ENGINEER IN THE FIELD.
- PROVIDE NEW CONDUCTORS, 3#1, #60, FROM NEW SERVICE PANEL TO EXISTING MOBILE HOME PANEL. USE EXISTING CONDUIT.

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

DESIGNED BY TIMOTHY G. FORTIE	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA
DESIGN CHECKED BY J. DIEGO	MOKELUMNE RIVER FISH HATCHERY MANUFACTURED HOME ELECTRICAL
PROJ. NO. Z-	100-SKETCH-5
SCALE AS SHOWN	STRUCT. DISC. NUMBER REV.
DATE	



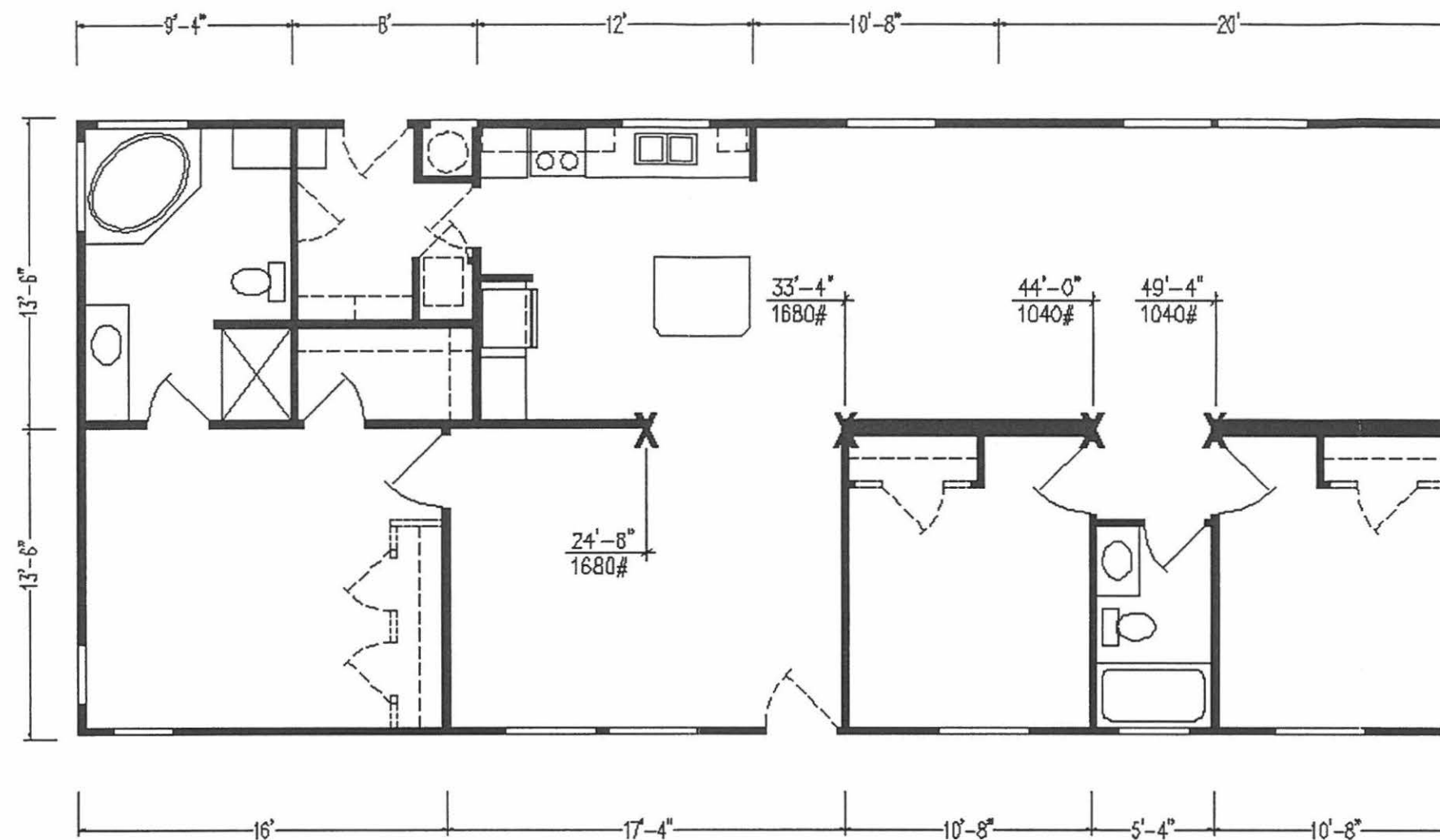
MANAGER'S MOBILE HOME FLOOR PLAN

3/8" x 1'-0"

3" ON ORIGINAL DOCUMENT
0 1 2 3

NO.	DATE	REVISION	BY	REC.	APP.

DESIGNED BY TIM FUETTE	EAST BAY MUNICIPAL UTILITY DISTRICT OAKLAND, CALIFORNIA			
DESIGN CHECKED BY	MOKELUMNE RIVER FISH HATCHERY MANUFACTURED HOME			
DRAWN BY FACILITY DRAFTING	FLOOR PLAN			
PROJECT ENGINEER R.P.E. NO.	PRJ. NO.	100-SKETCH-6		
RECOMMENDED ENGR.	SCALE 3/8" x 1'-0"			
APPROVED MGR. OF DESIGN R.P.E. NO. C39851	DATE		STRUCT.	DISC. NUMBER REV.



J238-CT

CENTERLINE SUPPORT REQUIREMENTS

THIS SHEET IS TO BE INSERTED WITH SUPPLEMENT TO FIELD INSTALLATION MANUAL FOR 20# ROOF ZONE SNOW LOAD. SEE ABOVE PRINT FOR LOAD REQUIREMENTS AND LOC.

DIVISIONS				REVISIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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SKYLINE

DRAWN BY: TL
DATE: 11/12/2008
SHEET 1 OF 3
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Skyline Corporation Manufactured Home Installation Manual



Bringing America Home. Bringing America Fun.

INSTALLATION MANUAL

Using the Manual

This manual is organized into a series of steps that will take you through the entire installation process using only those pages required for the specific home being installed. First, review the entire manual, including the Introduction chapter. As you read it, identify sections of the manual that you will need; identify other documents or information you will need; construct lists of tools and materials required for your particular installation; and make sure you have everything you need before starting work.

After reviewing the entire manual, refer to the sequence of installation steps in the table below. Identify the pathway for your installation and follow the arrows downward. Select either **Single Section Home** or a **Multi-Section Home** and choose the column corresponding to the home's foundation type, either **Pier and Ground Anchor** or **Load-Bearing Perimeter Wall** (see **Definitions**, p. 4). Then complete the work in each of the sections starting with **Getting Started**.

If using an alternative (proprietary) foundation system, the installation process will change from that described in this manual. Consult the system manufacturer directions for instructions. See page 6 for alternative foundation system criteria.

SINGLE SECTION HOME		MULTI-SECTION HOME	
Pier and Ground Anchor	Load-Bearing Perimeter Wall	Pier and Ground Anchor	Load-Bearing Perimeter Wall
Getting Started (p. 8) ▼ Prepare the Site (p. 13) ▼ Install Footings (p. 18) ▼ Set the Home (p. 30) ▼ Install Stabilizing System (p. 65) ▼ Connect Utilities (p. 77) ▼ Prepare Appliances and Equipment (p. 86) ▼ Complete Under the Home and Site Built Structures (p. 96) ▼ Prepare Home for Occupancy (p. 99) ▼ Complete Installation Checklist (p. 100)	Getting Started (p. 8) ▼ Prepare the Site (p. 13) ▼ Construct Foundation (p. 28) ▼ Connect Utilities (p. 77) ▼ Prepare Appliances and Equipment (p. 86) ▼ Complete Under the Home and Site Built Structures (p. 96) ▼ Prepare Home for Occupancy (p. 99) ▼ Complete Installation Checklist (p. 100)	Getting Started (p. 8) ▼ Prepare the Site (p. 13) ▼ Install Footings (p. 18) ▼ Set the Home (p. 30) ▼ Complete Multi-Section Set (p. 36) ▼ Complete Roof and Exterior Walls (p. 47) ▼ Connect Crossovers (p. 52) ▼ Complete Interior (p. 63) ▼ Connect Utilities (p. 77) ▼ Prepare Appliances and Equipment (p. 86) ▼ Complete Under the Home and Site Built Structures (p. 96) ▼ Prepare Home for Occupancy (p. 99) ▼ Complete Installation Checklist (p. 100)	Getting Started (p. 8) ▼ Prepare the Site (p. 13) ▼ Construct Foundation (p. 28) ▼ Complete Roof and Exterior Walls (p. 47) ▼ Connect Crossovers (p. 52) ▼ Complete Interior (p. 63) ▼ Connect Utilities (p. 77) ▼ Prepare Appliances and Equipment (p. 86) ▼ Complete Under the Home and Site Built Structures (p. 96) ▼ Prepare Home for Occupancy (p. 99) ▼ Complete Installation Checklist (p. 100)

Disclaimer

The Manufactured Housing Research Alliance, its members, consultants, contractors and representatives make no representations, warranty or guarantee, express or implied, as to the accuracy or appropriateness of any materials or information in this manual for use in a specific home, nor assume any liability for the use of the information, methods, or materials contained herein, or for damages arising from any such use.

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Introduction

This installation manual contains instructions that must be followed for the proper installation of the home. It complies with the HUD Model Manufactured Home Installation Standards. Please read all instructions and any other documents (including addendum pages and supplements) that may apply to the specific home prior to commencing site work or installation.

This installation manual covers permits and site work through final inspection of the installation. It covers both single and multi-section homes installed over pier and anchor, load bearing crawl space walls and basement foundations. It contains instructions, including specifications and procedures, for the set and hookup of manufactured homes to be used as single-family dwellings.

The importance of correct installation cannot be over-emphasized. Correct installation is absolutely essential to homeowner satisfaction and the structural integrity of the home. All instructions must be followed to provide the customer with a safe, quality home.

No manual can cover all circumstances that may exist for certain home designs or building sites. For questions, further clarification, or if you encounter conditions at the site or in the design of the home or its foundation not covered by this manual, please contact the manufacturer (see **Resources**, p. 4), a registered engineer, or registered architect.

Supplemental addendum pages may be included with this manual. Supplements include requirements not covered in this manual or that supersede the manual instructions.

Once the home installation is complete, leave this manual with the home.

IMPORTANT NOTICES

- The home manufacturer is not responsible for installation or for the materials supplied by the set-up crew at the time of installation. The installer may be responsible for any deviations from the installation instructions of this manual.
- To keep the home in compliance with its warranty, the home installation must follow the procedures described in this manual or other procedures approved by the manufacturer. Deviation from the instructions in this manual may void the home's warranty. Any alterations or changes to the home shall be approved by a registered engineer or registered architect and may still be subject to warranty violations.
- When an installer does not provide support and anchorage in accordance with the approved manufacturer's installation instructions, or encounters site conditions (such as areas that are subject to flood damage or high seismic risk) or other conditions that prevent the use of the instructions provided in this manual, the installer must obtain special site-specific instructions from the manufacturer or use a design approved by a registered engineer or registered architect.
- The installer must possess a valid installation license as a manufactured home installer.
- If the installer identifies failures of the home to comply with the Federal Manufactured Home Construction and Safety Standards (the HUD Code), the installer must notify the manufacturer and retailer.

The Technical Content of the Manual has been reviewed by PFS Corporation and found to be in conformance with the Federal Manufactured Home Construction and Safety Standards.



SAFETY

There are potential hazards associated with the installation of a manufactured home. Home installers are licensed, and as experienced professionals, should recognize these hazards, be qualified to work with them, and be capable of providing safe work practices and equipment that minimize the risks of injury.

Only qualified persons should install a manufactured home. As qualified professionals in the field of manufactured home installation, installers are the experts and must be aware of the hazards and conditions faced. Warnings are published throughout this manual as reminders. These reminders may not cover all hazards, all potential hazards, or all possible consequences of improper or unsafe installation practices.

Construction crews should be trained in the skills required and be supervised by experienced personnel. Installers should regularly inspect work performed by crews and subcontractors.

Obey OSHA regulations, particularly those related to home construction, such as Title 29 Code of Federal Regulations Part 1926. For copies of OSHA regulations, call (202) 512-1800 or visit www.osha.gov on the web.

RESOURCES

Manufacturer contact information:

Skyline Corporation
P.O. Box 743
Elkhart Indiana 46515
(574) 294-6521
(574) 295-8601 - FAX
www.skylinecorp.com

Office of Regulatory Affairs and Manufactured Housing

US Department of Housing and Urban Development
451 Seventh Street, SW, Room 9164
Washington, DC 20410-8000
Telephone: (202) 708-6423 or (800) 927-2891
FAX: (202) 708-4213

State Administrative Agencies

A list of SAAs may be found on the web at www.hud.gov or by contacting the Office of Regulatory Affairs and Manufactured Housing.

FEDERAL PREEMPTION

This home was engineered, constructed, and inspected in conformance with the Federal Manufactured Home Construction and Safety Standards (MHCSS) of the US Department of Housing and Urban Development (24 CFR Part 3280, commonly referred to as the "HUD Code") in effect on the date of manufacture. These Standards set forth minimum requirements for the design and construction of manufactured homes designed to be used as dwellings.

Individual states, counties and cities shall have no authority to establish standards regarding the construction or safety of a manufactured home. A metal certification label is affixed to each section of the home to certify that it has been constructed and inspected to comply with these Standards. The design plans and in-plant construction of all homes are inspected by independent third party agencies to assure compliance with the Standards.

The installation of the home and any alterations made to the home shall conform to the requirements of the MHCSS and the HUD Model Manufactured Home Installation Standards. These installation instructions are minimum requirements. Applicable local or state laws may have more stringent installation requirements than outlined in this manual and must be followed. Consult with the local authority having jurisdiction (LAHJ) for regulations that may require licenses and/or permits or which may affect procedures described in this manual.

DEFINITIONS

ANCHOR ASSEMBLY. Any device or other means designed to transfer loads to the ground.

ANCHORING EQUIPMENT. Ties, straps, cables, turnbuckles, chains, and other approved components, including tensioning devices that are used to secure a manufactured home to anchor assemblies.

ANCHORING SYSTEM. A combination of anchoring equipment and anchor assemblies that will, when properly designed and installed, resist the uplift, overturning, and lateral forces on the manufactured home.

BASEMENT. A load-bearing perimeter wall foundation that includes habitable space (finished or unfinished, heated or unheated) partly or completely below grade.

CRAWLSPACE. The space underneath the home's floor system, enclosed with either load- or non-load bearing perimeter walls. The ground may be covered with a concrete slab or by a plastic ground cover. Crawlspace walls must be vented.

CROSSOVERS. Utility interconnections between sections of multi-section homes, including heating and cooling ducts, electrical circuits, and water pipes, drain plumbing, and gas lines.

DATA PLATE. An information sheet located at the main electrical panel, in the utility room, in a bedroom closet, or in a cabinet in the kitchen. It contains a unique identification number and identifies the wind zone, roof load zone, and climatic zone for which the home was constructed.

DIAGONAL TIE. A tie intended to resist horiz. or shear forces, but which may resist vertical, uplift, and overturning forces.

FOOTING. That portion of the support system that transmits loads directly to the soil.

GROUND ANCHOR. A specific anchoring assembly device designed to transfer home loads to the ground.

H-BEAM. Steel H-beams are often used to support a home over a basement or crawlspace. They span across the foundation from sidewall to sidewall, typically with an intermediate support pier and footing (typically in the center point resulting in a line of piers under the centerline of a double section home).

INFORMATION PACKET. A set of important documents provided with the home including warranties, information on high wind coverage, and other features of the specific home.

INSTALLATION LICENSE. The proof that an installer meets the requirements for installing manufactured homes under the HUD-administered installation program.

LABELED. Equipment or materials to which has been attached a label, symbol, or other identifying mark of a certified testing laboratory, inspection agency, or other organization concerned with product evaluation. The label indicates compliance with nationally recognized standards or tests to determine suitable usage in a specified manner.

LISTED OR CERTIFIED. Included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

LOAD-BEARING PERIMETER WALL FOUNDATION. A support system for the home whereby the home is mechanically fastened to a structural wall(s) that transfers gravity, lateral, and uplift loads to the ground.

LOCAL AUTHORITY HAVING JURISDICTION (LAHJ). The state, city, county, municipality, utility, or organization that has local responsibilities that must be complied with during the installation of a manufactured home.

MUST. Indicates a mandatory requirement.

N/A. Indicates not applicable.

PIER. That portion of the support system between the footing and the manufactured home, exclusive of shims. Types of piers include, but are not limited to: (1) manufactured steel stands; (2) pressure-treated wood; (3) manufactured concrete stands; (4) concrete blocks; and (5) portions of foundation walls.

PIER AND GROUND ANCHOR FOUNDATION. A support system for the home that employs piers under the chassis and other locations to support gravity loads and employs ground anchors and tie downs (the stabilizing system) to resist lateral and uplift loads.

PERIMETER BLOCKING. Regularly spaced piers supporting the sidewalls and marriage line of the home. Some homes require perimeter blocking in addition to supports under the home's frame.

QUALIFIED. Has the necessary knowledge and skills gained from experience and training that will allow performance of the job safely, competently, and in accordance with all applicable codes, standards, rules, and regulations. Meets all necessary qualification tests including any license and certification requirements that may be in effect in the area where the home will be installed.

RAMADA. Any freestanding roof or shade structure, installed or erected over a manufactured home or any portion thereof.

SHOULD. Indicates a recommendation that is strongly advised but not mandatory.

SHALL. Indicates a mandatory requirement.

SITE FOR A MANUFACTURED HOME. A designated parcel of land designed for the accommodation of one manufactured home, its accessory buildings or structures, and accessory equipment, for the exclusive use of the occupants of the home.

SKIRTING. A weather-resistant material used to enclose the perimeter, under the living area of the home, from the bottom of the manufactured home to grade.

STABILIZING SYSTEM. All components of the anchoring and support systems, such as piers, footings, ties, anchoring equipment, anchoring assemblies, or any other equipment, materials and methods of construction, that support and secure the manufactured home to the ground.

SUPPORT SYSTEM. Pilings, columns, a combination of footings, piers, foundation walls, caps, and shims and any combination thereof that will, when properly installed, support and secure the manufactured home to the ground.

TIE. Straps, cable, or securing devices used to connect the manufactured home to anchoring assemblies.

UTILITY CONNECTION. The connection of the manufactured home to utilities that include, but are not limited to, electricity, water, sewer, gas, or fuel oil.

VERTICAL TIE. A tie intended to resist uplifting and overturning forces.

WIND ZONE. The areas designated on the Basic Wind Zone Map, as further defined by the MHCSS.

ENGINEER'S STAMP

Certain pages of this manual display the seal of a registered engineer. Federal guidelines only require the seal from one state to be displayed, but the details herein apply to all states.

SYMBOLS USED IN THE MANUAL



This icon indicates an important warning. It is critical to heed these warnings.



This icon indicates a recommended best practice. While not required, following these practices will result in a superior installation, reducing the chance that cosmetic or durability related complaints might arise.

ABBREVIATIONS

ABS	Acrylonitrile Butadiene Styrene	max.	Maximum
ANSI	American National Standards Institute	MHCSS	Manufactured Home Construction and Safety Standards
APA	American Plywood Association	min.	Minimum
ASTM	American Society for Testing and Materials	mph	Mile(s) per hour
AWPA	American Wood Preservers Association	NEC	National Electric Code
CFM	Cubic feet per minute	NFIP	National Flood Insurance Program
CFR	Code of Federal Regulations	NFPA	National Fire Protection Association
DWV	Drain, Waste, Vent	o.c.	On center
EMT	Electrical metallic tubing	OSHA	Occupational Safety and Health Administration
FEMA	Federal Emergency Management Agency	oz	Ounce(s)
ft	Foot/feet	p.	Page
ga	Gauge	psf	Pounds per square foot
HUD	US Department of Housing and Urban Development	psi	Pounds per square inch
in	Inch(es)	SAA	State Administrative Agency
LAHJ	Local Authority Having Jurisdiction	sq ft	Square foot/feet
lb(s)	Pound(s)		

ALTERNATIVE FOUNDATION SYSTEMS

Alternative foundation systems or designs are permitted if they are approved by the home manufacturer and the manufacturer's DAPIA, and are in accordance with either of the following:

- Systems or designs are manufactured and installed in accordance with their listings by a nationally recognized testing agency based on a nationally recognized testing protocol; or
- System designs are prepared by a registered engineer or a registered architect or tested and certified by a registered engineer or registered architect in accordance with acceptable engineering practice and are manufactured and installed so as not to take the home out of compliance with the Manufactured Home Construction and Safety Standards.

DISPLAY AND STORAGE OF THE HOME

WEATHER PROTECTION

If the installation is not started immediately upon delivery of the home, the retailer and/or installer has the responsibility to ensure the exterior weather protection covering of marriage walls and the roof of homes with hinged roofs has not been

damaged during shipment. Inspect the home immediately upon the delivery and frequently during storage. Promptly repair tears in the home closure materials to prevent damage from the elements. Inspect and repair roof shingles and siding as needed.

SUPPORTING A HOME FOR DISPLAY

When a new or used manufactured home is to be displayed at a retail location, temporarily block and support the home. Set up single-section homes with single block piers spaced no further apart than 12 feet o.c. beneath each I-beam. The tire and axle system may be used as one of these required supports, and the hitch jack may be used as another. Locate the first pier no further than two feet from the rear end of the home (**Figure 1**). Place additional piers along the perimeter on either side of openings greater than four feet (i.e. sliding glass doors, bay windows, etc.).

For multi-section homes, locate additional piers along the marriage line under support columns. These locations will be marked by the manufacturer.

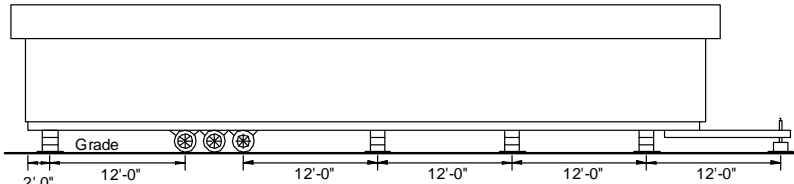


Figure 1. Supporting a home for display

For all homes, place footings below each pier. Footings may be placed directly on the surface grade without excavation and may be ABS pads, 2 x 10 by 16 inch long pressure treated lumber or 16" x 16" by 4 inch thick concrete pads.

SUPPORTING A HOME FOR STORAGE

To prevent damage to homes being stored but not on display (i.e. people shall not be permitted inside the home) for a period exceeding 30 days, locate piers below each I-beam no further than two feet from each end of the home and at the approximate center of the home length.

CUSTOMIZATION OF THE MODEL MANUAL

This manual is based on a model manufacturer's installation manual used by many different companies. It may have been customized from the model by the manufacturer. The table below lists the locations where this manual differs from the model manual.

Section	Step	Summary of the change
Multi-section set	Step 3	Revised hinged roof details to Skyline system.
Multi-section set	Step 6, 7 & 8	Revised mating line connections to conform to Skyline system.
Connect cross-overs	Step 1	Revised heat duct cross-overs to conform to Skyline systems.
Install stabilizing System	Step 1	Revise anchor location requirements to conform to Skyline system.
Connect Utilities	Step 2	Revise water heater drip pan drainage to Skyline system.
Install Stabilizing Systems	Step 1	Add minimum ground anchor requirements

Getting Started

This chapter covers a few steps that, taken now, will avoid problems later in the installation process.

Follow the Steps below:

- ▼ **STEP 1. LOCATE THE DATA PLATE** (p. 8)
- ▼ **STEP 2. CONFIRM WIND ZONE** (p. 8)
- ▼ **STEP 3. CONFIRM THERMAL ZONE** (p. 10)
- ▼ **STEP 4. CONFIRM ROOF-LOAD ZONE** (p.11)
- ▼ **STEP 5. CHECK LOCAL CODES AND SECURE PERMITS** (p. 12)

STEP 1. LOCATE THE DATA PLATE

Locate the data plate inside the home (**Figure 2**), typically on a wall panel or door face near the electrical panel, or master bedroom closet.

The image shows a sample data plate form. It includes a 'COMPLIANCE CERTIFICATE' section with checkboxes for various features like 'For Heating', 'For Cooling', 'For Ventilation', etc. Below this is a 'BASIC WINDZONE MAP' showing the United States divided into Wind Zones I, II, III, and IV. There are also checkboxes for 'HOME CONSTRUCTED FOR' and 'WIND ZONE'.

Figure 2. Sample data plate



The information on the data plate will be used to verify that the home was designed for the proper location.

STEP 2. CONFIRM WIND ZONE

From **Table 1**, identify the wind zone for the home. Verify that the home conforms to the following rules and any special requirements determined by the LAHJ.

- No home may be located in a higher wind zone than that indicated on the data plate. (Example: a home designed for Wind Zone II cannot be placed in Wind Zone III.)
- A home may be located in a lower wind zone than that indicated on the data plate. (Example: a home designed for Wind Zone II can be placed in either Wind Zone II or I.)
- Homes located within 1,500 feet of the coastline in Wind Zones II and III must be designed to withstand exposure 'D' conditions. This will be indicated on the data plate.

If the home does not conform to these rules, contact the manufacturer immediately.



Site Appropriateness. If the site is not accessible, not appropriate for the planned support system or cannot be properly graded, notify the purchaser, the retailer and HUD with the reasons why the site is unsuitable. Do not install the home until all issues are remedied.

TABLE 1. WIND ZONE BY LOCALITY

Wind Zone I	
All areas except those areas listed below as being within Wind Zone II or III	
Wind Zone II	
Alabama	Counties of Baldwin and Mobile
Florida	All counties except those listed below as within Wind Zone III
Georgia	Counties of Bryan, Camden, Chatham, Glynn, Liberty, McIntosh
Louisiana	Parishes of Acadia, Allen, Ascension, Assumption, Calcasieu, Cameron, East Baton Rouge, East Feliciana, Evangeline, Iberia, Iberville, Jefferson Davis, Lafayette, Livingston, Pointe Coupee, St. Helena, St. James, St. John the Baptist, St. Landry, St. Martin, St. Tammany, Tangipahoa, Vermillion, Washington, West Baton Rouge, and West Feliciana
Maine	Counties of Hancock and Washington
Massachusetts	Counties of Barnstable, Bristol, Dukes, Nantucket, and Plymouth
Mississippi	Counties of George, Hancock, Harrison, Jackson, Pearl River, and Stone
North Carolina	Counties of Beaufort, Brunswick, Camden, Chowan, Columbus, Craven, Currituck, Jones, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington
South Carolina	Counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, Jasper, and Williamsburg
Texas	Counties of Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, Orange, Refugio, San Patricio, and Willacy
Virginia	Cities of Chesapeake, Norfolk, Portsmouth, Princess Anne, and Virginia Beach
Wind Zone III	
Hawaii	Entire state
Alaska	Coastal regions (as determined by the 90 mph isotach on the ANSI/ASCE 7-88 map)
Florida	Counties of Broward, Charlotte, Collier, Dade, Franklin, Gulf, Hendry, Lee, Martin, Manatee, Monroe, Palm Beach, Pinellas, and Sarasota
Louisiana	Parishes of Jefferson, La Fourche, Orleans, Plaquemines, St. Bernard, St. Charles, St. Mary, and Terrebonne
North Carolina	Counties of Carteret, Dare, and Hyde
Other	All regions of the U.S. Territories of American Samoa, Guam, Northern Mariana Islands, Puerto Rico, Trust Territory of the Pacific Islands, and the United States Virgin Islands



Figure 2A. Wind Zone Map



STEP 3. CONFIRM THERMAL ZONE

From **Figure 3. Thermal (UO) zone map**, identify the thermal (UO) zone for the home. Verify that the home conforms to the following rules.

- No home may be located in an area with a higher thermal zone number than that indicated on the data plate. (Example: a home designed for Thermal Zone 2 cannot be placed in Thermal Zone 3.)
- A home may be located in a lower thermal zone than that indicated on the data plate. (Example: a home designed for Thermal Zone 2 may be placed in either Thermal Zone 2 or 1.)
- In no case may a home designated for installation in the "Humid & Fringe Climate," as identified on the data plate, be located outside of this region (**Table 2**).

If the home does not conform to these rules, contact the manufacturer immediately.

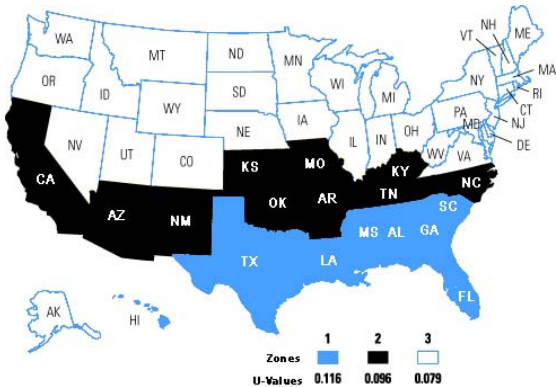


Figure 3. Thermal (UO) zone map



TABLE 2. HUMID AND FRINGE CLIMATE ZONES

Humid and Fringe Climate Zone	
Alabama	Counties of Baldwin, Barbour, Bullock, Butler, Choctaw, Clarke, Coffee, Conecuh, Covington, Crenshaw, Dale, Escambia, Geneva, Henry, Houston, Lowndes, Marengo, Mobile, Monroe, Montgomery, Pike, Washington, and Wilcox
Florida	All counties and locations
Georgia	Counties of Appling, Atkinson, Bacon, Baker, Ben Hill, Berrien, Brantley, Brooks, Bryan, Calhoun, Camden, Charleton, Chatham, Clay, Clinch, Coffee, Colquitt, Cook, Crisp, Decatur, Dougherty, Early, Echols, Effingham, Evans, Glynn, Grady, Irwin, Jeff Davis, Lanier, Lee, Liberty, Long, Lowndes, McIntosh, Miller, Mitchell, Pierce, Quitman, Randolph, Seminole, Tattnall, Terrell, Thomas, Tift, Turner, Ware, Wayne, and Worth
Hawaii	All counties and locations
Louisiana	All counties and locations
Mississippi	Counties of Adams, Amite, Claiborne, Clarke, Copiah, Covington, Forrest, Franklin, George, Greene, Hancock, Harrison, Hinds, Issaquena, Jackson, Jasper, Jefferson, Jefferson Davis, Jones, Lamar, Lawrence, Lincoln, Marion, Pearl River, Perry, Pike, Rankin, Simpson, Smith, Stone, Walthall, Warren, Wayne, and Wilkinson
North Carolina	Counties of Brunswick, Carteret, Columbus, New Hanover, Onslow, and Pender
South Carolina	Counties of Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, and Horry
Texas	Counties of Anderson, Angelina, Aransas, Atascosa, Austin, Bastrop, Bee, Bexar, Brazoria, Brooks, Burleson, Caldwell, Calhoun, Cameron, Camp, Cass, Chambers, Cherokee, Colorado, Comal, De Witt, Dimmit, Duval, Falls, Fayette, Fort Bend, Franklin, Freestone, Frio, Galveston, Goliad, Gonzales, Gregg, Grimes, Guadalupe, Hardin, Harris, Harrison, Hays, Henderson, Hidalgo, Hopkins, Houston, Jackson, Jasper, Jefferson, Jim Hogg, Jim Wells, Karnes, Kaufman, Kennedy, Kinney, Kleberg, La Salle, Lavaca, Lee, Leon, Liberty, Limestone, Live Oak, Madison, Marion, Matagorda, Maverick, McMullen, Medina, Milam, Montgomery, Morris, Nacogdoches, Navarro, Newton, Nueces, Orange, Panola, Polk, Rains, Refugio, Robertson, Rusk, Sabine, San Augustine, San Jacinto, San Patricio, Shelby, Smith, Starr, Titus, Travis, Trinity, Tyler, Upshur, Uvalde, Val Verde, Van Zandt, Victoria, Walker, Waller, Washington, Webb, Wharton, Willacy, Williamson, Wilson, Wood, Zapata, and Zavala

STEP 4. CONFIRM ROOF LOAD ZONE

From **Table 3**, identify the Roof Load Zone for the home. Verify that the home conforms to the following rules.

- No home may be placed in an area with a higher roof load than that indicated on the data plate. (Example: a home designed for the South (20 psf) Roof Load Zone cannot be placed in the Middle (30 psf) Roof Load Zone).
- A home may be located in an area with a lower roof load than that indicated on the data plate. (Example: a home designed for the Middle (30 psf) Roof Load Zone may be placed in the South (20 psf) Roof Load Zone).
- There are special high roof load areas (primarily in mountains) not shown on the map. Contact the LAHJ or SAA for information about these areas. The home's data plate will indicate if the home has been designed for one of these high roof load areas.
- Ramadas may be used in areas with roof live loads greater than 40 psf. Ramadas are to be self-supporting, except that any connection to the home must be for weatherproofing only.



TABLE 3. ROOF LOADS BY LOCALITY

North (40 psf roof load)	
Alaska	All counties
Maine	Counties of Aroostook, Piscataquis, Somerset, Penobscot, Waldo, Knox, Hancock, Washington
Middle (30 psf roof load)	
Colorado	All counties
Idaho	All counties
Iowa	Counties of: Buena Vista, Butler, Calhoun, Cerro Gordo, Cherokee, Chickasaw, Clay, Dickinson, Emmet, Floyd, Franklin, Hamilton, Hancock, Hardin, Howard, Humboldt, Ida, Kossuth, Lyon, Mitchell, O'Brien, Osceola, Palo Alto, Plymouth, Pocahontas, Sac, Sioux, Webster, Winnebago, Worth, Wright
Maine	Counties of Androscoggin, Cumberland, Franklin, Kanabec, Lincoln, Oxford, Sagadahoc, York
Massachusetts	County of Essex
Michigan	Counties of Alger, Alcona, Alpena, Antrim, Baraga, Benzie, Charlevoix, Cheboygan, Chippewa, Crawford, Delta, Dickson, Emmet, Gogebic, Grand Traverse, Houghton, Iron, Kalkaska, Keweenaw, Leelanau, Luce, Mackinac, Marquette, Menominee, Missaukee, Montmorency, Ogemaw, Ontonagon, Oscoda, Otsego, Presque Isle, Roscommon, Schoolcraft, Wexford
Minnesota	Counties of Aitkin, Anoka, Benton, Blue Earth, Brown, Cass, Carlton, Carver, Chippewa, Chisago, Cook, Cottonwood, Crow Wing, Dakota, Dodge, Douglas, Faribault, Fillmore, Freeborn, Goodhue, Grant, Hennepin, Hubbard, Itasca, Isanti, Jackson, Kandiyohi, Kanabec, Koochiching, Lac qui Parle, Lake, Le Sueur, Lincoln, Lyon, McLeod, Meeker, Morrison, Millie Lacs, Mower, Martin, Murray, Nicollet, Nobles, Olmsted, Pipestone, Pine, Pope, Ramsey, Redwood, Renville, Rice, Rock, St. Louis, Sibley, Scott, Steele, Sherburne, Swift, Stearns, Stevens, Todd, Wadena, Wright, Washington, Wabasha, Winona, Waseca, Watonwan, Yellow Medicine
Montana	All Counties
New Hampshire	All Counties
New York	Counties of Cayuga, Clinton, Essex, Erie, Franklin, Fulton, Genesee, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Monroe, Montgomery, Niagara, Oneida, Onondaga, Ontario, Orleans, Oswego, St. Lawrence, Saratoga, Schenectady, Seneca, Warren, Washington, Wayne, Wyoming, Yates
South Dakota	Counties of Brookings, Clay, Codington, Deuel, Grant, Hamlin, Hanson, Hutchinson, Kingsbury, Lake, Lincoln, McCook, Miner, Minnehaha, Moody, Turner, Union, Yankee
Utah	All Counties
Vermont	Counties of Addison, Caledonia, Chittenden, Essex, Franklin, Grand Isle, Lamoille, Orange, Orleans, Rutland, Washington, Windsor
Wisconsin	Counties of Ashland, Bayfield, Barron, Buffalo, Burnett, Clark, Chippewa, Door, Douglas, Dunn, Eau Claire, Florence, Forest, Iron, Jackson, Langlade, Lincoln, Marathon, Marinette, Menominee, Oconto, Oneida, Pepin, Pierce, Polk, Price, Rusk, St. Croix, Sawyer, Taylor, Trempealeau, Vilas, Washburn
Wyoming	All Counties
South (20 psf roof load)	
Other	The states and counties not listed for the Middle or North roof load zone above are deemed to be within the South roof load zone.

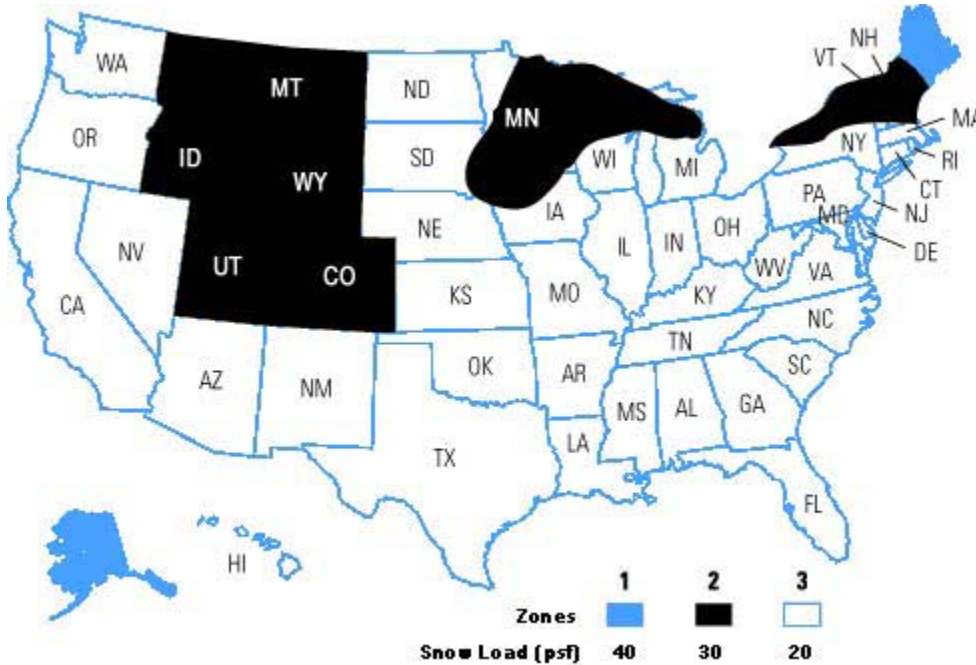


Figure 3A. Roof zone map.

Is the data present and the home placed in the appropriate wind, thermal, and roof load zones?

- ▶ **YES, go to STEP 5, CHECK LOCAL CODES AND SECURE PERMITS.**
- ▶ **NO, Stop installation activities and notify the home manufacturer, home retailer, purchaser and HUD.**



STEP 5. CHECK LOCAL CODES AND SECURE PERMITS

Local regulations may set conditions for the siting and installation of a manufactured home. Consult the LAHJ, state manufactured housing association, and the state SAA (See **Resources**, p. 4) for the specific local requirements, including:

- Building codes that may affect the construction of site built structures and infrastructure.
- Local requirements regulating the installation of manufactured homes.
- Setback requirements for property lines, streets, yards, and courts.
- Fire separation distances.
- Development covenants for the specific property.
- The locations of flood hazard areas and any special foundation requirements for homes installed in those areas.
- In some areas, building permits are required to install manufactured homes. Prior to making any alteration to the site and the home, contact the LAHJ to determine if plan approval and permits are required.



Areas subject to flooding.

The foundation specifications contained in this manual are NOT intended to address flood loads. If the home is in the flood plain, consult a registered engineer.

- ▶ go to **Prepare the Site** (p. 13)

Prepare the Site

A properly prepared site is critical to a good quality installation and the long term structural stability of the home.

This chapter explains the process of planning the site, evaluating the soil, and preparing the site for construction of the home's support system.

Follow the Steps below:

- ▼ **STEP 1. PLAN SITE ACCESS** (p. 13)
- ▼ **STEP 2. DETERMINE HOME LOCATION AND LAYOUT** (p. 13)
- ▼ **STEP 3. CLEAR AND GRADE THE SITE** (p. 14)
- ▼ **STEP 4. DETERMINE SOIL CONDITIONS** (p. 14)
- ▼ **STEP 5. DETERMINE SOIL BEARING CAPACITY AND FROST LINE** (p. 14)
- ▼ **STEP 6. DETERMINE GROUND ANCHOR HOLDING CAPACITY** (p. 15)

STEP 1. PLAN SITE ACCESS

Planning the route to the site is typically the responsibility of the retailer or transportation company. Whoever is responsible must secure state permits from the states through which the home will pass.

In planning the route, avoid obstructions that might interfere with the passage of the home, such as low hanging wires and trees, low overpasses, and bridges not suitable for the load. Contact the utility company if wires need to be moved. Do not allow branches, bushes, or other foliage to scrape against the home as the home is moved to the site. Avoid ditches, berms, steep slopes, and soft ground. Identify and fill any holes and soft spots into which the transporter's wheels may sink. Avoid moving over steep changes in grade (20 degrees or more).

If required, provide for home storage and staging areas on the site. Plan the delivery and staging of home sections and materials so that after all deliveries are complete, home sections and materials can be accessed for use and installed in the appropriate sequence. Orient home sections so they do not have to be rotated or excessively maneuvered during the installation process. Plan for temporary needs, such as dumpsters, portable toilets, crew parking, delivery vehicle drop-offs and concrete mixer deliveries.

Before moving the manufactured home to the site, inform the LAHJ and make sure the site is prepared and utilities are available.

STEP 2. DETERMINE HOME LOCATION AND LAYOUT

The home location may have already been determined by others. If not, plan the home location and layout in compliance with the regulations researched in **Getting Started, STEP 5. CHECK LOCAL CODES AND SECURE PERMITS** (p. 8). Contact utilities for locations of existing infrastructure, such as underground cables, pipes, and electrical lines.

When planning the site improvements, consider the following:

- The home location should be level.
- Avoid contact with large trees, steep slopes, poorly drained areas, and potential flood zones.
- Preserve trees and shrubs for shade, visual screens, and windbreaks.
- Plan the driveway, parking areas, septic, well, other structures, and utility lines.



Site Preparation. The home manufacturer has no control over the site planning and installation of the home unless the manufacturer is responsible for the home's installation. Final responsibility for site preparation, including soil stability and frost heave control, lies with the installer. An improperly prepared site may result in the denial of a foundation-related warranty claim.



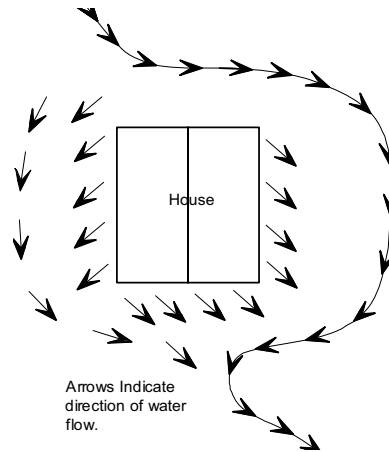
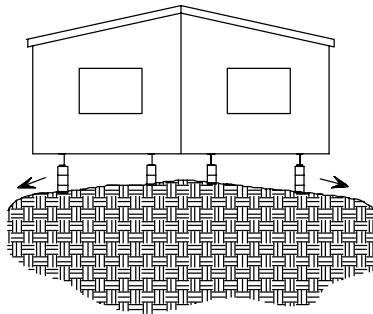
Fire separation. Comply with any LAHJ fire separation requirements or the requirements NFPA 501A, 2003 edition (Chapter 6).

- Consider future additions, such as screen rooms, porches, and awnings.
- Site the home away from natural water paths.

STEP 3. CLEAR AND GRADE THE SITE

Trim overhanging foliage considering future growth, potential storms, swaying in wind and snow/ice-weighted branches. Remove organic material such as vegetation, wood, roots, twigs, dead branches, grass, and brush from directly under the home. Remove any debris that could become termite infested from the site and surrounding area. Remove all other debris from the home location, including roots from beneath footing locations. Properly dispose of all items.

Crown the site (**Figure 4**) away from the foundation for the first ten feet with a minimum slope of 1/2 inch per foot. Where property lines, walls, slopes, or other physical conditions prohibit this slope, provide the site with drains, swales, or grading to drain water away from the structure. Any fill required to grade the site should be inorganic "controlled fill" applied in a maximum of four inch layers, compacted between each layer to at least 90% of its maximum relative density. Direct runoff away from the site using ditches and berms (**Figure 5**). If the home will have skirting, start grading from two feet in from the edge of the home.



Grade the ground so that water under porches, decks, and recessed entries flows away from the home. If proper grading is not possible, use other methods such as a drain tile and automatic sump pump system to remove any water that may collect under the home.

The home is suitable for the installation of gutters and downspouts. When gutters and downspouts are installed, direct runoff away from the home.

STEP 4. DETERMINE SOIL CONDITIONS

Examine the soil type under the proposed home location to make sure it is suitable for placement of a home. The design of the home's support system, including footing/pier spacing and size, will in part be determined by the bearing capacity of the soil, and if ground anchors are used, by the soil's withdrawal strength.

The soil under every portion of the support system must meet the following criteria:

- The soil must be firm and undisturbed (not previously excavated) or fill compacted to at least 90% of its maximum relative density. Uncompacted fill will settle over time, causing the home to shift and become unlevel.
- Fill must not contain large debris. This too will settle over time.
- The soil must not be comprised of organic clays or peat. Organic material can decay, causing settlement, and also may harbor pests that can infest the home.



Site drainage. Moisture under the home can result in structural damage to the floor system and other parts of the home. Failure to provide adequate slope/drainage can result in moisture-related problems such as mold, mildew, and erosion.

Figure 4. Crown the soil under the home to prevent water ponding

Figure 5. Direct runoff away from the home



Soil. Inadequate soil bearing capacity or a support system mismatched to the soil characteristics can result in excessive or differential settlement of the home, which can cause the home to go out of level, resulting in jammed doors and windows, cracks in finishes and ruptured plumbing connections.



- The water table must be below the lowest level of the planned support system/foundation. A soil's bearing capacity can be greatly reduced when it is saturated with water. Note that water tables may vary with seasonal or climatic conditions. Consult a geologist or the LAHJ if you are unsure of the water table level.
- The soil must not be a highly expansive type. Expansive soils can expand when they become saturated with water, causing the home to shift and become unlevel. If soils are expansive, contact a registered engineer, or registered architect to assist with the design of the foundation system.

Does the soil meet these criteria?

- ▶ **YES**, go to **STEP 5, DETERMINE SOIL BEARING CAPACITY AND FROST LINE**, (p. 15).
- ▶ **NO**, Consult a registered engineer, registered architect, or geologist to determine a suitable soil bearing capacity.

STEP 5. DETERMINE SOIL-BEARING CAPACITY AND FROST LINE

The soil under a home must be capable of withstanding the loads imposed by the weight of the home, its support system and furnishings, as well as any loads imposed by wind, snow, or other climatic conditions.

SOIL-BEARING CAPACITY

Determine the soil-bearing capacity in pounds per square foot (psf) before designing a support system. The higher the capacity (psf), the more weight the soil can hold without unduly compressing. As the soil-bearing capacity increases, footings can be reduced in size or spaced farther apart.

Use one or more of the following methods to determine the site's soil bearing capacity:

- **Test the soil.** Hire a registered geologist, registered engineer, or registered architect to determine the soil classification and maximum allowable soil bearing capacity by testing the soil in accordance with generally accepted engineering practice.
- **Obtain soil records.** The local office of the U.S. Department of Agriculture's Natural Resources Conservation Service (www.soils.usda.gov) and/or the LAHJ may have test results and/or soil analyses on file for the area.
- **Conduct a pocket penetrometer test.** Use a pocket penetrometer to estimate allowable soil-bearing capacity as follows:
 1. Select a location that will be under a footing.
 2. Clear an area of a minimum of one square foot at least four inches deep or to the depth of the bottom of the planned footing.
 3. Using the instructions provided with the pocket penetrometer, take at least five readings.
 4. Discard the high and low readings and average the remaining readings. Round this result down to the nearest soil-bearing value shown in the right column of **Table 4**.
 5. Confirm that the rounded result matches the soil description on **Table 4**.
- **Determine soil-bearing value by visual examination.** If one of the options above is not available, the values on **Table 4** can be used to establish soil-bearing capacity by visual examination. This method provides lower capacity values than the options above. Accurate soil identification typically requires special training or expertise. An engineer or building code official may be able to assist in classifying the soil found on the site.



Soil bearing capacity. Support systems on soils with bearing capacities less than 1,000 psf must be designed by a registered engineer or registered architect and approved by the LAHJ.

Limitations of pocket penetrometers. Pocket penetrometers do not work on sand or gravel. Use **Table 4** to determine allowable pressure for these types of soils. If you encounter a layer of gravel, test the soil under the gravel. Do not put the penetrometer on stones larger than its tip as this will provide an inaccurate reading.

TABLE 4. SOIL-BEARING CAPACITY BY SOIL TYPE

Soil Type (and classification)	Allowable Pressure (psf)
Rock or hard pan (class 1)	4,000
Sandy gravel and gravel; very dense and/or cemented sands; coarse gravel/cobbles; preloaded silts, clays and coral (class 2)	2,000
Sand; silty sand; clayey sand; silty gravel; medium dense course sands; sandy gravel; very stiff silt, sand clays (class 3)	1,500
Clay, sandy clay, silty clay, clayey silt (classes 4A and 4B)	1,000
Uncompacted fill, peat, organic clays (class 5)	Professional testing required

Note to table: No allowances made for overburden pressure, embedment depth, water table height, or settlement problems.

- **Use default capacity.** Use an allowable pressure of 1,500 psf, unless site-specific information requires the use of lower values based on soil classification and type according to **Table 4**.

Note that soil types may vary across a home site. In this case, the soil with the lowest bearing capacity should be assumed when designing the support system. Keep a record of the soil-bearing capacity value; it will be used later to design the home's support system.

FROST LINE

In climates subject to ground freezing, consult the LAHJ, a registered engineer, or registered architect to determine the depth of the frost line. **Figure 6** may be used as a guideline when there is no specific local determination. Keep a record of the frost depth; it will be used later to design the home's support system.

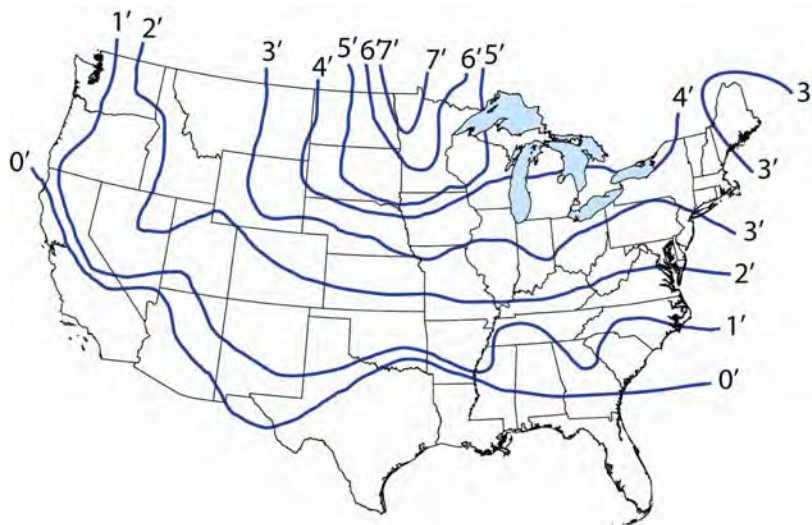


Figure 6. Average frost penetration depth (in feet)

Will this installation use auger-type ground anchors?

- ▶ **YES**, go to **STEP 6, DETERMINE GROUND ANCHOR HOLDING CAPACITY**, (p. 16).
- ▶ **NO**, go to **Construct Foundation**, (p. 28).

STEP 6. DETERMINE GROUND ANCHOR HOLDING CAPACITY

When using auger-type ground anchors to tie down the home, first, use a torque probe to determine the anchor-holding strength of the soil on the site.

Use a torque probe with a shaft of sufficient length to test the soil at the depth of the



Torque Probe. Before using the torque probe, check with the utility companies for the location of underground cables or pipes to avoid contact with the probe shaft.

anchor helical plate. Augur the probe into the ground, and following the probe manufacturer's instructions, take the torque wrench reading in the area where the anchors will be installed and at the depth of the anchor helix. If the soil varies in consistency across the site, then use the lowest reading. Based on this reading, consult the anchor manufacturer's charts to select the anchor type(s).



What type of support system will this installation use?

- ▶ For pier and ground anchor, go to **Install Footings**, (p. 18)
- ▶ For load-bearing perimeter wall, go to **Construct Foundation**, (p. 28)

Install Footings

This chapter provides instructions for the design and construction of individual footings that transfer the load from a single pier to the ground. A footing and pier together (discussed in **Set the Home**) is referred to as a "support." A footing may also be designed to carry the load of multiple piers (often called "strip" footings). The design of strip footings is not covered in this manual.

Follow the Steps below:

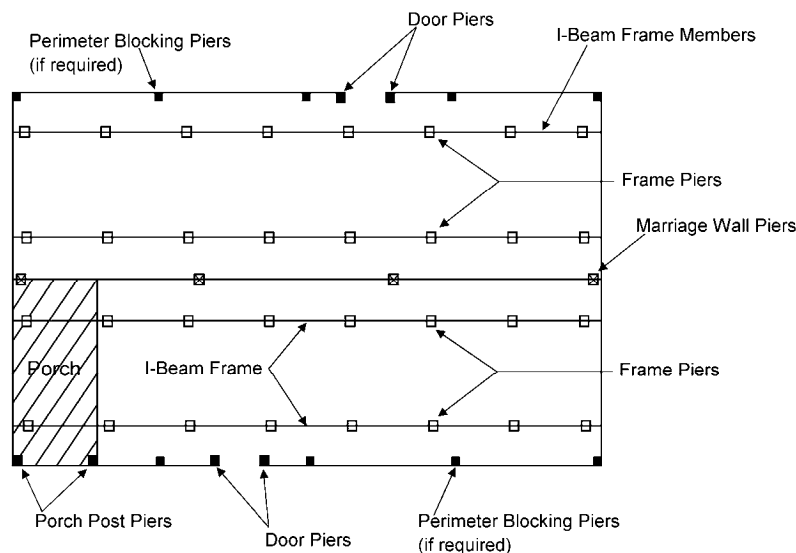
- ▼ **STEP 1. DESIGN POINT LOAD SUPPORTS** (p. 18)
- ▼ **STEP 2. DESIGN FRAME SUPPORTS** (Homes Without Perimeter Blocking) (p. 21)
- ▼ **STEP 3. DESIGN FRAME AND PERIMETER SUPPORTS** (Homes With Perimeter Blocking) (p.22)
- ▼ **STEP 4. SELECT FOOTING MATERIALS** (p. 23)
- ▼ **STEP 5. SIZE FOOTINGS** (p. 23)
- ▼ **STEP 6. INSTALL FOOTINGS** (p. 26)

STEP 1. DESIGN POINT LOAD SUPPORTS

All homes will need supports, and therefore footings, under the frame, marriage line (for multi-section homes), exterior wall openings and other heavy point loads.

The home manufacturer may have provided a blocking diagram (or tags, labels, paint or other markings under the home) indicating the required locations and/or loads for perimeter, marriage line and/or frame supports specifically for this home. If so, the diagram or tags take precedence over the directions provided in this manual.

Create a sketch of the home that includes the exterior walls, the frame I-beams and the marriage line(s), if a multi-section home. The sketch will be used in this chapter to locate each support, and note the size of the corresponding footing. **Figure 7** is an example of such a support plan.



As the location and load for each support is determined, note it on the sketch. When selecting locations for supports, keep in mind that increasing the spacing between supports will increase the load on that support and the size of the required footing.



High roof loads. For roof loads of 40 psf or greater, a registered engineer or registered architect must determine the maximum marriage wall opening permitted without pier or other supports.

Figure 7. Example of support plan

DETERMINE LOCATIONS

Point loads exist where a bearing/structural weight is concentrated and transferred to the foundation at a specific point. Locate a support under each point load, including the following examples:

- Exterior doors on side walls at both sides of each door (blocking is not required at exterior doors on non-bearing end walls).
- Other exterior wall openings four feet and greater at both sides of each opening (including multiple windows that total four feet wide or more without intermediate supports, even if individual windows are less than four feet).
- Marriage line openings four feet or greater at both sides of each opening.
- Locations where through-the-rim crossover ducts penetrate the rim joist at the marriage line and perimeter blocking is required (not required if the home is constructed with a perimeter frame system).
- Marriage line columns.
- Load-bearing porch posts.
- Under heavy (400 lbs or greater) items, such as heavy furniture, waterbeds, fireplaces and large fish tanks.

Mark the required point load support locations on the sketch. Supports are not required where the manufacturer has reinforced the floor (such as with additional outriggers or floor joists) and so noted in the documentation provided with the home. **Figure 8** and **Figure 9** identify typical point load support locations.

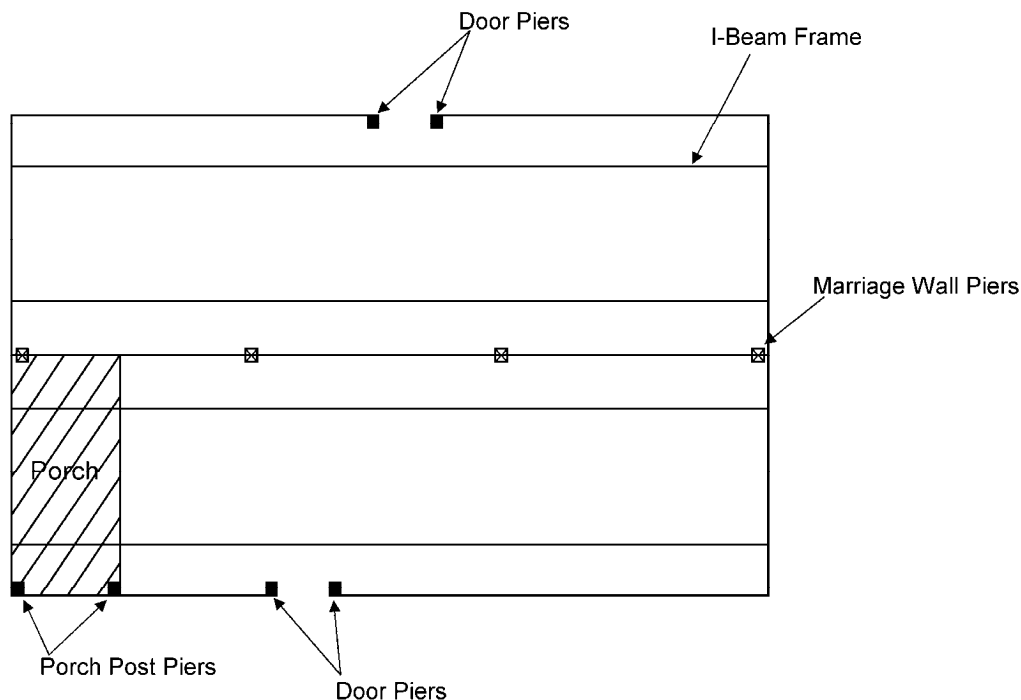


Figure 8. Typical point-load support locations

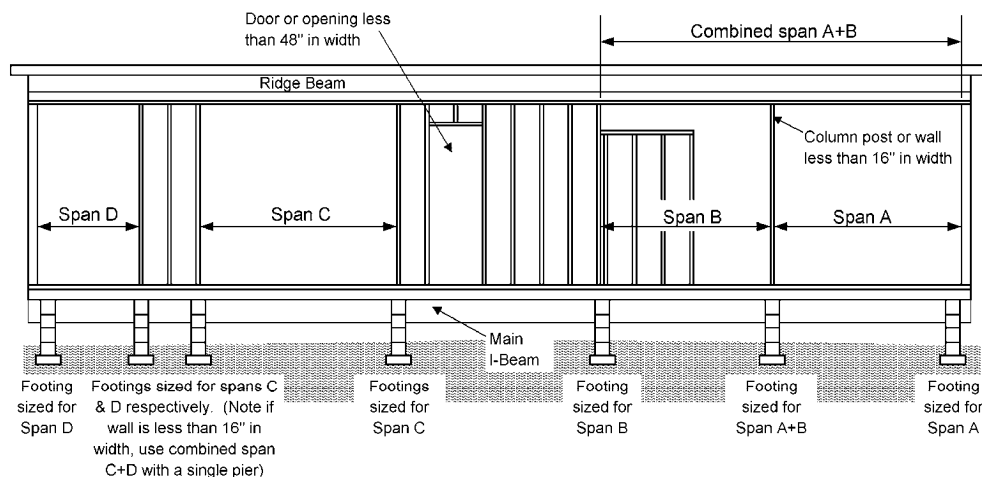


Figure 9. Typical point-load support locations along the marriage line



CALCULATE LOADS

Use **Table 5** to determine the loads on point-load supports. For each support, find the columns with the appropriate roof load zone and section width. Find the row(s) corresponding to the span (see **Figure 9** for guidance on determining spans).

The number in the columns under the "M" and "P" headings are the loads for supports along the marriage line and perimeter respectively (point loads in the center of a section, i.e. not along a marriage line or perimeter wall, require the load in the "P" column). Interpolation for openings between those shown in the table is permitted.

Note the required loads next to each point load support on the sketch.

TABLE 5. LOAD ON POINT-LOAD FOOTINGS

		Roof load zone and maximum section width																	
		South (20 psf)						Middle (30 psf)						North (40 psf)					
		12 ft		14 ft		16 ft		12 ft		14 ft		16 ft		12 ft		14 ft		16 ft	
Location*		M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P	M	P
Span in feet	4	1010	720	1100	770	1200	830	1250	860	1370	930	1500	1000	1490	1000	1640	1090	1800	1180
	8	1720	1130	1900	1240	2100	1350	2200	1410	2440	1560	2700	1700	2670	1690	2970	1870	3300	2050
	12	2430	1550	2700	1710	3000	1880	3140	1960	3500	2180	3900	2400	3850	2380	4300	2650	4800	2930
	16	3140	--	3500	--	3900	--	4090	--	4570	--	5100	--	5040	--	5640	--	6300	--
	20	3850	--	4300	--	4800	--	5040	--	5640	--	6300	--	6220	--	6970	--	7800	--
	24	4560	--	5100	--	5700	--	5980	--	6700	--	7500	--	7400	--	8300	--	9300	--
	28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

M = Marriage line, P = Perimeter

Determine from the data plate and/or other documents if the home requires perimeter blocking.

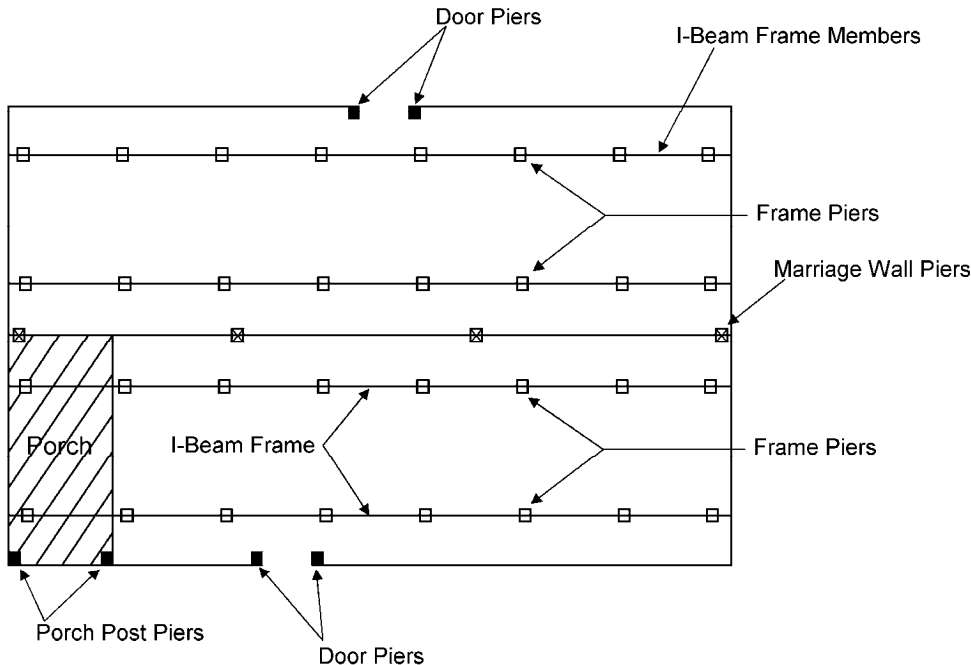
- ▶ If perimeter blocking is NOT required, go to **STEP 2, DESIGN FRAME SUPPORTS** (Homes Without Perimeter Blocking), (p. 21).
- ▶ If perimeter blocking is required, go to **STEP 3, DESIGN FRAME AND PERIMETER SUPPORTS** (Homes With Perimeter Blocking), (p. 21).

STEP 2. DESIGN FRAME SUPPORTS (Homes Without Perimeter Blocking)

DETERMINE LOCATIONS

All homes require regularly spaced supports along all main frame I-beams. Select spacing between supports and sketch them on the support plan. Keep in mind that frame supports under homes with 8" deep I-beams may be no more than eight feet apart. Those under homes with 10" or 12" deep I-beams may be no more than 10 feet apart. Generally, greater distances between supports will require larger footings.

Figure 10 shows typical frame support locations.



CALCULATE LOADS

Use **Table 6** to determine the loads on frame supports. Find the column with the appropriate roof load zone and section width. Find the row corresponding to the selected support spacing. The number in the intersecting cell is the load.

Loads on all frame supports can be assumed to be equal if support spacing is equal. However, if different support spacings are used then each support with a different spacing should be calculated separately.

Note the location and load required of each support on the sketch.

TABLE 6. LOAD ON FRAME SUPPORTS FOR HOMES NOT REQUIRING PERIMETER BLOCKING

		Roof load zone and max. section width								
		South (20 psf)			Middle (30 psf)			North (40 psf)		
		12 ft	14 ft	16 ft	12 ft	14 ft	16 ft	12 ft	14 ft	16 ft
Maximum support spacing	4 ft	2460	2720	3000	2740	3030	3350	3020	3350	3700
	6 ft	3540	3930	4340	3960	4400	4870	4380	4870	5390
	8 ft	4620	5130	5690	5180	5760	6390	5740	6390	7090
	10 ft	5700	6340	7030	6400	7120	7910	7100	7910	8780

▶ go to **STEP 4. SELECT FOOTING MATERIALS** (p. 23)



Spacing frame supports.

There must be a support located near the end of each I-beam such that there is no more than 12 inches of beam past the edge of the support.

Figure 10. Typical support locations for homes not requiring regularly spaced perimeter supports



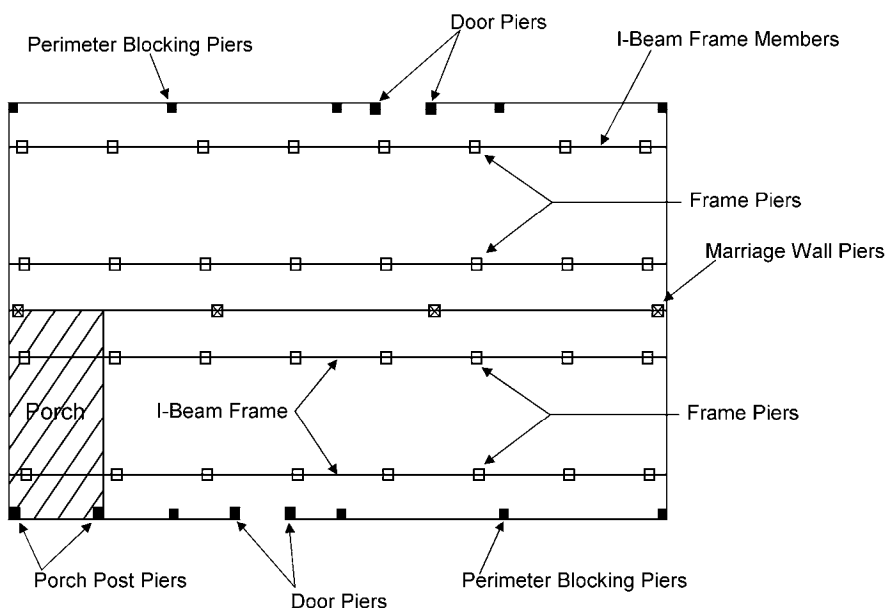
STEP 3. DESIGN FRAME AND PERIMETER SUPPORTS (Homes With Perimeter Blocking)

DETERMINE LOCATIONS

Depending on design and location, some homes require regularly spaced perimeter supports along all of the sidewalls and marriage walls in addition to frame supports. This will be indicated on the data plate and/or documents included with the home.

If required, perimeter supports are only needed on bearing walls. Bearing walls are those walls that support the ends of roof trusses or rafters (typically sidewalls and marriage walls but not end walls of main units or sidewalls of tag units).

To minimize the number of required perimeter supports, space them evenly between point load supports as shown in **Figure 11** and **Figure 12** (but not under spans). These figures identify typical support locations for homes requiring perimeter supports.



Spacing frame supports.

There must be a support located near the end of each I-beam such that there is no more than 12 inches of beam past the edge of the support.

Figure 11. Typical support locations for homes requiring perimeter supports

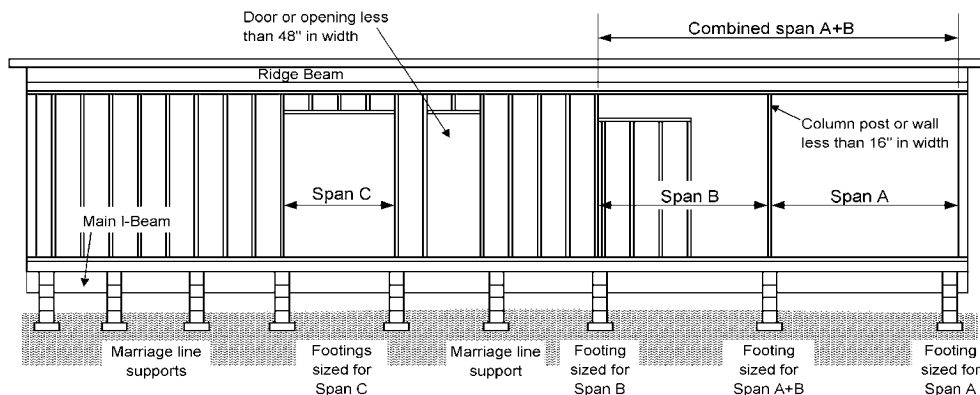


Figure 12. Typical marriage line support locations for homes requiring perimeter supports

CALCULATE LOADS

Use **Table 7** to determine the loads on frame and perimeter supports for homes requiring perimeter blocking. Find the column with the appropriate roof load (**Table 3**) and section width. Find the group of rows corresponding to the selected support spacing. The values in the intersecting cells are the loads for the frame, perimeter, and marriage line supports respectively.

Loads on supports of a given type (frame, perimeter, or marriage) can be assumed to be equal if support spacing is equal. However, if different support spacings are used then each support with a different spacing should be calculated separately.

Note the location and load required of each support on the sketch.



TABLE 7. LOAD ON FRAME AND PERIMETER SUPPORTS FOR HOMES REQUIRING PERIMETER BLOCKING

Maximum spacing	Location	Roof load zone and max. section width								
		South (20 psf)			Middle (30 psf)			North (40 psf)		
		12 ft	14 ft	16 ft	12 ft	14 ft	16 ft	12 ft	14 ft	16 ft
4 ft	Frame	1210	1360	1440	1210	1360	1440	1210	1360	1440
	Perimeter	1530	1660	1850	1810	1970	2200	2090	2290	2550
	Marriage	2460	2720	3110	2940	3270	3730	3410	3810	4350
6 ft	Frame	1660	1890	2010	1660	1890	2010	1660	1890	2010
	Perimeter	2150	2340	2630	2560	2810	3150	3000	3280	3680
	Marriage	3540	3930	4510	4250	4750	5440	4960	5570	6370
8 ft	Frame	2110	2410	2580	2110	2410	2580	2110	2410	2580
	Perimeter	2760	3020	3400	3310	3640	4100	3870	4270	4800
	Marriage	4620	5130	5910	5570	6230	7150	6520	7320	8390
10 ft	Frame	2560	2940	3150	2560	2940	3150	2560	2940	3150
	Perimeter	3370	3690	4180	4070	4480	5050	4760	5260	5930
	Marriage	5700	6340	7310	6890	7710	8860	8070	9070	10410

STEP 4. SELECT FOOTING MATERIAL

Select one of the products and materials from **Table 8** for the footings.

TABLE 8. FOOTING MATERIALS

Material	Appropriate Use	Specification
Poured concrete	All soil types	Minimum 6" thick poured-in-place concrete pads, slabs, or ribbons with at least a 28 day compressive strength of 3,000 psi. Cast-in-place concrete footings may also require reinforcing steel based on acceptable engineering practice, the design loads, and site specific soil conditions.
Pre-cast concrete	All soil types	Minimum 4" thick nominal precast concrete pads meeting or exceeding ASTM C 90-02a, Standard Specification for Load Bearing Concrete Masonry Units, without reinforcement, with at least a 28-day compressive strength of 2,500 psi.
ABS plastic	Stable soils	Use in accordance with the pad manufacturer's instructions. Must be certified for use in the soil classification at the site, listed and labeled for the required load capacity.
Proprietary systems	Consult system manufacturer	Consult system manufacturer.
Pressure-Treated Lumber	Stable soils	Two layers of nominal 2-inch thick wood x 24" maximum length, pressure-treated with a water borne preservative, in accordance with AWPA Standard U1-04 for Use Category 4B ground contact applications. Cut ends of pressure treated lumber must be field treated in accordance with AWPA Standard M4-02.
Pressure-Treated Plywood	Stable soils	Single layer of nominal 3/4 inch thick maximum 16 inch x 16 inch, or two layers of 3/4 inch thick for sizes greater than 16 inch x 16 inch. Rated exposure 1 or exterior sheathing in accordance with PS-1-07 Construction and Industrial Plywood. Pressure-treated in accordance with AWPA Standard U1-04 for Use Category 4B ground-contact applications.



Will footings be concrete?

- ▶ **YES**, go to **STEP 5, SIZE FOOTING**, (p. 24).
- ▶ **NO**, see footing system manufacturer's instructions. For on-grade footings, the ground moisture barrier may be installed now – see **Complete Exterior Work, STEP 2. INSTALL GROUND MOISTURE RETARDER** (p. 96) then go to **Set the Home** (p. 30).

STEP 5. SIZE FOOTINGS

Once the load on the footing and the soil-bearing capacity are known, calculate the size of each footing as follows:

1. From **Table 9** determine if the pier is to be of single-stack blocks (8 inch x16 inch) or double-stack blocks (16 inch x 16 inch) pier.
2. Locate the group of rows in **Table 10** with the soil-bearing capacity determined in **Prepare the Site, STEP 5. DETERMINE SOIL-BEARING CAPACITY AND FROST LINE** (p. 15). Use the next lowest value if the exact value does not appear.
3. Read across the table to determine the minimum required footing area and the minimum footing thickness for the corresponding footing type (single or double-stacked blocks).
4. The required footing size may be changed by selecting another support spacing (**Table 6** or **Table 7**).

TABLE 9. PIER CONFIGURATION

Pier location	Height	Configuration	Maximum load
Frame	Less than 36 in (except corner piers more than 3 blocks high)	Single-stack blocks with long side perpendicular to I-beam	8,000 lbs.
	Between 36 in and 67 in and corner piers over 3 blocks high	Double, interlocked blocks	16,000 lbs.
	Over 67 in	Double, interlocked blocks	16,000 lbs.
Perimeter	54 in or less	Single-stack blocks with long side parallel to perimeter rail (rim joist)	8,000 lbs.
Marriage line	54 in or less	Single-stack blocks with long side perpendicular to the marriage line	8,000 lbs.



Frost protection. When selecting footing materials, bear in mind the need for frost protection. Not all footing materials are suitable for freezing climates.

TABLE 10. FOOTING DIMENSIONS

Soil Bearing Capacity	Minimum Footing Area (sq. in.)	Minimum Footing Dimensions (in)	8 in. x 16 in. pier (single-stack blocks)		16 in. x 16 in. pier (double-stack blocks)	
			Unreinforced cast-in-place min. thickness (in.)	Maximum footing capacity (lbs)	Unreinforced cast-in-place min. thickness (in.)	Maximum footing capacity (lbs)
500	256	16 x 16	4	800	4	800
	512	16 x 32	4	1600	4	1600
	324	18 x 18	4	1010	4	1010
	400	20 x 20	4	1250	4	1250
	576	24 x 24	4	1800	4	1800
	900	30 x 30	4	2810	4	2810
1000	256	16 x 16	4	1680	4	1680
	512	16 x 32	4	3370	4	3370
	324	18 x 18	4	2130	4	2130
	400	20 x 20	4	2630	4	2630
	576	24 x 24	4	3800	4	3800
	900	30 x 30	4	5930	4	5930
1500	256	16 x 16	4	2570	4	2570
	512	16 x 32	4	5150	4	5150
	324	18 x 18	4	3260	4	3260
	400	20 x 20	4	4020	4	4020
	576	24 x 24	4	5800	4	5800
	900	30 x 30	6	8000	6	8910
2000	256	16 x 16	4	3460	4	3460
	512	16 x 32	6	6840	6	6840
	324	18 x 18	4	4380	4	4380
	400	20 x 20	4	5410	4	5410
	576	24 x 24	6	7700	6	7700
	900	30 x 30	6	8000	6	12030
2500	256	16 x 16	4	4350	4	4350
	512	16 x 32	6	8000	6	8620
	324	18 x 18	4	5510	4	5510
	400	20 x 20	4	6800	4	6800
	576	24 x 24	6	8000	6	9700
	900	30 x 30	8	8000	8	15000
3000	256	16 x 16	4	5240	4	5240
	512	16 x 32	6	8000	6	10400
	324	18 x 18	4	6630	4	6630
	400	20 x 20	4	8000	4	8190
	576	24 x 24	6	8000	6	11700
	900	30 x 30	8	8000	8	16000

Note: The capacity values listed have been reduced by the dead load of the concrete footing.

Design footings to comply with the following additional requirements:

- Design each footing at least slightly larger than the base of the pier it supports.
- To keep footings directly under I-beams and other support points, size them slightly larger than the minimum required area to allow slight adjustment of the pier location during home installation.
- Design footings with a footing extension (projection beyond the base of the



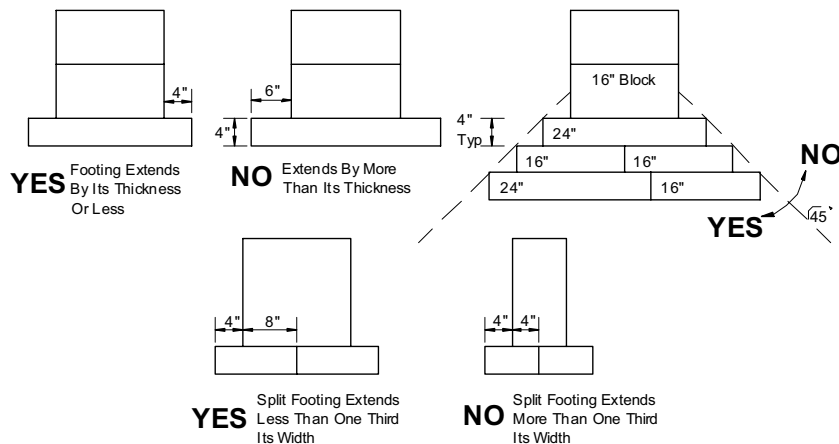


Figure 13. Maximum footing extensions

- The footing sizes shown are for square pads and are based on the surface area (square inches). Design non-square footings such that the area and depth is equal to or greater than the area and depth of the square footing shown in **Table 10**, and the distance from the edge of the pier to the edge of the footing is not more than the thickness of the footing.
- For four-inch thick unreinforced precast concrete footings, use the minimum footing size for the six-inch cast-in-place footing from **Table 10**.

TABLE 10A. FOOTING EQUIVALENTS

Unreinforced Cast-In Place Concrete Size (Inches)	16 x 16 Pre-Cast Concrete Pads	Round Cast-In-Place Concrete (Diameter – Inches)	2x12x24 Treated Lumber Pads
16 x 16	Single	20	Single
20 x 20	Double	24	Double
24 x 24	Quad	28	Triple
30 x 30	Quad	36	—



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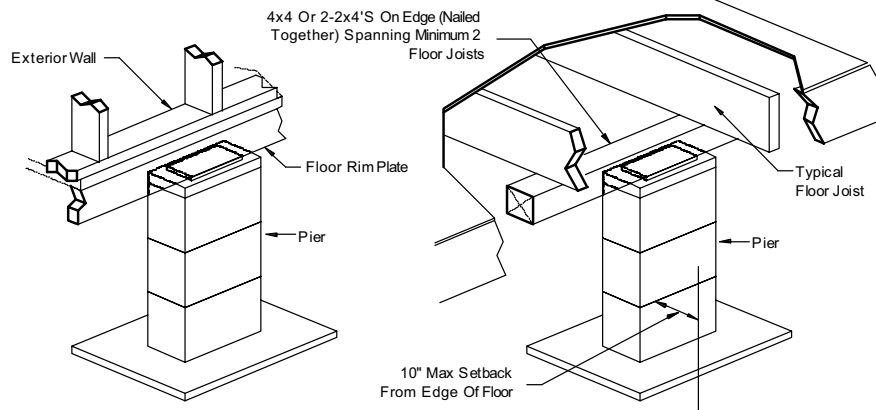
STEP 6. INSTALL FOOTINGS

Construct the footings as follows:

- Maintain the distance between adjacent piers to within 10% of the tabulated spacing and so the average distance between any adjacent spans is equal to or less than the tabulated spacing.
- Whenever possible, place point load supports directly under the required locations. If plumbing, electrical, mechanical equipment interferes, place supports no more than 6 inches in either direction of the support point.
- Recess perimeter blocking supports and perimeter point load supports no more than 10 inches from the edge of the floor with added support as shown in **Figure 14**.



Placing Concrete anchors. If anchors will be placed in concrete, follow instructions in **Install Stabilizing System** (p. 65) to determine anchor layout. Either place anchors immediately after the concrete has been poured or drill them in after the concrete has set.



- If footings are rectangular, orient them so that the long side is perpendicular to the home's I-beam.
- Place the bottom of footings on undisturbed soil or fill compacted to at least 90% of its maximum relative density.
- In freezing climates protect footings from the effects of frost heave in accordance with any LAHJ requirements (see **Prepare the Site**, p. 13). Place the bottom of the footings below the frost line (insulated foundations and monolithic slabs are other frost protection options not covered in this manual).
- Make sure the top surface of the footing is level, flat, and smooth.

In accordance with the American Concrete Institute publication ACI-308, maintain curing measures before construction or installation onto the concrete footing begins, until a minimum of 70% of the specified 28-day compressive strength has been achieved. The ACI recommended time to attain this level of strength is seven days for ASTM C150 Type 1 mixtures and 10 days for Type II mixtures. Full design live and dead loads may not be applied until the 28-day duration has elapsed for achieving full strength.

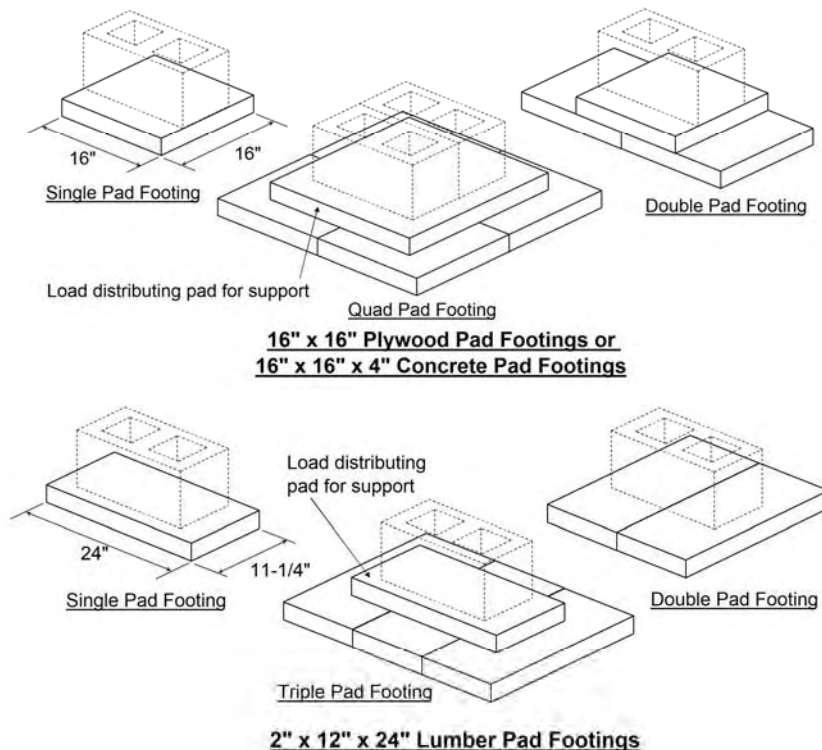


Figure 14. *Perimeter supports*



Excavation. If excavation is required, mark the footing locations on the ground with stakes before beginning to dig.

Figure 14A. *Footing pads.*



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▶ go to **Set the Home** (p. 31)

Construct Foundation

(FOR HOMES WITH LOAD-BEARING PERIMETER WALL)

This chapter provides guidelines and recommendations for the design and construction of a basement or crawlspace foundation using a load-bearing perimeter wall. A load-bearing perimeter wall foundation system uses a wall along the outer edge of the home to support the home's outside walls. This perimeter support works with interior supports such as piers, columns, and cross beams that support the home's frame and, if multi-section, marriage line.

Follow the Steps below:

- ▼ **STEP 1. OBTAIN A FOUNDATION DESIGN** (p. 28)
- ▼ **STEP 2. EXCAVATE** (p. 28)
- ▼ **STEP 3. CONSTRUCT THE FOOTING OR SLAB** (p. 28)
- ▼ **STEP 4. CONSTRUCT THE PERIMETER WALL** (p. 28)
- ▼ **STEP 5. INSTALL INTERIOR SUPPORTS** (p. 29)
- ▼ **STEP 6. WATERPROOF FOUNDATION WALL** (p. 29)
- ▼ **STEP 7. BACKFILL AND GRADE** (p. 29)

STEP 1. OBTAIN A FOUNDATION DESIGN

If a load-bearing perimeter wall foundation design has not been provided by the home manufacturer, it is the responsibility of the retailer and/or home owner to provide a design approved by an engineer or architect, licensed in the state where the home will be installed. The approved design must comply with the LAHJ regulations for foundation design, waterproofing, and drainage, and the following:

- The foundation perimeter bearing wall must be supported with a concrete slab or continuous strip footing around the perimeter of the home. Interior piers must be supported by a slab or footings. If footings are used under interior piers, they may be designed as in **Prepare Footings**, p. 18.
- Slabs must extend to the edges of the home.
- Footings and slabs must be protected from the effects of frost heave by extending the footings to or below the frost line or by using a frost protected shallow foundation design.

STEP 2. EXCAVATE

Excavate for the foundation, properly disposing of the earth that is not needed for backfill or site-grading purposes.

STEP 3. CONSTRUCT THE FOOTINGS OR SLAB

Construct the foundation according to the approved design, including the perimeter foundation wall, drainage system, footing(s), and/or slab.

STEP 4. CONSTRUCT THE PERIMETER WALL

Unless the approved design requires otherwise, construct the perimeter wall with mortared and reinforced concrete blocks or reinforced poured-in-place concrete. Install reinforcement according to the approved design or LAHJ. Install ventilation and access openings according to the approved design, or if not specified, according to the requirements in **Complete Under the Home, STEP 3 INSTALL SKIRTING** (p. 97).

When constructing pockets for an H-beam system, measure the beam depth and locate the pockets carefully. It is critical that when the home's frame rests on top of the H-beam, the perimeter of the floor rests squarely on the foundation wall sill plate



Using engineered designs.

This section is NOT intended to provide a complete design for a buildable foundation. A complete design must be obtained that is suitable for the local area and sealed by a professional engineer or registered architect, licensed in the state.

Foundation ready home.

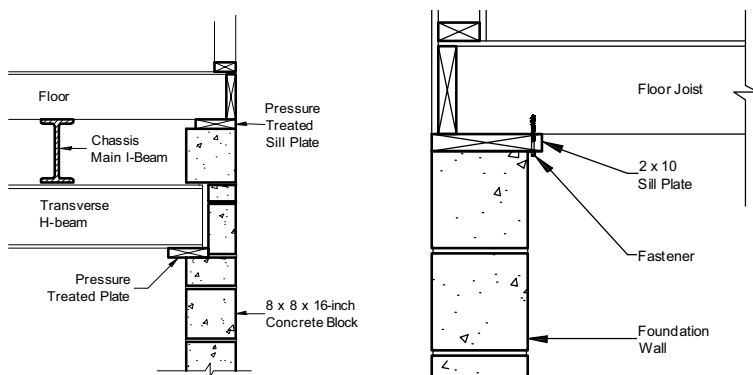
Make sure that homes to be installed on a basement or a crawlspace have been ordered with a recessed frame or as foundation-ready, where the frame is designed to avoid interference with the foundation wall.

Checking the water table.

For basements, check for a high water table. The water table may vary seasonally or based on weather conditions. A geologist can perform an algae test to determine the water table level. The foundation de-

(**Figure 15**). Leave room for a two-inch nominal, pressure treated wood spacer on top of the wall pockets (to prevent corrosion, the steel beams must not be in direct contact with concrete). Leave at least one inch for thermal expansion at the ends of the beams and maintain a minimum of two inches of bearing area for the beams in the pockets (yielding a minimum pocket depth of three inches).

Bolt a pressure treated wood sill plate (minimum 2 x 6) to the top of the foundation wall. If the home's siding cannot be nailed through, use a 2 x 10 sill plate that extends into the foundation 1-1/4 inches (**Figure 16**). The home can then be connected to the foundation by fastening the sill plate into the floor joists from below. Connect the home to the foundation according to the approved design. Recess nuts into the sill plate and cut off the ends of bolts so they do not project above the sill plate and interfere with the placement of the home.



sign must account for a high water table.

Level the wall. Make sure the foundation is level and straight with no more than a 1/4 inch vertical variation over the entire foundation and no more than 1/8 inch vertical variation over any two-foot length.

Check for Plates. When using an H-beam system, check and compensate for reinforcement plates that add thickness to the chassis beam at axle locations.

Figure 15. H-beam installation

Figure 16. Connection using 2 x 10 sill plate



Limits of excavation. When a crane will be used, excavate no more than two feet outside the foundation perimeter. Unexcavated ground will provide a more stable base for the crane.

Footing heights. Pour footings to a height that will reduce the need to cut blocks or shim when building perimeter walls and piers.



Backfilling. Backfill against basement walls only after the home is connected to the foundation or the basement walls may deflect inward or collapse.

STEP 5. INSTALL INTERIOR SUPPORTS

Install piers, columns and H-beams to support the interior of the home according to the approved design.

STEP 6. DAMP PROOF FOUNDATION WALL

Damp proof the foundation wall no less than up to the height of the planned backfill.

Is this a basement foundation?

- ▶ **YES**, go to **Set the Home**, (p. 30).
- ▶ **NO**, go to **STEP 7. BACKFILL AND GRADE**, (p. 29)

STEP 7. BACKFILL AND GRADE

Backfill against the foundation wall to the height of the damp proofing. Take care to not damage the drainage system. Grade the fill as per **Prepare the Site** (p. 13).

Does the approved foundation design call for ground anchors?

- ▶ **YES**, go to **Install Stabilizing Systems**, (p. 65).
- ▶ **NO**, go to **Set the Home**, (p. 30).

Set the Home

This chapter describes the process of installing the first section of the home (for single section homes this is the only section) onto the foundation.

Follow the Steps below:

- ▼ **STEP 1. PREPARE FOR SET** (p. 30)
- ▼ **STEP 2. POSITION HOME SECTION** (p. 30)
- ▼ **STEP 3. LIFT HOME** (p. 30)
- ▼ **STEP 4. CONSTRUCT PIERS** (p. 32)

STEP 1. PREPARE FOR SET

Before beginning the home set, complete the following:

- Confirm that the site is properly cleared and graded (see **Prepare the Site**, p. 13).
- Ensure that the footings are in place and properly located.
- Install any utilities that will be difficult to install (e.g. those below grade beneath the home) after the home is in place.
- Secure or remove from the home and properly store all ship loose items (refer to shipping documents for items shipped with the home).
- Inspect the home interior, exterior and all provided materials, appliances, and equipment. Immediately report any damage or shortages to the manufacturer.
- The ground moisture retarder may be installed now or after the home is complete. See **Complete Exterior Work, STEP 2. INSTALL GROUND MOISTURE RETARDER** (p. 96) for requirement and then return here.

For perimeter bearing wall foundations:

- Check that the length and width of the home match with the foundation walls.
- Check that the two main diagonal measurements of the foundation are equal.
- Check that the foundation walls and other support points are within 1/4 inch of level overall and within 1/8 inch of level within any four foot distance.
- For multi-section homes, check that each pair of diagonal measurements for each portion of the foundation corresponding to a home section are equal.
- For multi-section homes, find the electrical bonding lugs on the front or rear outriggers. Reverse them to the inside of the outrigger using star washers so they will be accessible after the home is placed on the foundation walls.
- If using an H-beam system, remove the frame's shackle hanger if it will interfere with proper placement of the beam.

STEP 2. POSITION HOME SECTION

Position the home section in its final location (if possible, move the heaviest section of the home into place first). Then place materials needed to construct support piers near their final locations under the home as determined in **Prepare Footings**, (p. 18).

STEP 3. LIFT HOME

There are three primary methods available to place the home on the foundation: jacking, rolling and craning. Jacks, often with roller systems, are typically used for pier and anchor foundations; roller systems are commonly used for crawlspace foundations with load-bearing perimeter walls; and cranes are most commonly used for basement foundations.



Clearances under the

home. After the home is leveled, the resulting distance between the bottom of the entire chassis main frame beam and the ground must be no less than 12 inches.

Utilize proper cribbing.

Manufactured homes weigh several tons. No one should be under the home (whether it is moving or stationary) unless proper cribbing is in place (**Figure 17**). Failure to utilize proper cribbing may result in serious injury or death.



Leveling during

jacking. Keep the home's floor as level as possible during jacking. Twisting or warping the floor can damage the structure and finishing. Use as many jacks as necessary to keep the floor flat and level.

JACKS

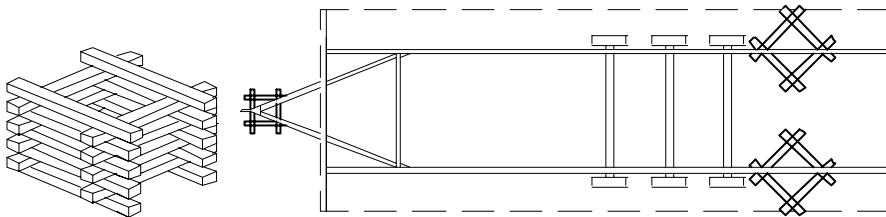
If jacks are to be used, comply with all jacking safety precautions and the procedure below. Lifting the home with jacks involves potential risks and must be done with utmost care and caution. Failure to follow jacking warnings and procedures may result in serious injury or death. Please read the Jacking Safety Precautions before lifting the home with jacks.

JACKING SAFETY PRECAUTIONS

- No one should be under the home's I-beams while the jacks are being operated or while the home is supported only on the jacks.
- Use jacks only for raising the home. Do not rely on the jacks to support the home.
- If possible, raise the home only on one side so that the other side is in contact with the ground. Leave the hitch connected to the vehicle or other stabilizing equipment.
- Obey all OSHA regulations.
- Make sure adequate safety cribbing (**Figure 17**) is in place whenever the home is placed on jacks.
- Use a minimum of two commercial quality jacks, each with a rating of at least 12 tons.
- Jack only on the main chassis I-beam, centering jacks directly under the beam.
- Do not jack on a seam (joint between flanges of twin I-beams).
- To distribute the concentrated loads from jacks to I-beam, place a minimum 3/8-inch thick steel plate, a C-channel, a 1½-inch thick hardwood block or a commercial jacking plate, between the main chassis I-beam and the jack head.
- Locate the jack base on firm ground. Never jack on freshly disturbed soil or where an underground sewer pipe may be located.
- Use a firm support under the jack base to prevent tipping or settling of the jack. A minimum 16" x 16" or larger wood or rigid fiberglass pad is recommended. Never use concrete blocks as a support for a jack.

Follow the jacking sequence outlined below to avoid overstressing structural members:

1. **Block wheels.** Block the wheels so the house does not roll.
2. **Install cribbing.** Install safety cribbing (**Figure 17**).



3. **Level lengthwise.** Locate one jack at the hitch and level the section lengthwise (such that the front and rear of the section are at the same height).
4. **Locate frame jacks.** Place a minimum of one jack just forward of the first spring hanger and another just behind the last spring hanger of the I-beam on the side of the home that is lowest (making sure not to place jacks where the piers will go). Place jacks no more than 20 feet apart and no more than 20 feet from each end of the I-beam.
5. **Lift the home.** Operating the jacks simultaneously (or sequentially in very small increments), lift the home section until it is slightly higher than the final desired pier height.

ROLLER SYSTEMS

When using a roller system, comply with the equipment manufacturer's directions and the following sequence:



Figure 17. Stack 4" x 6" by 5' long timbers as shown to form safety timbers. Place safety timbers under home behind axle area and under hitch.

1. **Establish staging area.** Establish a staging area directly adjacent to one or both sides of the foundation.
2. **Setup rollers.** Set up the roller system according to the equipment manufacturer's directions.
3. **Fasten bump blocks.** Temporarily fasten wooden bump blocks on the sill plates at the ends of the foundation to stop the home from rolling at the desired location.
4. **Roll home.** Roll the home into place over the foundation.
5. **Remove bump blocks.** Remove the blocks before installing the next section of a multi-section home.

CRANES

When using a crane, follow these guidelines:

- Position the home section(s) and crane (taking the boom reach into consideration) such that they do not have to be repositioned during the set.
- Use enough properly sized straps to maintain balance of the home and to prevent damage to the structure.
- Place straps under walls or posts, including temporary posts used to support the opening. Do not position lifting straps under marriage wall openings.
- Use a properly sized spreader bar to maintain a vertical lift, to avoid placing compression forces on the eaves and to reduce any tendency to slip.
- Connect a rope to at least one point on the home so it can be controlled while aloft.
- Make provisions to retrieve the straps/cables after the home is set. If using a cradle system, notch the sill plate where the straps will fall. For a sling system, notch and reinforce the home's rim joist to keep the strap from slipping and allow the strap to be removed after the home is set.
- Always set the home section farthest from the crane first so that subsequent section(s) need not be lifted over previously set sections.

Have the interior foundation supports already been designed and installed as part of an approved load-bearing perimeter wall foundation?

- ▶ **YES**, go to **Complete Multi-Section Set**, (p. 36) or go to **Connect Utilities**, (p. 77) for single section homes.
- ▶ **NO**, go to **STEP 4. CONSTRUCT PIERS**, (p. 32).

STEP 4. CONSTRUCT PIERS

For the side of the home section that is up on jacks, place piers on footings or pads following the home manufacturer's blocking plan (or tags). If no plan was provided, use the support plan developed in **Install Footings** (p. 18). Start at one end of the home section and work toward the other noting the required pier material specifications and procedure described below.

Construct piers so as to provide a stable foundation for the home using materials listed in the specifications box below and based on the location of the pier and its height as measured from the top of the footing or pad to the top of the cap. See **Table 12** for pier construction requirements.



Designing piers. Incorrect size, location or spacing of piers may result in serious structural damage to the home. Install piers at all required locations. Failure to do so may lead to sagging floors, walls, and roofs, and could void the home's warranty.

TABLE 11. PIER MATERIAL MINIMUM SPECIFICATIONS

Component	Specification
Concrete Block	Nominal dimensions of at least 8" x 8" x 16"; minimum load 8,000 lbs; confirming to ASTM designation C90, grade N.
Caps	Solid masonry (nominal 4" x 8" x 16" pre-cast concrete without reinforcement); pressure treated lumber (nominal 2" x 8" x 16"); or steel (minimum 1/2" thick, corrosion protected by a min. of a 10 mil coating of an exterior paint or equivalent).
Spacers	Nominal 2" thick boards.
Shims (also called wedges)	Hardwood, minimum 4" width by minimum 6" length by maximum 1" thick (nominal); plastic must be listed with maximum load capacity; used in pairs.
Commercial metal or pre-cast concrete piers	Available in various sizes stamped with maximum load capacity and listed or labeled for the required vertical load capacity, and where required by design, for the appropriate horizontal load capacity. Metal or other manufactured piers must be provided with protection against weather deterioration and corrosion at least equivalent to that provided by a coating of zinc on steel of .30 oz per sq. ft of surface coated.
Pressure treated wood	With a water borne preservative, in accordance with AWP A Standard U1-04 for Use Category 4B ground contact applications.

TABLE 12. PIER CONSTRUCTION

Pier location	Height	Configuration	Maximum offset top to bottom	Maximum load	Mortar and reinforcement
Frame	Less than 36 in (except corner piers more than 3 blocks high)	Single-stack blocks with long side perpendicular to I-beam	1/2"	8,000 lbs.	Not required
	Between 36 in and 67 in and corner piers over 3 blocks high	Double, interlocked blocks	1" (1/2" up to 36" high)	16,000 lbs.	Not required
	Over 67 in	Designed by a registered engineer or registered architect			
Perimeter	54 in or less*	Single-stack blocks with long side parallel to perimeter rail (rim joist)	1/2" up to 36" high, 1" over 36" high	8,000 lbs.	Not required
Marriage line	54 in or less*	Single-stack blocks with long side perpendicular to the marriage line	1/2" up to 36" high, 1" over 36" high	8,000 lbs.	Not required

* Construct perimeter and marriage line piers over 54 inches according to the requirements for frame piers of the same height.

- 1. Prepare footing surface.** Make sure the footing surface upon which the pier sits is flat and smooth. Before placing the pier on the footing, clean dirt, rocks, or other material off the surface of the footing. For cast-in-place concrete footings, if the footing surface is uneven, create a level, flat surface by placing a treated board on the footing and mortaring on the first block (or manufactured pier base), or by placing the first block (or manufactured pier base) on a layer of premix dry sand mortar.
- 2. Stack blocks.** Stack concrete blocks with their hollow cells aligned vertically. When piers are constructed of blocks stacked side-by-side, orient each layer at right angles to the previous one (**Figure 18**) and plan blocks so that split caps will be perpendicular to the blocks they rest on and to the I-beam.

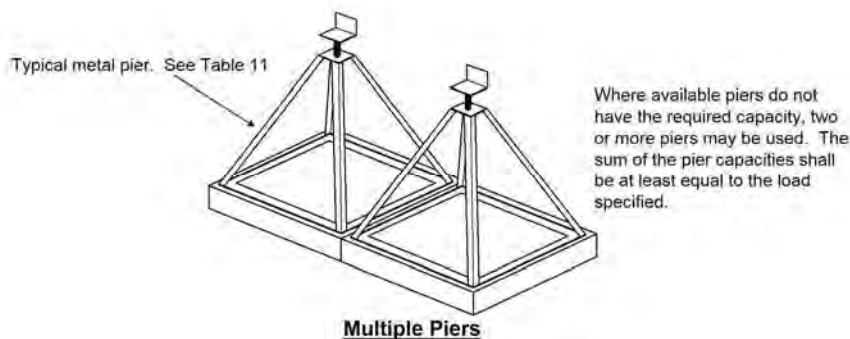
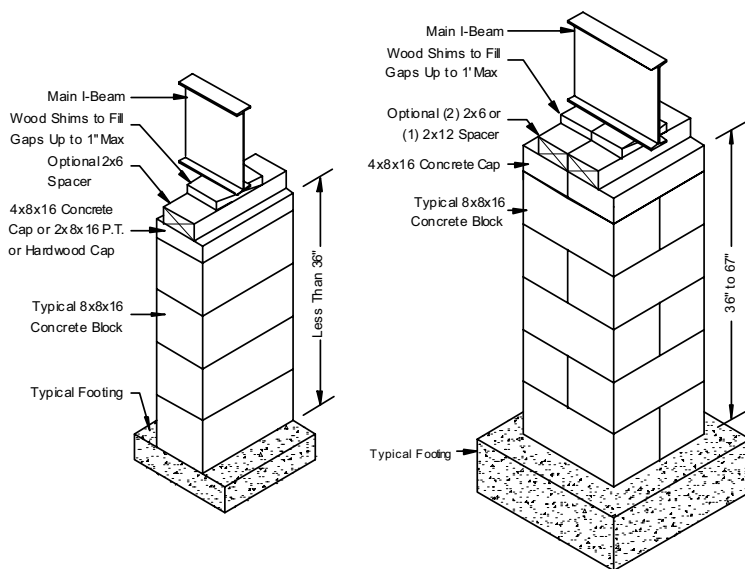
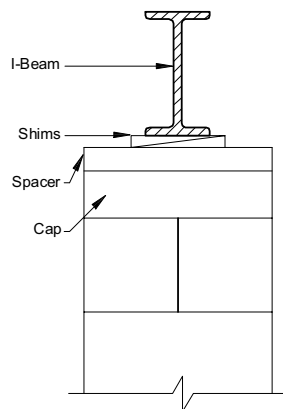


Figure 17A. Multiple Piers.



3. **Cap piers.** Place a cap on hollow block piers to evenly distribute the structural load. Use caps the same length and width as the piers they rest upon. When using split caps on double-stacked block piers, install the caps with the long dimension perpendicular to the joint in the blocks below and to the main I-beam.
4. **Install shims.** Use shims to level the home and fill any gaps between the base of the I-beam and the top of the pier cap. Always use shims in pairs (**Figure 19**). Drive them in tightly so they do not occupy more than one inch of vertical space. When the space to be shimmed is greater than one inch and less than the minimum thickness of available caps or concrete blocks, use hardwood dimensional lumber (two inches maximum thickness) or 2" or 4" thick concrete block. For split caps, install shims and dimensional lumber/blocks over each individual cap.



5. **Set up level.** Set up a water level with the fluid level at the desired height of the main piers. Carefully lower the side of the section down onto the leveled piers, adjusting the final height with shims.

USING A WATER LEVEL

A water level is a standard device for leveling the home. The level consists of the following components:

- One container (five gallon bucket or one gallon jug).
- 150 feet of 1/2 inch diameter plastic tubing.

Figure 18. Frame pier construction



Curing time of mortar.

Where wet mortar is used to construct or level piers, allow it to cure to at least 80% of strength capacity (usually requiring 96 hours) before setting the home.

Figure 19. Correct shim placement



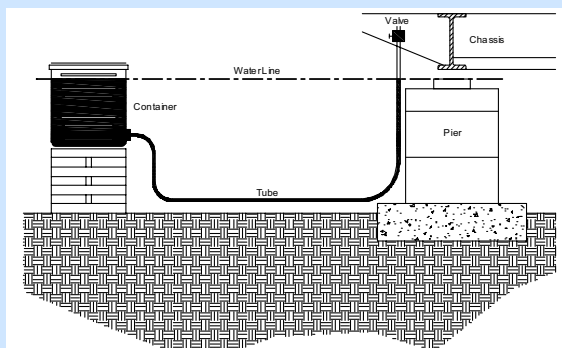
Dimensions of masonry perimeter walls.

If using a masonry perimeter enclosure, calculate pier heights so that the enclosure can be built using standard unit dimensions (without cutting).



Level the home. The home is adequately leveled if there is

- Fittings for container to tubing.
- Valve for terminal end of tubing.
- Liquid for system: colored water in warm climates, windshield washing fluid in cold climates.



How to use a water level

- Position level.** Position the level such that it can reach all piers.
 - Place container.** Place the container so that the fluid in the container is at the same level as the desired level of the top of the supports under the home, allowing for any bracing below the level of the I-beams.
 - Uncoil tubing.** Uncoil the tubing and fill with fluid, taking care not to introduce bubbles into the hose. Never allow anything to crimp or crush the tubing so as to impede the free flow of fluid.
 - Bleed air.** Hold the valve below the level of the water container; open the valve to bleed out any air and close the valve.
 - Establish height.** Locate the tubing adjacent to a pier that is set to the desired final height. Position the valve above the pier and open the valve. Move the water container up or down to where the water level is at the desired final height of the pier. Maintain the water container in that position and close the valve.
 - Level piers.** Move the tubing to the next pier. Hold the valve above the pier and open it. Set the pier height to the level of the water in the tubing and close the valve. Repeat this step until all piers are at the same level.
- Complete the opposite side.** Jack the other side of the section up and install piers following the instructions above. At the completion of this step, the section should be level from front to rear and from side to side.
 - Install perimeter and marriage line piers.** Install perimeter piers and for multi-section homes, marriage line piers. Position marriage line piers to provide equal bearing for both mating sections.
 - Remove running gear.** Remove and store, recycle or properly dispose of the hitch, axles, and wheels. These items are the property of the homeowner unless other contractual arrangements have been made.

Is this a single-section home?

- ▶ **YES**, go to **Connect Utilities**, (p. 77).
- ▶ **NO**, go to **Complete Multi-Section Set**, (p. 36).

no more than 1/4 inch difference between adjacent pier supports (frame or perimeter) and the exterior doors and windows of the home do not bind and can be properly operated.

Water level operation. To operate the water level properly, both ends of the system must be open to the atmosphere and there must be approximately the same amount of fluid in the tubing at all times (within a few inches).

Complete Multi-Section Set

This chapter covers the preparation and installation of additional home sections, including the structural connections between units, raising and fastening hinged roofs, and fastening the home to a load-bearing perimeter wall foundation.

Follow the Steps below:

- ▼ **STEP 1. INSTALL MARRIAGE LINE ANCHORS** (p. 36)
- ▼ **STEP 2. REMOVE PROTECTIVE SHIPPING MATERIALS** (p. 36)
- ▼ **STEP 3. COMPLETE HINGED ROOF** (p. 36)
- ▼ **STEP 4. CHECK MARRIAGE LINE GASKET** (p. 37)
- ▼ **STEP 5. POSITION ADDITIONAL HOME SECTIONS** (p. 38)
- ▼ **STEP 6. CONNECT FLOORS** (p. 39)
- ▼ **STEP 7. CONNECT ROOF** (p. 41)
- ▼ **STEP 8. CONNECT WALLS** (p. 43)
- ▼ **STEP 9. ATTACH TAG UNITS** (p. 45)
- ▼ **STEP 10. REMOVE TEMPORARY ITEMS** (p. 46)
- ▼ **STEP 11. FASTEN HOME TO FOUNDATION** (p. 46)
- ▼ **STEP 12. BACKFILL AND GRADE** (p. 46)
- ▼ **STEP 13. BUILD STAIRS** (p. 46)

STEP 1. INSTALL MARRIAGE LINE ANCHORS

If the home is in Wind Zone II or III, install ground anchors along the marriage line now; before mating sections are joined see **Install Stabilizing System** (p. 65). After installing marriage line anchors return to this point in **Complete Multi-Section Set**.

STEP 2. REMOVE PROTECTIVE SHIPPING MATERIALS

Remove all shipping protection and associated fasteners from both home sections to be joined, including plastic used to close up the open sides during transportation. Do not remove the temporary supports holding up the ceilings at major openings.

STEP 3. COMPLETE HINGED ROOF

If the home has a hinged roof that has been folded down for shipping, raise the roof using a crane or roof jacks following the procedure below:

1. **Position lift points.** Position the roof lift points (jacks or crane lift points) following the jack manufacturer or crane operator instructions. Space roof lift points equally along the length of the roof with no more than five feet from the end of the roof to the first or last lift points. Use three lift points for a roof up to 48 feet long (excluding overhangs), four lift points for up to 60 feet, and five lift points for up to 72 feet.
2. **Remove fasteners.** Remove any temporary fasteners connecting the hinged portion of the roof to the vertical king posts.
3. **Lift roof.** Raise the roof to its intended height. A temporary slight overexten-



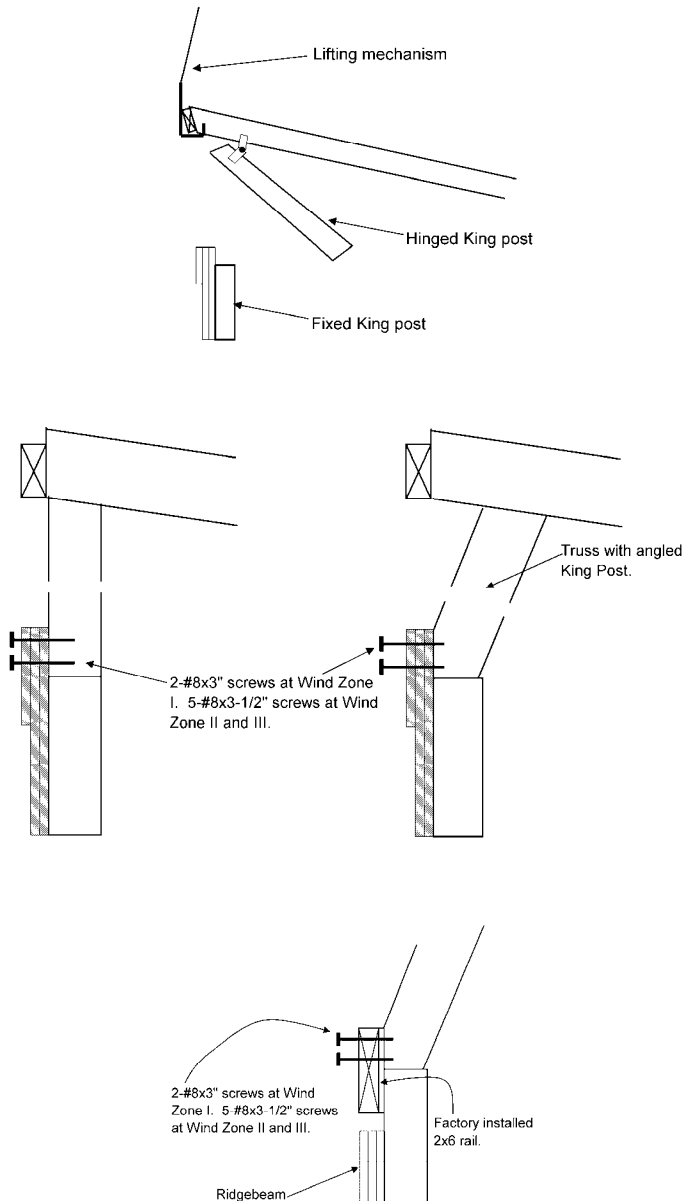
Position roof jacks. Position jacks vertically to prevent the jack foot from kicking out or sliding.

Caution during roof raising. Do not enter the roof cavity during the raising procedure.

Checklists for alternate construction. If the serial number (see the data plate or the chassis front cross member) has the letters "AC" before or after it, then the Alternate Construction on-site check list supplied with the home must be completed and returned to the home manufacturer in a timely manner. If the AC

sion may be required during lifting. However, take care not to overextend the roof and damage the hinge. Raise the roof evenly in small increments, keeping it level throughout the entire process to prevent racking. Do not allow roofing paper and shingles to get caught in the hinge crease. (**Figure 20**)

4. **Secure king posts.** Secure the moveable portion of the king post to the ridgebeam by driving two (2) #8x3" wood screws through the beam and into the hinged king post (at Wind Zone I). Use five (5) #8x3-1/2" screws at Wind Zone II or III. (**Figure 21** and **Figure 22**).



5. **Redistribute Insulation.** Before closing up the attic space check that the insulation has not shifted. Re-level the insulation if needed.
6. **Install gable walls.** Assembled frames or wall studs and sheathing needed for the site assembly of the gable end walls may be provided. Install the gable end walls for each home section as follows **Figure 23**. *End wall completion:*
 - **Studs:** Install studs 16 inches o.c. with 3-12d nails or 4-15Ga.x7/16"x2-1/2" staples, and;
 - **Sheathing:** Install 3/8" min OSB sheathing with 8d nails or 16Ga. x 7/16" x 1-1/2" staples 6" o.c.

checklist relates to the roof, then failure to do so may require future disassembly of the roof and further inspections.

Figure 20. Typical roof lifting arrangement.

The final position of the truss is shown on the truss detail included with this manual.

Figure 21. Ridge beam to hinged king post fastening

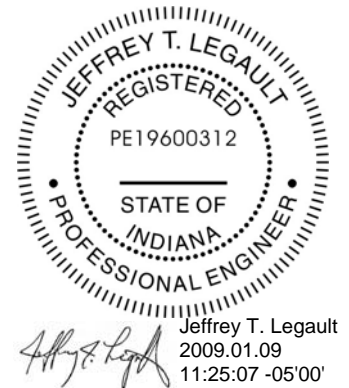
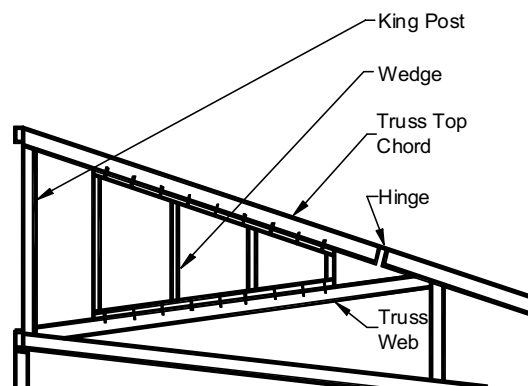
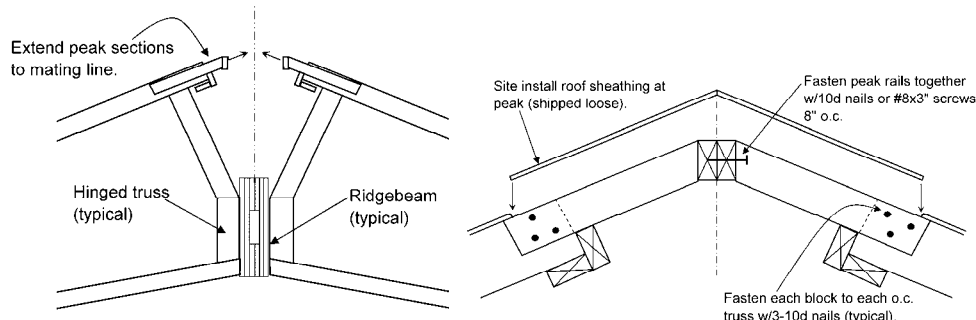


Figure 22. Alternate ridge beam to king post fastening



7. **Install vents.** Extend plumbing vents, exhaust fans, appliance vents, and fire-place stacks through the hinged portion of the roof in strict accordance with this manual (**Prepare Appliances and Equipment**, p. 86) and/or supplemental instructions provided by the home manufacturer.
8. **Roof Close-up.** A paper spacer has been placed between the two courses of shingles at the hinge to prevent premature sealing of the upper course. Remove this paper and fasten the upper course in place as shown on the shingle installation instructions. Repeat procedure on other half of home. The units should now be joined together. The fastening of the ridgebeam halves together as specified in this manual can be accomplished either by reaching down from the roof opening at the ridge or by moving along inside the roof cavity. Care should be taken not to damage the ceiling during this operation.
9. **Ridge Assembly.** Some models will require the framing of the peak area of the home to be completed on site. Extend peak close off frame from each half until they meet at the mating line. (**Figure 24**) Fasten each peak frame block to each truss top chord w/3-10d nails. Fasten the peak rails together w/10d nails 8" o.c. or w/#8x3" screws 8" o.c. Attach the roof sheathing at the peak to the blocking w/15Ga.x7/16"x1-1/2" staples or 8d nails 4" o.c. There is not a removable piece of roof decking at the peak (for ridgebeam access with this type of construction). Install roof felt and remaining shingles to complete the peak close-off.



STEP 4. CHECK MARRIAGE LINE GASKET

A continuous, non-porous gasket creating a permanent air barrier must be installed on at least one side of the marriage line; along the floor, end walls and ceiling (and marriage lines for any tag units). Skyline Corp. has installed this gasket in the factory. Inspect the gasket and repair any gaps or tears.

If not installed at the factory, install a continuous gasket between the home sections along the floor, end walls, and ceiling (**Figure 25**).

For homes with through-the-rim crossover ducts (see **Crossover Connections**, p. 52) inspect and if necessary, repair gaskets around the rim joist duct openings using 3/4-inch thick fiberglass duct board or other material acceptable to the manufacturer. Ensure that duct openings are unobstructed.

Figure 23. End wall completion

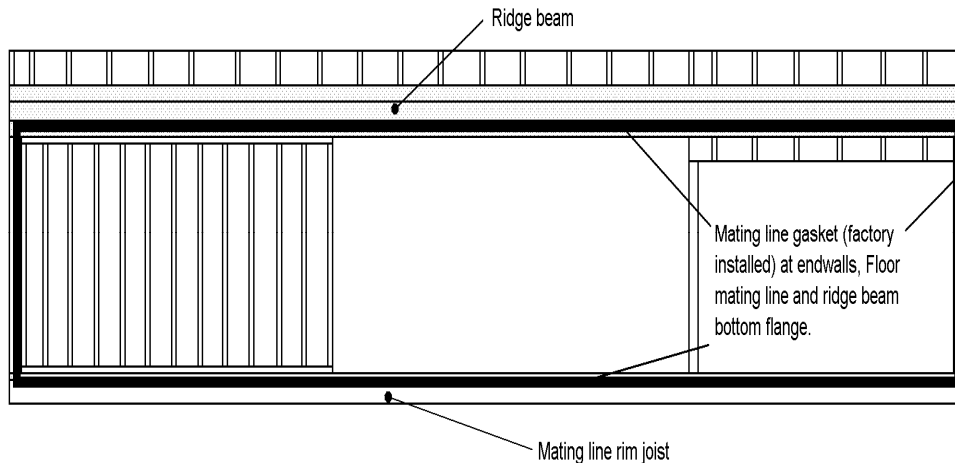


Inspecting vents. Fuel fired heating appliance and fire-place vents that pass through a hinged roof must be completed and inspected at the site prior to energizing the appliance or occupying the home. Failure to comply with this precaution may result in serious injury or death. Venting systems must be installed in conformance with the appliance manufacturer's instructions and any instructions supplied with the home.

Figure 24. Ridge Assembly



Checking through-the-rim-ducts. Ensure that through-the-rim-duct connections are secure and tight after the home sections are together.



**Figure 25. Mating Line Gas-
ket**

STEP 5. POSITION ADDITIONAL HOME SECTIONS

Follow this procedure to install additional home sections:

1. **Remove obstructions.** Remove protruding nails and staples or anything else that will keep the home sections from fitting together snugly. If present, cut the temporary ceiling and floor plates at the edges of marriage line openings taking care not to damage ceiling or floor coverings or displace temporary marriage line support posts (these supports and the plates will be removed after the home sections have been structurally connected).
2. **Complete crossovers.** Before moving the two sections together, complete any crossover connections that require access from the open marriage line, including the attic duct connection (if present) and marriage wall interior electrical connections (see **Connect Crossovers**, p.52).
3. **Position section.** Position the section as closely as possible (ideally within six inches) and line up with the previously set section. If using a mechanical positioning system or crane, follow the system manufacturer's instructions or the crane operator's directions.
4. **Construct piers.** With the outside walls of the home aligned, construct the piers for the home section according to the instructions in **Set the Home** (p. 30) before continuing to the steps below.
5. **Level section.** Lower the section onto the outside piers first, inside piers last. Before releasing the mechanical positioning system, check interior doorways and other openings for misalignments that may cause problems during trim-out. The floors should be flush, level, and tight and the roof section should have little, if any, gap at the top of the marriage line. Use at least two come-alongs to pull the sections snugly together and use the water level or other leveling device to set all piers and shims.
6. **Shim gaps.** Shim any gaps up to one inch between structural elements with dimensional lumber. If any gaps exceed one inch, re-position the home to eliminate such gaps.

STEP 6. CONNECT FLOORS

Make floor structural connections according to one of the methods described below.

Method 1: Install fasteners through rim joists

With the home aligned at the floor and supported by its foundation, join the floors as shown in **Figure 26** using the fastener type, size, and spacing indicated on

Table 13. A gap of 1" is allowable. Gaps larger than 1/2" must be filled with plywood or lumber shims.



Mechanical positioning system. For a pier-set home, a mechanical positioning system (such as a roller system) will make the process easier and safer and be less likely to damage the home.

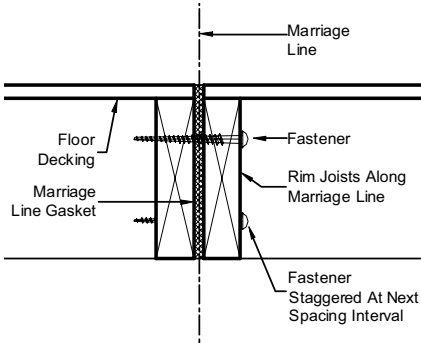


Sealing gaps. Prior to completion of the exterior close-up, gaps that do not exceed one inch are permitted between structural elements provided that the gaps are closed before completion of close-up, the home sections are in contact with each other, and the marriage gasket provides a proper seal.

TABLE 13. FLOOR CONNECTION FASTENING SPECIFICATIONS

Fastener		Spacing		
Type	Size	Wind Zone I	Wind Zone II	Wind Zone III
Lag screw with washer	3/8" x 3"	24 - 36 in.	24 - 36 in.	24 - 36 in.

* Increase fastener lengths by 3 inches for double rim joists.



- Install additional fasteners as indicated below, making sure to repair any openings in the bottom board with tape specially made for that purpose (may be provided).
- Install two additional fasteners at each end of the home at approximately a 45 degree angle (+/- 5 degrees) from horizontal.
 - If the home has a through-the-rim crossover duct, install one additional fastener at each side of the duct opening.
 - After installation of fasteners, repair tears or holes in the bottom board using tape specially made for that purpose.

A+

Patch bottom board.

Use adhesive spray, mastic, and/or divergent staples in combination with bottom board tape for a more secure and durable connection.

Figure 26. Floor connection

STEP 7. CONNECT ROOF

If the marriage line along the roof is not snug, position jacks every 20 feet or less along the outside I-beam and uniformly lift the section until the roof area is tight.

Check to make sure the ceiling joint is flush before installing the connections. If not, use a jack and tee to raise whichever ceiling is low, starting at the front and working to the rear of the home. Fasten the roof along the marriage line using one of the methods below for either double or triple-section homes.

DOUBLE-SECTION HOMES

Make roof structural connections in double-section homes according to the method described below.

Install fasteners through ridge beam

To obtain access into the ceiling cavity, fold back the underlayment paper and remove the 16" wide sheathing panel(s) at the peak. The beam halves may be bolted or lag screwed together. Install bolts or lag screws at 24" o.c. with 6 additional bolts/lags over interior beam supports. (**Figure 27**). Pre-drill 1/4" pilot holes for lag screws at 1-1/2" down from the top of the beam and with a maximum offset from horizontal of 45 degrees. Use fastener sizes as specified in **Table 14**. Stagger fasteners on each side of marriage line. Spacing indicated is on-center, both sides of ridge. Fasteners may be installed from one-side of ridge beam only.

NOTE: (1) When beam support consists of a column instead of Centerline bearing wall, use 6 bolts/lags at 3" o.c. each side of column.
 (2) Beam marked with paint at column locations.

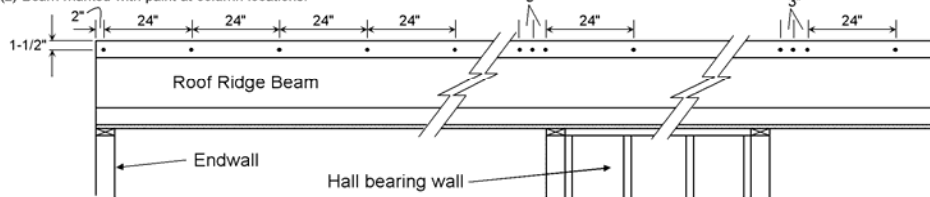


TABLE 14. ROOF CONNECTIONS SPECIFICATIONS

Fastener		Spacing		
Type	Size	Wind Zone I	Wind Zone II	Wind Zone III
Bolts with washers both sides	3/8" x 4-1/2"	24 in.	24 in.	24 in.
Lag screws with washers	3/8" x 5"	24 in.	24 in.	24 in.



Closing the roof gap. Level and fasten the marriage line joint at the floor before jacking to tighten a roof gap. **DO NOT** use roof fasteners to close any gaps. Separation of the ridge beams and trusses may occur.

Figure 27. Ridge beam fastening

In Wind Zones II and III an *optional* metal cap or straps may be installed as follows:

Caps

- Select metal caps made of minimum 8" x 30 ga galvanized steel or 0.019" aluminum.
- Install caps continuously, overlapping by minimum of four inches at splices.
- Fasten caps with 1" x 1" x 16 ga galvanized staples or 12 ga 1-1/4" long x 3/8" diameter head roof nails or #8 x 1-1/4" sheet metal screws at two inches o.c. both sides of ridge.

Straps

- Select metal straps made of minimum 1-1/2" wide x 26 ga galvanized steel or 0.019" aluminum.
- Space straps a minimum of 96 inches o.c. for Wind Zone II and a minimum 80 inches o.c. for Wind Zone III.



Installing lags. If lags are used to connect roofs, use pilot holes and use appropriately sized washers.

When to use metal straps.

If a ridge vent will be installed, use straps instead of a continuous cap.

TRIPLE-SECTION HOMES

For triple-section homes where roof lines run parallel to each other on adjacent units (**Figure 29**), follow the instructions in the appropriate method below to complete the connections at the roof.

Method 1: Install fasteners through pre-installed sheathing

For homes where sheathing is in place on both sides of the marriage line (**Figure 28**) install fasteners from the low side of the roof on an angle so as to penetrate roof beams on both sides of marriage line, using the fastener specifications and spacings indicated on **Table 15**.

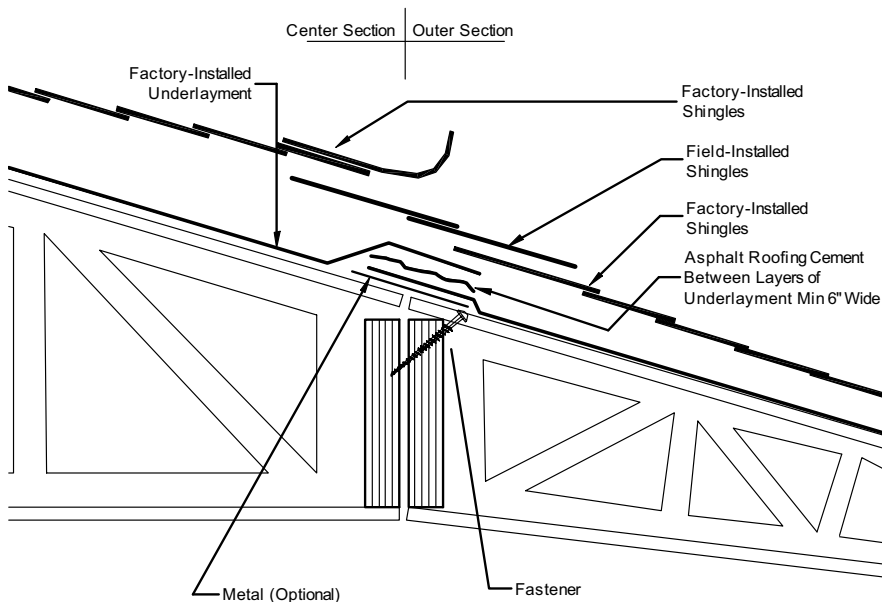


Figure 28. Triple-section roof connection Method 1

See Skyline Corporation Manufactured Home Addendum for Triplewide homes for additional information.

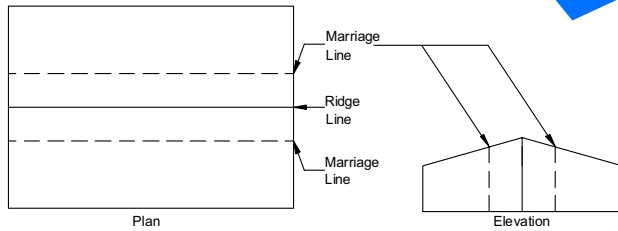


Figure 29. Triple-section home

TABLE 15. ROOF CONNECTION SPECIFICATIONS

Fastener		Spacing		
Type	Size	Wind Zone I	Wind Zone II	Wind Zone III
Lag screw	3/8" x 4-1/2"	24in.	24in.	24in.
Bolts	3/8" x 5"	24in.	24in.	24in.

Method 2: Install fasteners with ship loose sheathing

For homes where sheathing is shipped loose to be installed on site (**Figure 30**) fasten field-installed sheathing to all underlying blocking and framing with 15 ga 7/16" x 1-1/2" staples at four inches o.c. in field and perimeter.

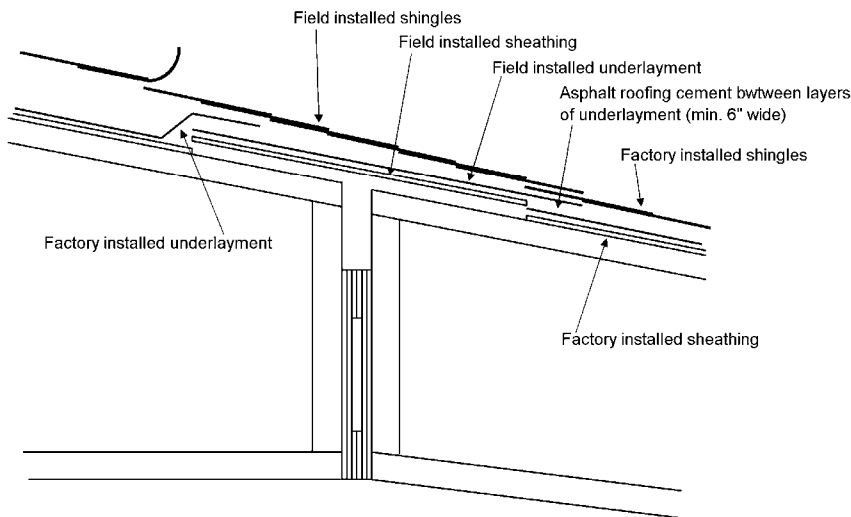


Figure 30. Triple-section roof connection Method 2

STEP 8. CONNECT WALLS

Once the home is secured along the marriage line floor and roof, secure end walls, interior doorways, and marriage line partitions according to the appropriate method described below.

END WALLS

Install toed fasteners through sheathing

Toe fasteners through sheathing from the exterior at an approximately 45 degree angle (+/- 5 degrees) (**Figure 31**) according to the fastener specifications and spacing requirements in **Table 16**.

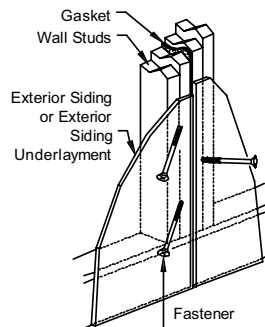


Figure 31. End wall connection toed through sheathing

TABLE 16. END WALL FASTENER SPECIFICATIONS

Fastener type	Size	Spacing
Lag screw with washer	5/16" x 5"	12in. o.c.
Wood screw	#8 x 3"	8in. o.c.
Nail	16d	8in. o.c.

MARRIAGE WALL COLUMNS, OPENINGS AND INTERIOR PARTITIONS

Make connections inside the home along the marriage walls (**Figure 32** and **Figure 33**) by installing fasteners according to the specifications and spacing requirements in **Table 17**. Toe screw 2 x 4 or 2 x 6 studs; through-screw 2 x 3 studs.

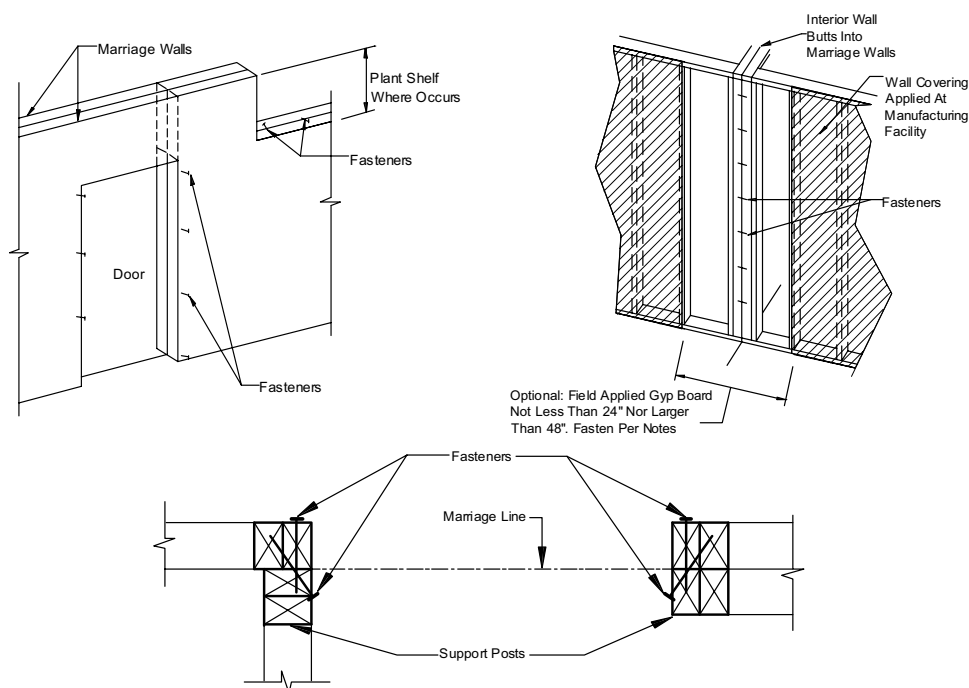


Figure 32. Marriage wall connections

Figure 33. Marriage line column connections

TABLE 17. MARRIAGE WALL CONNECTION SPECIFICATIONS

Fastener type	Size	Spacing
Wood screw	#8 x 4"	16 in. o.c.

Do additional sections (non tag) remain to be positioned?

- ▶ **YES**, go to **STEP 1. INSTALL MARRIAGE LINE GROUND ANCHORS**, (p. 36)
- ▶ **NO**, continue below.

Is there a tag unit?

- ▶ **YES**, go to **STEP 9. ATTACH TAG UNITS** (p. 45)
- ▶ **NO**, continue below.

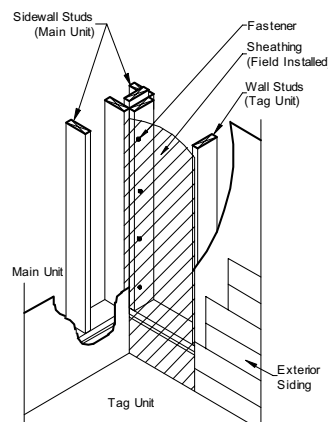
Is there a hinged roof?

- ▶ **YES**, go to **STEP 3. COMPLETE HINGED ROOF**, (p. 36)
- ▶ **NO**, go to **STEP 9. ATTACH TAG UNITS**, (p. 45)

STEP 9. ATTACH TAG UNITS

After the main unit has been set on its foundation, install all tag units according to the following procedure:

1. **Position and block the tag.** Position the tag unit as close to the main unit as possible at its intended location. Use a hitch jack to obtain approximate leveling and install pier supports according to **Set the Home, STEP 2. POSITION HOME SECTION** (p. 30). Determine whether the tag and main unit floors are designed to line up flush or are offset by a step and adjust the tag pier heights accordingly.
2. **Level the unit.** Using a water level (p.34), verify that the piers are level. The elevation of all points along the lower flange of the I-beam should be no more than 3/8 inches from the desired height and should not deviate more than 3/4 inches overall.
3. **Connect floors.** If the floor of the tag unit is level with main unit floor, connect the floors together as described in **STEP 5. CONNECT FLOORS** (p. 39).
Connect walls. Secure the tag unit walls to the main unit sidewall using #8 x 4" screws at 12 inches o.c. (see **Figure 34**). The sheathing shown in the detail may not be included by the manufacturer. If included, the sheathing over the last stud bay was tacked in place at the factory for easy removal at the site. Once the wall connections are complete, re-install the sheathing and complete the siding installation.



4. **Connect roofs.** Connect the tag unit roof to the main unit roof using #10 x 5" screws or 3/8" x 6" lag screws, toe screwed at each main unit vertical structural member (stud or truss) location. See **Figure 35** for flush roof connections



Piers under tag units.

Some tag units have special piercing needs due to the roof and/or floor construction. These will be detailed in supplemental piercing plans supplied with the home. Note that tag unit end walls are typically load bearing rather than side walls.

Figure 34. Tag unit wall connection

and **Figure 36** for roof connections with an offset greater than two inches. Roof connections with an offset less than two inches do not require screws.

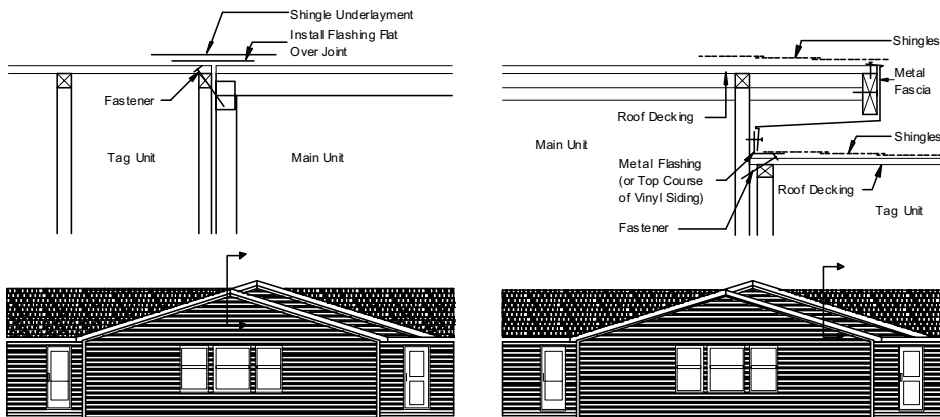


Figure 35. Tag unit flush roof connection

Figure 36. Tag unit offset roof connection

STEP 10. REMOVE TEMPORARY ITEMS

Once the home is properly supported and the marriage line connections are completed, remove the temporary ridge beam supports and wall/ceiling plates used to brace the ridge beam during shipment. Take care not to damage the ceiling.

Remove and store or properly dispose of or recycle the hitch, axles, and wheels. These items are the property of the homeowner unless other contractual arrangements have been made.

Is the home supported on a load-bearing perimeter wall?

- ▶ **YES**, go to **STEP 11. FASTEN HOME TO FOUNDATION**, (p. 46)
- ▶ **NO**, go to **Complete Roof and Exterior Walls** (p. 47).

STEP 11. FASTEN HOME TO FOUNDATION

Fasten the home to the foundation (typically to the sill plate) according to the fastening schedule provided by the manufacturer.

Is the home supported on a basement foundation?

- ▶ **YES**, go to **STEP 12. BACKFILL AND GRADE**, (p. 46)
- ▶ **NO**, go to **Complete Roof and Exterior Walls** (p. 47).

STEP 12. BACKFILL AND GRADE

Backfill against the foundation wall to the height of the waterproofing, taking care to not damage the drainage system.

Grade the site as described in **Prepare the Site, STEP 3. CLEAR AND GRADE THE SITE** (p.14).

STEP 13. BUILD STAIRS

Construct the basement stairs in compliance with the local building code. Take care that adequate headroom is maintained under beams and that there is sufficient landing space at the bottom of the stairs.

- ▶ go to **Complete Roof and Exterior Walls** (p. 47).



When to backfill. Backfill against basement walls only after the home is connected to the foundation or the basement walls may deflect inward or collapse.

Cutting the chassis. Do not cut, notch, bend, or alter in any manner beams, cross-members, and other parts of the steel chassis.

Complete Roof and Exterior Walls

This chapter covers closing up and weatherproofing the home by completing the roofing and siding.

Follow the Steps below:

- ▼ **STEP 1. COMPLETE ROOF** (p. 47)
- ▼ **STEP 2. COMPLETE TAG UNIT ROOF** (p. 49)
- ▼ **STEP 3. COMPLETE SIDE WALLS** (p. 49)

STEP 1. COMPLETE ROOF

RIDGE CLOSEUP

For multi-section homes, the first step in completing the exterior is sealing the roof along the ridge line (**Figure 37**). For homes with asphalt shingles, follow the procedure below. For homes with metal or other roofing materials, follow the instructions that come with the roofing materials or provided as a supplement to this manual.

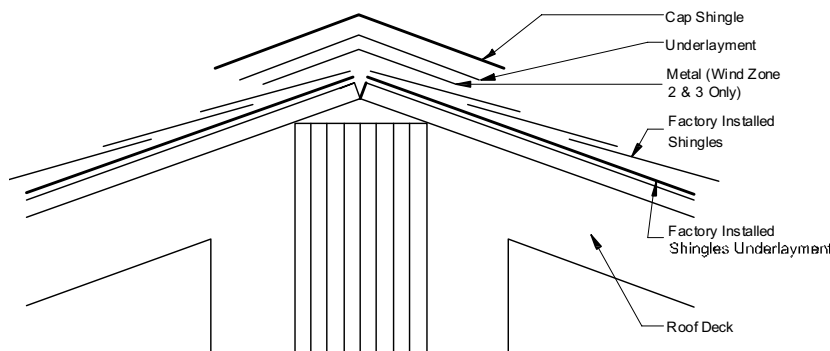


Figure 37. Shingle installation at ridge



Weatherproofing. It is vitally important to close up the home quickly to protect the interior from damage due to inclement weather.

Removing shipping protection. Remove shipping protection from the roof prior to completing roofing.

1. **Install underlayment** (when sheathing at the ridge is installed on site). Make sure the roof sheathing is already installed (see **Complete Multi-Section Set, STEP 6. CONNECT ROOF**, p. 39). Install 15# felt or equivalent continuously along the length of the ridge, covering all exposed sheathing and overlapping sheathing joints by at least five inches on each side. Fasten using 1" x 1" x 16 ga galvanized staples. For Wind Zones II and III, also apply a six inch wide strip of roofing cement along each side of ridge under the underlayment.
2. **Install shingles.** If shingles have been left off at the ridge line for site installation, install them now using 1" x 1" x 16 ga galvanized staples or 12ga 1-1/4" long, 3/8" diameter head roof nails. For Wind Zone I, fasten at 5/8 inch above each tab cutout slot and one at each end of the shingle one inch in from the edge (four fasteners for a three-tab shingle) (**Figure 38**). For Wind Zones II and III, use two fasteners 5/8 inch above and on either side of the tab slots and one at each end of the shingle one inch in from the edge (six fasteners for a three-tab shingle). Do not fasten through the shingle tar line.

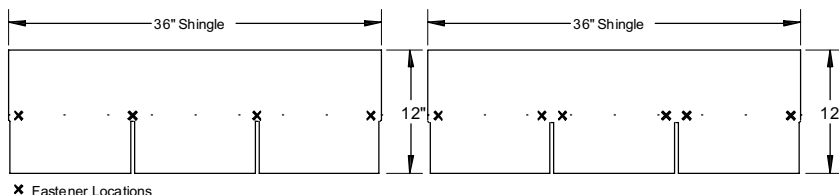
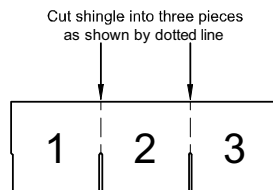


Figure 38. Shingle fastener locations for Wind Zone I (left) and Wind Zones II and III (right).

3. **Install underlayment.** Install 15# felt or equivalent underlayment that is at least 10 inches wide continuously along the ridge. Fasten with 1" x 1" x 16 ga galvanized staples. For Wind Zones II and III, also apply a six inch wide strip

of roofing cement on both sides of the ridge under the underlayment.

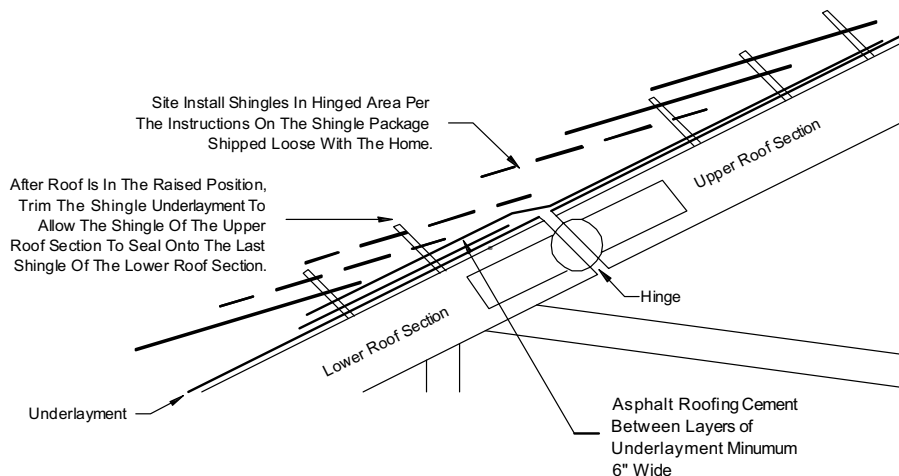
4. **Install shingle cap.** Starting at the opposite end of the home from the prevailing wind, install ridge cap shingles provided by the manufacturer or use 12" x 12" shingles (36" shingles cut into three equal pieces) (**Figure 39**). Install using 1" x 1" x 16 ga galvanized staples or 12 ga 1-1/4" long, 3/8" diameter head roofing nails spaced 5-5/8 inches from bottom edge and 1/2 inch to 1-1/2 inches in from both edges. Cover the exposed fasteners with tar or cement.



HINGE ROOF CLOSE-UP

For homes with hinged roofs, complete roofing underlayment and shingles along the hinge line (**Figure 40**) as follows:

1. **Install underlayment.** Attach the underlayment to the roof deck with a minimum of six-inch wide strip of cement. If necessary, trim the underlayment to allow the lowest shingle above the hinge of the roof to seal to the topmost shingle on the lower portion of the roof.



2. **Install shingles.** Install missing shingles according to the shingle manufacturer's instructions.

COMPLETE TRIPLE-SECTION ROOFS

Complete roofing along triple-section home marriage lines according to one of the following methods based on the construction of the home.

Method 1: Dual ridge beams

1. **Install underlayment.** Fold down the underlayment of the outer section roof and apply a minimum six-inch wide strip of roofing cement to the sheathing. Lay the underlayment of the center section on top of the cement (see Best Practice tip for optional metal flashing). Fold down the center section roof underlayment on this cement.
2. **Install shingles.** Install missing row(s) of shingles, securing them per the shingle manufacturer's installation instructions (refer to the shingle wrapper).



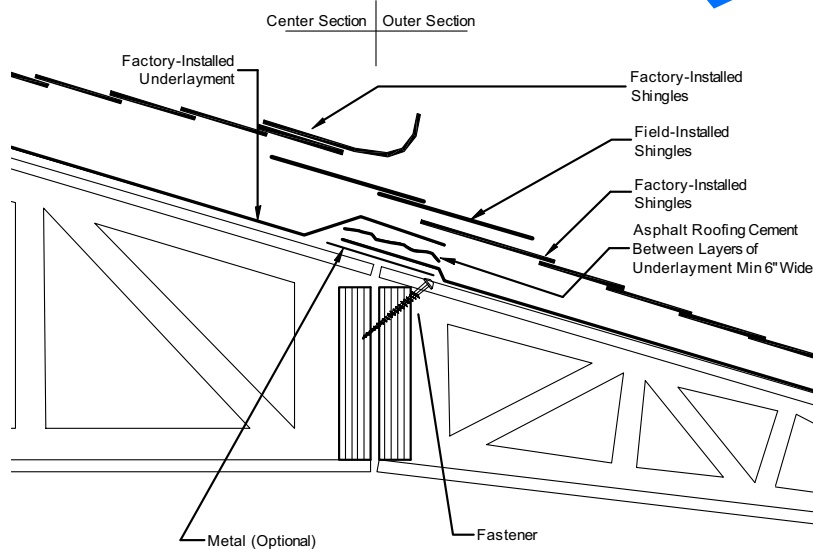
Installing a ridge vent. If a ridge vent is to be installed, follow the ridge vent manufacturer's instructions provided with the material or as an addendum to this manual in lieu of underlayment over ridge line and shingle cap.

Figure 39. Shingle cut into thirds

Figure 40. Shingle installation at hinge line



Installing metal flashing. Install optional metal flashing over the roof decking before applying roofing cement. Fold back the underlayment and fasten 30 ga x 6" wide minimum galvanized metal with roofing nails or 16 ga x 1" crown staples of sufficient length to penetrate the roof sheathing. Space fasteners four inches o.c. or less near the edge of the metal. Overlap the metal by at least two inches at joints.

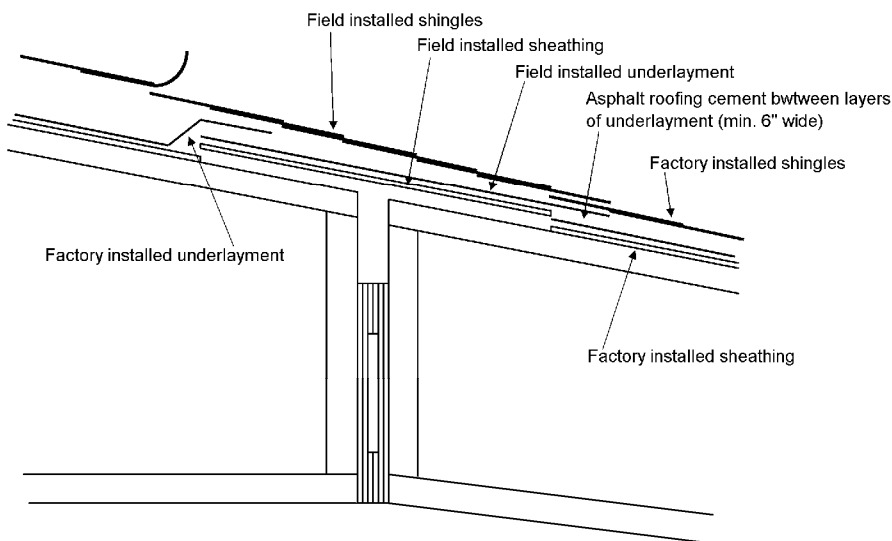


**Figure 41. Triple-section
roof connection Method 1**

See Skyline Corporation
Manufactured Home Adden-
dum for Triplewide homes for
additional information.

Method 2: Field-installed sheathing

1. **Install underlayment.** Fold down the underlayment of the outer section roof and fold up the underlayment on the center section roof. Apply to the lower roof underlayment a minimum six-inch wide strip of roofing cement centered on the sheathing joint. Cover with the shipped loose underlayment. Apply another minimum six-inch wide strip of roofing cement to the ship loose underlayment centered on the upper roof sheathing joint.
2. **Install shingles.** Install missing row(s) of shingles per the shingle manufacturer's installation instructions (refer to the shingle wrapper).



**Figure 42. Triple-section
roof connection Method 2**

STEP 2. COMPLETE TAG UNIT ROOF

If the home has a tag unit, complete roofing for this unit now. The process for completing the roof is different for flush and offset roofs. Follow the instructions in the appropriate section below.

FLUSH ROOFS

For flush roofs, complete roofing along the marriage line and at the valley line as follows (see **Figure 43**):

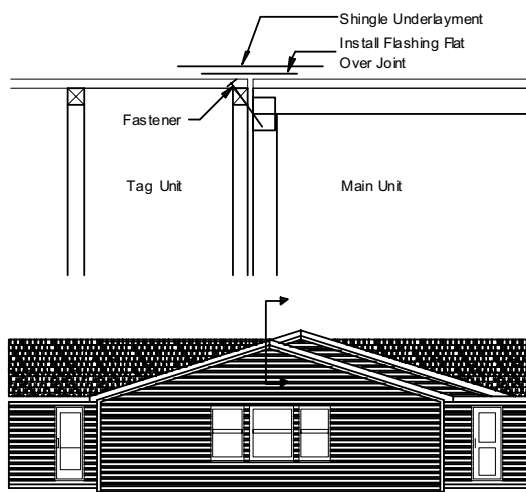


Figure 43. Tag unit flush roof connection

See Skyline Corporation Manufactured Home Addendum for Triplewide homes for additional information

Marriage line

Method 1: Install metal flashing (minimum 30 ga x minimum 6" wide) over the joint between the main roof dormer and tag unit roof. Secure the flashing to the roof decks on both dormer and tag unit roofs with roofing nails or 16 ga staples with a one inch crown and long enough to fully penetrate the roof decks. Space fasteners maximum two inches o.c. near the edge of the flashing. Overlap seams in the metal by at least two inches. After flashing is complete, install shingles per shingle manufacturer instructions and ridge cap/vent according to **STEP 1. COMPLETE ROOF** (p. 47).

Method 2: Install two layers of roofing underlayment or equivalent over the joint between the main roof dormer and tag unit roof lapping the factory installed underlayment a minimum of six inches on each side and fully cemented at the laps. Install shingles per shingle manufacturer instructions and ridge cap/vent according to **STEP 1. COMPLETE ROOF** (p. 47).

Valley line

Along the bottom of the valley, shingles and one or more layers of roll roofing may need to be installed. If fastened to the roof at the factory, unroll the roofing, overlap the tag roof and trim the roofing to the roof edge. If shipped loose, install the roll roofing at the valley, lapping it under the factory installed roll roofing a minimum of 12 inches and fully cement the roofing at the lap. Complete shingles at the valley either by interweaving them or by trimming back approximately four inches from the valley line and fully cementing the exposed shingle edges.

OFFSET ROOFS

If there is a gap between the main unit dormer overhang and the tag unit roof of less than two inches, fold up the main unit dormer fascia, slide the underlayment and flashing from the tag unit roof behind the fascia, and bend the fascia back down and secure into sub-fascia with metal screws (**Figure 44**).

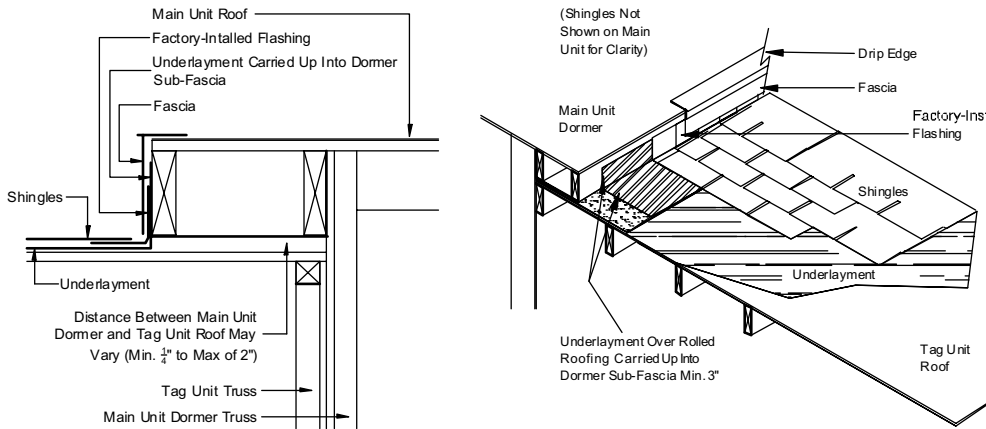


Figure 44. Tag unit roofing connection with less than two inch height difference

If the gap between the main unit dormer overhang and the tag unit roof is two inches or more, bend up the inside corner trim at the dormer overhang and main unit sidewall, fold up the factory installed flashing on the tag unit roof, fold the inside corner trim back down, and secure into dormer wall with metal screws (**Figure 45**)

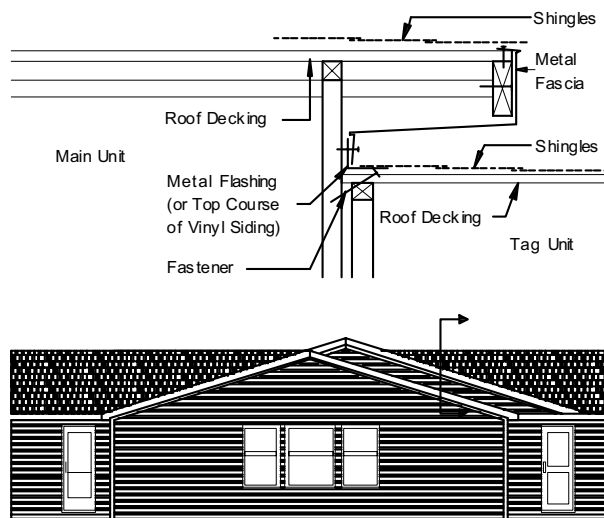


Figure 45. Tag unit offset roof connection

STEP 3. COMPLETE SIDE WALLS

Siding necessary to complete the exterior has been provided with the home. Follow the siding manufacturer's instructions (found on or with the packaging or as an addendum to this manual) and to complete the exterior siding as follows:

1. **Remove shipping protection.** Remove temporary shipping protection from walls.
2. **Complete crossovers.** Complete any crossover connections in the walls, including: electrical, stereo speaker, doorbell, telephone, and intercom wires.
3. **Install siding.** Fasten siding only at stud locations, avoiding electrical wires that are present in the walls.
4. **Install close-up of strips.** If siding has been installed on the end walls at the factory, fasten close-up strips securely along both edges and seal the edges with a waterproof sealant.
5. **Install trim.** Install any matching trim required to complete the installation.
6. **Seal penetrations.** With a waterproof sealant, seal any penetrations in the siding that may have been caused by temporary shipping protection.



Covering the HUD label. Do not cover the HUD label on the exterior of the home.

Removing shipping protection. Remove temporary shipping protection from walls before installing siding or serious moisture damage may result.

► go to **Connect Crossovers** (p. 52).

Connect Crossovers

This chapter covers crossover connections between units of multi-section homes, including ducts and electrical, water, waste, gas, telephone, and cable TV connections.

Follow the Steps below:

- ▼ **STEP 1. CONNECT DUCTS** (p. 52)
- ▼ **STEP 2. CONNECT ELECTRICAL CROSSEVERS** (p. 56)
- ▼ **STEP 3. INSTALL ELECTRICAL BONDING** (p. 58)
- ▼
- STEP 4. CONNECT WATER LINES** (p. 59)
- ▼
- STEP 5. CONNECT DRAIN, WASTE, AND VENT LINES** (p. 60)
- ▼ **STEP 6. CONNECT GAS LINES** (p. 61)
- ▼ **STEP 7. CONNECT TELEPHONE AND CABLE TV WIRING** (p. 62)

STEP 1. CONNECT DUCTS

There are three main types of duct crossover connections. Based on the location of the duct, follow the installation steps on the page indicated below:

- Under the floor (p. 52).
- In the roof cavity (p. 54).
- In floor, through-the-rim joist (p. 54)

To prevent air leakage, seal all ductwork connections, including duct collars using one or more of the following materials:

- Galvanized metal straps in combination with galvanized sheet metal screws.
- For rigid air ducts and connectors, tape and mastics listed to UL 181A.
- For flexible air ducts and connectors, tape and mastics listed to UL 181B.

UNDER FLOOR FLEXIBLE Crossover DUCT

When heating or cooling equipment is installed in the home, the flexible crossover duct is provided by the manufacturer. In all cases the crossover duct must be listed for exterior use.

There are four common configurations of under floor crossover ducts depending on the number of home sections and the furnace/air handler location. See **Table 18** to locate the appropriate figure.

TABLE 18. UNDER FLOOR DUCT CONFIGURATIONS

Furnace location	Two home sections	Three home sections
Furnace over trunk duct	See Figure 46	See Figure 48
Furnace offset from trunk duct	See Figure 47	See Figure 49



Qualified personnel. Use only qualified personnel to make crossover connections. Consult the LAHJ for licensing or any additional crossover connection requirements.

Access for service. Whenever possible maintain access to connection areas for future maintenance.

Make tight connections. Permanent, durable, and tight crossover duct connections are critical to the proper performance of the home. Leaky ducts can result in severe moisture problems in the home, discomfort from rooms not receiving the proper amount of conditioned air, and high utility bills from wasted heating and/or cooling energy.

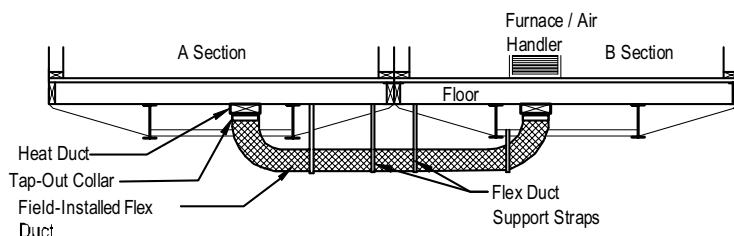


Figure 46. Furnace over trunk duct, two home sections

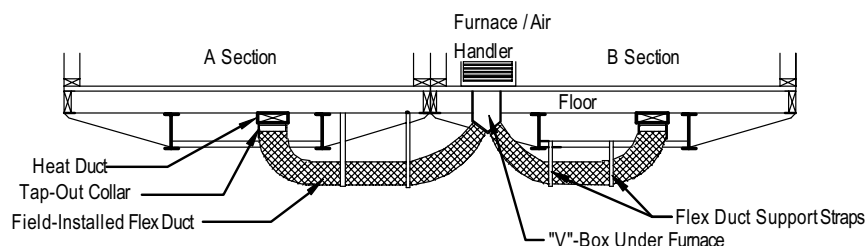


Figure 47. Furnace offset from trunk duct, two home sections

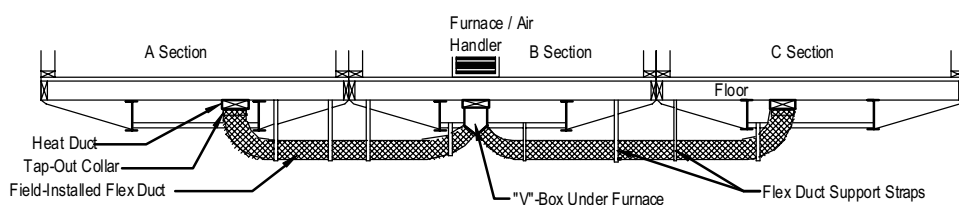


Figure 48. Furnace over trunk duct, three home sections

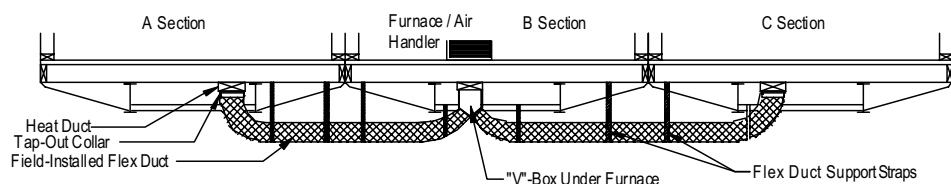


Figure 49. Furnace offset from trunk duct, three home sections

For under floor flexible crossover ducts follow the steps below:

1. **Locate collars.** Locate the metal crossover collars (or V-box) connected to the main trunk duct (or furnace) under the home and remove temporary shipping protection.
2. **Install inner duct.** Slide the crossover duct inner liner over the crossover collar/V-box as far as it will go. Temporarily fasten the inner liner in place with duct tape. Install a large nylon zip-tie over the inner liner just above the "ridge" around the crossover collar/V-box. Apply mastic completely over inner liner and collar/V-box (alternately, the mastic may be applied to the collar/V-box prior to sliding the duct inner liner over it).
3. **Connect duct insulation.** Bring the duct insulation up over the zip-tie and above the home's bottom board into the floor cavity. Temporarily duct tape it against the base of the trunk duct/V-box.
4. **Pull duct wrap.** Pull the crossover duct outer wrap over the top of the insulation and temporarily secure it to the trunk duct/V-box with duct tape.
5. **Install zip-tie.** Feel for the nylon zip-tie that was installed over the inner liner. Place another nylon zip-tie just under the first one to permanently secure the crossover duct insulation and outer wrap.
6. **Trim duct.** Trim the crossover duct to length such that the installed duct will be straight with no kinks or unnecessary bends.
7. **Connect other end.** Follow the same procedure (steps 1 through 5) to connect the opposite end of the crossover duct and any other crossover ducts.
8. **Seal joints.** Seal the joints between the bottom board and the crossover duct with foam or mastic.
9. **Support duct.** Support the crossover duct(s) above the ground using nylon or galvanized metal straps and saddles spaced every 48 inches o.c. or less.



Securing the crossover.

Between Step 5 and Step 6, drill three or more 1/16 inch holes an equal distance around and just below the bottom edge of the nylon zip-tie. Install #12 pan head screws in these holes, through the flexible duct and into the metal crossover collar/V-box. The screw heads should be against the zip-tie.



Cover exposed metal.

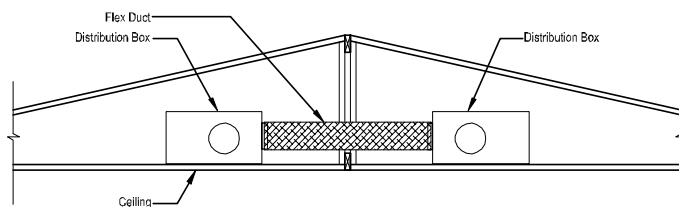
Completely cover all exposed metal connectors with insulation. Apply sealants and tapes only to surfaces that are dry and free

Choose straps at least 1/2 inch wider than the spacing of the metal spirals encasing the crossover duct. Install the straps so they cannot slip between spirals. Secure metal straps with galvanized screws.

ROOF CAVITY CROSSOVER DUCT

For ducts installed in the roof cavity, follow the steps below:

1. **Access duct.** Access the crossover location through an access panel in the roof and remove any temporary shipping protection.
2. **Join ducts.** Using the provided flexible duct, join the distribution boxes in each section of the home as shown in **Figure 50**, cutting off any extra duct length to keep the duct as straight as possible. The duct is connected to one side of the home.
3. **Fasten ducts.** At each connection point between ducts and between ducts and distribution boxes or connectors, secure the inner duct liner with a nylon strap, apply mastic completely over the connection area, pull the duct insulation and outer liner over the connection area, and secure them with a second nylon strap.
4. **Reinstall panel.** Reinstall and secure the access panel.



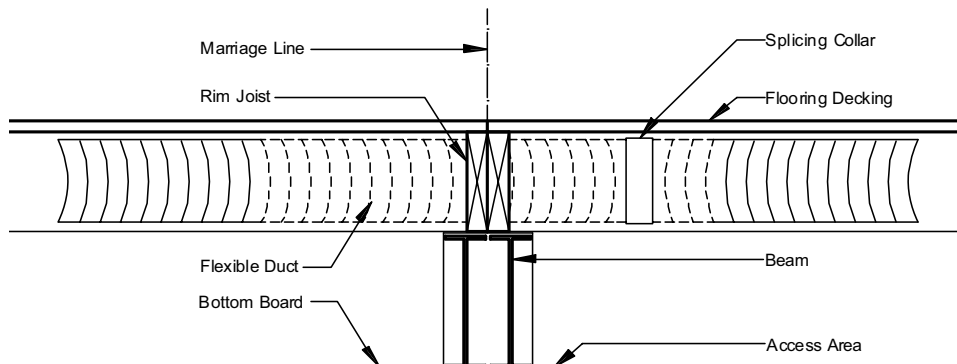
IN THE FLOOR CROSSOVER DUCT

Where one or more crossover ducts are built into the home's floor system, connect them either through (note openings in rim joists) or under (note access panels in bottom board) the rim joist depending on the design of the home.

Method 1: Flex duct through rim joist

Connect flex ducts that pass through the rim joist (**Figure 51**) as follows:

1. **Access duct.** From underneath the home, cut through the bottom board and part the floor insulation to access the duct.
2. **Extend duct.** Extend the flex duct from the side of the home with the furnace through the rim joist opening and connect it to the opposing duct using the provided splicing collar.
3. **Connect duct.** Connect the ducts using the procedure for joining under floor flexible crossover ducts (p. 52).
4. **Seal bottom board.** Move the floor insulation back to its original location and seal the bottom board with tape specially made for that purpose (may be provided).



of dust, dirt, and grease.

Avoid ground contact. Installed crossover ducts must not be in contact with the ground.

Unobstructed airflow. Excess length, kinks and bends in the crossover duct will restrict airflow and degrade the home's HVAC system performance.

Figure 50. Duct crossover located in the roof cavity



Additional marriage line

support. If the duct runs through the marriage line rim joist, and perimeter blocking is required, a perimeter pier is required under the marriage wall at the crossover location or unless the home is constructed with a perimeter support system.

Figure 51. In-floor duct with flex duct connection through the rim joist (shown with perimeter frame system)

Method 2: Gasketed Type through the rim joist

With a through-the-rim joist design, the duct in each floor section terminates at an opening in the marriage line rim joist. Fixed through-the-rim crossovers employing a marriage line gasket such as in **Figure 52** were completed in **Complete Multi-Section Set, STEP 4. CHECK MARRIAGE LINE GASKET** (p. 38) and require no additional work here.

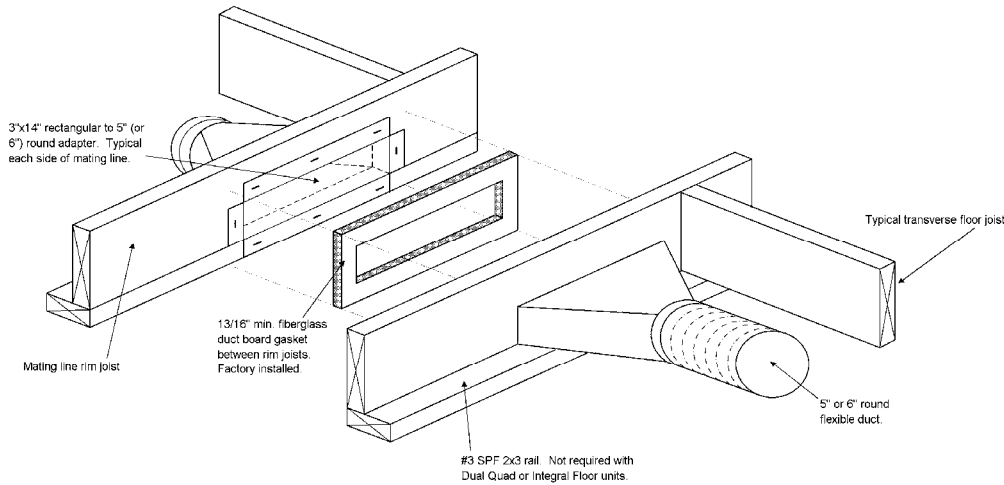


Figure 52. In-floor duct with gasket between halves.

Under the rim joist

In this configuration, flexible crossover ducts from adjoining sections pass through the floor and dip under the rim joist at the marriage line where they are joined (**Figure 53**). Pull each pair of ducts through the openings provided in the bottom board, under the marriage line rim joist and connect them using the provided splicing collar and the procedure for joining under floor flexible crossover ducts (p. 52) or the duct manufacturer instructions if provided.

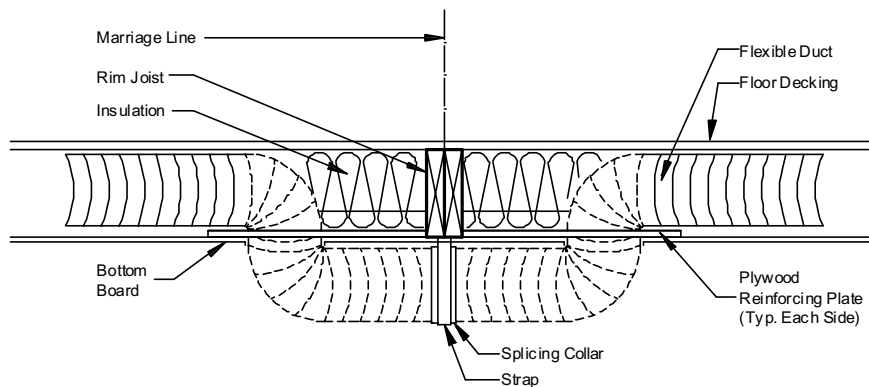


Figure 53. In-floor duct with flex duct crossover under the rim joist

STEP 2. CONNECT ELECTRICAL CROSSEVERS

Multi-section homes may have one or more electrical crossovers located in the wall(s) and/or floor(s) along the marriage line(s).

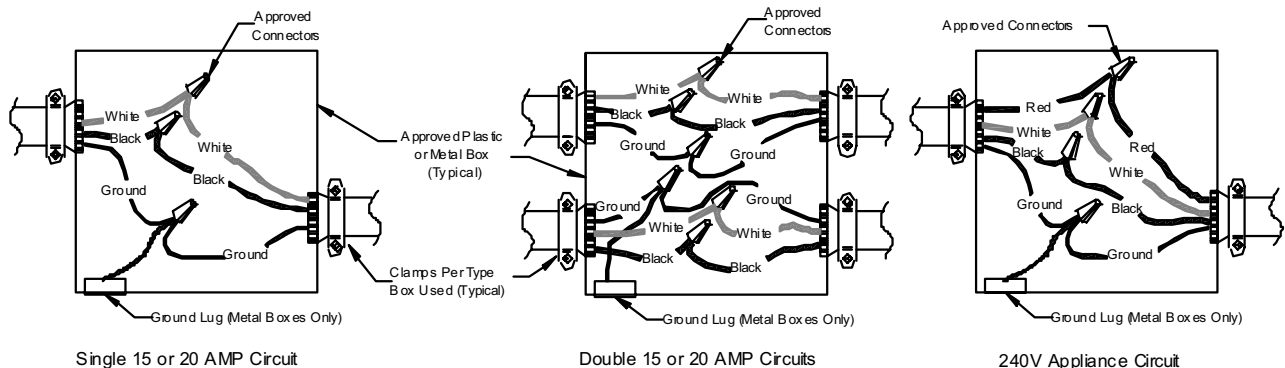
JOINING WIRES

Two types of connections may be present at these locations—snap connectors and junction boxes. Identify matching circuits if multiple circuits exist at a single crossover location. These will be coded for identification. Connect snap connectors according to the connector manufacturer's installation instructions, including fastener requirements.

Connect wires in junction boxes as follows (**Figure 54**):

Pull wires. Pull circuit wires into the junction box, sliding them through a romex connector and secure snugly. (**Figure 54**) Do not over-tighten.

1. **Strip wires.** Remove the outer jacket that holds the circuit wires together providing a minimum of four inches of free wire in the box.
2. **Connect wires.** Connect wires together matching like colors, using appropriately sized wire nuts. Use the ground wire to ground the junction box and/or cover plate(s), if metal. Junction boxes may contain single or multiple 15 or 20-amp circuits, or a single 240-volt appliance circuit.
3. **Replace cover.** Reposition the junction box cover and secure using machine (not sheet metal) screws.



Use qualified electricians.

All electrical work must be performed by a qualified electrician and comply with the 2005 NEC.

Disconnect power. Turn off power to the home before making connections.

Proper use of GFCI circuits. Ensure Ground Fault Circuit Interrupter (GFCI) circuits are connected to the proper GFCI protected circuits from the power supply.

Figure 54. Types of junction box wiring connections

FLOOR CROSSOVER

When making electrical connection(s) in the floor, use one of the wiring options described below:

Method 1: Access panel

1. **Access wires.** Find the crossover location(s) and remove the access panel(s) if attached. If access panel openings are not provided, cut through bottom board to expose the wiring (**Figure 55**).
2. **Route wires.** Pass the wires through predrilled holes or notches in the rim joist or if there is a single bumped-out access panel as in **Figure 56**, then under the rim joists. If holes or notches have not been provided and there is no bumped-out access panel, drill maximum one-inch diameter hole(s) half-way up the rim joists on each home section, making sure the holes align and feed the wire through the hole.
3. **Connect wires.** Connect wires via a junction box or snap-connector(s) as described above.
4. **Secure wires.** Secure wires with staples to adjacent joists or studs within eight inches of junction box or snap-connector(s).
5. **Install smash plates.** For notched perimeter joists, install steel wire protectors (smash plates).
6. **Seal bottom board.** Replace insulation and re-install access panels and/or seal the bottom board with tape specially made for that purpose (may be provided). The access panel(s) may be temporarily installed near the crossover



Using snap connectors. Do not use oversized nails or drive nail heads into snap connectors. Some connectors are designed for one-time use only – a new connector must be used if they become separated.

Protect cables. Cover all cables with conduit or other suitable weather-resistant and protective material.

location or shipped loose with the home.

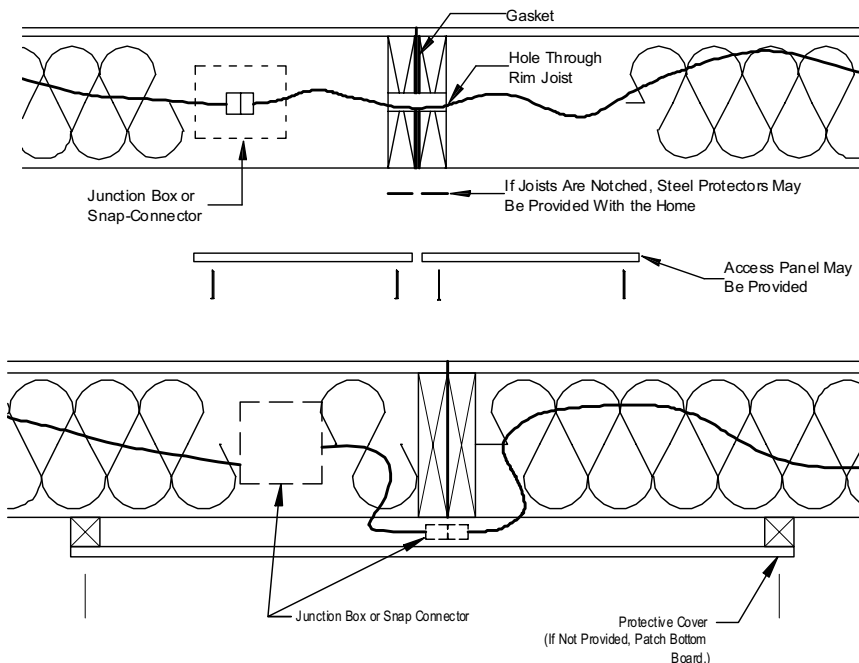


Figure 55. Electrical crossover wires with flush access panels

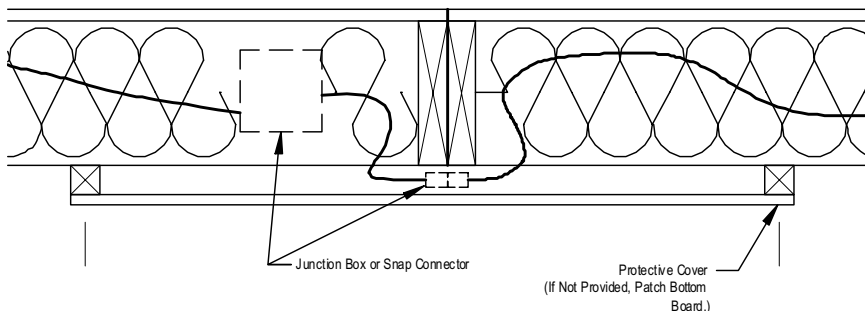


Figure 56. Floor electrical crossover wires with bumped-out access panel

Method 2: Junction box with conduit

1. **Access boxes.** If junction boxes are not exposed, access them inside the floor by cutting the bottom board or by removing the access panel(s). Remove the junction box covers.
2. **Connect wires.** If wire is coiled inside one junction box, insert it into provided flexible conduit and pass it under the rim joists to the opposing box and make the connection as described above. If no coiled wire is provided, install provided ship-loose conduit with wire making connections in both boxes (**Figure 57**).
3. **Cover boxes.** Replace and secure covers on junction boxes.
4. **Seal floor.** Replace any displaced insulation and replace access panel or seal the bottom board with tape specially made for that purpose (may be provided).

Variation to Method 2: A junction box may be installed only on one side with the other side containing conduit behind an access panel. Bring the conduit to other side and make one connection in the junction box.

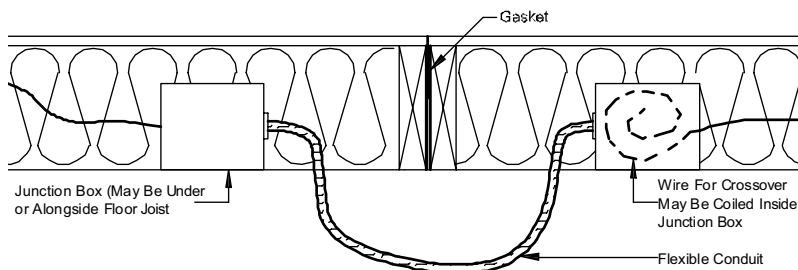


Figure 57. Under the rim joist electrical crossover connection with conduit

WALL CROSSOVERS

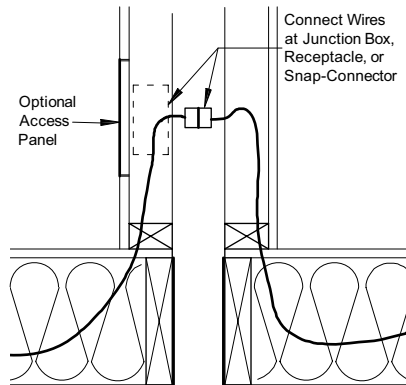
Connect electrical, phone, cable television, and stereo speaker wires in marriage walls and/or partition and end walls.

If access panels into the marriage walls are not provided, then the connection should have been made prior to bringing the home sections together. If access panels are provided in marriage, end or partition walls, remove the panels, join the wires as described above using the provided snap-connector, junction box, or at a receptacle,



Avoid damaging crossover wires. Carefully fold marriage wall crossover wires so they stay within a single bay and are not sand-

and re-attach the access panel (Figure 58 for marriage walls and Figure 59 for partitions and end walls).



wiched between studs when the sections are pulled together.

Figure 58. Inside marriage wall crossover connection

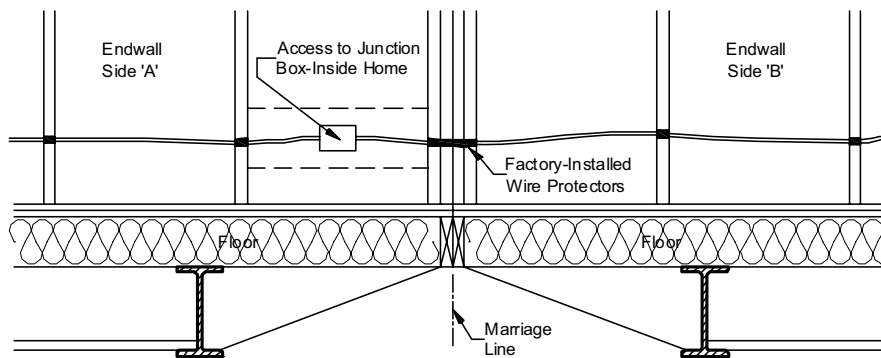


Figure 59. Inside partition or end wall electrical crossover connection

STEP 3. INSTALL ELECTRICAL BONDING

To ensure all metal parts are effectively grounded, electrically bond all chasses together as follows (Figure 60):

1. **Find lugs.** Determine if solderless ground lugs are provided on the front or rear frame outriggers or headers.
2. **Attach wire.** If lugs are provided, uncoil the bonding wire (#8 minimum bare copper wire) from one side of the home and connect it to the lug provided on the opposing side using the provided paint penetrating star washer, tighten the set screw firmly on the wire and repeat for any additional home sections.

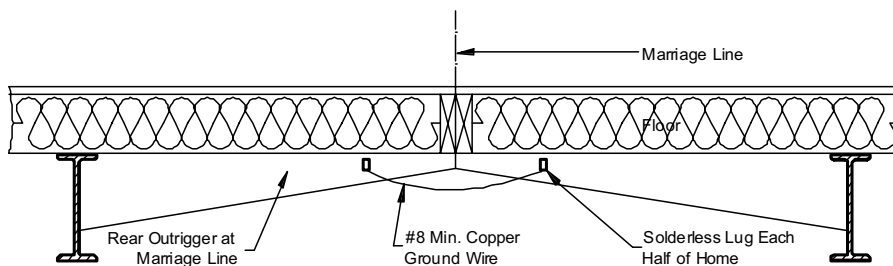


Figure 60. Electrical bonding of multi-section homes

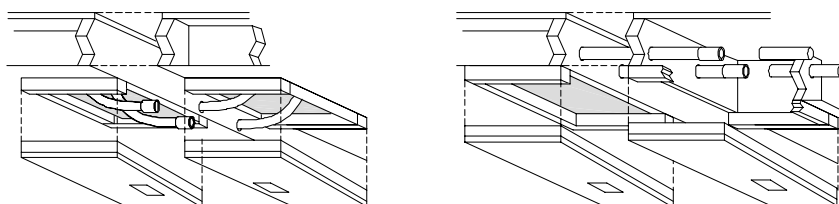
3. **Attach strap.** If ground lugs and copper wire are not provided, attach the provided four-inch bonding strap to each pair of adjacent chasses with two #8 x 3/4" self-tapping metal screws (one screw each side).

STEP 4. CONNECT WATER LINES

Connect water lines inside the floor through access panels or below the bottom board as follows:

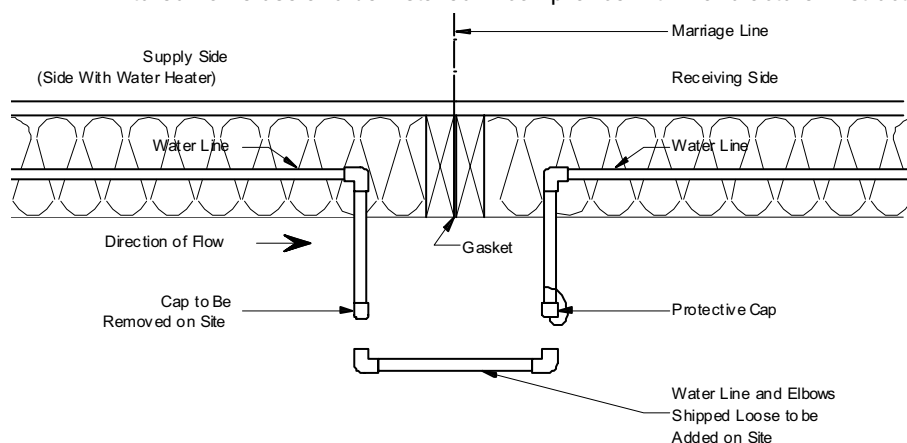
WATER LINES ACCESSED THROUGH PANELS

1. **Remove panels.** Remove access panels from each home section.
2. **Remove caps.** Remove shipping caps from ends of water lines.
3. **Pull lines.** Pull water lines through holes in rim joist. If holes are not provided, drill round holes in the center of the rim joist, with a maximum diameter of one third the rim joist depth (**Figure 61**).
4. **Connect pipes.** Connect threaded water lines using provided connector fittings (do not use lubricants or sealants). Connect non-threaded water lines using provided fittings and cement, inserting pipe to full depth of each fitting (a short connector pipe may be provided to bridge the gap between sections).
5. **Test.** Test connections for leaks.
6. **Seal floor.** Securely replace insulation and access panels.



WATER LINES DROPPED BELOW BOTTOM BOARD

1. **Remove caps.** Remove protective shipping caps from ends of pipes and make sure pipe ends are clean and smooth.
2. **Connect pipes.** Connect threaded water lines using flexible pipe or a rigid connector line (if provided) and connector fittings (do not use lubricants or sealants). Connect non-threaded water lines, pipe, and elbows with cement provided, inserting pipe to full depth of each fitting (**Figure 62**).
3. **Test.** Test connections for leaks.
4. **Protect pipes.** Wrap water lines with insulation and bottom board shipped loose with home or otherwise protect to prevent freezing. Tape bottom board using tape specially made for that purpose (may be provided) and staple with 7/16" x 1/2" staples at four inches o.c. around bottom board using a divergent (stitch) stapler or equivalent. If heat tape is used it must be listed for manufactured home use and be installed in compliance with manufacturer instructions.



Applying cement. Follow cement manufacturers instructions with respect to application and drying time. Allow cement to fully cure before filling pipes with water.

Figure 61. Water line crossover with access panels



Choosing cement type. Use the proper cement for water lines as it may differ from the cement used for the DWV system.

Figure 62. Water line crossover through bottom board

STEP 5. CONNECT DRAIN, WASTE, AND VENT LINES

Complete portions of the drain, waste, and vent (DWV) system that are below the floor as follows:

1. **Remove caps.** Remove shipping covers from pipes extending through the bottom board; inspect pipes and fittings and clean them of dirt, obstructions, and burrs.
2. **Assemble pipes.** Using the drain schematic drawing provided with the home, begin assembling the DWV system starting at the location farthest from the sewer/septic connection and working towards the outlet, fastening the pipe with cement or adjustable screw-clamp connectors, if provided (**Figure 63**). As the system is assembled, support the piping with temporary blocking. Unless otherwise noted on the schematic diagram, provide a minimum 1/4 inch per foot slope towards the sewer/septic using a plumber's level. Where a slope of 1/4 inch per foot cannot be maintained, use a minimum slope of 1/8 inch per foot and install of a full-size clean-out at the uppermost point of the run (**Figure 64**).

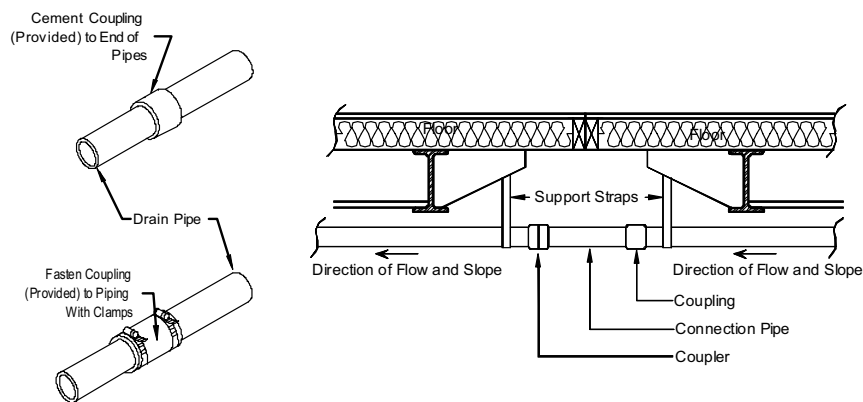


Figure 63. Drain crossover connection

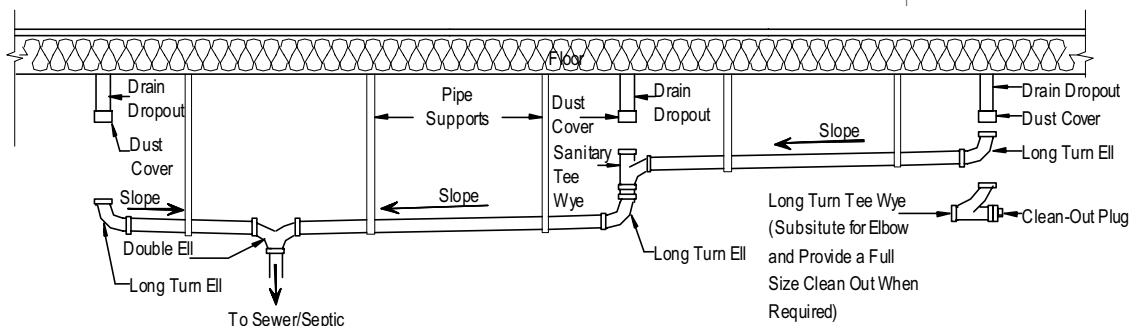


Figure 64. DWV system

3. **Test.** Conduct a two-part leakage test on the completed drainage system as follows:
 - Part 1. With all fixtures connected, and all tub and shower drains plugged, fill the system with water to the rim of the toilet bowl through a higher fixture. Release all trapped air, replace tub and shower plugs, backfill fixtures, and allow the system to stand at least 15 minutes. Check for leaks. Drain the system. If leaks are found, repair and retest.
 - Part 2. Plug all fixtures, sinks, showers, and tubs and fill with water. Release the water in all fixtures simultaneously to obtain the maximum possible drain piping flow. As water is draining, check for leaks. If any are found, repair and retest.
4. **Connect to outlet.** Connect the main drain line to the site sewer/septic hook-up, using an approved elastomer coupling (**Figure 65**).

Choosing glues. Use only solvents and glues compatible with the pipe (ABS or PVC). Follow manufacturer's instructions.

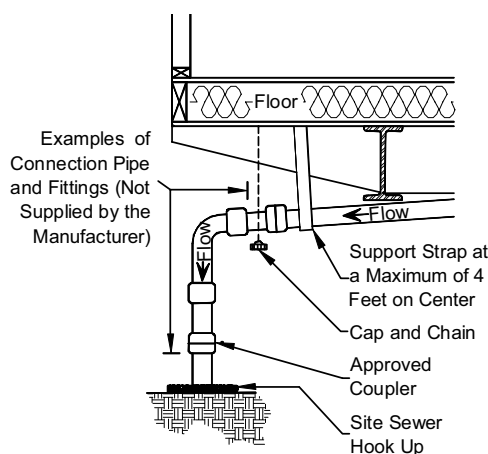


Figure 65. DWV connection to sewer/septic

5. **Install supports.** Install permanent drain line supports at a distance of four feet o.c. or less (see **Figure 63**, **Figure 65**, and **Figure 66**).

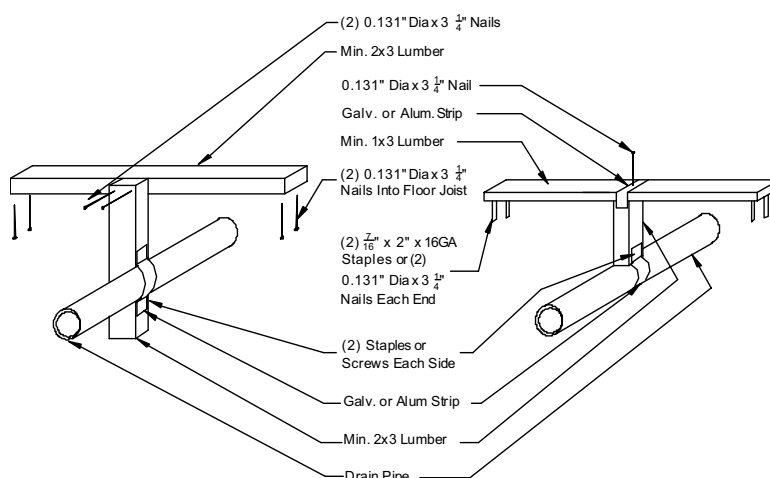


Figure 66. DWV pipe support options



Protect pipes from freezing. If the home is to be left unheated in cold weather, pour antifreeze solution into all drain traps, including sinks, tubs, and toilets. Be sure that the antifreeze is safe for the fixtures and P-traps.

Installing quick disconnect fittings. Do not use tools, lubricants, or sealants with quick disconnect fittings.

Gas test precautions. Do not connect to gas service until tests described in **Connect Utilities** have been successfully completed.

6. **Insulate.** Replace all insulation and make sure all potentially exposed portions of the DWV system are well insulated to protect against freezing.

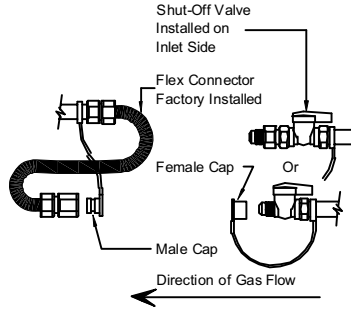
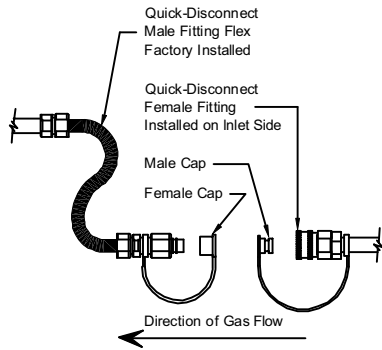
STEP 6. CONNECT GAS LINES

The gas crossover connection may use quick disconnect fittings or threaded connectors. Find the connection location below the floor at the marriage line and gather the connectors (they may be shipped loose if not present under the home).

For quick disconnect fittings (**Figure 67**), remove any dust caps and then with one hand, pull back on the quick disconnect device, snap it over the quick disconnect adaptor and release it to complete the connection.

For threaded connectors (**Figure 68**), remove the black cap and nipple (or any other plugs, such as a black iron plug) from both the supply and receiving sides and screw the connector onto the supply and return pipes as necessary.

Check for leaks before connecting to gas service (see **Connect Utilities, STEP 3. CONNECT GAS SERVICE**, p. 83).



STEP 7. CONNECT TELEPHONE AND CABLE TV WIRING

Install telephone and cable television wiring in accordance with the requirements of the LAHJ, the NEC, and NFPA No.70-2005. When making crossover connections or installing telephone or cable television wires, do not run them in the same raceway as, or in close proximity to, high voltage electrical conductors or cables.

Wires should only be installed by trained professionals.

► go to **Complete the Interior** (p. 63)

Figure 67. Gas crossover with quick disconnect fittings

Figure 68. Gas crossover with threaded connectors



Installing wiring. When installing telephone and cable television wires, do not damage electrical wires, plumbing lines, or ducts. Serious personal injury or death could result from damage to electrical wires.

Complete the Interior

This chapter covers the completion of the home's interior finishes including finishing walls, ceilings, flooring, trim, and miscellaneous items.

Follow the Steps below:

- ▼ **STEP 1. ALIGN MARRIAGE WALLS** (p. 63)
- ▼ **STEP 2. FINISH GYPSUM BOARD** (p. 63)
- ▼
- STEP 3. COMPLETE WALL AND CEILING FINISHES** (p. 64)
- ▼ **STEP 4. COMPLETE CARPET** (p. 64)
- ▼ **STEP 5. COMPLETE TRIM** (p. 64)
- ▼ **STEP 6. INSTALL SHIP LOOSE ITEMS** (p. 64)

STEP 1. ALIGN MARRIAGE WALLS

Align and secure walls at marriage line openings as follows:

1. **Align walls.** Align walls and clamp in place.
2. **Fasten walls.** Secure clamped walls together with metal straps or long screws so they do not move when the clamps are removed. Insert wood wedges in gaps between walls, and glue and screw to create a tight connection.
3. **Fill gaps.** Fill any remaining gaps with wood or sheathing material.

Does the home require patching and finishing gypsum board walls or ceilings?

- ▶ **YES**, go to **STEP 2. FINISH GYPSUM BOARD**, (p. 63)
- ▶ **NO**, go to **STEP 3. COMPLETE WALL AND CEILING PANELS**, (p. 64).

STEP 2. FINISH GYPSUM BOARD

Finish all unfinished gypsum board walls and ceilings as follows:

1. **Install panels.** Install ship loose gypsum panels using a 1/4 inch diameter bead of adhesive on all framing members and minimum 1-1/2 inch long dry-wall screws, nails, or staples at six inches o.c. along panel edges and 12 inches o.c. in the field into framing members.
2. **Mud seams.** Mud and tape all seams and corners, filling all fastener depressions. Follow mud manufacturer's directions.
3. **Paint.** When the final coat of mud is dry, prime and paint all unfinished gypsum board to match existing paint color and finish texture.

Does the home have pre-finished interior wall panels at the marriage line?

- ▶ **YES**, go to **STEP 3. COMPLETE WALL AND CEILING PANELS**, (p. 64)
- ▶ **NO**, go to **STEP 4. COMPLETE CARPET**, (p. 64).



Fastening gypsum. When attaching gypsum board, depress, but do not break the paper face with the fastener. Breaking the paper will weaken the connection.

Using alternative materials. Obtain the home manufacturer's approval before using interior finish materials other than those provided with the home.

STEP 3. COMPLETE WALL AND CEILING FINISHES

Install interior ship loose wall and/or ceiling panels using a 1/4 inch diameter bead of polyvinyl acetate (PVA) adhesive on all framing members and fasten with minimum 1-1/2 inch long staples or nails at six inches o.c. along panel edges and 12 inches o.c. in the field into framing members.

STEP 4. COMPLETE CARPET

Install and seam ship loose or rolled carpet as follows:

1. **Prepare floor.** Clean the floor of all dirt and debris and smooth the floor deck at the marriage line seams as necessary to ensure a level and smooth surface.
2. **Lay pad.** Lay down the carpet pad, if provided.
3. **Stretch carpet.** Ensuring all carpet "grain" runs in the same direction, fit and secure the carpet using a power carpet stretcher. Stretch the carpet up to the seam and tack it down temporarily until the carpet is seamed.
4. **Butter carpet.** "Butter" with carpet adhesive the edges of the carpet along the seam.
5. **Seam carpet.** Place heat bond tape under the seam with the glue side next to the carpet and apply heat from a seaming iron to the top of the seam, pressing the carpet into the glue.
6. **Keep scraps.** Retain reasonable size carpet scraps to protect carpet and flooring during move-in.

STEP 5. COMPLETE TRIM

Using fine gauge wire staples or pin nails, install ship loose molding and wainscot paneling to finish trimming out ceilings, marriage line walls, front and rear end walls, and passageway doors where necessary.

STEP 6. INSTALL SHIP LOOSE ITEMS

Remove all strapping, blocking, and packaging from appliances, windows, and doors. Install any drapes, mini-blinds, mirrors, door stops, closet shelves, and hardware per the product manufacturer's installation instructions.

Proceed based on the foundation type:

- ▶ **Pier and ground anchor**, go to **Install Stabilizing Systems**, (p. 65)
- ▶ **Load bearing perimeter wall**, go to **Connect Utilities** (p. 77).



Installing carpet. Only experienced carpet installers should install carpet. Failure to follow the carpet manufacturer's directions may void the carpet warranty.



Stagger seams.

Stagger all seams. For example, locate the carpet pad seam three inches to left of marriage line and the carpet seam three inches to right of marriage line.

Install Stabilizing Systems

This chapter covers the design and installation of the stabilizing system which secures the home against lateral and upward forces caused by wind. The system covered here uses earth (or ground) anchors and steel straps connected to the home's longitudinal steel beams and/or exterior walls. Stabilizer plates may also be used to prevent the anchor head from moving laterally in the ground. An anchor, strap, and stabilizer plate (if used) together are referred to as a tie-down.

Anchors can also be mounted in concrete footings when there is enough concrete mass (weight) to resist the lateral and upward forces. This type of system is not covered in this manual.

Follow the Steps below:

- ▼ **STEP 1. DETERMINE ANCHOR LOCATIONS** (p. 65)
- ▼ **STEP 2. DETERMINE TIE-DOWN CONFIGURATION** (p. 71)
- ▼ **STEP 3. SELECT ANCHORS** (p. 71)
- ▼ **STEP 4. INSTALL ANCHORS** (p. 72)
- ▼ **STEP 5. INSTALL STRAPS** (p. 73)
- ▼ **STEP 6. TIGHTEN AND ADJUST STRAPS** (p. 76)

STEP 1. DETERMINE ANCHOR LOCATIONS

Create a sketch of the home plan showing the exterior walls, marriage line(s) (if any) and frame I-beams (this will be similar to the base sketch created in **Prepare Footings**, page 18).

See **Table 19** for a list of anchor locations, types, and where they are required. Pages where the requirements are provided are noted in the last column.

As each anchor location is determined, mark it on the sketch, noting important dimensions such as spacing between anchors. When complete, this will be the home's tie-down plan (**Figure 69** and **Figure 70**).

TABLE 19. ANCHOR LOCATION TYPES

Location	Type	Wind Zone I	Wind Zones II and III	See page
Sidewall	Frame	Yes	Yes	66
	Vertical	No ¹	Yes	70
End wall	Frame	Sometimes	Yes	70
Marriage line	Vertical	Sometimes	Yes	70
Tag Unit	Frame	Yes	Yes	70
	Vertical	No	Yes	70
Porch Post	Vertical	No	Yes	70
Offset Unit		Yes	Yes	70

¹ Connect any factory-installed sidewall tie-down straps to a ground anchor regardless of the wind zone in which the home is placed.

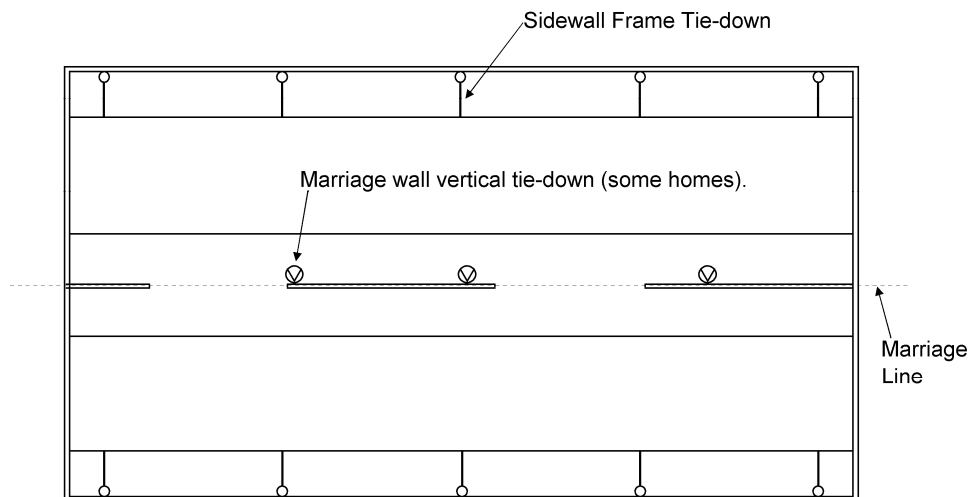
² Install marriage line anchors prior to moving the home over the top of the anchor locations and then return to Set the Home or Complete Multi-Section Set respectively.

Figure 69 and **Figure 70** illustrate typical anchor locations for a double-section home in Wind Zone I and Wind Zones II and III respectively.

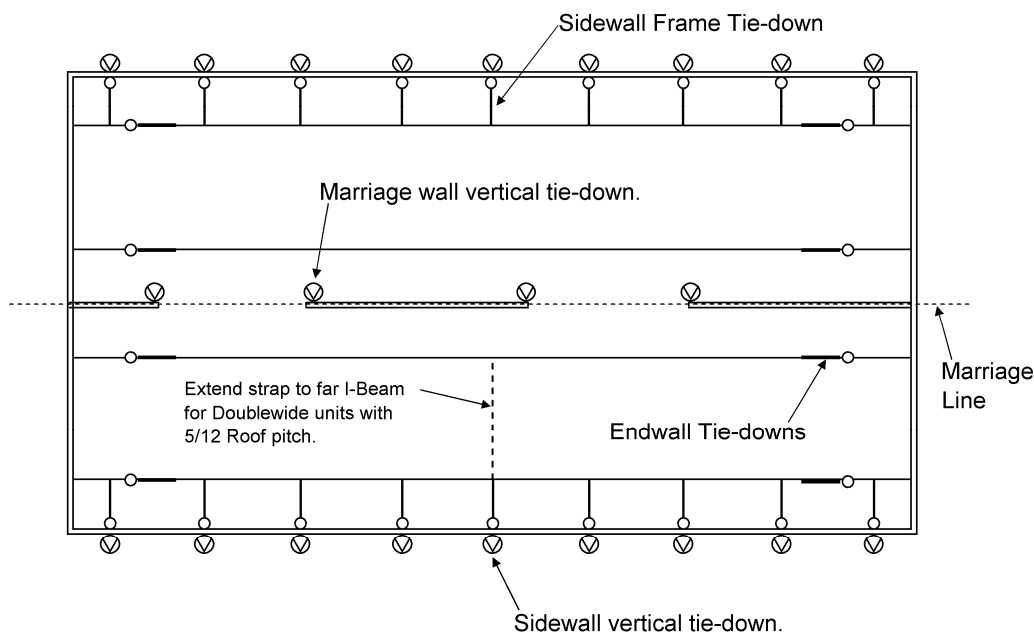


Need for a stabilizing system. The manufactured home must be secured against the wind by the use of an anchor assembly or an alternative foundation system. Where site or other conditions prohibit the use of the manufacturer's instructions, a registered engineer or registered architect must design the stabilizing system.

Flood and seismic forces. The stabilizing system requirements in this chapter do not consider flood or seismic loads and are not intended for use in flood or seismic hazard areas. In those areas retain a registered engineer or registered architect to design the stabilizing system.



Key:
 ○ ← Anchor Head
 | ← Strap
 ⊗ ← Vertical Tie-down



SIDEWALL FRAME ANCHORS

Use **Tables 20, 21, and 22** to determine the spacing between anchors for Wind Zones I, II, and III, respectively. Spacing requirements will vary depending on the type of home (single or multi-section), the slope of the roof, the width of the floor for each section, the sidewall height, I-beam spacing, and the height from the ground to the strap attachment point. Determine the values for the home. Using the table for the appropriate wind zone, determine the column and row that corresponds to the characteristics of the home. The value on the tables is the maximum distance between anchors. Check the anchor manufacturer instructions to determine if there is a minimum spacing between anchors. Keep in mind that sidewall frame tie-downs must be located no more than two feet from each end wall.

Figure 69. Typical anchor locations for a double-section home in Wind Zone I

Figure 70. Typical anchor locations for a double-section home in Wind Zones II or III



Maximum spacing requirements. The LAHJ may have anchor spacing requirements that supersede the values provided in this manual.



TABLE 20. WIND ZONE I SIDEWALL FRAME ANCHOR MAXIMUM SPACING

Floor width	Sidewall height	I-beam spacing	Height from ground to strap attachment	Roof slope maximum 4.35/12 (20 degrees)		Roof slope max. 5/12 (22.5 deg.)	Roof slope max. 7/12 (30.3 deg.)
				Single section	Double section	Double section	Double section
--Less than 11'	Up to 8'-0"	75.5" or 82.5"	Up to 25"	--	8'-0"		
			25" to 48"	--	8'-0"		
			48" to 67"	--	8'-0"		
		99.5"	Up to 25"	--	8'-0"		
			25" to 48"	--	8'-0"		
			48" to 67"	--	8'-0"		
	More than 8'-0" to 9'-0"	75.5" or 82.5"	Up to 25"	--	7'-0"		
			25" to 48"	--	7'-0"		
			48" to 67"	--	7'-0"		
		99.5"	Up to 25"	--	7'-0"		
			25" to 48"	--	7'-0"		
			48" to 67"	--	7'-0"		
More than 11' to 13'	Up to 8'-0"	75.5" or 82.5"	Up to 25"	10'-9"	11'-3"	7'-6"	6'-6"
			25" to 48"	7'-6"	8'-0"	5'-0"	4'-6"
			48" to 67"	7'-6"	8'-0"	5'-0"	4'-6"
		99.5"	Up to 25"	8'-3"	8'-9"	5'-9"	5'-0"
			25" to 48"	7'-6"	8'-0"	5'-0"	4'-6"
			48" to 67"	7'-6"	8'-0"	5'-0"	4'-6"
	More than 8'-0" to 9'-0"	75.5" or 82.5"	Up to 25"	9'-0"	10'-0"	7'-0"	6'-0"
			25" to 48"	6'-9"	7'-3"	5'-0"	4'-3"
			48" to 67"	6'-9"	7'-3"	5'-0"	4'-3"
		99.5"	Up to 25"	7'-6"	7'-9"	5'-3"	4'-9"
			25" to 48"	6'-9"	7'-3"	5'-0"	4'-3"
			48" to 67"	6'-9"	7'-3"	5'-0"	4'-3"
More than 13' to 15'	Up to 8'-0"	75.5" or 82.5"	Up to 25"	11'-9"	13'-9"	8'-3"	7'-3"
			25" to 48"	9'-6"	10'-0"	6'-0"	5'-3"
			48" to 67"	7'-9"	8'-3"	5'-0"	4'-3"
		99.5"	Up to 25"	11'-6"	12'-6"	7'-6"	6'-6"
			25" to 48"	7'-9"	8'-3"	5'-0"	4'-3"
			48" to 67"	7'-9"	8'-3"	5'-0"	4'-3"
	More than 8'-0" to 9'-0"	75.5" or 82.5"	Up to 25"	9'-3"	12'-3"	7'-9"	6'-9"
			25" to 48"	8'-6"	9'-0"	5'-9"	5'-0"
			48" to 67"	7'-0"	7'-3"	4'-9"	4'-0"
		99.5"	Up to 25"	10'-6"	11'-0"	7'-0"	6'-0"
			25" to 48"	7'-0"	7'-6"	4'-9"	4'-0"
			48" to 67"	7'-0"	7'-3"	4'-9"	4'-0"
More than 15'	Up to 8'-0"	75.5" or 82.5"	Up to 25"	11'-9"	14'-0"	8'-3"	7'-0"
			25" to 48"	11'-0"	12'-0"	6'-9"	5'-9"
			48" to 67"	9'-0"	10'-0"	5'-6"	4'-9"
		99.5"	Up to 25"	13'-0"	14'-0"	8'-0"	7'-0"
			25" to 48"	10'-0"	11'-0"	6'-0"	5'-3"
			48" to 67"	8'-0"	8'-9"	5'-0"	4'-3"
	More than 8'-0" to 9'-0"	75.5" or 82.5"	Up to 25"	9'-3"	13'-0"	7'-9"	6'-9"
			25" to 48"	9'-3"	10'-9"	6'-6"	5'-6"
			48" to 67"	8'-3"	9'-0"	5'-3"	4'-6"
		99.5"	Up to 25"	11'-9"	13'-0"	7'-6"	6'-6"
			25" to 48"	9'-0"	9'-9"	5'-6"	5'-0"
			48" to 67"	7'-0"	7'-9"	4'-6"	4'-0"




TABLE 21. WIND ZONE II SIDEWALL FRAME ANCHOR MAXIMUM SPACING

Floor width	Sidewall height	I-beam spacing	Height from ground to strap attachment	Roof slope maximum 4.35/12 (20 degrees)		Roof slope maximum 5/12 (26.5 degrees)	
				Single section	Double section	Single section	Double section
Less than 11'	Up to 7'-6"	75.5"	Up to 22"	--	5'-4"		
			22" to 48"	--	M.A.		
			48" to 67"	--	N.A.		
		99.5"	Up to 25"	--	N.A.		
			25" to 48"	--	N.A.		
			48" to 67"	--	N.A.		
	More than 7'-6" to 9'-0"	75.5"	Up to 25"	--	4'-0"		
			25" to 48"	--	N.A.		
			48" to 67"	--	N.A.		
		99.5"	Up to 25"	--	N.A.		
			25" to 48"	--	N.A.		
			48" to 67"	--	N.A.		
More than 11' to 13'	Up to 7'-6"	75.5" or 82.5"	Up to 25"	5'-4"	5'-4"	--	5'-4"
			25" to 48"	N.A.	N.A.	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
		99.5"	Up to 25"	4'-0"	4'-0"	--	5'-4"
			25" to 48"	N.A.	N.A.	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
	More than 7'-6" to 9'-0"	75.5" or 82.5"	Up to 25"	4'-0"	4'-0"	--	5'-4"
			25" to 48"	N.A.	N.A.	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
		99.5"	Up to 25"	N.A.	N.A.	--	5'-4"
			25" to 48"	N.A.	N.A.	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
More than 13' to 15'	Up to 7'-6"	75.5" or 82.5"	Up to 25"	5'-4"	5'-4"	--	5'-4"
			25" to 48"	4'-0"	4'-0"	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
		99.5"	Up to 25"	5'-4"	5'-4"	--	5'-4"
			25" to 48"	N.A.	N.A.	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
	More than 7'-6" to 9'-0"	75.5" or 82.5"	Up to 25"	5'-4"	5'-4"	--	5'-4"
			25" to 48"	N.A.	N.A.	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
		99.5"	Up to 25"	4'-0"	4'-0"	--	5'-4"
			25" to 48"	N.A.	N.A.	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
More than 15'	Up to 7'-6"	75.5" or 82.5"	Up to 25"	5'-4"	5'-4"	--	5'-4"
			25" to 48"	4'-0"	4'-0"	--	5'-4"
			48" to 67"	4'-0"	4'-0"	--	5'-4"
		99.5"	Up to 25"	5'-4"	5'-4"	--	5'-4"
			25" to 48"	4'-0"	4'-0"	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
	More than 7'-6" to 9'-0"	75.5" or 82.5"	Up to 25"	5'-4"	5'-4"	--	5'-4"
			25" to 48"	4'-0"	4'-0"	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"
		99.5"	Up to 25"	5'-4"	5'-4"	--	5'-4"
			25" to 48"	4'-0"	N.A.	--	5'-4"
			48" to 67"	N.A.	N.A.	--	5'-4"



TABLE 22. WIND ZONE III SIDEWALL FRAME ANCHOR MAXIMUM SPACING

Floor width	Sidewall height	I-beam spacing	Height from ground to strap attachment	Roof slope maximum 4.35/12 (20 degrees)		Roof slope maximum 5/12 (26.5 degrees)	
				Single section	Double section	Single section	Double section
Less than 11'	Up to 7'-6"	75.5"	Up to 25"	--	4'-0"		
			25" to 48"	--	N.A.		
			48" to 67"	--	N.A.		
		99.5"	Up to 25"	--	N.A.		
			25" to 48"	--	N.A.		
			48" to 67"	--	N.A.		
	More than 7'-6" to 9'-0"	75.5"	Up to 20"	--	4'-0"		
			20" to 48"	--	N.A.		
			48" to 67"	--	N.A.		
		99.5"	Up to 25"	--	N.A.		
			25" to 48"	--	N.A.		
			48" to 67"	--	N.A.		
More than 11' to 13'	Up to 7'-6"	75.5" or 82.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
		99.5"	Up to 25"	N.A.	N.A.	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
	More than 7'-6" to 9'-0"	75.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
		99.5"	Up to 25"	N.A.	N.A.	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
More than 13' to 15'	Up to 7'-6"	75.5" or 82.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
		99.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
	More than 7'-6" to 9'-0"	75.5" or 82.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
		99.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
More than 15'	Up to 7'-6"	75.5" or 82.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	4'-0"	4'-0"	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
		99.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
	More than 7'-6" to 9'-0"	75.5" or 82.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"
		99.5"	Up to 25"	4'-0"	4'-0"	--	4'-0"
			25" to 48"	N.A.	N.A.	--	4'-0"
			48" to 67"	N.A.	N.A.	--	4'-0"

SIDEWALL VERTICAL ANCHORS

Homes designed for Wind Zones II and III also require vertical tie-downs along the side-walls. The vertical tie-down anchor straps (or brackets for connecting to the home) are factory installed and indicate the locations. Vertical and frame sidewall tie-downs may connect to one double-headed anchor or each to its own dedicated anchor.

Any factory-installed sidewall tie-down straps must be connected to a ground anchor regardless of the wind zone in which the home is placed.

END WALL FRAME ANCHORS

End wall frame tie-downs are especially important for homes that are wider and have higher roof pitches because those features increase the surface area exposed to wind loads at the ends of the home. Use **Table 23** to determine the number of end wall frame anchors required at the each end of each home section. End wall frame tie-downs are not required at Wind Zone I.

TABLE 23. END WALL FRAME ANCHORS REQUIRED PER HOME SECTION ON EACH END OF THE HOME

	Maximum sidewall height	Maximum roof pitch	Wind Zone II			Wind Zone III		
			12' section width	14' section width	16' & 18' section width	12' section width	14' section width	16' & 18' section width
Single Section	7'-6"	4.35/12	2	4	4	4	4	4
		5/12	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
	9'-0"	4.35/12	4	4	4	4	4	4
		5/12	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Multi-Section	7'-6"	4.35/12	3	3	3	3	3	4
		5/12	3	3	3	3	4	4
	9'-0"	4.35/12	3	3	4	3	4	4
		5/12	3	3	4	3	4	4

MARRIAGE LINE VERTICAL ANCHORS

In Wind Zones II and III, marriage line anchors are required along the marriage wall. In Wind Zone I marriage line anchors are sometimes required. (**Figure 80**)

There may be manufacturer-installed brackets indicating required tie-down locations (may be identified by tags or paint). If necessary to avoid interference with tie-downs, the marriage line pier location may be offset horizontally from the column by a maximum of 6 inches.

TAG UNIT FRAME ANCHORS

See Addendum to these installation instructions for tie-down requirements for tag units.

TAG UNIT VERTICAL ANCHORS

See Addendum to these installation instructions for tie-down requirements for tag units.

PORCH POST ANCHORS

At Wind Zone II or III install tie-down strap to a ground anchor through the factory installed bracket. Install ground anchor and tie-down strap at each factory installed bracket.

OFFSET UNIT ANCHORS

See Addendum to these installation instructions for tie-down requirements for offset units.



When to install marriage

line anchors. Anchors along the marriage line must be installed prior to the second half of a multi-section home being set.

Setting the strap angle.

When straps are connected only to the near I-beam, (**Figure 71**) the angle the strap makes with the ground should be between 30 degrees and 60 degrees. Angles greater than 60 degrees may require closer anchor spacing.

STEP 2. DETERMINE TIE-DOWN CONFIGURATION

There are two primary tie-down configurations: the near beam and the far beam methods. Skyline Corporation use the near beam method for all Wind Zone I applications. The near beam method is also used at Wind Zones II and III, except when a unit has a 5 in 12 roof pitch, and then the far beam method is used. The two methods are described below:

- **Near Beam Method.** Connect an anchor strap from the anchor head to the beam closest to the anchor. (**Figure 71**). In addition for Wind Zones II and III, connect a vertical sidewall strap from the sidewall of the home to the anchor head using a double-headed anchor.
- **Far Beam Method.** Connect an anchor strap from the anchor head to the outside beam. (**Figure 71**). In addition for Wind Zones II and III, connect a vertical sidewall strap from the sidewall of the home to the anchor head using a double-headed anchor. The far beam method is only required for double wide units at Wind Zone II or III with a 5/12 roof pitch.

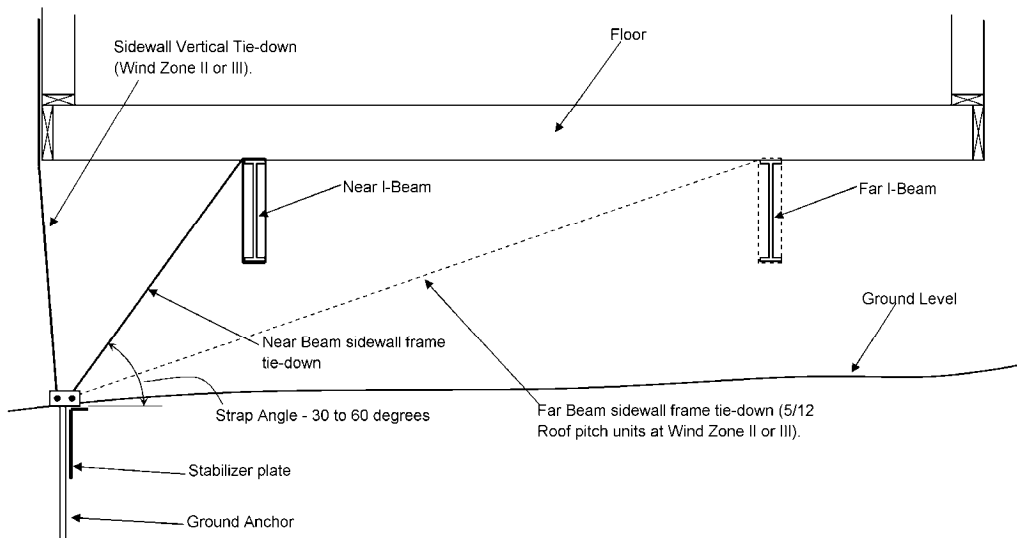


Figure 71. Lateral tie-down configurations

STEP 3. SELECT ANCHORS

Use the torque probe results from **Prepare the Site, STEP 5. DETERMINE SOIL-BEARING CAPACITY AND FROST LINE** (p. 15) and the anchor manufacturer instructions; select the type and length of anchor to use. The installed ground anchor size (length) must be listed (i.e. approved) for the soil class.

Make sure the anchor is of sufficient length such that the top of the helix is below the frost line. Select a shaft diameter sufficient to resist excessive torsion, "ring-off" (when the helix or anchor head separates from shaft) or shaft splitting. Consult the anchor supplier for guidance.

Review all of **STEP 3. INSTALL ANCHORS** (p. 71) and **STEP 4. INSTALL STRAPS** (p. 72) before making final anchor selections to determine when single-headed vs. double-headed anchors should be used. Follow the specifications in Table 30 when selecting stabilizing system components.

TABLE 24. ANCHOR SYSTEM MATERIALS SPECIFICATIONS

Component	Specification
Anchors	Anchors must be tested and listed to resist a minimum ultimate load of 4,725 lbs and a minimum allowable working load of 3,150 lbs or ultimate and corresponding working load limited by soil conditions and anchor length. The working load is the maximum load the designer can use. Ground anchors must be provided with protection against weather deterioration and corrosion at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 oz per sq ft of surface coated.
Straps	Straps must be minimum 1-1/4" x 0.035" zinc-coated (0.30 oz per sq ft) steel strapping conforming to ASTM D3953-97, Type 1, Grade 1, Finish B with a minimum allowable working load capacity of 3,150 lbs and a minimum ultimate load of 4,725 lbs. Slit or cut edges of zinc-coated strapping do not need to be zinc coated.
Stabilizer plates	The size and type of stabilizer plate, if required by the ground anchor manufacturer, will be specified in the anchor manufacturer's instructions. Stabilizer plates must be provided with protection against weather deterioration and corrosion at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 oz per sq ft of surface coated. Alternatively, ABS stabilizer plates may be used when listed and certified for such use.

STEP 4. INSTALL ANCHORS

Before beginning anchor installation, check for obstructions under the home such as piers and frame members that may interfere with the tie down strapping. Check with utility companies to determine the location of underground utilities, such as electrical and phone lines, and water, sewer, and gas pipes that may be buried in potential anchor locations. Also check for homeowner-installed wires and pipes, such as those connecting exterior lighting or sheds to the home. These must also be avoided.

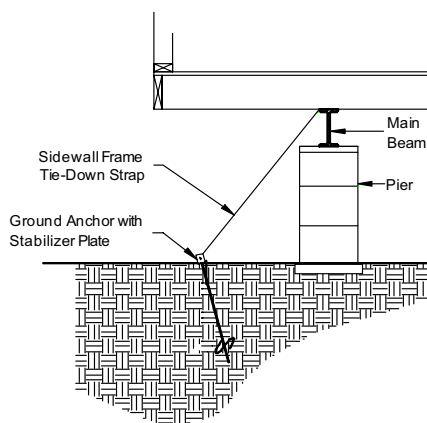
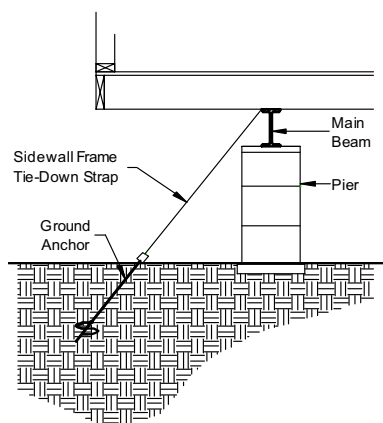
FRAME ANCHORS

Frame anchors can be installed in two ways, in-line and against a stabilizer plate. The two methods are discussed below:

In-Line Configuration

The in-line configuration (**Figure 72**) for homes can be used in Wind Zone I only. Typically, in-line anchors are used under high homes where the anchors can be installed from under the home after the home is set. In-line anchors can also be installed before the home is set, however, precisely aligning the anchor with the home both vertically and horizontally is difficult. Using swivel connectors for the strap to beam connection can provide some horizontal flexibility.

To install in-line frame anchors, drive the anchor into the ground at an angle and location such that a straight line can be drawn from the tip of the anchor through the anchor head and to the connection point on the I-beam (**Figure 73**).



Stabilizer Plate Configuration

Stabilizer plate configurations (**Figure 73**) are suitable for homes in all wind zones. Anchors may be installed after the home is set. A stabilizer device, typically an ABS or metal plate, is used to prevent the top of the anchor from slicing through the soil when the load is applied. Stabilizer plates are available in a variety of widths. Choose the widest plate that can be driven into the soil to maximize resistance to movement. The LAHJ



Grading area around anchors. Anchor heads should not rest in sunken spots. Grade the ground so that water does not collect around anchor heads, but runs away from the anchor and out from under the home. Do not bury anchor heads.

Figure 72. In-line anchor configuration

Figure 73. Stabilizer plate configuration



may have stabilizer plate requirements.

Install anchors with stabilizer plates as follows:

1. **Locate anchor.** Select a location for the anchor under the home but within six inches of the exterior wall (**Figure 74**). Avoid locations that will interfere with skirting.

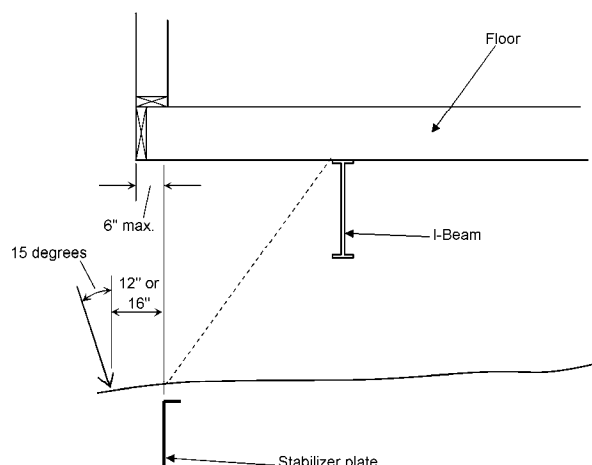


Figure 74. Determining anchor and stabilizer plate location

2. **Install anchor.** To assure that the anchor attachment point will end up at the stabilizer plate, start the anchor insertion approximately 12 inches back from the desired location if using a 48 inch long anchor, or approximately 16 inches if using a 60 inch long anchor. Install the anchor at about 15 degrees off vertical, with the head tilted away from the home. Install the anchor to a depth of approximately one half its length.
3. **Drive stabilizer plate.** Drive the stabilizer plate into the ground to its full depth at the point determined in Step 1.
4. **Complete anchor installation.** Screw the anchor the rest of the way into the ground. The finished anchor must be installed to its full depth.

VERTICAL ANCHORS

To install vertical anchors, screw the anchor into the ground directly under the strap attachment point on the home until the bottom of the anchor head is flush with the ground or no more than one inch above grade.

STEP 5. INSTALL STRAPS

Follow the instructions below to connect straps from the home to sidewall frame, end wall frame and vertical anchors.

Always protect straps at sharp corners including around I-beams with radius clips or other methods (**Figure 75**). Radius clips may be fabricated from 26ga (min) by 1 1/4-inch wide galvanized steel strap formed to fit around corners.

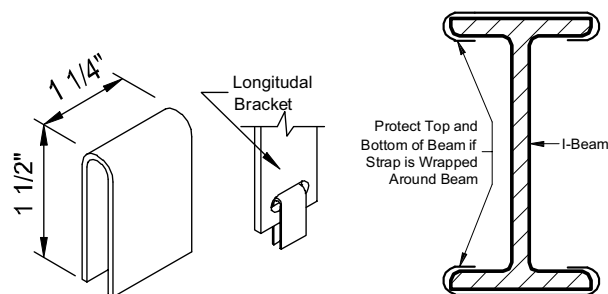


Figure 75. Radius clips



Soil depression.

Do not locate anchor heads in soil depressions where water may pool.

SPLICING STRAPS

Splicing may be required when a pre-cut strap is of insufficient length. Splices in tie-down straps are not permitted in a 'Y' configuration. Overlap straps by 12 inches, applying one splice clip from above and the other from below; use a crimping tool to tightly seal the splice clips (Figure 76). Do not run any portion of the splice through an anchor head bolt.

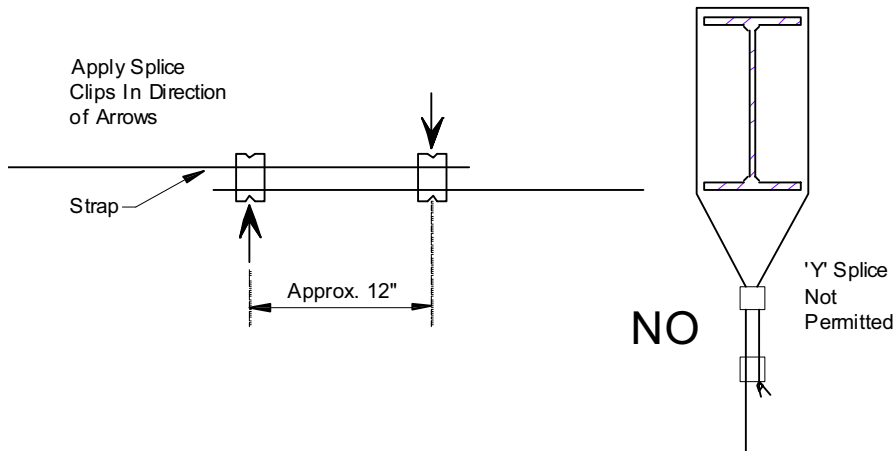
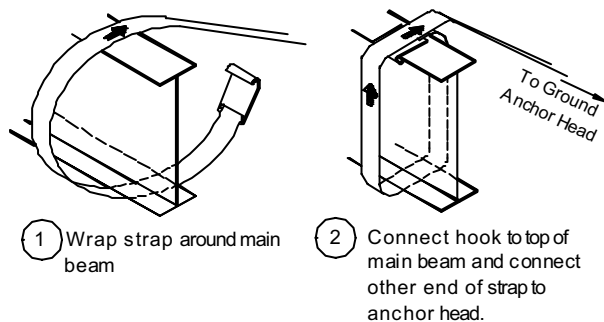


Figure 76. Tie-down strap splice

SIDEWALL FRAME ANCHORS

Install straps to sidewall frame anchors as follows:

1. **Connect strap to home.** Connect one end of the strap to the home connection point using approved buckles or clips (swivel or hook clip preferred).



2. **Connect strap to anchor.** Connect the other end of the strap to the split bolt in the anchor. Leave enough strap length to be able to make at least three, but no more than five complete turns around the bolt before it becomes tight (approximately 2 1/2 inches per turn or 7 1/2 to 13 inches total). Fewer than three turns and the strap may not hold onto the bolt when force is applied. Conversely, more than five turns may not fit within the U-channel of the anchor head. Follow the procedure outlined in Figure 78.

Figure 77. Strap to beam connection



Strap to beam connection.

Regardless of the strap supplier's recommendations, the strap must be connected to the top of the main beam to prevent damage to the structure.

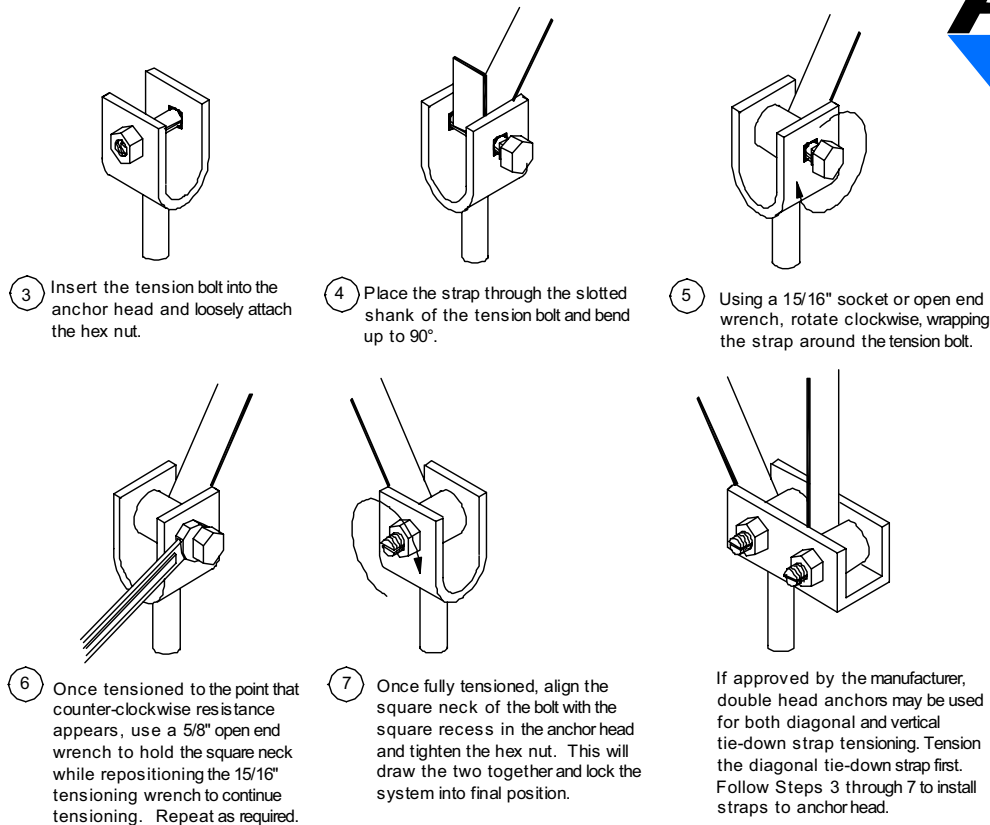


Figure 78. Procedure for connecting the strap to frame and anchor



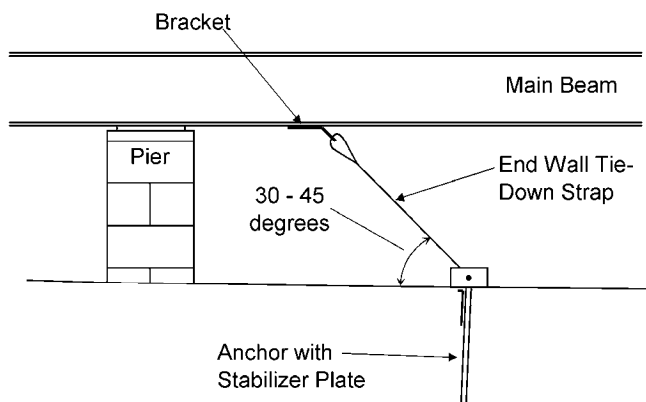
Anchor head location. As the anchor is pulled up to meet the stabilizer plate, the head of the anchor will rise. In its final position, the bottom of the anchor head should be no more than 1/4 inch above the top of the stabilizer plate.

Figure 79. End wall frame anchor attachment method

3. **Pretension anchor.** For anchors with stabilizer plates, pretension the anchor by pulling it up to the stabilizer plate using the strap and take-up bolt to move the anchor head. Continue pulling the strap until the plate moves a small amount (about 1/2 inch). This is called packing the plate and it will yield the strongest resistance (the bottom of the anchor head should be maximum 1/4 inch above the top of the stabilizer plate).

END WALL FRAME ANCHORS

Attach straps to the bracket welded by the manufacturer to the frame (**Figure 79**). If no brackets have been installed, use approved beam clamps designed specifically for this purpose, available from anchor suppliers. Connect straps to anchors following same procedure as for sidewall frame anchors.



MARRIAGE LINE VERTICAL ANCHORS

If vertical straps have been attached to the home by the manufacturer, connect the other end of the straps to the anchor heads. Factory installed marriage line uplift straps must be attached to anchoring equipment. The types of straps used are shown below.

(Figure 80) Type 1 is a strap used at Wind Zone I only. Some Wind Zone I units do not require marriage line vertical uplift tie-downs. These units will not have any of the straps shown below factory installed and will have double marriage line walls. Type 2 and 3 are used at Wind Zone II or III only. All Wind Zone II or III multi wide units require marriage line vertical tie-downs.

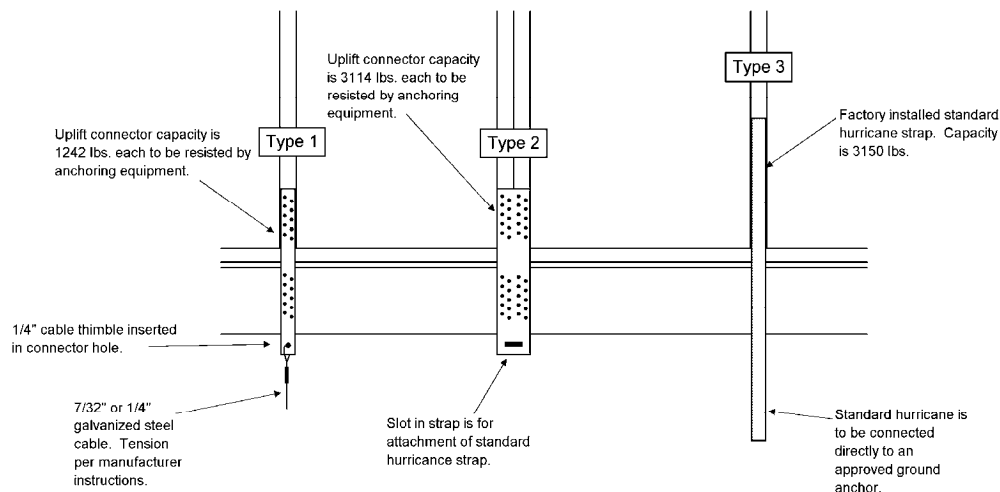


Figure 80. Marriage line vertical tie-downs

STEP 6. TIGHTEN AND ADJUST STRAPS

After all anchors have been installed and pre-tensioned, recheck all anchor straps to assure that they are tight and that the anchor shafts have remained in contact with the stabilizer plates. Do not over-tension straps.

► go to **Connect Utilities** (p. 77)

Connect Utilities

This chapter contains procedures and requirements for the connection and testing of utility hook-ups. Responsibility for making utility connections varies by location. Consult the LAHJ and the utility before connecting the home to any utilities.

Follow the Steps below:

- ▼ **STEP 1. CONNECT ELECTRICAL SERVICE** (p. 77)
- ▼ **STEP 2. CONNECT WATER SERVICE** (p. 80)
- ▼ **STEP 3. CONNECT GAS SERVICE** (p. 83)
- ▼ **STEP 4. CONNECT OIL SERVICE** (p. 84)

STEP 1. CONNECT ELECTRICAL SERVICE

The home is designed for connection to an electrical wiring system rated at 120/240 volt AC. All electrical field work must be done by a licensed electrician or other person approved by the LAHJ.

50 AMP POWER SUPPLY CORD

The power supply to a Skyline Corporation manufactured home may be by a listed 50 AMP power supply cord. The power cord shall be permanently attached to the distribution panel board or to a junction box. The listed 50 AMP power supply cord shall bear the following marking: FOR USE WITH MOBILE HOMES – 50 AMPERES.

FEEDER WIRE AND EQUIPMENT SIZES

The current rating (in amperes) of the home can be found on the tag located on the outside next to the feeder or service entrance, and on the electrical distribution panel. Using this information, determine the required feeder wire size from **Table 25**. These sizes are based on an ambient temperature of 86 degrees Fahrenheit and do not take voltage drop into consideration.

Acceptable conductor types are: RHH, RHW, RHW-2, THHN, THHW, THW, THW2, THWN, THWN-2, XHHW, XHHW-2, SE, USE, and USE-2.

TABLE 25. ELECTRICAL FEEDER WIRE AND EQUIPMENT SIZES FOR COPPER CONDUCTORS

Main Breaker Size in Panel Box (AMPS)	Junction box size	Minimum Size Raceway Conduit Diameter (in)	Conductors (Cu)			
			Red & Black (Power)	White (Neutral)	Green (Grounding)	Bare Ground
50	6x6x6	1	#6 AWG	#6 AWG	#10 AWG	#8
100	8x8x4	1-1/4	#3 AWG	#3 AWG	#8 AWG	#8
125	10x10x4	1-1/2	#2 AWG	#2 AWG	#6 AWG	#6
150	10x10x4	1-1/2	1/0 AWG	#2 AWG	#6 AWG	#6
200	12x12x4	2	3/0 AWG	1/0 AWG	#6 AWG	#4
225	15x12x4	2-1/2	3/0 AWG	1/0 AWG	#4 AWG	#4



Special precautions when installing electrical service. Installation of the electric power to the home can cause exposure to live electrical circuits. Exposure to live electrical circuits or improper grounding of the conductor in the panel board may result in severe shock or possible electrocution. A qualified installer must make the connections for the electric power.

FEEDER CONNECTIONS

Feeder connections are made from above or from below the home as follows:

From above – mast weatherhead feeder

The routing, connection, and support of the service drop must meet local codes. Homes equipped this way contain all necessary conduits to the electrical distribution panel. However, the feeder conductors (not provided with the home) are installed on site. If the masthead is located above the roof overhang, allow a minimum clearance of eight feet above all roof points that the conductors pass over. There are two exceptions to this rule: (1) The vertical clearance may be reduced to three feet if the roof has a minimum slope of 4 in 12; and (2) The vertical clearance may be reduced to 18 inches if no more than four feet of service-drop conductors pass above the roof overhang, and if they terminate at a through-the-roof raceway or approved support. A minimum clearance must also be provided from the final grade to the service-drop conductors. This measurement may vary from 10 feet to 18 feet, depending on the types of traffic anticipated below the service drop (refer to the NEC). Unless impractical, locate service heads above the point of attachment of the service-drop conductors and make them rain-tight. If individual conductors do not extend downward, form drip loops.

From below – underside junction box feeder

A section of conduit is factory installed through the floor cavity. Connect to that conduit with approved fittings and conduit (not provided with the home) to the point where the service entrance cable enters the crawl space. Install properly-sized service entrance conductors from the main power supply to the panel board. Depending on the location of the main panelboard inside the home, or the point at which the service entrance conductors enter the crawl space, a separate service disconnect may be required. Refer to **Table 25** for the conductor and junction box requirements. The installer must provide the supply connection including the feeder conductors, junction box, and conduit connectors. Protect conductors emerging from the ground from a minimum of 18 inches below grade to eight feet above grade, or to the point of entrance to the home. The distance measured from the top surface of a buried cable, conduit, or raceway to the finished grade must meet the minimum burial requirements outlined in the NEC. Use a moisture-proof bushing at the end of the conduit from which the buried cable emerges.

GROUNDING

The home must be properly grounded to protect the occupants. The only safe and approved method of grounding the home is through an electrically-isolated grounding bar in the manufactured home distribution panel board. This grounds all non-current-carrying metal parts to the electrical system in the home at a single point.

Each neutral conductor must be connected to the system grounding conductor on the the supply side of the main disconnect in accordance with Articles 250.24, 250.26, and 250.28 of the National Electrical Code, NFPA No. 70-2005.

Where the meter base has a disconnect (typically when the meter is more than 6 feet from the service electric panel, although this may vary by LAHJ) the ground and neutral should be bonded at that disconnect and then grounded to the driven earth ground. Four wires will leave the service electric panel to the disconnect. Three wires will enter the disconnect from the meter base (refer to **Figure 81**).

Where there is no disconnect on the meter base or between the meter base and service electric panel (typically when the meter is within 6 feet from the service electric panel, although this may vary by LAHJ), the main circuit breaker in the service electric panel becomes the first disconnect. In this case, the neutral and ground are bonded in the service electric panel and connected to the driven earth ground from the service electric panel. Three wires lead between the meter base and the service electric panel (refer to **Figure 82**).



Power supply. A large enough power supply must be available at the site. An inadequate power supply may result in improper operation of and possible damage to motors and appliances. It may also increase electricity costs.



Grounding the electrical system. Do not provide electrical power until the grounding electrode is installed and connected. When the meter base is not on the house never use the neutral conductor of the feeder cable as a ground wire.

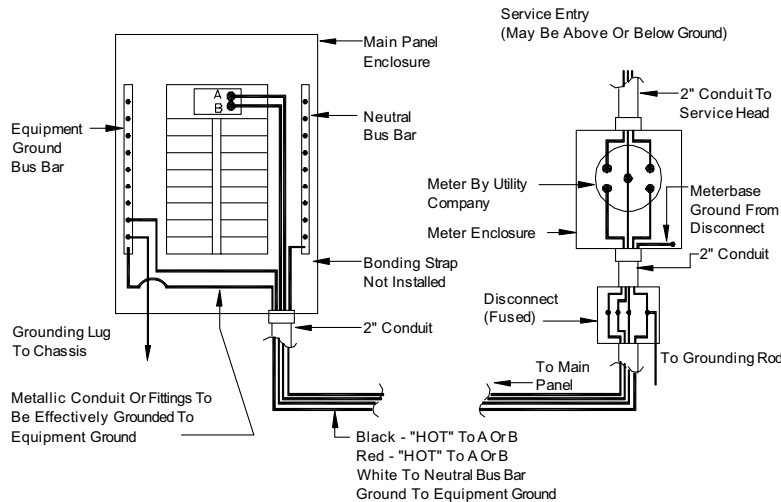


Figure 81. Electrical feeder connection when meter has a disconnect installed (typically more than 6 feet from service electric panel).

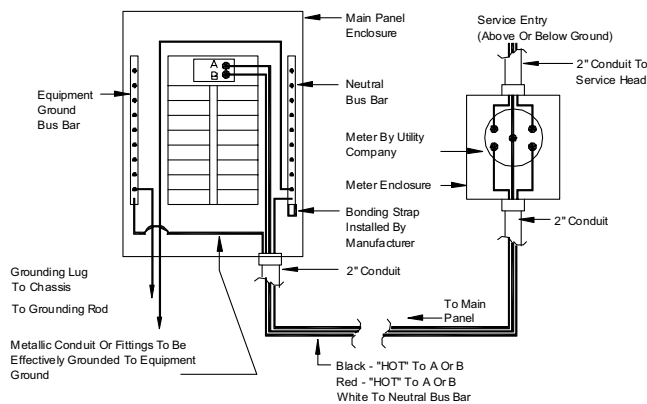


Figure 82. Meter base wiring when there is no separate disconnect installed (typically within 6 feet of service electric panel).

In all cases, a grounding electrode conductor and a ground wire must be installed according to the following specifications:

1. Grounding wire to be per **Table 25** provided by the manufacturer. If manufacturer provides a minimum 1/2 inch EMT or conduit raceway, the #6 minimum bare copper wire is provided by the retailer for installation.
2. The clamp connecting the grounding wire to the electrode shall be suitable for direct burial and located flush or below ground level.
3. Use a listed 5/8 inch diameter by eight foot long iron electrode or nonferrous rod of at least 1/2 inch diameter by eight feet long for grounding (larger sizes may be required by the LAHJ due to soil impedance).
4. Drive the electrode to a depth of not less than eight feet so that at least eight feet of the electrode is in contact with the soil.
5. When rock is encountered, the electrode may be driven at an angle not to exceed 45 degrees from vertical or buried in a trench that is at least 2-1/2 feet deep.

FIELD INSTALLED METER BASE

When a meter base is installed in the field, **Figure 83** and the following requirements must be adhered to:

- Install the meter base according to the manufacturer's instructions.
- Use straps to support any conduit. Do not use the meter base equipment for support.
- Use exterior equipment and enclosures listed as weatherproof and entrance

conductors listed for wet locations.

- The grounding bar may be installed separate from the neutral bar for purposes of testing the electrical system.
- The grounding bar may be isolated during the electrical check and re-attached, after the tests are completed.
- Check with the local electrical utility to verify meter base requirements and locations and distances for the main panel and meter box.
- The field installed meter base enclosure must be installed in accordance with its listing. Fasten securely to exterior wall studs and provide for a weather-tight seal.
- Check the local code for any requirements regarding the location of the meter base.

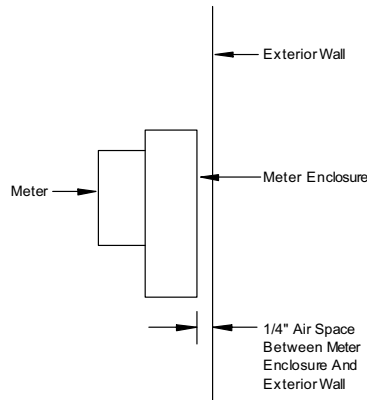


Figure 83. Meter base clearances.

STEP 2. CONNECT WATER SERVICE

CONNECTION

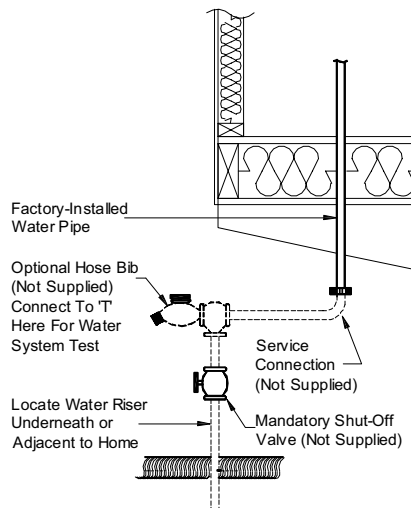
To connect the home's water system to the water source, identify the water inlet located under the home (usually below the water heater compartment or utility room) and follow the procedure described below (refer to **Figure 84**):

1. **Flush pipe.** Flush field-installed water piping free of all debris prior to connection to the home's water inlet.
2. **Clean threads.** Ensure that pipe threads are clean.
3. **Install pressure-reducing valve.** If the local water supply exceeds 80 psi install a pressure-reducing valve.
4. **Connect valve.** Install a main shut-off valve between the water supply and the inlet on the home. Locate the riser for the shutoff valve underneath or adjacent to the home. Select a full flow gate or ball shutoff valve, or equivalent valve. To prevent the possibility of fresh water contamination install an anti-siphon valve on all field installed exterior faucets.



Selecting heat tape. Use only pipe-heating cable (tape) listed for manufactured homes, and install it in accordance with the cable (tape) manufacturer installation instructions.

Maximum water pressure. The water system for the home was designed for a maximum inlet pressure of 80 psi.



5. **Install water heater discharge drain.** Inspect the drain opening on the water heater to ensure that it is clear of any obstruction. If the home is to be installed on a basement or enclosed crawlspace, install drain pipe connecting the discharge from the water heater temperature and pressure relief valve to the outside or to a sump.
6. **Install water heater drip pan drain.** Assure that the drain for the water heater drip pan does not terminate under the home. Using the materials provided and the accompanying instructions run a drain line from the water heater drip pan through the floor to the exterior of the crawl space. Terminate the line between six and 24 inches above grade. (Figure 85). Make the termination point rodent proof.

Figure 84. Water system connection



Turning on Water Service.

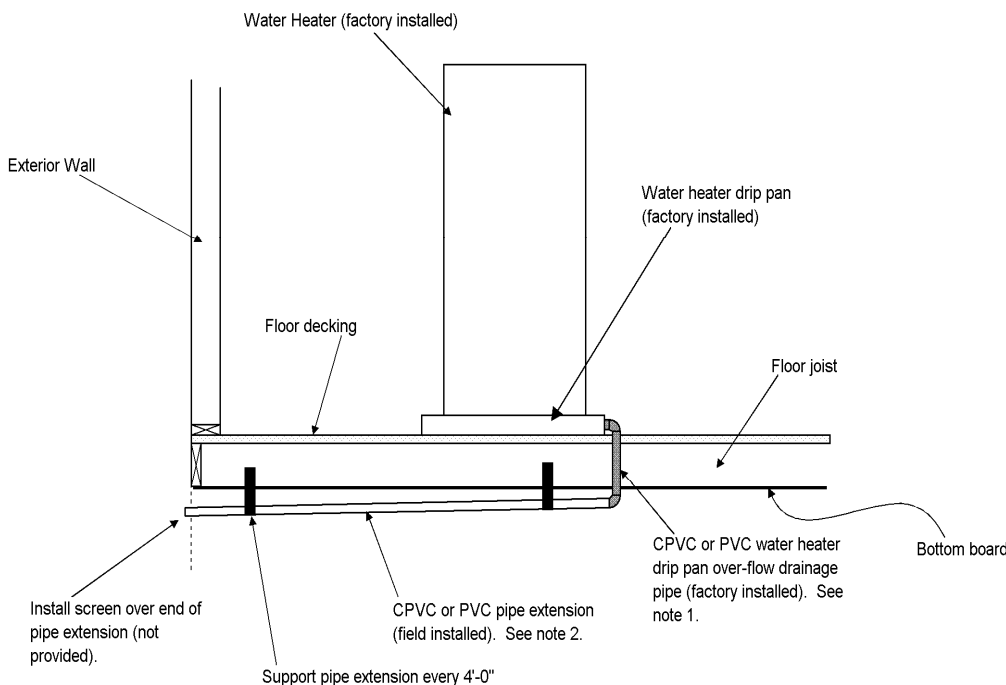
Do NOT turn on the water service to the home until the drain lines have been completed and connected to the sewer system.



Using check

valves. Install a check valve on the water inlet to prevent water system drainage in the event of a loss of water pressure from the source. Such pressure loss could cause the water heater to drain, exposing the heating elements of electric water heaters causing them to fail.

Figure 85. Water heater drip pan and drain



Note 1. Water heater drip pan drain pipe has been factory installed through the bottom board. A 90 degree elbow has been factory installed to accept the pipe extension.

Note 2. Insert the CPVC or PVC drain pipe extension (factory provided – field installed) into the factory installed 90 degree elbow. Be sure to provide 1/4" per foot of slope to provide positive drainage.



Selecting heat tape. Use only pipe-heating cable (tape) listed for manufactured homes, and install it in accordance with the cable (tape) manufacturer installation instructions.

Testing water lines. Only use pneumatic (air) testing when hydrostatic testing is not practical. Air under pressure is explosive. Exercise extreme caution and notify all site personnel of the test. Wear protective eyewear and take precautions to prevent impact damage to the system while the test is in progress. Do not pneumatically test CPVC systems. Pneumatically test Flow Guard Gold systems only at low pressure levels (20 psi or less).

Pressurizing water lines. When pressurizing the water system, connect the pump to a location above a closed shut-off valve so as not to introduce pressure into the municipal water supply.

7. **Insulate.** In areas subject to freezing temperatures, protect with insulation or heat tape pipes, valves and pressure reducers that are exposed to the outdoors; and pipes in water heater compartments with non-insulated doors. Connect heat tape to the electrical outlet under the home near the water supply inlet.

TESTING

After testing the electrical system and connecting the water lines check the water system for leaks using one of the procedures described below. Before testing, close all water faucets, spigots, and toilet-tank float valves.

Hydrostatic (preferred):

1. **Bypass water heater.** Bypass the hot water heater by disconnecting the hot outlet and cold inlet water lines from the water heater and joining them together. This will protect the hot water tank from damage and protect those involved in the test from possible injury.
2. **Fill water heater.** Confirm that the water heater tank is full of water.
3. **Pressurize system.** Connect a hydrostatic pump, valve, and gauge to the location shown in **Figure 84**. Pressurize the system with water at 100 psi, and then isolate it from the pressure source. Bleed all air from the highest and farthest points in the system.
4. **Hold pressure.** Monitor the pressure for at least 15 minutes.
5. **Fix leaks.** If the pressure drops below 100 psi, locate and correct any leaks by cutting out and discarding bad pipe sections or joints and installing new pipe or joints with couplings.
6. **Repeat.** Repeat the test until all leaks have been eliminated.

Pneumatic:

1. **Bypass water heater.** Bypass the hot water heater by disconnecting the hot outlet and cold inlet water lines from the water heater and joining them together. This will protect the hot water tank from damage and protect those involved in the test from possible injury.
2. **Pressurize system.** Connect an air pump and pressure gauge to the water inlet, pressurize the system to 100 psi and isolate the pressure source from the system.
3. **Hold pressure.** Monitor the pressure for least 15 minutes. If the pressure drops below 100 psi, locate any leaks by applying soapy water to the connections and looking for bubbles.
4. **Fix leaks.** Correct any leaks by cutting out and discarding bad pipe sections or joints and installing new pipe or joints with couplings.
5. **Retest.** Repeat the procedure until all leaks have been eliminated.
6. **Restore connections.** Reconnect the water heater and the water supply.

FREEZE PROTECTION FOR UNOCCUPIED HOMES

If the home is to be left unheated in cold weather, protect water lines from freezing as follows:

1. **Disconnect supply.** Turn off the water supply and disconnect the water supply inlet.
2. **Drain water heater.** Turn off the water heater; if necessary, attach a hose to the valve to direct water away from under the home, open the drain valve and drain the tank completely.
3. **Drain faucets.** Open all faucets throughout the home (including the laundry area if plumbed, and any exterior faucets) and let them drain completely.
4. **Drain toilets.** Flush toilets and drain water tanks completely.
5. **Close faucets.** Close all water faucets with the exception of one.
6. **Connect compressor.** Connect a maximum of 30 psi air supply to the water inlet connection using a low pressure compressor.
7. **Open faucets.** With the air supply on the system, open one faucet at a time



throughout the home.

8. **Disconnect compressor.** After the entire system has been drained of all water, disconnect the air supply and close the water inlet valve.
9. **Pour anti-freeze.** Pour an antifreeze solution into all drain traps, including sinks, tubs, and toilets. Be sure that the antifreeze is safe for the fixtures and P-traps.

STEP 3. CONNECT GAS SERVICE

CONNECTION

If the home uses natural or liquid petroleum gas (LPG, also known as propane) for water or space heating, cooking or other appliances, follow the procedure described below:

1. **Inspect vents.** Assure that all exhaust vents on gas-fired equipment are securely connected and that roof jacks and stacks have not come loose during transit and they are properly installed.
2. **Review appliance instructions.** Review each appliance manufacturer's instructions before the home is connected to the gas supply. Most gas appliances are typically configured to operate on natural gas. If the gas supply will be LPG, consult the appliance manufacturer's instructions to determine what changes need to be made. For homes located above 3,000 feet, appliances may require a different orifice.
3. **Remove cap.** Remove the protective cap from home inlet pipe and install a full flow shut-off valve at the supply inlet (**Figure 86**).
4. **Install regulator.** The gas piping system is designed for a pressure that is at least seven inches of water column (4 oz. per sq in or 0.25 psi) but not more than 14 inches of water column (8 oz. per sq in or 0.5 psi). If gas from any supply source exceeds, or could exceed this pressure, install a regulator if required by the LAHJ.
5. **Connect supply.** Using matching threaded fittings, connect the gas supply to the inlet side of the shut-off valve.
6. **Close valves.** Close all valves at appliances prior to opening the main supply valve.

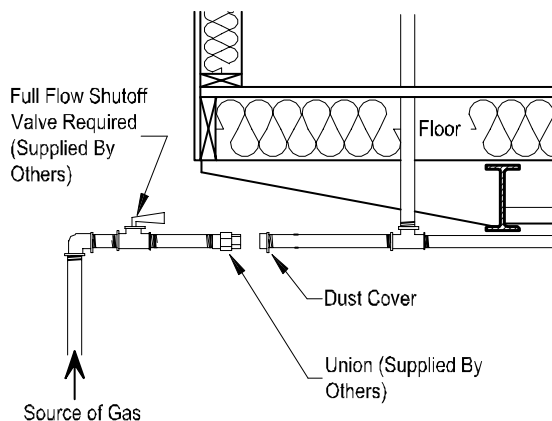


Figure 86. Gas service connection

TESTING

Test the gas piping system in the following two ways: 1) piping only and 2) entire system. Consult with the LAHJ for any additional testing or start-up requirements.

Before testing is begun, the temperature of the ambient air and the piping should be approximately the same. Conduct the tests when and where air temperatures will remain constant.

Piping only test (all appliances isolated)

1. **Isolate appliances.** Isolate all appliances from the system by closing all appliance shut-off valves.
2. **Attach gauge.** Attach to the home's gas inlet a mercury manometer or slope



Fill gas water heaters. Before lighting the pilot on a gas powered water heater, fill the tank with water. Failure to do so could damage the water heater.

gauge calibrated in increments of not more than 1/10 lb.

3. **Pressurize system.** Using an air compressor, pressurize the system with compressed air to three psi and isolate the pressure source from the system.
4. **Monitor pressure.** Monitor the pressure for at least 10 minutes.
5. **Check for leaks.** If pressure drops below three psi, check for leaks by applying a non-corrosive, ammonia-free gas leak detection fluid to the joints at all valves, appliance connections, and crossover connections (do not use dish washing detergents, soap, or other household chemicals). If bubbles form, tighten the connection and recheck.
6. **Repair leaks.** If leaks persist, replace defective pipes or fittings with sound material and retest.
7. **Release pressure.** Release pressure and open all appliance shut-off valves.
8. **Rinse connections.** Thoroughly rinse all tested connections with water to remove leak detection fluid.

Entire system test (with appliances)

1. **Close appliances.** Close all gas equipment controls and pilot light valves according to the individual gas equipment manufacturer's instructions.
2. **Open valves.** Assure that gas shut-off valves for all gas equipment are in the open position.
3. **Attach gauge.** Attach to the home's gas inlet a pressure gauge calibrated in ounces.
4. **Pressurize system.** Pressurize the system with compressed air to six to eight ounces (3/8 to 1/2 psi, or 10 to 14 inches of water column).
5. **Check for leaks.** Check for leaks as described above in step 4 of the Piping only test. Replace defective pipes or fittings with sound material and re-test.
6. **Rinse connections.** Thoroughly rinse all tested connections with water to remove leak detection fluid.

GAS APPLIANCE START-UP

Open the shut-off valve for each appliance and adjust the burners according to the appliance manufacturer's instructions. Verify that the furnace and water heater thermostats are operating properly and set them to the desired temperatures.

STEP 4. CONNECT OIL SERVICE

Homes that are equipped with oil burning furnaces must have oil supply piping installed and tested on site by a qualified professional in accordance with NFPA 31, Standard for the Installation of Oil Burning Equipment, 2001 or the requirements of the LAHJ, whichever is more stringent. The home manufacturer does not supply oil piping or tanks.

OIL CONNECTION

Consult the furnace manufacturer's instructions for proper pipe-sizing and installation procedures. Where piping is run through the bottom of the home, ensure all holes in the bottom board are sealed tight with foam, mastic, and/or tape specially made for that purpose and made rodent proof.

When equipping the home with an oil storage tank, comply with the following:

- Install the pipe with a gradual slope toward the fill end or drain plug (if so equipped) to facilitate pumping or draining of water and sludge.
- Provide a readily accessible approved manual shut-off valve at the outlet, installed to close against the supply.
- Equip the tank with an approved oil filter or strainer located downstream from the tank shut-off valve. Use a filter or strainer containing a sump with a drain to trap water.
- Equip under ground tanks with a filler neck extending one foot above grade and a minimum 1-1/4 inch diameter vent pipe extending at least two feet above grade.
- Locate the tank to be accessible for service and inspection, and safe from fire and other hazards.



Testing oil tanks. All oil storage tank and piping installations and tests must meet all applicable local regulations and should be made only by experienced, qualified personnel.



- If the tank is located inside a compartment of the home, provide ventilation at the bottom of the compartment to permit diffusion of vapors. If the tank is fixed to the home, provide for filling and draining from the outside.
- Insulate interior tanks from the structural members of the home. Provide tanks so installed with an outside fill and vent pipe and an approved liquid level gauge.
- Install tanks that feed vaporizing type oil furnaces so that oil flows by gravity. To achieve efficient gravity flow, make sure that the bottom of the tank is at least 18 inches above the furnace oil control level.
- Tanks for gun type oil furnaces (these furnaces include a fuel pump) may be installed above or below ground.

OIL SYSTEM TESTING

Before operating the system, fill the tank to capacity with the fuel to be burned and visually check all joints in the system for leakage. Replace (do not repair) parts that leak.

▶ go to **Prepare Appliances and Equipment** (p. 86)

Prepare Appliances and Equipment

This chapter provides instructions for installing and/or preparing appliances and other equipment. While the items below can be completed in any order, the last item, **CONDUCT ELECTRICAL TEST**, must be done last.

Follow the Steps below:

- ▼ **INSTALL AIR CONDITIONER OR HEAT PUMP** (p.86)
- ▼ **PREPARE HEATING SYSTEM** (p. 91)
- ▼ **INSTALL REMOTE HEATING AND COOLING EQUIPMENT** (p.87)
- ▼ **INSTALL EVAPORATOR COOLER** (p. 88)
- ▼ **PREPARE VENTILATION STSTEM** (p. 88)
- ▼ **PREPARE FUEL BURNING WATER HEATER** (p. 89)
- ▼ **PREPARE CLOTHES DRYER** (p. 89)
- ▼ **SMOKE ALARMS** (p. 90)
- ▼ **PREPARE FIREPLACES AND WOOD STOVES** (p. 90)
- ▼ **PREPARE KITCHEN AND BATH APPLIANCES / FIXTURES** (p. 92)
- ▼ **INSTALL EXTERIOR LIGHTING** (p. 93)
- ▼ **INSTALL CEILING FANS AND LIGHTING** (p. 93)
- ▼ **TEST ELECTRICAL SYSTEM** (p. 95)



INSTALL AIR CONDITIONER OR HEAT PUMP (if applicable)

CENTRAL UNITS

Install split system or unitary central air conditioners and/or heat pumps as follows:

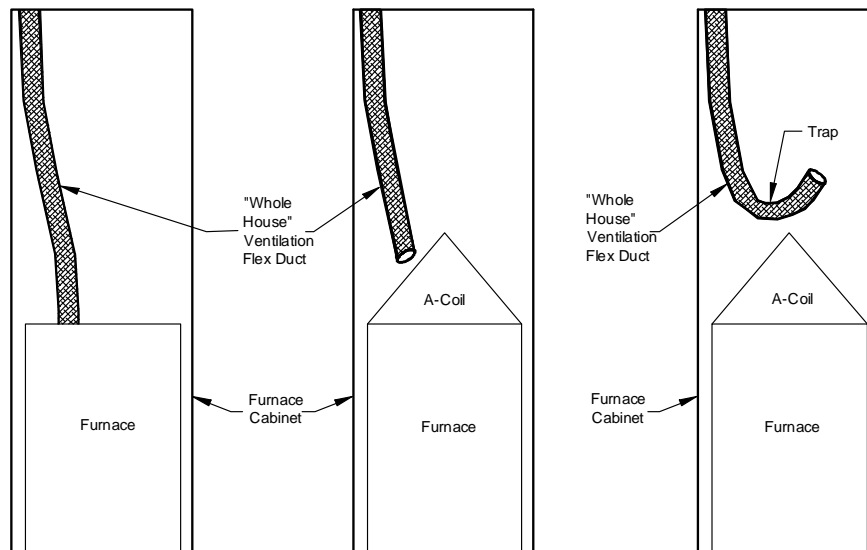
1. **Check suitability.** Check the home's Comfort Cooling Certificate (may be included with the data plate) to confirm that the home is suitable for installation of central air. If so, note the air distribution system's rated duct capacity (BTU/hr), any equipment sizing guidance provided by the manufacturer and information provided to calculate the home's heat gain.
2. **Select equipment.** Select equipment with a rated heating capacity (BTU/hr) not exceeding the maximum indicated on the home's data plate and a rated cooling capacity sized in accordance with Chapter 28 of the 1997 ASHRAE Handbook of Fundamentals or ACCA Manual J, Residential Cooling Load, 8th edition. Information needed to calculate the home's heat gain can be found on the home's comfort cooling certificate. Choose equipment with a min. circuit amperage (found on the equip. rating plate) no greater than the branch circuit rating of the exterior air conditioning receptacle (indicated on the adjacent tag), if present.
3. **Install A-coil.** When installing a cooling A-coil in a down-flow furnace that incorporates a fresh air intake duct, position the duct in the furnace cavity according to the furnace manufacturer's instructions (**Figure 83**). For electric down-flow furnaces, trim the ventilation duct as needed to allow installation of the A-coil and secure the duct to the wall of the compartment or to the top of the A-coil. Do not restrict the flex duct opening; allow the duct insulation to



Use listed appliances. All applicable appliances must be listed or certified by a nationally recognized testing agency for the application for which the unit is intended and installed in accordance with the terms of its listing or certification.

Properly sizing equipment. Oversized cooling equipment can lower energy efficiency, reduce comfort, shorten equipment life, and may cause moisture problems in the home (including potentially damaging the home's structure). Sizing guidance is provided by the Manufactured Housing Re-

contact the A-coil, or allow the duct to become kinked, restricted, or configured to form a trap.



search Alliance Cooling Equipment Sizing Guidelines available at www.mhrahome.org.

Figure 83. Whole house ventilation flex duct in an electric down-flow furnace. From left to right: as prepared in the factory; proper installation with A-coil; improper installation with A-coil



Selecting A-coils. Use only A-coil units compatible and listed for use with the furnace in the home and installed in accordance with the furnace manufacturer's instructions.

PREPARE HEATING SYSTEM

If the home does not contain a factory installed heating appliance, install a remote heating appliance according to **INSTALL REMOTE HEATING AND COOLING EQUIPMENT**, p. 91. Prepare fuel-burning heating systems included with the home as follows:

1. **Inspect for damage.** Inspect the furnace and report any damage to the home manufacturer.
2. **High altitude.** If the home is located more than 2,000 feet above sea level or as indicated in the furnace manufacturer's instructions, derate gas furnaces 4% for each 1,000 feet above sea level. This work must be done by a qualified (and in some jurisdictions, licensed) technician.
3. **Convert for LPG gas.** If LPG gas (propane) will be used, convert the appliance from natural gas to LPG gas use. Conversion must be made by a qualified and (if required by the LAHJ) licensed technician.
4. **Install intake air pipe.** Consult the appliance manufacturer's instructions for maximum allowable pipe run length, requirements for air dampers, locations relative to expected snow levels (check with the LAHJ for expected snow levels), acceptable materials, pipe supports, and pipe termination requirements.
5. **Install flue.** For combustion appliances, install the flue roof cap and stack assembly as described in **PREPARE FIREPLACES, Chimneys** (p. 94).

INSTALL REMOTE HEATING AND COOLING EQUIPMENT

Install remote units in compliance with all heating and cooling equipment requirements in this chapter above and the following:

1. **Locate connections to the home.** Find the manufacturer-installed connectors, labels, or tags under the home indicating the required connection points for supply and return air. If connectors are not provided nor location indicated, select a supply duct location such that there are approximately equal numbers of supply registers forward and rear of the connection point. Locate the return duct in the center of the home.
2. **Install ducts.** Install the appropriate supply and return ducts (not provided) between the remote unit and the home (**Figure 85**), making connections according to the instructions for crossover ducts in **Crossover Connections** (p. 56).
3. **Install dampers.** If installing a remote cooling unit in a home with a factory in-

Installing flue stacks with a hinged roof. If flue stack components are installed above the finish roof line (as is often the case with hinged roofs), an Alternative Construction letter is normally required along with a follow-up inspection. Contact the factory for guidance.

Venting appliances to the outside. Vent to the exterior of the home all combustion appliances except ranges and ovens.

Selecting ducts. Exterior ductwork for remote units must be provided by the installer or HVAC contractor. Ducts must be approved for exterior installation and should be wrapped with insulation of at least R-8 under a vapor barrier with a perm rating of not greater than one.



stalled furnace, install dampers between the furnace and the home's air duct system, and between the remote unit and the home's air duct system to prevent warm air in heating mode from escaping to the remote cooling unit and vice versa.

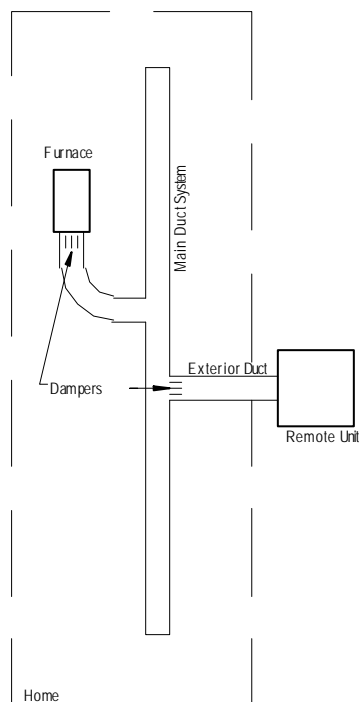


Figure 84. Remote unit damper locations

4. **Connect wiring.** Install a thermostat containing a fan switch. Connect utilities in accordance with all manufacturer's instructions and local codes.
5. **Seal penetrations.** Repair or replace all floor insulation disturbed during the duct installation and seal holes in the bottom board using foam, mastic, or tape specially made for that purpose.

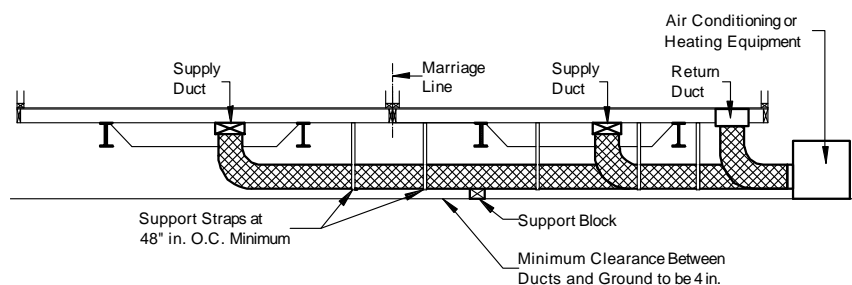


Figure 85. Ducts connecting exterior heating and/or cooling equipment to the home



Choosing pipe lengths.

The appliance manufacturer may designate the length of the pipe run based on the pipe diameter and the number of turns in the pipe run.

INSTALL EVAPORATOR COOLER (if applicable)

If the home has been factory prepared for the installation of an evaporator cooler, then install a listed evaporator cooler in accordance with the appliance instructions and listing. Contact the Skyline division that built your home for more information.

PREPARE VENTILATION SYSTEM

Prepare the whole-house ventilation system according to the ventilation system manufacturer's instructions. Confirm that any fresh air intake ducts extend to the exterior and do not draw air from the crawlspace under the home. Do not allow any fresh air ventilation intake ducts to become kinked or restricted, forming a trap (**Figure 85**).

PREPARE FUEL-BURNING WATER HEATER

The water heater discharge and drip pan drains should have been installed in **Connect Utilities** (p. 81).

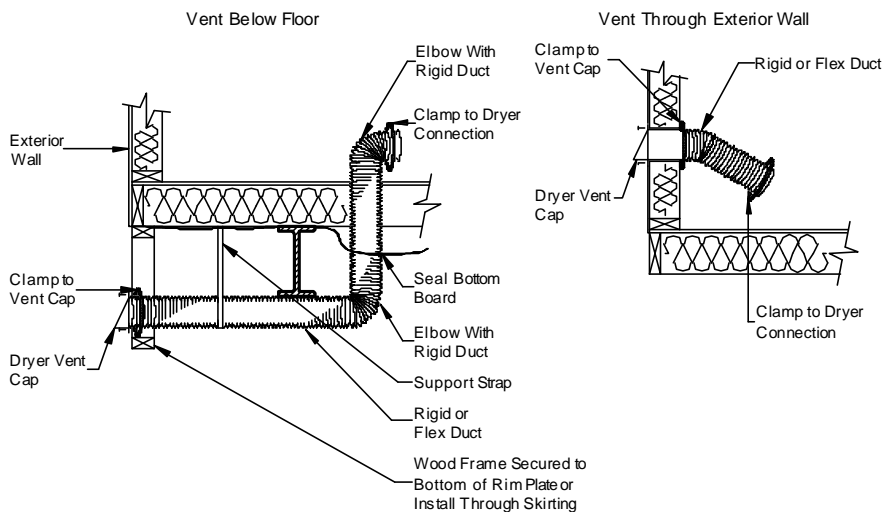
In homes with direct-vent water heaters (that utilize gas, oil, or other combustion fuel), and where the water heater is not independently vented to the exterior through a grilled opening, provide combustion air from under the floor using pipe and cement acceptable to the appliance manufacturer or through the roof via a double-walled flue pipe. If provided through the floor, run the air piping to the exterior of the home, with supports spaced every 3-1/2 feet o.c. or less. Terminate the pipe facing downward a minimum of 12 inches above the ground surface and provide a screen on the pipe vent cap.

PREPARE CLOTHES DRYER

DRYER VENTS

If the home includes a clothes dryer, the components for ventilating the dryer are included with the home (but not necessarily installed) and a vent opening has been roughed in either in the wall or floor. (If a dryer is not installed, seal all dryer vent openings).

Run the dryer vent to the outside through the exterior wall or through the floor to a point beyond the perimeter of the home, using materials approved by the clothes dryer manufacturer (see **Figure 86**).



Install the vent as follows:

1. **Remove temporary caps.** Remove any temporary seals and duct caps from the vent rough openings.
2. **Install ductwork.** Install ductwork using clamps (do not use screws or other fasteners that penetrate into the duct) and support the duct with metal straps connected to the floor joists or chassis at two feet o.c. or less. Ensure duct connections are internally overlapped to prevent inhibiting the flow of air and thereby causing lint accumulation.
3. **Install cap and damper.** Install an approved dryer vent cap with damper on the exterior termination of the duct. If the vent terminates at skirting, secure the cap to framing or skirting with sheet metal screws and seal edges with caulk or sealant. If the vent terminates through a wall, apply a bead of sealant to the back of the cap around the opening and secure with sheet metal screws to metal, hardboard or fiber cement siding or with wood screws to a mount block for vinyl siding.
4. **Seal opening.** Seal openings inside and outside of the home including at the floor, interior walls, siding and skirting (with caulk), and at the bottom board using foam, mastic and/or tape specially made for that purpose.

Venting exhaust systems.

Exhaust vents must extend to the home's exterior through skirting. Termination of the dryer exhaust underneath the home can cause condensation and moisture damage to the home. Lint and dust accumulation can ignite, causing a fire. The exhaust system must not contain reverse slope.

Figure 86. Clothes dryer ventilation ductwork through floor (left) or exterior wall (right)



Avoid damaging structural elements. Do not cut or otherwise damage structural elements such as floor joists or wall studs for the installation of the dryer exhaust system.

Gas. Ventilation components that may be included with the home for an electric dryer may not be acceptable for gas dryers. Consult the gas dryer manufacturer instructions.

GAS DRYERS

If the home was not fitted for a gas dryer, installing one requires substantial alteration to the home. Gas supply piping and adequate venting must be provided as specified by the dryer manufacturer and installed by a trained professional. Do not cut major structural elements to accommodate a gas dryer.

PREPARE SMOKE ALARMS

The home has several factory installed smoke alarms that are wired to a 120-volt circuit. If the home was designed for placement on a basement, an additional alarm is provided for installation at a pre-wired location under the home. Connect the basement smoke alarm and test all alarms as follows:

1. **Check circuit.** Ensure that electrical power to the home is activated and that the smoke alarm circuit is on.
2. **Remove batteries.** Make sure backup batteries (if any) are removed from all smoke alarms.
3. **Test alarms.** Press the test button on each alarm sequentially. All alarms should sound simultaneously when the test button on any one smoke alarm is pressed. Replace (with the same brand as those installed elsewhere in the home) any alarms that do not sound and retest.
4. **Replace batteries.** After successful test, replace the backup batteries, discarding the protective tabs.

PREPARE FIREPLACES AND WOOD STOVES

Install chimneys, chimney flashing and roofing, fireplace combustion air inlets, and hearths according to the manufacturer's instructions and the procedures described below. Fireplaces, wood stoves and their components are to be installed per their manufacturer instructions and in accordance with their listings.

CHIMNEYS

Fireplace and wood stoves may require on-site installation of additional sections of approved chimney pipe, a spark arrestor, and a rain cap assembly. Follow the manufacturer's instructions and the procedures described below:

1. **Remove coverings.** Remove protective materials covering the roof flashing and any foreign material from the installed part of the chimney.
2. **Install chimney pipe.** Assemble and seal the chimney per the fireplace or wood stove manufacturer's installation instructions and if there is a conflict between the instructions and the figure, follow the instructions. To assure sufficient draft for proper operation, extend the chimney at least three feet above the highest point where it penetrates the roof and at least two feet higher than any surface within 10 feet of the chimney (**Figure 88**). Use additional section(s) of chimney pipe (not provided) if required by local code or if the site has obstructions within 10 feet of the chimney.



Installing ducts.

Keep ductwork straight and smooth as possible without excess slack. Slope it slightly downward towards the exterior to facilitate moisture drainage.



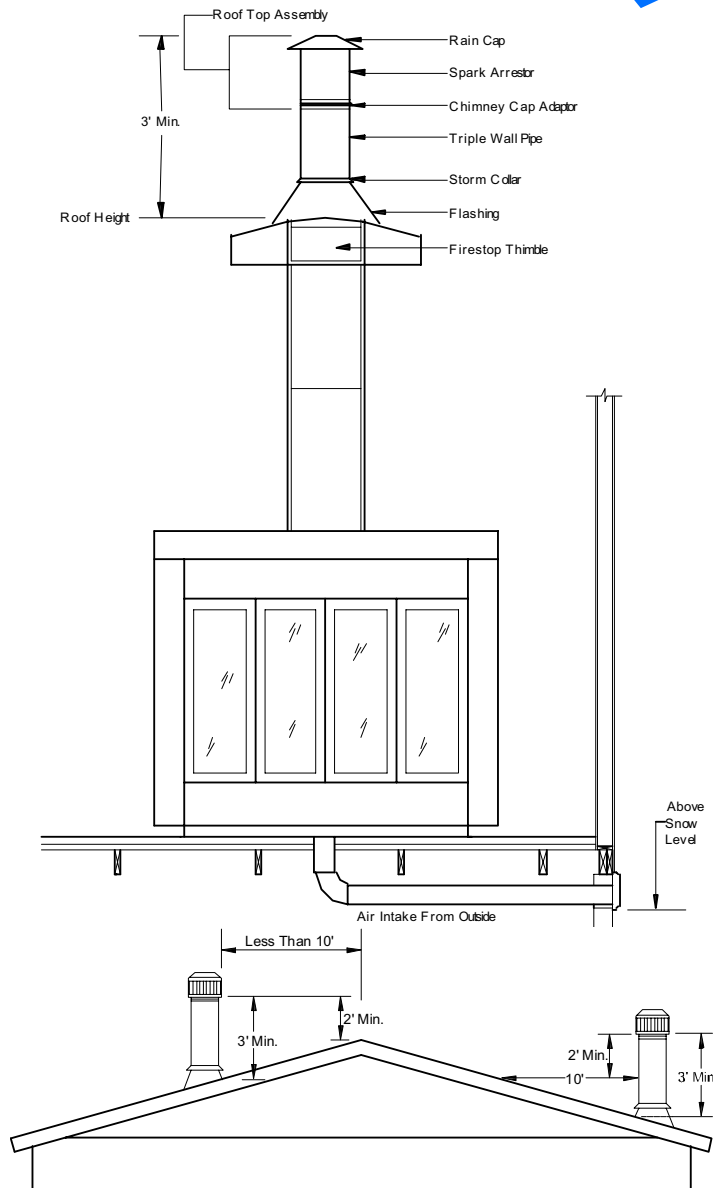


Figure 91. Chimney and combustion air intake duct installation



Selecting the appropriate flue. Wood fireplaces use larger diameter flues than gas fireplaces. Make sure flue matches the appliance type. Gas fireplaces cannot burn wood because the flue is too small and smoke will back up into the home. If wood fireplaces are converted to gas the flue will be too large resulting in excessive heat loss through the chimney.

Figure 92. Chimney clearance

3. **Install shingles.** Install shingles up to the edge of the flue cut-out in the roof deck. Secure shingles installed under the roof flashing with asphalt cement.
4. **Install flashing.** Place flashing over pipe section and shingles and set in asphalt cement. Secure flashing to roof deck at top two corners with roofing nails.
5. **Complete shingles.** Cut shingles in successive courses to fit around the pipe and embed them in asphalt cement where they overlap the flashing. Secure shingles with roofing nails through flashing and apply asphalt cement over nail heads. The completed installation should appear as shown in **Figure 93**, with the lower part of the flange overlapping the lower shingles and the side and upper shingles overlapping the flange.

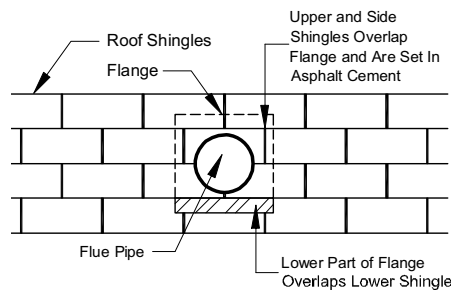
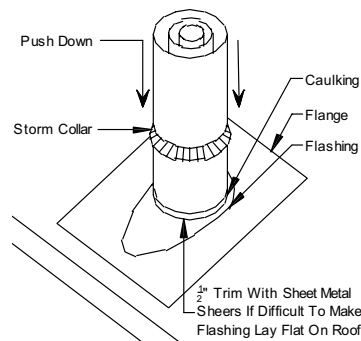


Figure 93. Roof flashing and shingle installation around chimney

COMBUSTION AIR INLETS

Combustion air inlets provide combustion air through the floor or an exterior wall to a combustion appliance. If through an exterior wall, site installation is not required. If through the floor, extend the duct from its point just below the floor to the outside (additional duct material required for this may or may not be provided with the home). Locate the inlet damper above expected snow levels (contact the LAHJ for snow levels).

Follow the fireplace manufacturer's instructions (typically in the fireplace/stove or with the chimney parts).

HEARTH

If shipped loose, install the fireplace hearth according to the fireplace manufacturer's instructions.

PREPARE KITCHEN AND BATH APPLIANCES / FIXTURES

Install kitchen and bath appliances according to the manufacturer's instructions and the procedures described for each appliance below.

COOKING APPLIANCES

If the home is provided with a range, cook top and/or grill containing its own exhaust system that penetrates the floor, complete the exhaust system as follows:

1. Remove covers. Remove the cover on the factory-installed exhaust pipe protruding from beneath the floor near the appliance.
2. Install termination fitting. Secure the provided termination fitting at the outside edge of the floor.
3. Install duct. Use the provided flexible metallic duct to connect the elbow protruding from the floor and the termination fitting. Refer to the manufacturer's installation instructions for guidance on supporting the duct and making the connections.

SITE-INSTALLED GAS APPLIANCES

Install only appliances with a Btu capacity equivalent to or less than the capacity of the factory-installed piping and at the location of a factory-installed gas riser.

REFRIGERATOR

Prepare the refrigerator as follows:

- Remove straps, blocks, or other securement devices used for shipping and patch any resulting marks on floors or walls.
- If the refrigerator has an icemaker, check water lines for leaks upon installation and a few days later to make sure no leaks have developed.

SITE-INSTALLED APPLIANCES AND FIXTURES

If sinks, tubs, showers or other fixtures or appliances are to be site-installed, follow the manufacturer's installation instructions. Use only products listed for use in manufactured homes and follow all applicable local codes.



Installing combustion air inlets. Do not install the combustion air inlet such that material from the hearth can drop beneath the home.

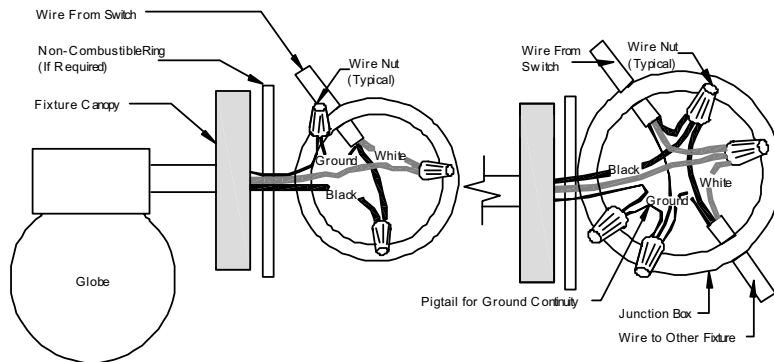


Installing exhaust ducts. Route exhaust ducts so they do not terminate beneath the home.

INSTALL EXTERIOR LIGHTING

Install exterior lighting according to **Figure 94** and the following:

1. **Remove cover.** Remove the screws and cover from electrical junction box.
2. **Install flash ring.** Place the non-combustible flash ring over the junction box.
3. **Connect wires.** Connect fixture wires to house wires in the box, black to black, white to white, and equipment ground to equipment ground, using listed wire connectors. Push wires into the box.
4. **Connect fixtures.** Connect the fixture to the junction box or strap using screws provided with the light fixture.
5. **Weatherproof.** Weatherproof/caulk around the base of the fixture, leaving a small gap in the caulking on the bottom to permit drainage of water that may accumulate.
6. **Complete installation.** Install bulb and globe on the fixture and verify proper operation.



INSTALL CEILING FANS/LIGHTS

Install ceiling fans with the trailing edges of the blades at least six feet-four inches above the finished floor. Comply with all unit manufacturers' instructions and the requirements below. Electrical boxes for use with ceiling fans have a maximum allowed weight (usually 35 – 50 lbs). This is stamped inside the box. Check the maximum weight of the fan versus the allowable weight for the electrical box before installing the fan.

CEILING FAN/LIGHT MOUNTED TO FACTORY-INSTALLED ELECTRICAL BOX IN CEILING

Before installing the unit, make sure that adequate structural bracing is present in the ceiling. If uncertain, check with the manufacturer. Follow the fan or light manufacturer's instructions to connect the unit and complete the wiring. If the instructions are not available, connect the wiring as shown in **Figure 95**.



Lighting installation. A qualified electrician should install lighting. Before connecting lighting, disconnect power to the lighting circuit. Ground all exterior light fixtures.

Using a non-combustible ring. Install a non-combustible ring completely covering any combustible surfaces the fixture may be mounted on (e.g. hard-board, clad wood and vinyl siding), or when ceiling material is exposed between the light fixture canopy and the junction box.

Figure 94. Exterior lighting connection



Installing ceiling fans. A qualified electrician should install lighting and fans. Before connecting the ceiling fan or light, disconnect power to the fan wires. Any unit installed outside of the home (such as in a porch ceiling) shall be listed for wet locations.

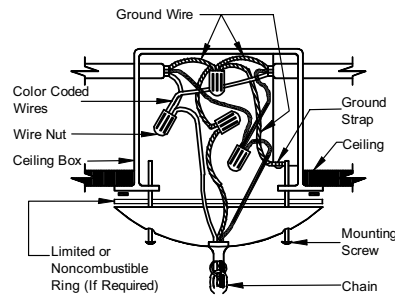


Figure 95. Wiring for a ceiling fan or chain-hung light fixture.

CEILING FAN/LIGHT MOUNTED ON SITE-INSTALLED DECORATIVE BEAM

Where the electrical box will be mounted in a site-installed decorative center beam attached to the ridge beam, connect the fixture as follows (see **Figure 96**):

1. **Cut hole.** If the decorative beam (shipped loose) does not contain a pre-cut hole for the electrical box, cut a hole with a diameter approximately 1/4 inch larger than the box's using a hole saw. Align the hole with the supply wire location and center on the beam.
2. **Install box.** Install the box in the hole and secure the flange (plastic boxes only) to the decorative beam with four #6 x 1" screws.
3. **Insert wire.** Insert the ceiling wire through a knock-out hole in the side of the electrical box. It may be necessary to cut a notch in the top of the decorative beam (on the supply wire side of the center beam hole) allowing the supply wire to be inserted into the electrical box without binding against the beam during installation. Leave approximately four inches of wire free in the box.
4. **Attach beam.** Secure the decorative beam in place over the center line joint, checking that the supply wire is not pinched or penetrated by beam fasteners. Secure the electrical box to the ridge beam with #8 x 2 1/2" wood screws through the two holes in the top of the box.
5. **Strip wires.** Strip about 3/4 inch of insulation from the white and black conductor ends of the supply wire.
6. **Position ring.** Position the non-combustible flash ring (provided) over the electrical box so that the finished surface (adjacent to electrical box) which is to be covered by the fan canopy is not exposed.
7. **Install and wire unit.** Follow the unit manufacturer's installation instructions for mounting the fan/light assembly to the box and for electrical wiring. Use provided electrical connectors for splicing wire.



Choosing ceiling fan junction boxes. Connect ceiling fans only to junction boxes listed and marked for ceiling fan application in accordance with Article 314.27(b) of 2005 NEC. Always ground metal junction boxes.

Selecting fan weight. Do not use any ceiling fans or light fixtures that exceed the weight rating of the box (35 lbs unless otherwise noted).

Grounding electrical devices. Ground fans/lights using a fixture-grounding device or a fixture-grounding wire as specified in the manufacturer's instructions.

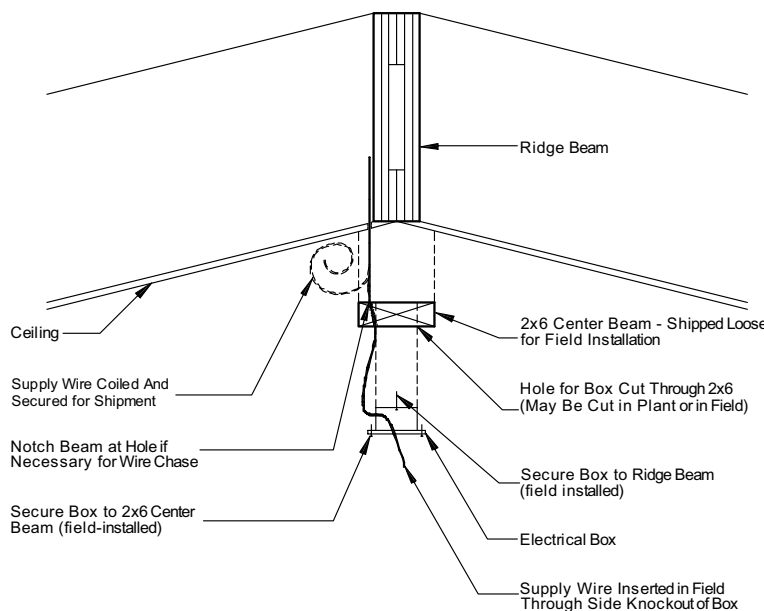


Figure 96. Ceiling fan/light mounted to flush ridge beam



TEST ELECTRICAL SYSTEM

After completion of all electrical wiring and connections, including crossovers, appliances, lights, and ceiling fans, inspect and test the electrical system as follows:

1. **Fill water heater.** Fill water heater before turning on power to the home or switching on the circuit breaker.
2. **Test continuity.** Before turning on the electrical power to the home, conduct an electrical continuity test to ensure that exposed metallic parts of the home and the chassis are effectively bonded.
3. **Test operation.** After turning on the electrical power to the home, conduct operational tests of all devices (except water heaters, electric ranges, electric furnaces, dishwashers, clothes washers/dryers, and portable appliances) to demonstrate that they are connected and in working order.
4. **Test polarity.** After turning on the electrical power to the home, conduct electrical polarity checks to determine that connections of electrical equipment installed or completed during installation have been made properly. Visual verification is an acceptable electrical polarity check.

▶ go to **Complete Exterior Work** (p. 96).

Complete Exterior Work

This chapter covers sealing the bottom board, installing the ground cover and skirting, preparing wind protection shutters, and completing site-built structures.

Follow the Steps below:

- ▼ **STEP 1. REPAIR AND SEAL BOTTOM BOARD** (p. 96)
- ▼ **STEP 2. INSTALL GROUND MOISTURE RETARDER** (p. 96)
- ▼ **STEP 3. INSTALL SKIRTING** (p. 97)
- ▼ **STEP 4. ASSEMBLE OPTIONAL WIND PROTECTION SHUTTERS** (p. 97)
- ▼ **STEP 5. COMPLETE SITE-BUILT STRUCTURES** (p. 97)

STEP 1. REPAIR AND SEAL BOTTOM BOARD

Tears and openings in the bottom board can result from transportation or installation activities. Inspect for holes and gaps the entire bottom board, especially areas around service penetrations, crossover connections, pipe and duct hangers, foundation elements, and the perimeter of the floor. Using approved materials appropriate for the type of repair, repair the bottom board wherever torn or loosened as follows:

1. **Insulate.** Replace any missing insulation prior to closure and repair of the bottom board, paying particular attention to insulation gaps that may have been created at P-traps.
2. **Repair large openings.** Repair large openings with a durable patch made of bottom board fabric or other compatible material and fastened with vinyl bottom board tape held in place by fasteners installed with a divergent stapler. Seal the edges around patches with foam or mastic. For large openings, install a rigid backer board behind the bottom board to provide a fastening substrate for the patch.
3. **Repair small openings.** Repair small gaps and tears with a combination of vinyl bottom board tape, patches, mastic, or foam sealant.

STEP 2. INSTALL GROUND MOISTURE RETARDER

If the space under the home is to be enclosed with skirting or other materials, a ground moisture retarder of a minimum six mil thick polyethylene sheeting or equivalent must be installed covering the ground under the home. Moisture retarders are not required in arid regions (less than 15 inches of rainfall annually) with dry soil conditions. If on-grade (surface) footings are used, install the ground moisture retarder prior to placing the footings, or install it around the footings after all other work under the home is complete.

Install the ground moisture retarder as follows:

1. **Apply sheeting.** Unroll the ground moisture overlapping joints in the sheeting a minimum of 12 inches and covering the entire area under the home except for areas under recessed entries, decks, and porches.
2. **Seal joints.** Seal joints in the retarder with mastic.
3. **Weigh down.** To keep the retarder in place, weigh it down with stones, concrete blocks, or other heavy, durable materials.
4. **Repair tears.** Repair any voids or tears in the retarder by patching with like material, maintaining a minimum 12-inch overlap and sealing joints with mastic.



Sealing bottom boards. A continuous and sealed bottom board is critical for home performance, energy efficiency, protection against moisture problems, prevention of pipe freezing, and protection against insects and rodents.

Bottom board sealing methods. Tapes shall never be used alone to repair a bottom board. Divergent staples or mastic must be used in tandem with tape to prevent future tear off.

Fastening vinyl siding. Do not install fasteners directly into vinyl siding. Allow for siding thermal expansion by pre-drilling minimum 1/2 inch diameter fastener holes or fastening skirting to a ledger under the home (see Best Practice tip).



Avoiding radon. For enclosed perimeter wall crawlspace foundations in areas where radon is commonly found in the soil, continue the moisture retarder up the perimeter wall.

STEP 3. INSTALL SKIRTING

Skirting is any structural or non-structural perimeter crawlspace enclosure. Complete site-built structures (see **STEP 5. COMPLETE SITE-BUILT STRUCTURES**, p.98) that abut the home (such as porches, attached garages, and steps) prior to installing skirting.

TABLE 26. ANCHOR SYSTEM MATERIALS SPECIFICATIONS

Component	Specification
Skirting	Skirting must be of weather-resistant materials or provided with protection against weather deterioration at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 oz per sq ft of surface coated. Skirting made from wood or wood products and used within six inches of the ground needs to be made of materials naturally resistant to decay and termite infestation or pressure treated.
Vents	Ventilation openings must be covered for their full height and width with a perforated (1/4 inch maximum opening in any dimension) corrosion and weather-resistant covering that is designed to prevent the entry of rodents. In areas subject to freezing, the coverings for the ventilation openings must have an operable damper, permitting them to be in the open or closed position depending on the weather.

To design and install skirting, comply with the skirting manufacturer's instructions (if provided) and the following:

1. **Configure skirting.** Run the skirting along the perimeter of the home's heated, conditioned space. Do not enclose with skirting areas under recessed entries, porches, or decks (whether constructed as part of the home or added on site) unless skirting is of the fully vented type and installed so as to allow water to freely flow out from under the home.
2. **Fasten skirting.** Recess the skirting under the siding or trim and attach it to the home in a manner that prevents water from being trapped between the siding or trim and the skirting. For wood, aluminum, or fiberglass skirting, install a skirt rail (lumber strip) under the floor inset at least 1-1/2 inches from the edge of the siding for attachment of the skirting. Allow for frost heave when installing skirting in areas subject to frost.
3. **Provide ventilation.** Unless the skirting has integral ventilation openings that meet the following ventilation requirements, install equally sized ventilation openings on at least two opposite sides of the foundation. Size ventilation area to equal at least one square foot or each 150 square feet of under-floor area (or for each 1,500 square feet if a ground moisture retarder is installed according to **STEP 2. INSTALL GROUND MOISTURE RETARDER**, p. 96). Place vents as high above the ground as practical.
4. **Install access.** Provide an access opening not less than 18 inches wide and 24 inches high and located so that any utility connections located under the home are accessible.
5. **Extend vents, drains, and inlets.** Run appliance exhaust vents, combustion air inlets, and air conditioner condensation drains through the skirting to the outside and terminate each as instructed in the sections of this manual corresponding to each appliance.

STEP 4. ASSEMBLE OPTIONAL WIND PROTECTION SHUTTERS

If desired, prepare temporary protective window covers for use during severe wind storms and hurricanes according to **Figure 97**, **Table 27**, and the procedure below.

1. Assemble extension framing using with two 16d common nails at each connection.
2. Assemble shutter panels as shown in **Figure 97**.
3. Store the shutters such that they are protected from the weather, are not in direct contact with the ground, and are easily accessible by the homeowner.

at least 12 inches, sealing the edges and between the seams with mastic.

Attaching vinyl siding. To install skirting on vinyl-sided homes, screw a treated 2 x 4 on edge to the underside of the floor joists two inches back from the edge of the home. Screw skirting tight to the 2 x 4.



Avoid backfilling against skirting. Do not backfill against non-structural skirting.

To attach shutters to the home:

1. Fasten extension framing to wall framing materials with 16d double-headed nails or #8 x 3" screws, toe nailed/screwed, per **Table 27**.
2. Fasten assembled panel(s) to extension framing with 12d nails, per **Table 27**.

After use, remove shutters from the home, patch nail holes with caulk and store them as above.

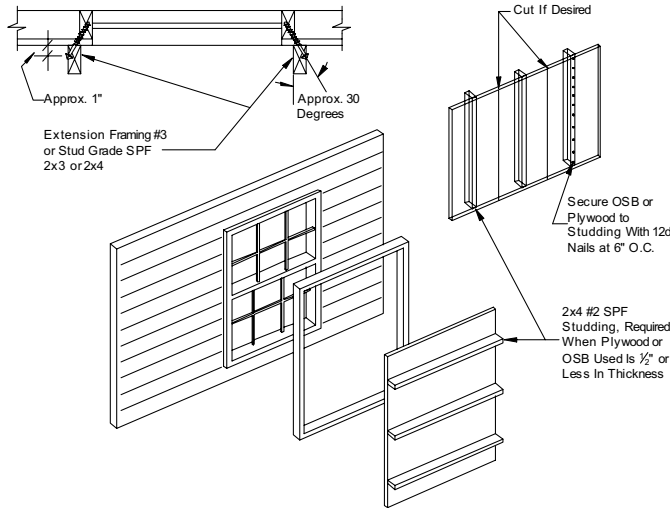


Figure 97. Wind protection shutter construction

TABLE 27. SHUTTER CONSTRUCTION SPECIFICATIONS

Window width	Extension framing	Panel thickness (in)	Wind Zones 2 & 3	Wind Zone 2		Wind Zone 3	
			Fastening to extension	Fastening to wall framing		Fastening to wall framing	
			12d nails	16d nails	#8 x 3 screws	16d nails	#8 x 3 screws
Up to 48"	2 x 3*	7/16, 1/2	6 in. o.c.	8 in. o.c.	22 in. o.c.	6 in. o.c.	16 in. o.c.
	2 x 3	23/32, 3/4	6 in. o.c.	8 in. o.c.	22 in. o.c.	4-1/2 in. o.c.	12 in. o.c.
Up to 72"	2 x 3*	7/16, 1/2	4 in. o.c.	5 in. o.c.	14 in. o.c.	3 in. o.c.	8 in. o.c.

* 2 x 3 perimeter extension with 2 x 4 studding at 16 inches o.c.

STEP 5. COMPLETE SITE-BUILT STRUCTURES

Install site-built structures such as steps, landings, garages, awnings, carports, breezeways, porches, decks, railings, sheds, and utility rooms according to manufacturer's instructions (if any), in compliance with all local regulations including fire separation and electrical requirements, and according to the following:

- Construct site-built structures to be structurally independent unless provided for in the design of the home (instructions will be provided by the manufacturer).
- Do not damage the integrity of the home's structural or weatherproofing system. Seal any weatherproofing connections between the site-built structure and the home and flash any roof connections.
- Utilize only GFCI outlets for site-built structures.
- Install and test smoke alarms in any site-built structures according to local code.



Designing site-built structures. All site-built structures must support their own dead, live, and wind loads and must not transmit any loads to the home's structure. All carports should be freestanding.

► go to **Prepare Home for Occupancy** (p. 99).

Prepare Home for Occupancy

Follow these steps for final inspection and completion of the home.



Follow the Steps below:

- ▼ **STEP 1. VERIFY ALTERNATIVE CONSTRUCTION (A/C) INSPECTION** (p. 99)
- ▼ **STEP 2. COMPLETE INSPECTION CHECKLIST** (p. 99)
- ▼ **STEP 3. COMPLETE ENERGY STAR CHECKLIST** (p. 99)
- ▼ **STEP 4. CLEAN THE HOME** (p. 99)

STEP 1. VERIFY ALTERNATIVE CONSTRUCTION (A/C) INSPECTION

This is normally the responsibility of the retailer and the manufacturer, however, the installation is not complete until the alternative construction inspection has been passed and documented.

STEP 2. COMPLETE INSPECTION CHECKLIST

After all previous steps have been accomplished, inspect the home to verify that it has been completely and properly installed using the checklist starting on p. 100.

Correct any deficiencies found, if possible, or if not possible, inform the retailer or manufacturer immediately.

STEP 3. COMPLETE ENERGY STAR CHECKLIST

For ENERGY STAR qualified homes (check with the retailer or manufacturer), this step is to be completed by the manufacturer's designated representative. Ask the retailer or the manufacturer who this is.

The manufacturer's representative must complete the Energy Star Site Installation Checklist, obtain signatures on the ENERGY STAR label, and return the completed ENERGY STAR Site Installation Checklist to the manufacturing plant.

STEP 4. CLEAN THE HOME

Remove and properly dispose of all installation-generated dust, debris, and packaging materials from the home and the surrounding property. Ensure that the home is in "move-in" condition.

Installation is Complete

Complete Installation Checklist

Use this checklist to confirm that the listed aspects of the installation are complete and correct.

FOUNDATION

- Footings properly sized and constructed for the soil conditions
- Pier spacing per data plate and applicable table and roof load zone
- Piers properly constructed and vertical
- Perimeter blocking installed (if required)
- Piers at each side of large sidewall openings
- Center line piers installed at columns
- Shims in place and tight

ANCHORS

- Approved anchors are used
- Anchors are installed at correct angles
- Anchor spacing and installation correct
- Longitudinal ties installed (if required)
- Anchor straps are tensioned

UNDER THE HOME

- Moisture retarder installed
- The ground is properly graded to prevent water accumulation
- HVAC ducts are supported off the ground and connected tightly to collars at all ends
- Fireplace combustion air intake free and unrestricted
- No holes or tears in bottom board
- Skirting has been installed per manufacturer's instructions with proper venting and provision for frost heave
- Dryer vent, range/cook top exhaust, water heater temperature and pressure overflow pipe and AC condensate drain installed to perimeter of crawl space

EXTERIOR

- Shingled roofs are free of visible damage and serious defects and there are no missing or loose shingles
- Shingle close-up and ridge cap have been completed per applicable details
- All hold down straps on shingled roofs have been removed and staple holes have been properly sealed
- Penetrations at roof stacks, vents and chimneys have been properly sealed
- Siding and trim is free of gaps, voids, missing fasteners, damage, and serious defects. All seams are sealed and hardboard edges are sealed
- Drip edge and fascia is properly installed and free of damage and serious defects
- Gutters and downspouts are installed properly such that water is diverted away from the home
- Trees and bushes have been trimmed to prevent brushing against the home in windy conditions or under snow loads
- The HUD label is exposed, intact and legible
- The exterior of the home and immediate surroundings is clean, clear of construction materials, dust, and debris



Limits of the checklist. This checklist is not all-inclusive. Some homes have important features not listed here. Completing this checklist does not guarantee that all installation requirements have been met.



INTERIOR

Ceilings, walls, and floor coverings are free from damage and serious defects
 Carpeting is properly stretched and seamed
 All trim and molding is installed properly and free of damage and defects
 All cabinets, countertops, plumbing fixtures, appliances, furnishings, and window coverings are free of damage or serious defects
 All cabinet doors and drawers work properly
 All interior and exterior doors and windows open, close, and latch properly
 One window in each bedroom meets emergency egress requirements, has operating instruction labels on it, and operates properly
 All temporary shipping hardware has been removed
 Floors are level
 The data plate is intact and legible
 Smoke alarms have been tested
 The interior of the home is clean, clear of materials, dust, and debris

WATER AND DRAIN SYSTEMS

Crossover and service connection and splices have been properly made with correct materials
 Water and drain lines are insulated or otherwise protected from freezing
 Pipe supports are installed and properly spaced
 Proper slope has been maintained on all drain lines
 All necessary inspections and tests have been performed
 All sinks, basins, tubs, and toilets operate properly
 All hot and cold water lines are properly connected to fixtures, dispense water as labeled, and operate properly

ELECTRICAL SYSTEMS

The panel amperage matches the connection to the home
 The home has been properly grounded
 The main power supply has been properly connected and tested by a licensed electrician
 All electrical crossovers have been connected
 All receptacles, switches, and light fixtures operate properly
 Ground fault circuit interrupters operate properly
 All exterior lights have been properly installed

GAS/FUEL OIL SYSTEMS

The gas system pressure test has been conducted
 Connections between units are properly made with access as required
 The main fuel line has been properly connected and tested by a qualified technician

APPLIANCE OPERATING AND VENTING

All appliances are working properly
 Appliance venting is in accordance with the manufacturer's instructions
 Fresh air intakes are properly installed
 Whole house, kitchen, and bath exhaust fan operation are correct
 Fireplace chimney stack extension and roof cap have been installed in accordance with the manufacturer's instructions

Air conditioner/heat pump is sized properly

MISCELLANEOUS

Installation/anchoring certificates or seals have been issued and installed (if required)

Owner's and operation manuals are available for all appliances

This installation manual is left with home





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CONTRACT CONDITIONS FOR CONSTRUCTION CONTRACTS OF \$70,000 AND LESS

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PART 1 GENERAL CONDITIONS

1.01 DEFINITION

Wherever in the specifications and other contract documents the following terms, or pronouns in place of them, are used, the intent and meaning shall be interpreted as follows:

District: The East Bay Municipal Utility District

Contractor: The individual, partnership, joint venture, or corporation with whom the contract is made by the District.

Engineer: The Director of the Engineering Department of the District acting directly or through authorized agents acting within the duties entrusted to them.

1.02 COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK

- A. The Contractor shall not perform any work until he/she has received from the Engineer a Notice to Proceed letter.
- B. Work shall be continued at all times with such force and equipment as will be sufficient to complete it within the specified time.
- C. Contractor shall remove and dispose of the existing single wide manufactured unit and prepare the site pad as identified in Exhibit B prior to District delivering the two-wide manufactured unit to the site.
- D. Completion and acceptance of all work as shown in Exhibit A - Summary of Work constitutes contract completion.

1.03 SCHEDULE

- A. Prior to commencing work, Contractor shall provide the District with a written schedule of work activities to allow scheduling of inspection activities.
- B. The Contractor shall provide written or oral notice to the Engineer each day of the work planned for the following day.
- C. Notice to proceed will be issued prior to delivery of manufactured home to the project site.
- D. District will notify Contractor of the delivery date of the two-wide manufactured home within one week after issuing the NTP.
- E. The base bid shall be made ready for service within 30 calendar days after delivery of the manufactured home to the site.

- F. If awarded, Additive Bid Item A shall be made ready for service within 45 days after delivery of the manufactured home to the site.
- G. "Ready for service" means all functional, startup, pressure, and leakage testing is satisfactorily completed; all electrical and mechanical equipment is protected from weather and vandals; lighting and access are adequate for facilities to be operational; California DOSH Safety Standards complied with; marked-up as-built and record drawings have been submitted; operation and maintenance manuals have been submitted; and the facilities are capable of being operated.
- H. Contract shall be completed within 60 calendar days after the delivery of the manufactured home to the site.

1.04 LIQUIDATED DAMAGES

- A. The deductions for liquidated damages shall be \$75/day from date of required contract completion until actual contract completion date.
- B. Should the Contractor fail to complete all or any portion of the Work within the specified time thereof or within such extra time as may be allowed for delays by formal extensions granted by the District, deductions will be made from the Contractor's earnings for the time that the Work remains incomplete beyond the specified completion time. Liquidated damages will be apportioned such that the Contractor will be responsible for all delays not otherwise properly subject to time extensions.
- C. The above liquidated damages are necessary to ensure timely completion and to defray costs of additional construction inspection, contract administration. It being impracticable or extremely difficult to fix the actual amount of damage, the parties agree that the amounts set forth in this contract are hereby agreed upon as liquidated damages and will be deducted from any money due to the Contractor under the contract. Should the amount of the damages exceed the amount due the Contractor, the Contractor and its sureties shall be liable for the excess.
- D. Actual damages that result from delays to this work shall be assessed in addition to liquidated damages. For example, delays resulting from the site not being properly prepared as identified in 1.02 C, could result in storage rental fees estimated at \$300/unit/month and insurance coverages for the rental fees estimated at \$3000 for a three month period.

1.05 TERMINATION OF CONTRACT

- A. Termination by the District for Cause or Default
 - a. The District may terminate the Contractor's right to proceed under the contract, in whole or in part, for cause at any time after the occurrence of any of the following events:
 - i. The Contractor becomes insolvent or files for relief under the bankruptcy

laws of the United States.

- ii. The Contractor makes a general assignment for the benefit of its creditors or fails to pay its debts as the same become due.
 - iii. A receiver is appointed to take charge of the Contractor's property.
 - iv. The Contractor abandons the work. Abandonment is conclusively presumed when the District requests a written plan to cure a default and the Contractor does not submit the plan within five work days of the District's request.
- b. If any of the following events occur, the District may require that the Contractor submit a written plan to cure its default:
- i. The Contractor fails to supply skilled supervisory personnel, an adequate number of properly skilled workers, proper materials, or necessary equipment to prosecute the Work in accordance with the Contract Documents.
 - ii. The Contractor fails to make progress so as to endanger performance of the Work within the Contract Time.
 - iii. The Contractor disregards legal requirements of agencies having jurisdiction over the Work, the Contractor, or the District.
 - iv. The Contractor materially fails to execute the Work in accordance with the Contract Documents.
 - v. The Contractor is in default of any other material obligation under the Contract Documents.
- c. The District may terminate the Contractor's right to proceed under the contract in whole or in part for default if the written plan is not received by the District within five days after the District's request or if the District does not accept the Contractor's plan for curing its default.
- d. Upon any of the occurrences referred to above in Articles 1.05.A.a, 1.05.A.b, 1.05.A.c, the District may, at its election and by notice to the Contractor, terminate the contract in whole or in part; accept the assignment of any or all of the subcontracts; and then complete the Work by any method the District may deem expedient. If requested by the District, the Contractor shall remove any part or all of the Contractor's materials, supplies, equipment, tools, and construction equipment and machinery from the project site within seven days of such request; and if the Contractor fails to do so, the District may remove or store, and after 90 days sell, any of the same at the Contractor's expense.
- e. If the contract is terminated by the District as provided in this Article, the Contractor shall not be entitled to receive any further payment until the expiration of 35 days after acceptance of all work by the District.
- f. No termination or action taken by the District after termination shall prejudice any other rights or remedies of the District provided by law or by the Contract Documents.

- g. If, after termination for default, it is determined that the Contractor was not in default, or that default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for convenience pursuant to Article 1.05.B.

B. Termination by the District for Convenience

- a. The District may, at its option, and for its convenience, terminate this contract at any time by giving written notice to the Contractor specifying the effective date of termination. Upon such termination, the Contractor agrees to comply with the notice and further agrees to waive any claims for damages, including loss of anticipated profits, on account of the termination in accordance with Article 1.05.B.e; and, as the sole right and remedy of the Contractor, the District will pay the Contractor in accordance with Article 1.05.B.d below.
- b. Upon receipt of notice of termination under this Article 1.05.B, the Contractor shall, unless the notice directs otherwise, do the following:
 - i. Immediately discontinue the Work to the extent specified in the notice.
 - ii. Place no further orders or subcontracts for materials, equipment, services, or facilities, except as may be necessary for completion of a portion of the Work that is not discontinued or is necessary to secure the project site.
 - iii. Promptly cancel, on the most favorable terms reasonably possible, all subcontracts to the extent they relate to the performance of the discontinued portion of the Work.
 - iv. Thereafter, do only such Work as may be necessary to preserve and protect work already in progress and to protect materials, plants, and equipment in transit or on the project site.
- c. Upon termination, the obligations of the contract shall continue as to portions of the Work already performed and, subject to the Contractor's obligations under Article 1.05.B.b, as to bona fide obligations assumed by the Contractor prior to the date of termination.
- d. Upon such termination, the District will pay to the Contractor the sum of the following:
 - i. The amount of the contract price allocable to the portion of the Work properly performed by the Contractor as of the effective date of termination, less sums previously paid to the Contractor.
 - ii. Previously unpaid costs of any items delivered to the Project site which were already fabricated for subsequent incorporation in the Work.
 - iii. Any proven losses with respect to materials and equipment directly resulting from the termination.
 - iv. Reasonable demobilization costs.
- e. The above reimbursement is the sole and exclusive remedy to which the Contractor is entitled in the event the contract is terminated for convenience; and

the Contractor expressly waives any other claims, damages, demands, compensation or recovery related to this contract or project. The Contractor agrees to sign a general release incorporating this waiver.

C. Termination of the Contract - Act of God or Force Majeure

- a. "Act of God" has the meaning set forth in Section 7105 of the Public Contract Code. "Force Majeure" shall solely have the meaning set forth in Section 1511, Subparagraph 2 of the Civil Code. If an Act of God or Force Majeure occurs, the Engineer may, by written notice, suspend or terminate this contract. If the contract is not suspended or terminated, or if the contract is resumed after suspension, the Contractor shall fully restore the Work except as limited by Public Contract Code, Section 7105(a), in the case of an "Act of God."
- b. If the contract is terminated because of an Act of God or Force Majeure, the Contractor will be paid for Work performed prior to the Act of God or Force Majeure at either (i) the Unit Prices named in the contract; or (ii) in the event no unit prices are named, a sum equal to the percentage that the Contract Sum for the Work completed, at the time of occurrence of the Act of God or Force Majeure bears to the Contract Sum for all Work to be performed under the contract as determined by the Engineer. In no event will the District be liable to the Contractor for breach of contract, extra work, or damages because the contract is terminated due to an Act of God or Force Majeure.

D. Suspension by the District

- a. The Engineer may, in its sole discretion, order the Contractor, in writing, to suspend, delay, or interrupt the Work in whole or in part for as long as 90 days from the date of delivery of a written order of suspension. The order shall be specifically identified as a "suspension order" under this Article. The Work may be suspended for a longer period or periods if the parties agree. Upon receipt of a suspension order, the Contractor shall comply with its terms and take all reasonable steps to minimize costs related to the suspension of the Work or the portion of the Work. Within 90 days after the issuance of the suspension order, or such extension to that period as is agreed upon by the Contractor and the District, the District will either cancel the suspension order or delete the suspended Work.
- b. If a suspension order is canceled or expires, the Contractor shall resume the suspended work. A Change Order may be issued to cover any adjustments of the contract sum or an extension of contract time necessarily caused by the suspension. If the Contractor disputes the adjustment of the contract sum or the contract time, the Contractor shall submit a claim per Article 1.22.
- c. Costs directly associated with the suspension will be at the District's expense if the suspension is not due to any fault of the Contractor.
- d. A suspension order shall not be required to stop the work as permitted or required under any other provision of the Contract Documents

1.06 CHANGES

07/27/17

Contract # 17-566-001

Exhibit C - 7

Contract Conditions

- A. The District reserves the right to modify the drawings and specifications, and to require changes in the work, as necessary for proper completion of the work.
- B. Changes will be directed in writing by the Engineer. An equitable adjustment in the cost of the work will be determined by the Engineer. When requested by the Engineer, the Contractor shall submit a proposal covering the changes. For emergency work directed by the Engineer, the Contractor shall submit a breakdown of actual costs incurred.
- C. Changes will be set forth in a revised purchase order contract, which will reflect the revised work description and cost ceiling.

1.07 INSTRUCTIONS TO CONTRACTOR

The Contractor shall at all times be represented on the work in person or by a supervisor or duly designated agent. Instructions and information given by the Engineer to the Contractor's foreman or agent on the work shall be considered as having been given to the Contractor.

1.08 PERMIT

The District has obtained a building permit from the County of San Joaquin for this project. Contractor shall perform work in accordance with all applicable regulatory requirements enforced by the jurisdiction under the permit.

1.09 INSPECTION

All materials furnished and work completed under this contract is subject to rigid inspection. The Engineer, or its authorized agent or agents, shall have safe access to the work site or shop where the work, material or equipment subject to inspection is being performed or manufactured or where any off-site work is being performed.

1.10 MATERIAL, WORKMANSHIP, AND QUALITY ASSURANCE

All materials shall be of the specified quality and, unless otherwise specified, shall be new, unexpired, of good quality, and of current manufacture unless otherwise specified. All materials shall be of the specified quality and equal to approved samples, if samples were required.

All work shall be done and completed in a thorough, workmanlike manner, notwithstanding any omission from the specifications or the drawings, and it shall be the duty of the Contractor to call attention to apparent errors or omissions and request instructions before proceeding with the work. The Engineer may, by appropriate instructions, correct errors and supply omissions, which instructions shall be as binding upon the Contractor as though contained in the original Contract Documents.

All materials furnished and all work done shall be in accordance with the Contract Documents. Work, material, or equipment not in accordance with the Contract

Documents, in the opinion of the Engineer, shall be made to conform thereto. Unsatisfactory material and equipment will be rejected, and if so ordered by the Engineer, shall, at the Contractor's expense, be immediately removed from the vicinity of the work.

Furnish, install, and test materials and equipment in full accordance with the latest applicable rules, regulations, requirements, and specifications of the following:

- a. Local Laws and Ordinances.
- b. State and Federal Laws.
- c. National Electrical Contractors Association (NECA) Standard of Installation.
- d. National Electrical Manufacturers Association (NEMA).
- e. National Electrical Testing Association (NETA)
- f. California Electric Code (CEC).

1.11 WORKING HOURS

- A. Work or activity of any kind shall be limited to the hours from 7:00 a.m. to 6:00 p.m. Monday through Friday.
- B. Work in excess of eight hours per day, on Saturdays, on Sundays, or on District holidays requires prior consent of the Engineer and is subject to Cost of Overtime Construction Inspection.
- C. District holidays
 - a. Holidays are:
 - New Years Day
 - Martin Luther King Day (3rd Monday in January)
 - Lincoln's Birthday
 - Washington's Birthday (3rd Monday in February)
 - Chavez's Birthday
 - Memorial Day (last Monday in May)
 - Independence Day
 - Labor Day (1st Monday in September)
 - Admission Day
 - Columbus Day (2nd Monday in October)
 - Veteran's Day
 - Thanksgiving Day and following Friday
 - Christmas Day
 - b. When a holiday falls on Sunday, the following Monday shall be observed as the holiday. When a holiday falls on Saturday, the preceding Friday shall be observed as the holiday.

1.12 OPERATION OF EXISTING FACILITIES

- A. Unless otherwise specified, existing District facilities shall be kept in continuous operation throughout the construction period. No interruption will be permitted which adversely affects the degree of District service provided. Upon written permission obtained in advance, portions of the existing facilities may be taken out of service for short durations of minimum service demands.
- B. If the Contractor wishes to take any equipment or electrical circuit out of service, the Contractor shall provide a written request to the Engineer one week in advance of the date of the proposed work. No items shall be taken out of service until the Contractor has received written approval from the Engineer and the necessary lockout tagout (LOTO) procedure has been established, see Article 2.08.
- C. The Contractor shall cooperate with the District to permit full access to existing facilities by District personnel and equipment.

1.13 NOT USED

1.14 PROTECTION OF PROPERTY

- A. The Contractor shall be solely responsible for conditions of the jobsite, including safety of all persons and property, during performance of the work.
- B. The Contractor, at its own expense, shall repair or otherwise restore, to the Engineer's satisfaction, all injuries and damage resulting from its failure to protect the work and other structures, facilities, and property.

1.15 COOPERATION

The District reserves the right to perform other work at or near the site at any time by the use of its own forces or other Contractors. The Contractor shall coordinate its work and cooperate with District forces and other Contractors such that any delay or hindrance to their work will be avoided.

1.16 PREVAILING WAGES, PAYROLL RECORDS, HOURS OF LABOR AND EMPLOYMENT OF APPRENTICES

- A. Prevailing Wages
 - a. Pursuant to Section 1773 of the Labor Code of the State of California, the District has obtained from the Director of Industrial Relations of the State of California, the general prevailing rates of per diem wages and the general prevailing rates for holiday and overtime work in the locality in which the work is to be performed, for each craft, classification, or type of worker needed to execute the contract. The prevailing wage rates are available on the internet at <http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm>

- b. The holidays upon which such rates shall be paid shall be all holidays recognized in the collective bargaining agreement applicable to the particular craft, classification, or type of worker employed on the work.
- c. The Contractor shall post a copy of the general prevailing rate of per diem wages at the jobsite pursuant to Section 1773.2 of the Labor Code of the State of California.
- d. Pursuant to Section 1774 of the Labor Code of the State of California, the Contractor and any of its subcontractor shall pay not less than the specified prevailing rate of wages to all workers employed in the execution of the contract.
- e. As set forth with more specificity in Section 1773.1 of the Labor Code, "per diem" wages shall be deemed to include employer payments for health and welfare, pension, vacation, travel, subsistence, and in certain instances apprenticeship or other training programs, and shall be paid at the rate and in the amount spelled out in the pertinent prevailing wage determinations issued by the Director of Industrial Relations.
- f. The Contractor shall, as a penalty to the State or the District, forfeit not more than the maximum set forth in Section 1775 of the Labor Code for each calendar day, or portion thereof, for each worker paid less than the prevailing rates for the work or craft in which the worker is employed under the contract by the Contractor or by any subcontractor under him. The difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which such worker was paid less than the stipulated prevailing wage rate shall be paid to such worker by the Contractor.
- g. The specified wage rates are minimum rates only and the District will not consider and shall not be liable for any claims for additional compensation made by the Contractor because of its payment of any wage rate in excess of the general prevailing rates. All disputes in regard to the payment of wages in excess of those specified herein shall be adjusted by the Contractor at its own expense.
- h. General prevailing wage determinations have expiration dates with either a single asterisk or a double asterisk. Pursuant to California Code of Regulations, Title 8, Section 16204(b), the single asterisk means that the general prevailing wage determination shall be in effect for the specified contract duration. The double asterisk means that the predetermined wage modification shall be paid after the expiration date. No adjustment in the contract sum will be made for Contractor's payment of these predetermined wage modifications.
- i. The Contractor and all Subcontractors of any tier shall be properly registered with the State Department of Industrial Relations at the time of bid opening and for the duration of the project pursuant to Section 1725.5 of the Labor Code. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

B. Payroll Records

- a. The Contractor and each subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight

time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed in connection with the work. The payroll records shall be certified and shall be available for inspection in accordance with the provisions of Section 1776 of the Labor Code.

- b. The Contractor shall submit for each week in which any contract work is performed a copy of all payrolls to the Engineer. Contractor shall be responsible for submission of copies of payroll records of all subcontractors. Payrolls shall be completed and submitted by the 25th of the month for the previous 30 day period which started on the 15th of the previous month to the 15th of the current month.
- c. Certified payroll records shall be on the forms provided by the Department of Industrial Relations or contain the same information required on the Department's form. Copies of the form may be obtained from:

Division of Labor Standards Enforcement
Bureau of Field Enforcement
2031 Howe Avenue, Suite 100
Sacramento, CA 95825-5378
(916) 263-1811
(916) 263-5378

or from the Division of Labor Standards Enforcement website at
<http://www.dir.ca.gov/dlse/DLSE-Forms.htm>

- d. The Contractor or subcontractor shall certify the payroll records as shown on the reverse of the State form. In addition, the records shall be accompanied by a statement signed by the Contractor or subcontractor certifying that the classifications truly reflect the work performed and that the wage rates are not less than those required to be paid.
- e. In the event of noncompliance with the requirements of Section 1776 of the Labor Code, the Contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects such Contractor must comply with said Section. Should noncompliance still be evident after such ten-day period, the Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1776(h) of the Labor Code for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from progress payments then due.
- f. The Contractor and its subcontractors of any tiers shall also furnish the payroll records specified in Labor Code Section 1776 directly to the Labor Commissioner.

C. Hours of Labor

- a. Pursuant to the provisions of Sections 1810 et. seq. of the Labor Code of the State of California and any amendments thereof:
 - i. Eight hours labor constitutes a legal day's work under the contract.
 - ii. The time of service of any worker employed upon the work shall be limited and restricted to eight hours during any one calendar day, and forty hours during any one calendar week except as provided in Article 1.16.C.a.iv below.
 - iii. The Contractor shall, as a penalty to the State or the District, forfeit the amount set forth in Section 1813 of the Labor Code for each worker employed in the execution of the contract by the Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight hours in any calendar day and forty hours in any one calendar week in violation of this Article and the provisions of Labor Code Sections 1810 et. seq.
 - iv. Work performed by employees of the Contractor in excess of eight hours per day, and forty hours during any one calendar week, shall be permitted upon compensation for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay.
 - v. The Contractor and every subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by the contractor or the subcontractors in connection with the work; the record shall be kept open at all reasonable hours to the inspection of the District and to the Division of Labor Standards Enforcement of the State of California.

D. Employment of Apprentices

- a. In the performance of the contract, the Contractor and any subcontractor shall comply with the provisions concerning the employment of apprentices in Section 1777.5 of the Labor Code of the State of California and any amendments thereof.
- b. In the event the Contractor or any subcontractor willfully fails to comply with the aforesaid section, such Contractor or subcontractor shall be subject to the penalties for noncompliance in Labor Code Section 1777.7.

1.17 CLEAN UP

The Contractor shall be responsible for clean-up and removal of all debris, extra material, and equipment utilized for installation of the work.

1.18 BASIS OF PAYMENT

The basis of payment for the work specified herein shall be as included in the applicable lump sum price stated in the Contractor's Proposal. Contractor shall receive total payment after all work is complete as determined by the Engineer.

1.19 INDUSTRIAL WELFARE COMMISSION ORDER NO 16-2001

Post at the job site and comply with Industrial Welfare Commission Order No. 16-2001. Copies of this order may be obtained from the Department of Industrial Relations Public Information Office, P.O. Box 420603, San Francisco, CA 94142-0603, telephone (415) 703-5070, or on the internet at <http://www.dir.ca.gov/iwc>.

1.20 DECLARATIONS OF ELIGIBILITY AND NON-COLLUSION

With the bid proposal, Contractor shall execute and submit the Declaration of Eligibility to Work on Public Works Projects. Sign the form. The Contractor's representative signing the Declaration of Eligibility to Work on Public Works Projects shall meet all requirements for signing the quotation proposal.

With the bid proposal, Contractor shall execute and submit with the proposal the Declaration of Noncollusion. Sign the form. The Contractor's representative signing the Declaration of Noncollusion shall meet all requirements for signing the quotation proposal.

1.21 DESIGNATION OF SUBCONTRACTORS

With the bid proposal, Contractor shall complete all information required for all subcontracts in excess of one-half of one percent of the total bid and list this information on the Designation of Subcontractors Form (Form P-046). Subcontractors' names and addresses shall be complete and legible. Clearly state that portion of the work to be done by each subcontractor listed, by type and by estimated dollar amount. Designated subcontractors cannot be substituted after bid opening except as provided in Section 4107 of the Public Contract Code.

The Contractor's attention is called to the District's additional restrictions on subcontractor substitution as stated under Contract Equity Participation (Form P-040).

1.22 DISPUTES AND CLAIMS

If the Engineer issues an order or decision that requires the Contractor to perform Work that the Contractor believes is not required by the Contract Documents, the Contractor shall, within 48 hours of the order or decision, notify the Engineer in writing that it disputes the order or decision. The Contractor's notice shall include the date and circumstances of the Engineer's order or decision and the detailed basis for disputing the order or decision. Regardless of the basis of the dispute, the Contractor shall immediately perform the disputed work or conform to the Engineer's order or decision.

The Engineer will consider and investigate the dispute and issue a written and final decision regarding the dispute. If the Contractor disagrees with the Engineer's final decision, the Contractor shall, within 10 days of receipt of the decision, send the Engineer a written Notice of Intent To File a Claim.

Failure of the Contractor to comply with the notifications outlined above within the specified time constitutes a waiver of the Contractor's right to assert a claim concerning such matter.

Time to Submit Claim: The Contractor shall submit a written Claim within 30 days after submitting a Notice of Intent to File a Claim. The Claim shall relate directly to the circumstances addressed in the Notice of Intent to File a Claim, must identify the date of the Notice of Intent to File a Claim to which the Claim relates, and may not raise new issues or circumstances that were not identified in the Notice of Intent to File a Claim. The Claim shall clearly state that it is a Claim being submitted under this Article. Failure to submit a written Claim within the 30-day period waives any right to recover compensation or obtain an extension of Contract Time due to the issues referenced in the Notice of Intent to File a Claim.

Contents of Written Claim: The written Claim shall provide detailed information sufficient to allow the Engineer to evaluate entitlement and value of the Claim, including:

1. Description of the event or events giving rise to the Claim;
2. Identification of the date or dates of the event, or events giving rise to the Claim;
3. Identification of all statutory or contractual support for the Claim; and
4. Detailed analysis of the asserted effect on the Contract Sum and the Contract Time.

Extensions in Contract Time: The Claim shall provide an analysis of schedule impact that describes how the Contractor will incorporate the alleged changed work in the schedule and how that work impacts the current accepted schedule. If the Contractor is requesting an extension in the contract time, the magnitude and cause of the delay shall be demonstrated in the analysis of schedule impacts.

The Contractor, through a corporate officer or general partner, shall certify under penalty of perjury pursuant to the laws of the State of California for any Claim filed on behalf of itself or its Subcontractors or Suppliers, that:

1. The claim is made in good faith;
2. Supporting data are accurate and complete to the best of the Contractor's knowledge and belief; and
3. The amount requested accurately reflects the contract adjustment for which the Contractor believes the District is liable.

If Contractor does not certify the Claim as required above, the Claim will be denied without any further recourse by, or remedy to, the Contractor.

The Contractor's performance of its duties and obligations and submission of a claim, specified in this Article, is the Contractor's sole and exclusive remedy for the payment of money, extension of time, the adjustment or interpretation of Contract Documents terms or other contractual or tort relief arising from the Contract Documents. This exclusive remedy and the limitation of liability (expressed herein and elsewhere throughout the Contract Documents) apply notwithstanding the completion, termination, suspension, cancellation, breach or rescission of the Work or the Contract Documents, negligence or strict liability by the District, its representatives, consultants or agents, or the transfer of the Work to the District for any reason whatsoever. The Contractor waives all claims of waiver, estoppels, release, bar, or any other type excuse for non-compliance with the claim submission requirements. Compliance with the notice and claim submission procedures described in this Article is a condition precedent to the right to file a Government Code Claim, which in turn is a condition precedent to the right to commence litigation, or commence any other legal action. No claim or issues not raised in a timely protest and timely claim submitted under this Article may be asserted in any Government Code Claim pursuant to Government Code Section 900 et. Seq., subsequent litigation, or legal action. The District shall not be deemed to have waived any provision under this Article, if at the District's sole discretion, a claim is accepted in a manner not in accord with this Article.

For claims less than or equal to \$375,000, the Contractor shall comply with Public Contract Code Section 20104, et. Seq., which is set forth below in relevant part: (As used therein, the term "local agency" means East Bay Municipal Utility District.) This Public Contract Code section on claim resolution does not supersede the claim documentation requirements in this Article and only becomes operative upon the timely notice and submittal of a claim under the contract.

“20104. (a) (1) This article applies to all public works claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a Contractor and a local agency.

(2) This article shall not apply to any claims resulting from a contract between a Contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.

(b)(1) “Public work” means “public works contract” as defined in Section 1101 but does not include any work or improvement contracted for by the state or the Regents of the University of California.

(2) "Claim" means a separate demand by the Contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the local agency.

20104.2. For any claim subject to this article, the following requirements apply:

(a) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.

(b) (1) For claims of less than fifty thousand dollars (\$50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(c) (1) For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the local agency shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) or Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

(f) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code."

All civil actions filed to resolve claims under this Act are subject to the provisions of Public Contract Code Section 20104.4 and 20104.6(b).

The parties specifically and expressly agree that California Government Code Section 12650 et. seq. applies. If a false claim is knowingly submitted (as the terms "claim" and "knowingly" are defined in the California False Claims Act, California Government Code Section 12650 et. seq.) the District will be entitled to civil remedies set forth in the California False Claim Act. It may also be considered fraud and the Contractor may be subject to criminal prosecution.

Under no circumstances will the Contractor be entitled to indirect, consequential, special and incidental damages.

1.23 USE OF APPRENTICES

For contracts over \$30,000, the Contractor shall use apprentices in accordance with California Labor Code section 1777.5-.7. The District will notify the Division of Apprenticeship Standards once the purchase order for the contract has been issued.

PART 2 SAFETY AND REGULATORY REQUIREMENTS

2.01 CONTRACTOR'S RESPONSIBILITY FOR SAFETY

- A. The Contractor shall at its cost do whatever work is necessary for safety and be solely and completely responsible for conditions of the jobsite, including safety of all persons (including District employees) and property during the Contract period. This requirement applies continuously and is not limited to normal working hours.
- B. The Contractor shall at its cost be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. All employees on the work and other persons and organizations who may be affected thereby;
 - 2. All the work and materials and equipment to be incorporated therein, whether in storage on or off the site; and
 - 3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.
- C. The Contractor shall at its cost comply with all applicable laws and regulations (whether referred to herein or not) of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify the District and other owners of adjacent property and utilities

when prosecution of the work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

2.02 FEDERAL, STATE, AND LOCAL SAFETY REQUIREMENTS

Health and safety provisions shall conform to the Federal and State Departments of Labor Occupational Safety and Health Act (OSHA), and all other applicable federal, state, county, and local laws, ordinances, codes, the requirements set forth herein, and any regulations that may be specific to the District facilities including the Federal Occupational Safety and Health Act of 1970 (29 U.S.C., Section 651, et seq.) and California Code of Regulations, Title 8, Industrial Relations Division 1, Department of Industrial Relations, Chapter 4. Where any of these are in conflict, the more stringent requirement shall be followed. Failure to thoroughly familiarize itself with the aforementioned safety provisions shall not relieve the Contractor from compliance with the obligations and penalties set forth therein.

2.03 CONSTRUCTION SAFETY PROGRAM

- A. The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program. This person shall be the Contractor's Superintendent unless otherwise designated in writing by the Contractor to the District.
- B. The Contractor shall designate in writing to the District the name and position of all "Competent Person(s)" to be assigned to the jobsite prior to commencement of work. Any change in competent person(s) made after commencement of work shall be communicated to the District in writing on a daily basis.
- C. The duties and responsibilities of the "Competent Person(s)" shall be in accordance with the Construction Safety Orders, Title 8 of the California Administrative Code.
- D. The duty of the Engineer to conduct construction review of the Contractor's performance does not include a review or approval of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site. These responsibilities are solely the Contractor's.

2.04 NOT USED

2.05 MATERIAL SAFETY DATA SHEET (MSDS)

Attention is directed to the provisions of General Industry Safety Orders, Section 5194, Title 8, California Administrative Code. The Contractor shall submit to the Engineer a Material Safety Data Sheet or a letter from the manufacturer or supplier stating that a MSDS is not required, for each hazardous substance proposed to be used, ten days prior

to the delivery of such material to the job site or use of such material at a manufacturing plant where the Engineer is to perform an inspection.

2.06 WARNING DEVICES AND BARRICADES

The Contractor shall adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Such devices shall, as a minimum, conform to the requirements of Cal-OSHA.

2.07 NOT USED

2.08 LOCKOUT TAGOUT

A. The Contractor shall submit its lockout tagout procedures a minimum of 14 days in advance of any work requiring lockout tagout. The Contractor's lockout tagout procedures shall comply with all Federal, State and District requirements for lockout tagout and shall be effective for the duration of the work operations. The Contractor with its subcontractors shall meet with the District to share and reach agreement for implementation with LOTO plans and planning for any District equipment, process, or machinery that shall be locked-out. The Contractor shall furnish, install and remove its own locks and tags. The District will be responsible for its own locks and tags.

2.09 NOT USED

PART 3 INDEMNIFICATION AND INSURANCE

3.01 GENERAL – INDEMNIFICATION

- A. The Contractor has the entire responsibility for any and all injury to the public and to individuals; for all loss or damage arising from any obstructions or difficulties, either natural or artificial, which may be encountered in the project; for damage to property resulting from the performance of the work under this contract; for damage from any action of the elements prior to the final acceptance of the work; for damage from any act or omission not authorized by this Specification on the part of the Contractor or any agent or person employed by the Contractor.
- B. The Contractor expressly agrees to indemnify, defend and hold the District, its Directors, officers, agents, and employees, free and harmless from and against any and all loss, liability, expense, claims, costs, suits, damages, including attorneys' fees, arising out of Contractor's operation or performance under this Contract, except where such damages arise from the sole negligence or willful misconduct of the District, its agents, servants or other independent contractors directly responsible to the District for defects in designs furnished.

3.02 INSURANCE REQUIREMENTS

- A. The Contractor shall, at its expenses, procure and maintain for the duration of the Contract all the required insurance and shall submit Certificates of insurance to the Engineer for review and approval. The Certificates shall be on the forms provided by the District.
- B. The Notice to Proceed will not be issued, and the Contractor shall not commence work, until the Certificates have been approved by the District. Approval of the Certificates shall not relieve the Contractor of any of the insurance requirements, nor decrease the liability of the Contractor.
- C. The District may require the Contractor to provide insurance policies to the Engineer for review. If requested, the Contractor agrees to provide the District complete copies of the policies no later than ten (10) calendar days following the request.

3.03 WORKERS' COMPENSATION INSURANCE

- A. The Contractor shall procure and maintain for the duration of the contract, Workers' Compensation Insurance for all of its employees on the project. Likewise, Contractor shall require all of its subcontractors to procure and maintain Workers' Compensation Insurance for the duration of the contract. In lieu of evidence of Workers' Compensation Insurance, the District will accept a Self-Insured Certificate from the State of California. The Contractor shall require its subcontractor(s) to provide it with a copy of proof of Workers' Compensation Insurance, all in strict compliance with California State Laws.

3.04 COMMERCIAL GENERAL AND AUTO LIABILITY INSURANCE

- A. The Contractor shall procure and maintain for the duration of the contract, Commercial General and Auto Liability Insurance that provides protection from claims which may arise from operations or performance under this contract. The Contractor shall require its subcontractor(s) to provide it with a copy of proof the same liability insurance coverages.
- B. The amount of insurance for all policies shall be not less than \$3,000,000.
- C. The following endorsements/coverages shall be included in the policy(ies):
 - 1. The District, its Directors, officers and employees are Additional Insureds in the policy(ies) as to the work being performed under the contract.
 - 2. The coverage is primary and non-contributory to any other applicable insurance carried by the District.
 - 3. The policy(ies) covers contractual liability.
 - 4. The policy(ies) is written on an occurrence basis.

5. The policy(ies) covers District's Property in Consultant's/Contractor's care, custody and control.
6. The policy(ies) covers personal injury (libel, slander, and wrongful entry and eviction) liability.
7. The policy(ies) covers explosion, collapse, and underground hazards.
8. The policy(ies) covers products and completed operations.
9. The policy(ies) covers use of owned, non-owned and hired automobiles.
10. NOT USED
11. The policy(ies) shall not be canceled nor the above coverages/endorsements reduced without 30 days written notice to the District.

3.05 POLLUTION LIABILITY INSURANCE

- A. The Contractor shall procure and maintain for the duration of the contract, Pollution Liability Insurance that provide protection from claims related to the release or threatened release of pollutants into the environment arising out of or resulting from Contractor's performance under this contract. The Contractor shall require its subcontractor(s) to provide it with a copy of proof of the same pollution liability insurance coverages.
- B. Pollution Liability coverage shall not be less than \$1,000,000 (claims made basis with a one year tail coverage).

3.06 BUILDERS RISK INSURANCE

- A. The Contractor shall procure and maintain for the duration of the Contract, (in the name of the Contractor and the District), "All Risk" (excluding Earthquake and Flood) Builders Risk Insurance covering the entire work of this contract for 100% of the replacement value thereof, including items of labor and materials in place or to be used as part of the permanent construction, including surplus miscellaneous materials and supplies incident to the work, and such scaffoldings, staging, towers, forms and equipment not owned or rented by the Contractor, the Cost of which is not included in the cost of the work.
- B. Exclusions: This insurance does not cover any tools owned by mechanics, any tools, equipment, scaffoldings, staging, towers, and forms, rented or owned by the Contractor, the value of which is not included in the cost of the work, or any shanties or other structures erected for the sole convenience of the workmen.

- C. In the event of a loss by the perils insured against, of any or all of the work and/or materials herein provided for, at any time prior to the final completion of the contract and the final acceptance by the District, the Contractor shall promptly reconstruct, repair, replace or restore all work or materials so destroyed.
- D. Nothing herein provided for shall in any way excuse the Contractor or its surety from the obligation of furnishing all the required materials and completing the work in full compliance with the terms of the contract.

3.07 PAYMENT AND PERFORMANCE BONDS (Required for contracts greater than \$25,000)

The contractor shall furnish to the District a Payment Bond in an amount not less than 100 percent and a Performance Bond in an amount not less than 100 percent of the proposal. The Payment Bond and the Performance Bond shall be on the forms of the District. Two copies of the bonds shall be signed by the Contractor. If the Contractor is a corporation, the contract and bonds shall be signed by the corporate officers authorized to do so. Both copies of the bonds shall be executed by a sufficient, admitted surety insurer (as listed on the website:

[http://interactive.web.insurance.ca.gov/webuser/idb_co_list\\$.startup](http://interactive.web.insurance.ca.gov/webuser/idb_co_list$.startup)) admitted to transact such business in California by the California Department of Insurance. After the contract is executed on behalf of the District, one copy will be returned to the Contractor for its files.

If during the continuance of the contract any of the sureties, in the opinion of the District, are or become irresponsible, the District may require other or additional sureties, which the Contractor shall furnish to the satisfaction of the District within ten (10) calendar days after notice, and in default thereof the contract may be terminated and the materials purchased or the work completed as provided in Article entitled "Termination of Contract".

It is understood and agreed that no modifications or alterations made in the specification or summary of work shall operate to release any surety from liability on any bond or bonds required to be given herein

PART 4 TEMPORARY CONSTRUCTION FACILITIES AND UTILITIES

4.01 NOT USED

4.02 NOT USED

4.03 PROJECT SECURITY

The Contractor shall make adequate provision for the protection of the work area against fire, theft, and vandalism, and for the protection of the public against exposure to injury. All costs arising from theft or vandalism shall be borne by the Contractor. At the end of each workday, any gates, hatches, doors, windows, manways, and exterior ladders, etc.

shall be secured, closed, and locked. Any alarmed system which is activated or disabled during the workday shall be tested through to the alarm monitoring station for proper actuation. At the end of each workday the Contractor shall secure all equipment, hazardous materials, tools, materials, and flammable fluids. The Contractor shall maintain key control to assure only authorized personnel have access to equipment, hazardous materials, tools, materials, and flammable fluids.

Upon request and at no additional cost to the District, the Contractor shall provide such information as necessary and as allowed by law to complete a background check on any person that enters the site. The District reserves the right to deny access to the site to any person as allowed by law.

4.04 CONTRACTOR'S WORK AREA

- A. A reasonable amount of structural and other material to be used in constructing the work may be stored adjacent to the work, but only to an extent that is absolutely necessary to avoid delay in construction. Such materials will not be allowed to accumulate but shall be replenished from day to day as they may be required. In any event, materials may be stored only with permission of the Engineer, which permission shall be revocable at any time. The Contractor if so ordered, shall immediately, or within a time to be therein stated, remove such materials.
- B. The Contractor shall maintain the area during construction in a manner that will not obstruct operations of any street areas. Contractor shall proceed with its work in an orderly manner, maintaining the construction site free of debris and unnecessary equipment or materials.

4.05 WASTE DISPOSAL

The Contractor shall dispose of surplus materials, waste products, and debris and shall make necessary arrangements for such disposal. The Contractor shall obtain written permission from property owner prior to disposing surplus materials, waste products, or debris on private property.

4.06 SOUND CONTROL

The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the contract.

PART 5 MISCELLANEOUS PROVISIONS

5.01 NON-DISCRIMINATION CLAUSE

There shall be no discrimination against any person, or groups of persons, per Government Code Section 12940, Labor Code Section 1735, or any other applicable law or regulation in the performance of this contract.

There shall be no discrimination in the performance of this contract, against any person, or group of persons, on account of race, color, religion, religious creed, national origin,

ancestry, gender including gender identity or expression, age, marital or domestic partnership status, mental disability, physical disability (including HIV and AIDS), medical condition (including genetic characteristics or cancer), veteran or military status, family or medical leave status, genetic information, or sexual orientation. The Contractor shall not establish or permit any such practice(s) of discrimination with reference to the contract. Contractors determined to be in violation of this section will be deemed to be in material breach of the contract.

Contractor and its subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

The Contractor shall include the nondiscrimination and compliance provisions of these clauses in all subcontracts.

DECLARATION OF NONCOLLUSION

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares, under penalty of perjury under the laws of the State of California, that the bid submitted to the East Bay Municipal Utility District for _____

is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

Firm: _____

By: _____ Date: _____
(Signature of Bidder)

Signed At: _____ County, State of: _____



DECLARATION OF ELIGIBILITY TO WORK ON PUBLIC WORKS PROJECTS

The undersigned hereby certifies under penalty of perjury under the laws of the State of California that in connection with bidding on this project:

The bidder is eligible to bid on public works projects in the State of California;

The bidder is not barred from bidding on or being awarded a contract for public works pursuant to California Labor Code Sections 1725.5, 1777.1 or 1777.7;

The bidder has obtained from each and every sub-contractor it intends to employ on this project, a statement of eligibility to work on public works projects in the State of California indicating that the subcontractor is not barred from performing work on a public works project pursuant to California Labor Code Sections 1725.5, 1777.1 or 1777.7;

If at any time during the course of performing work for East Bay Municipal Utility District, the contractor (formerly known as the bidder) becomes, or any of its sub-contractors become, ineligible to work on public works projects in the State of California, the contractor will immediately notify East Bay Municipal Utility District of this fact in writing.

Date: _____

Signature of Bidder

Title: _____

Signed at: _____
(County)

State of: _____



DESIGNATION OF SUBCONTRACTORS (P-046)

Name of Bidder/Proposer _____

In compliance with the provisions of the Subletting and Subcontracting Fair Practices Act (Division 2, Part 1, Chapter 4 of the Public Contract Code of the State of California, and any amendments thereof), each bidder shall set forth below:

1. The name, the location of the place of business, and the California Contractor license number of each Subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work or improvement, or a Subcontractor licensed by the State of California who, under subcontract to the prime Contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent of the Contractor's total bid. List all Subcontractors meeting these criteria, including sole-source Subcontractors.
2. The portion and estimated dollar amount of the work that will be done by each Subcontractor listed below. The Contractor shall list only one Subcontractor for each portion as is defined by the Contractor in its bid.

All Contractors bidding on a public works project and all Subcontractors of any tier shall be registered with the State Department of Industrial Relations pursuant to Section 1725.5 of the Labor Code.

Please type or legibly print (attach additional sheets as necessary)

SUBCONTRACTOR'S COMPANY NAME CONTACT NAME / ADDRESS / PHONE NO.	CALIFORNIA LICENSE NUMBER	DESCRIPTION OF WORK TO BE PERFORMED	ESTIMATED \$ AMOUNT



DESIGNATION OF SUBCONTRACTORS (P-046)

SUBCONTRACTOR'S COMPANY NAME CONTACT NAME / ADDRESS / PHONE NO.	CALIFORNIA LICENSE NUMBER	DESCRIPTION OF WORK TO BE PERFORMED	ESTIMATED \$ AMOUNT

Designation of Subcontractors – From Public Contract Code Section 4105 - 4110

4105. Circumvention by a general contractor who bids as a prime contractor of the requirement under Section 4104 for him or her to list his or her subcontractors, by the device of listing another contractor who will in turn sublet portions constituting the majority of the work covered by the prime contract, shall be considered a violation of this chapter and shall subject that prime contractor to the penalties set forth in Sections 4110 and 4111.

4106. If a prime contractor fails to specify a subcontractor or if a prime contractor specifies more than one subcontractor for the same portion of work to be performed under the contract in excess of one-half of 1 percent of the prime contractor's total bid, the prime contractor agrees that he or she is fully qualified to perform that portion himself or herself, and that the prime contractor shall perform that portion himself or herself. If after award of contract, the prime contractor subcontracts, except as provided for in Sections 4107 or 4109, any such portion of the work, the prime contractor shall be subject to the penalties named in Section 4111.

4107. A prime contractor whose bid is accepted may not:

- (a) Substitute a person as subcontractor in place of the subcontractor listed in the original bid, except that the awarding authority, or its duly authorized officer, may, except as otherwise provided in Section 4107.5, consent to the substitution of another person as a subcontractor in any of the following situations:
 - (1) When the subcontractor listed in the bid, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract for the scope of work specified in the subcontractor's bid and at the price specified in the subcontractor's bid, when that written contract, based upon the general terms, conditions, plans, and specifications for the project involved or the terms of that subcontractor's written bid, is presented to the subcontractor by the prime contractor.
 - (2) When the listed subcontractor becomes insolvent or the subject of an order for relief in bankruptcy.
 - (3) When the listed subcontractor fails or refuses to perform his or her subcontract.
 - (4) When the listed subcontractor fails or refuses to meet the bond requirements of the prime contractor as set forth in Section 4108.
 - (5) When the prime contractor demonstrates to the awarding authority, or its duly authorized officer, subject to the further provisions set forth in Section 4107.5, that the name of the subcontractor was listed as the result of an inadvertent clerical error.
 - (6) When the listed subcontractor is not licensed pursuant to the Contractors License Law.
 - (7) When the awarding authority, or its duly authorized officer, determines that the work performed by the listed subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specifications, or that the subcontractor is substantially delaying or disrupting the progress of the work.
 - (8) When the listed subcontractor is ineligible to work on a public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.
 - (9) When the awarding authority determines that a listed subcontractor is not a responsible contractor.

Prior to approval of the prime contractor's request for the substitution, the awarding authority, or its duly authorized officer, shall give notice in writing to the listed subcontractor of the prime contractor's request to substitute and of the reasons for the request. The notice shall be served by certified or registered mail to the last known address of the subcontractor. The listed subcontractor who has been so notified has five working days within which to submit written objections to the substitution to the awarding authority. Failure to file these written objections constitutes the listed subcontractor's consent to the substitution.

If written objections are filed, the awarding authority shall give notice in writing of at least five working days to the listed subcontractor of a hearing by the awarding authority on the prime contractor's request for substitution.

- (b) Permit a subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the original bid, without the consent of the awarding authority, or its duly authorized officer.
- (c) Other than in the performance of "change orders" causing changes or deviations from the original contract, sublet or subcontract any portion of the work in excess of one-half of 1 percent of the prime contractor's total bid as to which his or her original bid did not designate a subcontractor.

4107.2. No subcontractor listed by a prime contractor under Section 4104 as furnishing and installing carpeting, shall voluntarily sublet his or her subcontract with respect to any portion of the labor to be performed unless he or she specified the subcontractor in his or her bid for that subcontract to the prime contractor.

4107.5. The prime contractor as a condition to assert a claim of inadvertent clerical error in the listing of a subcontractor shall within two working days after the time of the prime bid opening by the awarding authority give written notice to the awarding authority and copies of that notice to both the subcontractor he or she claims to have listed in error and the intended subcontractor who had bid to the prime contractor prior to bid opening.

Any listed subcontractor who has been notified by the prime contractor in accordance with this section as to an inadvertent clerical error shall be allowed six working days from the time of the prime bid opening within which to submit to the awarding authority and to the prime contractor written objection to the prime contractor's claim of inadvertent clerical error. Failure of the listed subcontractor to file the written notice within the six working days shall be primary evidence of his or her agreement that an inadvertent clerical error was made.

The awarding authority shall, after a public hearing as provided in Section 4107 and in the absence of compelling reasons to the contrary, consent to the substitution of the intended subcontractor:

- (a) If (1) the prime contractor, (2) the subcontractor listed in error, and (3) the intended subcontractor each submit an affidavit to the awarding authority along with such additional evidence as the parties may wish to submit that an inadvertent clerical error was in fact made, provided that the affidavits from each of the three parties are filed within eight working days from the time of the prime bid opening, or
- (b) If the affidavits are filed by both the prime contractor and the intended subcontractor within the specified time but the subcontractor whom the prime contractor claims to have listed in error does not submit within six working days, to the awarding authority and to the prime contractor, written objection to the prime contractor's claim of inadvertent clerical error as provided in this section.

If the affidavits are filed by both the prime contractor and the intended subcontractor but the listed subcontractor has, within six working days from the time of the prime bid opening, submitted to the awarding authority and to the prime contractor written objection to the prime contractor's claim of inadvertent clerical error, the awarding authority shall investigate the claims of the parties and shall hold a public hearing as provided in Section 4107 to determine the validity of those claims. Any determination made shall be based on the facts contained in the declarations submitted under penalty of perjury by all three parties and supported by testimony under oath and subject to cross-examination. The awarding authority may, on its own motion or that of any other party, admit testimony of other contractors, any bid registries or depositories, or any other party in possession of facts which may have a bearing on the decision of the awarding authority.

4107.7. If a contractor who enters into a contract with a public entity for investigation, removal or remedial action, or disposal relative to the release or presence of a hazardous material or hazardous waste fails to pay a subcontractor registered as a hazardous waste hauler pursuant to Section 25163 of the Health and Safety Code within 10 days after the investigation, removal or remedial action, or disposal is completed, the subcontractor may serve a stop notice upon the public entity in accordance with Chapter 4 (commencing with Section 9350) of Title 3 of Part 6 of Division 4 of the Civil Code.

4108. (a) It shall be the responsibility of each subcontractor submitting bids to a prime contractor to be prepared to submit a faithful performance and payment bond or bonds if so requested by the prime contractor.

- (b) In the event any subcontractor submitting a bid to a prime contractor does not, upon the request of the prime contractor and at the expense of the prime contractor at the established charge or premium therefor, furnish to the prime contractor a bond or bonds issued by an admitted surety wherein the prime contractor shall be named the obligee, guaranteeing prompt and faithful performance of the subcontract and the payment of all claims for labor and materials furnished or used in and about the work to be done and performed under the subcontract, the prime contractor may reject the bid and make a substitution of another subcontractor subject to Section 4107.

- (c) (1) The bond or bonds may be required under this section only if the prime contractor in his or her written or published request for subbids clearly specifies the amount and requirements of the bond or bonds.

(2) If the expense of the bond or bonds required under this section is to be borne by the subcontractor, that requirement shall also be specified in the prime contractor's written or published request for subbids.

(3) The prime contractor's failure to specify bond requirements, in accordance with this subdivision, in the written or published request for subbids shall preclude the prime contractor from imposing bond requirements under this section.

4109. Subletting or subcontracting of any portion of the work in excess of one-half of 1 percent of the prime contractor's total bid as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the awarding authority setting forth the facts constituting the emergency or necessity.

4110. A prime contractor violating any of the provisions of this chapter violates his or her contract and the awarding authority may exercise the option, in its own discretion, of (1) canceling his or her contract or (2) assessing the prime contractor a penalty in an amount of not more than 10 percent of the amount of the subcontract involved, and this penalty shall be deposited in the fund out of which the prime contract is awarded. In any proceedings under this section the prime contractor shall be entitled to a public hearing and to five days' notice of the time and place thereof.



EMPLOYMENT DATA AND CERTIFICATION INSTRUCTIONS (P-025)

**COMPLETION OF THIS FORM IS REQUIRED FOR ALL BIDS AND PROPOSALS.
AN IMPROPER OR INCOMPLETE FORM MAY RESULT IN REJECTION OF YOUR BID OR PROPOSAL OR
TERMINATION OF YOUR CONTRACT**

The East Bay Municipal Utility District **REQUIRES** the completion of this form when submitting any formal bid in response to a Notice to Contractors (NTC), Request for Statement of Qualifications (RSOQ), Request for Quotation (RFQ), or Request for Proposal (RFP) for materials, equipment, construction or professional or general services. Bidder/Proposer who fails to complete all applicable sections of this form may be denied contracts with the District.

Note: If you have difficulty completing this form or need clarification of the instructions, contact the Contract Equity Office at 510-287-0114.

SECTION A

FIRM NAME	<input type="checkbox"/> PRIME <input type="checkbox"/> SUBCONTRACTORS/TRUCKERS/ SUPPLIERS Submit a separate P-25 form for each subcontractor/trucker/supplier doing work for \$70,000 or more.		
PARENT COMPANY			
STREET ADDRESS (City, State, ZIP)			
MAILING ADDRESS (City, State, ZIP)			
PHONE NO.	FAX NO.	WEBSITE	E-MAIL

A1. TYPE OF ORGANIZATION

<input type="checkbox"/> INDIVIDUAL	NAME OF OWNER:		
<input type="checkbox"/> NONPROFIT CORP.	<input type="checkbox"/> PUBLICLY HELD CORP.	STATE OF INCORPORATION:	
<input type="checkbox"/> PRIVATE CORP.	<input type="checkbox"/> FOREIGN-OWNED		

Name(s), title, family relationship(s) and percentage of stock ownership for all shareholders who own 25% or more of stock in the corporation.

NAME	TITLE	FAMILY RELATIONSHIP	PERCENTAGE
			%
			%
			%

☐ JOINT VENTURE

List of Participants – Indicate percentage of work to be realized by each.

	%
	%

☐ PARTNERSHIP

Names of Partners – Indicate whether (G) General or (L) Limited.

A2. COMPOSITION OF OWNERSHIP

Indicate the percent of ethnic and gender ownership below

	Non-Hispanic Origin			Asian			Native American	Other	Refuse to State*
	White/ Caucasian	Black/ African American	Hispanic/ Latin American	Asian American	Asian-Pacific Islander American	Asian- Indian American		Indicate	
MALE									
FEMALE									
TOTAL									

* Firms that refuse to state will be classified as "Other".

SECTION B

B1. EMPLOYMENT DATA

Indicate below the number of employees in each occupational category for each of the ethnic groups listed for your firm's permanent workforce. *(Report employees in only one category. Permanent workforce is defined as full- and part-time employees with 6 months or more of continuous service.)* You may attach your EEO1 report in lieu of completing the form below. Please provide both your firm's consolidated and individual establishment EEO1 reports.

JOB CATEGORIES	RACE/ETHNICITY (number of employees)														Total A-N	
	Hispanic or Latino		Not Hispanic or Latino													
			Male						Female							
	Male	Female	White	Black or African American	Native Hawaiian or Other Pacific Islander	Asian	American Indian or Alaska Native	Two or More Races	White	Black or African American	Native Hawaiian or Other Pacific Islander	Asian	American Indian or Alaska Native	Two or More Races		
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
Executive/Senior Level Officials & Managers																
First/Mid-Level Officials & Managers																
Professionals																
Technicians																
Sales Workers																
Administrative Support Workers																
Craft Workers																
Laborers & Helpers																
Service Workers																
Firm's Total																
Bay Area* Total																

* Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Solano, Sonoma, and Santa Clara Counties

B1a. Identify the metropolitan statistical area (MSA) from which your firm's total permanent workforce is drawn. (See page 5)

B1c. Name of person responsible for affirmative action and compliance with equal employment opportunity laws in your firm:

B1b. If your firm's total permanent workforce is located in one county or parish, please identify:

PRINT NAME

TITLE

TELEPHONE NUMBER

SECTION C

CERTIFICATION OF FIRM'S OWNERSHIP AND COMPLIANCE WITH EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS REGARDING EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION REPORTING AND COMPLIANCE PROGRAMS INCLUDING HAVING A DISTRICT APPROVED PROCESS FOR RESPONDING TO COMPLAINTS OF DISCRIMINATION, HARASSMENT, AND RETALIATION

The undersigned has been (is) authorized to execute this certificate on behalf of _____
NAME OF FIRM

_____ and
swears under penalty of perjury that the foregoing statements are true and correct and that they include all material information necessary to identify and explain the operations of this firm as well as the ownership thereof. Any material misrepresentation will be grounds for terminating any purchase orders or contracts which may be or were awarded and for initiating actions under Federal or State laws concerning false statements. The District reserves the right to request support documentation, such as tax records, articles of incorporation and board minutes to verify composition of ownership.

The undersigned does further certify that the firm named above complies with the following non-discrimination clauses:

There shall be no discrimination against any person, or groups of persons, per Government Code Section 12940, Labor Code Section 1735, or any other applicable law or regulation in the performance of this contract.

There shall be no discrimination in the performance of this contract, against any person, or group of persons, on account of race, color, religion, religious creed, national origin, ancestry, gender including gender identity or expression, age, marital or domestic partnership status, mental disability, physical disability (including HIV and AIDS), medical condition (including genetic characteristics or cancer), genetic information, sexual orientation, or military and veteran status. The Contractor shall not establish or permit any such practice(s) of discrimination with reference to the contract. Contractors determined to be in violation of this section will be deemed to be in material breach of the contract.

Contractor and its subcontractors shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity, or national origin in the performance of this contract. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, national origin, protected veteran status or disability.

The Contractor shall include the nondiscrimination and compliance provisions of these clauses in all subcontracts

EXECUTED IN _____

CITY, COUNTY, STATE

ON _____

DATE

BY _____

PRINT NAME

TITLE

SIGNATURE _____

PHONE NUMBER

Instructions to Determine Your Statistical Areas (SA): If you operate a business solely or predominantly within one of the SA's listed below, use that location. If you have multiple facilities within a single state, use a State SA. If you have multiple facilities throughout the United States, use Total United States percentage. If you have any questions, call 510-287-0114.

CA STATISTICAL AREAS	WM%	WW%	EM%
BAKERSFIELD	29.7%	24.6%	45.7%
FRESNO	25.1%	21.6%	53.3%
LOS ANGELES-LONG BEACH	20.2%	16.4%	63.5%
MERCED	24.9%	21.1%	54.0%
MODESTO	33.0%	28.4%	38.6%
OAKLAND	28.0%	24.2%	47.8%
REDDING	46.6%	41.5%	11.9%
RIVERSIDE-SAN BERNADINO	28.2%	23.4%	48.3%
SACRAMENTO	36.1%	32.3%	31.6%
SAN DIEGO	32.4%	27.5%	40.2%
SAN FRANCISCO	30.8%	25.1%	44.0%

CA STATISTICAL AREAS	WM%	WW%	EM%
SAN JOSE	26.9%	21.0%	52.1%
SAN LUIS OBISPO-ATASCADERO-PASA ROBLES	42.3%	36.6%	21.1%
SANTA BARBARA-SANTA MARIA-LOMPOC	31.8%	28.6%	39.6%
SANTA CRUZ-WATSONVILLE	37.5%	32.1%	30.4%
SANTA ROSA	39.8%	36.9%	23.4%
STOCKTON-LODI	28.1%	24.5%	47.4%
VALLEJO-FAIRFIELD-NAPA	30.2%	26.8%	42.9%
VENTURA	33.3%	27.6%	39.1%
YUBA CITY	34.9%	31.0%	34.1%

CA COUNTIES	WM%	WW%	EM%
9 BAY AREA COUNTIES*	32.3%	27.8%	39.9%
ALAMEDA/CONTRA COSTA	28.9%	24.9%	46.2%
ALAMEDA	24.5%	21.6%	53.9%
CONTRA COSTA	33.3%	28.2%	38.5%
EL DORADO	46.7%	39.4%	13.9%
FRESNO	24.7%	21.4%	54.0%
LOS ANGELES	20.2%	16.4%	63.5%
MARIN	42.8%	38.4%	18.8%
MENDOCINO	40.4%	37.0%	22.6%
MERCED	24.9%	21.1%	54.0%
MONTEREY	23.8%	21.3%	54.9%
NAPA	37.6%	33.6%	28.8%
ORANGE	30.9%	25.5%	43.6%
RIVERSIDE	30.1%	24.7%	45.3%
SACRAMENTO	32.7%	30.0%	37.3%

CA COUNTIES	WM%	WW%	EM%
SAN BERNARDINO	26.5%	22.3%	51.1%
SAN DIEGO	32.4%	27.5%	40.2%
SAN FRANCISCO	29.2%	22.5%	48.3%
SAN JOAQUIN	28.1%	24.5%	47.4%
SAN LUIS OBISBO	42.3%	36.6%	21.1%
SAN MATEO	28.6%	23.6%	47.9%
SANTA CLARA	26.9%	21.0%	52.1%
SANTA CRUZ	37.5%	32.1%	30.4%
SHASTA	46.6%	41.5%	11.9%
SOLANO	27.8%	24.6%	47.6%
SONOMA	39.8%	36.9%	23.4%
STANISLAUS	33.0%	28.4%	28.6%
YOLO	31.7%	29.8%	38.5%
YUBA	36.7%	34.0%	29.4%

*ALAMEDA, CONTRA COSTA, MARIN, NAPA, SAN FRANCISCO, SAN MATEO, SOLANO, SONOMA, AND SANTA CLARA

STATES	WM%	WW%	EM%
ALABAMA	40.8%	33.2%	26.0%
ALASKA	40.2%	33.1%	26.7%
ARIZONA	37.0%	31.7%	31.3%
ARKANSAS	44.0%	37.5%	18.5%
CALIFORNIA	28.0%	23.6%	48.4%
COLORADO	42.2%	36.2%	21.6%
CONNECTICUT	42.4%	37.8%	19.8%
DELEWARE	39.3%	35.5%	25.3%
DISTRICT OF COLUMBIA	19.2%	18.0%	62.8%
FLORIDA	35.7%	30.9%	33.4%
GEORGIA	35.9%	30.0%	34.2%
HAWAII	13.1%	11.1%	75.8%
IDAHO	48.6%	40.8%	10.5%
ILLINOIS	38.6%	33.6%	27.8%
INDIANA	47.1%	40.6%	12.3%
IOWA	49.2%	44.8%	6.0%
KANSAS	45.6%	40.1%	14.3%
KENTUCKY	48.4%	41.9%	9.7%
LOUISIANA	37.3%	30.0%	32.7%
MAINE	50.6%	46.5%	2.9%
MARYLAND	34.0%	30.2%	35.8%
MASSACHUSETTS	44.0%	40.6%	15.3%
MICHIGAN	44.1%	37.5%	18.4%
MINNESOTA	47.6%	43.1%	9.3%
MISSISSIPPI	36.1%	29.6%	34.3%
MISSOURI	45.6%	40.3%	14.1%

STATES	WM%	WW%	EM%
MONTANA	49.1%	42.5%	8.4%
NEBRASKA	47.1%	42.7%	10.2%
NEVADA	37.8%	31.3%	30.9%
NEW HAMPSHIRE	50.6%	45.0%	4.4%
NEW JERSEY	36.7%	31.5%	31.7%
NEW MEXICO	26.6%	23.1%	50.3%
NEW YORK	35.0%	30.9%	34.1%
NORTH CAROLINA	39.1%	34.0%	26.9%
NORTH DAKOTA	49.6%	44.4%	6.0%
OHIO	46.1%	40.2%	13.7%
OKLAHOMA	41.7%	35.4%	22.9%
OREGON	45.5%	39.5%	15.0%
PENNSYLVANIA	46.4%	40.2%	13.4%
RHODE ISLAND	44.1%	41.4%	14.5%
SOUTH CAROLINA	37.6%	32.4%	30.0%
SOUTH DAKOTA	48.0%	43.6%	8.4%
TENNESSEE	44.1%	37.1%	18.8%
TEXAS	31.5%	26.1%	42.4%
UTAH	47.7%	39.1%	13.2%
VERMONT	50.4%	46.3%	3.3%
VIRGINIA	38.6%	34.0%	27.3%
WASHINGTON	43.6%	37.6%	18.8%
WEST VIRGINIA	51.9%	43.3%	4.9%
WISCONSIN	47.5%	42.8%	9.6%
WYOMING	49.0%	41.4%	9.6%

TOTAL USA 39.0% 33.7% 27.2%

WM = White Men, **WW** = White Women, **EM** = Ethnic Minority.

Figures compiled from the 2010 Census of Population, U.S. Department of Commerce, Bureau of the Census.



DATE _____

FAITHFUL PERFORMANCE BOND

CONTRACTOR (Name and California address where service may be effected)

SURETY (Name and California address where service may be effected)

AMOUNT OF BOND (Sum in words and figures)

CONTRACT DOCUMENTS (As named in the Contract)

Sample Only**KNOW ALL PERSONS BY THESE PRESENTS:**

THAT, the contractor named above, hereinafter called the Contractor, as Principal, and the Surety named above, as Surety, are held and firmly bound unto the East Bay Municipal Utility District, hereinafter called the District, in the sum entered above, lawful money of the United States of America, for the payment of which sum well and truly to be made to the District, we, and each of us, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

The condition of the above obligation is such that whereas the Contractor and the District entered into a Contract of even date herewith, by the terms and conditions of which the Contractor agreed to perform and complete the work, or manufacture, complete, and deliver the material or equipment, set forth in the Contract Documents named in the Contract, all now on file in the office of the Secretary of the District, as will more fully appear by reference to said Contract, which is made a part of this bond;

FAITHFUL PERFORMANCE BOND

NOW, THEREFORE, if the Contractor shall well and truly carry out, execute and perform all things by the Contractor to be carried out, executed and performed, according to the terms and conditions of said Contract, including any and all warranty and guaranty obligations contained therein, then this obligation shall become null and void, otherwise to remain in full force and effect throughout the period of performance, including any warranty or guaranty period.

No prepayment or delay in payment, and no change, extension, addition, or alteration of any provision of said Contract or Contract Documents agreed to between the Contractor and the District, and no forbearance on the part of the District shall operate to release the Surety from liability on this Bond, and consent to make such alterations without further notice to or consent by the Surety is hereby given, and the Surety hereby waives the provisions of Section 2819 of the Civil Code and Section 359.5 of the Code of Civil Procedure of the State of California.

Each signator to this bond hereby declares under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated the day and year entered on the first page hereof.

Contractor

By _____

Sample Only

By _____

**Title _____

(SEAL OF SURETY)

Surety

By _____

Title _____

Note: The signature of the Surety on this bond must be acknowledged before a Notary Public. An executed Power of Attorney indicating that the Surety's representative is authorized to bind the Surety must accompany this bond.

The foregoing Bond was accepted and approved this _____ day of _____, 20 _____

_____, East Bay Municipal Utility District

Specifications / Proposal No. _____

*If corporation, Corporate President or CEO; if Partnership, Partner.

**Corporate Secretary or financial officer.



DATE _____

PAYMENT BOND

CONTRACTOR (Name and California address where service may be effected)

SURETY (Name and California address where service may be effected)

AMOUNT OF BOND (Sum in words and figures)

CONTRACT DOCUMENTS (As named in the Contract)

Sample Only

KNOW ALL PERSONS BY THESE PRESENTS:

THAT, WHEREAS, the contractor named above, hereinafter called the Contractor, has this day entered into a Contract with East Bay Municipal Utility District, hereinafter called the District, to perform and complete the work set forth in the Contract Documents named in the Contract, all now on file in the office of the Secretary of the District, as will more fully appear by reference to said Contract, which is made a part hereof; and

WHEREAS, Sections 9550 to 9566 inclusive of the Civil Code of the State of California, and any amendments thereof, require contractors upon public work to file with the body by whom such contract was awarded a good and sufficient bond to secure the claims to which reference is made in said sections, NOW THESE PRESENTS

WITNESSETH: That the Contractor, as Principal, and the Surety named above, as Surety, are held and firmly bound unto any and all materialmen, persons, firms, or corporations furnishing materials, provisions, or other supplies used in, upon, for, or about the performance of the work contracted to be done, and to all persons, firms or corporations renting or hiring implements or machinery for or contributing to the said work to be done and to all persons who perform work or labor of any kind or nature thereon, or in connection therewith, and to all persons who supply both work and materials, in the sum entered on the first page hereof, lawful money of the United States of America, being not less than the total amount payable by the terms of said Contract, for which payment well, truly and promptly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly, and severally, firmly by these presents.

PAYMENT BOND

The condition of the above obligation is such that if the Contractor, or the Contractor's subcontractors, fail to pay for any materials, provisions or other supplies used in, upon, for, or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, the Surety will pay for the same, in an amount not exceeding the sum specified in this Bond, provided that any and all claims hereunder shall be filed and proceedings had in connection therewith as required by the provisions of said Sections 9550 to 9566 inclusive of the Civil Code of the State of California, and any amendments thereof: PROVIDED ALSO, that in case suit is brought upon this Bond a reasonable attorney's fee shall be awarded by the court to the prevailing party in said suit, said attorney's fee to be fixed as costs in said suit, and to be included in the judgment therein rendered.

No prepayment or delay in payment and no change, extension, addition, or alteration of any provision of said Contract or Contract Documents agreed to between the Contractor and the District, and no forbearance on the part of the District, shall operate to release the Surety from liability on this Bond, and consent to make such alterations without further notice to or consent by the Surety is hereby given, and the Surety hereby waives the provisions of Section 2819 of the Civil Code of the State of California.

Dated the day and year entered on the first page hereof.

Each signator to this bond hereby declares under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Sample Only

Contractor

By _____

*Title _____

By _____

**Title _____

(SEAL OF SURETY)

Surety

By _____

Title _____

Note: The signature of the Surety on this bond must be acknowledged before a Notary Public. An executed Power of Attorney indicating that the Surety's representative is authorized to bind the Surety must accompany this bond.

The foregoing Bond was accepted and approved this _____ day of _____, 20 _____

_____, East Bay Municipal Utility District

Specifications / Proposal No. _____

*If corporation, Corporate President or CEO; if Partnership, Partner.

**Corporate Secretary or financial officer.



CERTIFICATE OF COMMERCIAL GENERAL AND AUTO LIABILITY INSURANCE

THIS IS TO CERTIFY TO:

East Bay Municipal Utility District (EBMUD)

Department: Engineering and ConstructionStreet Address: 375 11th Street, MS# 62Mailing Address: P.O. Box 24055City, State, Zip: Oakland, CA 94623**THE FOLLOWING DESCRIBED POLICY HAS BEEN ISSUED TO:**District Contract Number: RFQ Number

Insured: _____

Address: _____

LOCATION AND DESCRIPTION OF PROJECT/AGREEMENT:PROJECT TITLE (APP CAP)**TYPE OF INSURANCE:** Commercial General and Automobile Liability Coverage/Endorsements as required by agreement.**LIMITS OF LIABILITY:**

(MINIMUM)

\$2,000,000/Occurrence, Bodily Injury, Property Damage-General Liability

\$2,000,000/Occurrence, Bodily Injury, Property Damage-Auto Liability

SELF INSURED RETENTION (\$): (Auto) (GL) (if applicable)

Aggregate Limits (AUTO) (GL) (if applicable)

INSURANCE COMPANY(IES): (Auto) (GL)

POLICY NUMBER(S): (Auto) (GL)

POLICY TERM: From: (Auto) (GL) To: (Auto) (GL)

THE FOLLOWING COVERAGES OR ENDORSEMENTS ARE INCLUDED IN THE POLICY(IES):

1. ☒ The District, its Directors, Officers and Employees are *Additional Insureds* in the policy(ies) as to work being performed under this contract. ENDORSEMENT NO. _____
2. ☒ The coverage is *Primary and non-contributory* to any other applicable insurance carried by the District.
3. ☒ The policy(ies) covers *contractual liability*.
4. ☒ The policy(ies) is written on an *occurrence* basis.
5. ☒ The policy(ies) covers District's Property in Consultant's/Contractor's care, custody and control.
6. ☒ The policy(ies) covers *personal injury* (libel, slander, and wrongful entry and eviction) liability.
7. ☒ The policy(ies) covers *explosion, collapse, and underground hazards*.
8. ☒ The policy(ies) covers *products and completed operations*.
9. ☒ The policy(ies) covers the use of *owned, non-owned* and hired automobiles.
10. ☐ NOT USED
11. ☒ The policy(ies) will not be canceled nor the above coverages/endorsements reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

IT IS HEREBY CERTIFIED that the above policies provide liability insurance as required by the agreement between the East Bay Municipal Utility District and the insured.Signed _____
Address _____

_____Firm _____
Date _____
Phone _____

"This certificate or verification of insurance is not an insurance policy and does not amend, extend, or alter the coverage afforded by the policies listed herein. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate or verification of insurance may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions, and conditions of the policies."



CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

THIS IS TO CERTIFY TO:

East Bay Municipal Utility District (EBMUD)
Department: Engineering and Construction
Street Address: 375 11th Street, MS# 62
Mailing Address: P.O. Box 24055
City, State, Zip: Oakland, CA 94623

THE FOLLOWING DESCRIBED POLICY HAS BEEN ISSUED TO:

District Contract Number: RFQ Number

Insured: _____

Address: _____

LOCATION AND DESCRIPTION OF PROJECT/AGREEMENT:

PROJECT NAME (ALL CAP)

TYPE OF INSURANCE: Workers' Compensation Insurance as required by California State Law.

The Workers' Compensation Carrier agrees to waive rights of recovery against District regardless of the applicability of any insurance proceeds. All Workers' Compensation coverage maintained or procured must specifically allow the named insured to waive subrogation prior to a loss.

INSURANCE COMPANY: _____

POLICY NUMBER: _____

**POLICY
TERM:**

From: _____

To: _____

The policy will not be canceled nor the above coverage reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

IT IS HEREBY CERTIFIED the above policy provides insurance as required by the agreement between East Bay Municipal Utility District and the Insured.

Signed: _____

Authorized Signature of Broker, Agent, or Underwriter

Date: _____

Firm: _____

Address: _____

Phone: _____

"This certificate or verification of insurance is not an insurance policy and does not amend, extend, or alter the coverage afforded by the policies listed herein. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate or verification of insurance may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions, and conditions of the policies."



CERTIFICATE OF POLLUTION LIABILITY INSURANCE

THIS IS TO CERTIFY TO:

East Bay Municipal Utility District (EBMUD)
Department: Engineering and Construction
Street Address: 375 11th Street, MS# 62
Mailing Address: P.O. Box 24055
City, State, Zip: Oakland, CA 94623

THE FOLLOWING DESCRIBED POLICY HAS BEEN ISSUED TO:

District Contract Number: RFQ Number
Insured:
Address:

LOCATION AND DESCRIPTION OF PROJECT/AGREEMENT:

PROJECT TITLE (APP CAP)

TYPE OF INSURANCE: Pollution Liability (Claims Made Basis with a 3-year Tail)

MINIMUM LIMITS OF LIABILITY: \$3,000,000 each claim and in the aggregate.

INSURANCE COMPANY:

POLICY NUMBER:

POLICY TERM: From: To:

POLICY TAIL: From: To:

The policy will not be canceled nor the above coverage reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

IT IS HEREBY CERTIFIED the above policy provides insurance as required by the agreement between East Bay Municipal Utility District and the Insured.

Signed: _____
Authorized Signature of Broker, Agent, or Underwriter

Date: _____ Firm: _____

Address: _____

Phone: _____

"This certificate or verification of insurance is not an insurance policy and does not amend, extend, or alter the coverage afforded by the policies listed herein. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate or verification of insurance may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions, and conditions of the policies."



CERTIFICATE OF BUILDER'S RISK INSURANCE

THIS IS TO CERTIFY TO:

East Bay Municipal Utility District (EBMUD)

Department: Engineering and Construction

Street Address: 375 11th Street, MS# 62

Mailing Address: P.O. Box 24055

City, State, Zip: Oakland, CA 94623

THE FOLLOWING DESCRIBED POLICY HAS BEEN ISSUED TO:

District Contract Number: RFQ Number

Insured: _____

Address: _____

LOCATION AND DESCRIPTION OF PROJECT/AGREEMENT:

PROJECT TITLE (APP CAP)

TYPE OF INSURANCE: Builder's Risk Insurance per EBMUD Contract Specification

MINIMUM LIMITS OF LIABILITY: 100% of the replacement value of the work in the project described above.

INSURANCE COMPANY: _____

POLICY NUMBER: _____

POLICY TERM:

From: _____

To: _____

The policy will not be canceled nor the above coverage reduced without 30 days written notice to East Bay Municipal Utility District at the address above.

IT IS HEREBY CERTIFIED the above policy provides insurance as required by the agreement between East Bay Municipal Utility District at the Insured.

Signed: _____

Authorized Signature of Broker, Agent, or Underwriter

Date: _____

Firm: _____

Address: _____

Phone: _____

"This certificate or verification of insurance is not an insurance policy and does not amend, extend, or alter the coverage afforded by the policies listed herein. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate or verification of insurance may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions, and conditions of the policies."