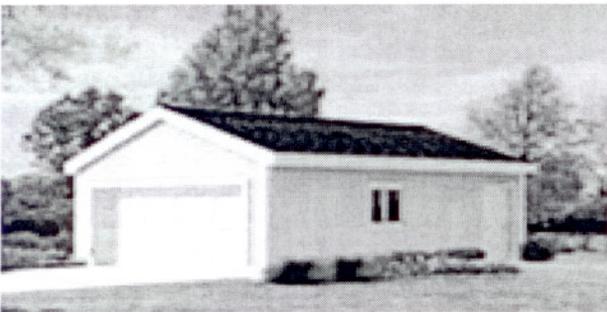




RESIDENTIAL DETACHED GARAGE HANDOUT

GETTING STARTED

1. Please read this handout in its entirety. If you have specific questions after reading the handout, please contact the Altoona Building Department at 515-967-5138. This handout cannot cover every possible scenario. Please visit with building department staff if the proposed garage construction differs from this handout.
2. If you plan on constructing a detached garage and the project meets the requirements within the handout, please obtain and fill out a building permit application. For projects in Altoona and Bondurant, the permit applications are available online at www.altoona-iowa.com (or) at the Altoona Building Department located at 1504 - 8th Street SW. For projects in Mitchellville, the permit applications and required paperwork must be submitted to Mitchellville City Hall located at 204 Center Avenue North. A building permit must be issued before any inspections can be scheduled and before any work can begin. The majority of detached garage applications are processed with little delay.
3. A site plan shall be provided at the time the building permit application is submitted. **Building permit applications submitted without a complete site plan will not be accepted for review.** The site plan shall be drawn on a minimum of 8-½" x 11" paper and shall be as close to scale as possible. Please make sure that the site plan is from an "overhead/aerial" view. You may obtain an aerial photo of your lot from the Polk County Assessor's website. (www.assess.co.polk.ia.us/) The site plan shall include, but not be limited to: showing any easements, distances from the proposed detached garage to the lot lines, the size and location of the proposed detached garage, the distance between the detached garage and the dwelling including any adjacent roofed decks/porches, and the location of all structures on the lot including sheds, gazebos, play houses, etc.
4. Complete and submit the sheet labeled - "Wall Bracing". (Located on the last page of this handout.)
5. The following inspections are **required** during the project: a footing/foundation inspection prior to pouring concrete, a framing rough-in inspection and a final inspection once all work is complete. The garage shall not be used until all inspections are signed off. **Note:** Electrical, mechanical and plumbing work are not required to be installed, however, certain requirements, separate permits and inspections will be required if installed.

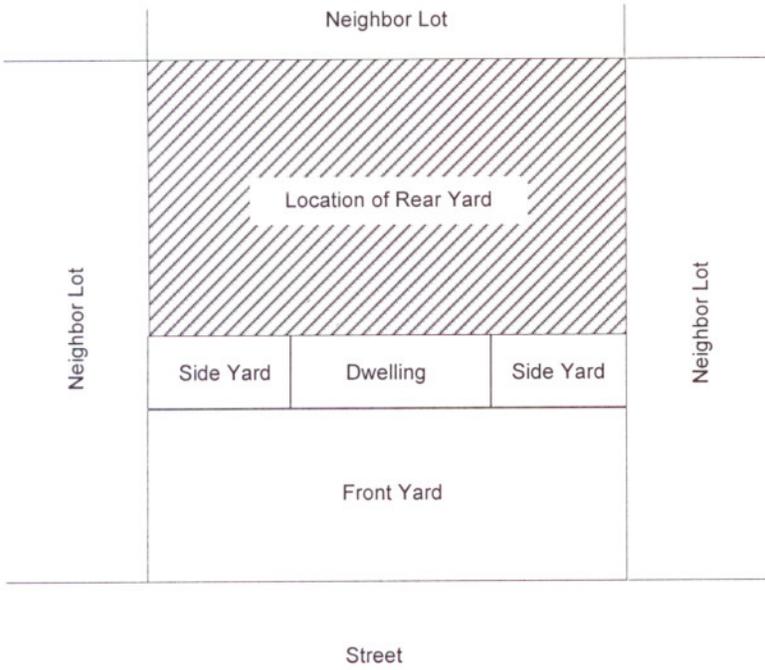


General Zoning Regulations - Questions and Answers

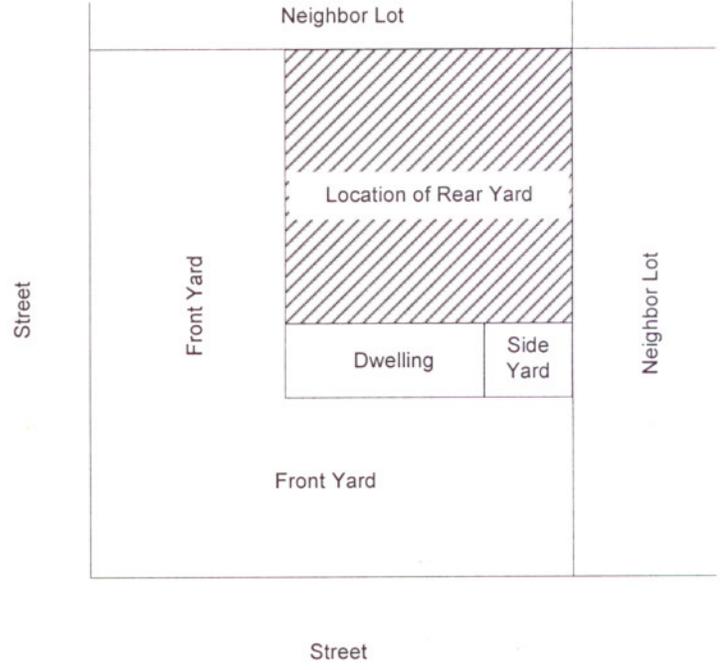
1. Q. What is the definition of a detached residential private garage?
A. A structure which is detached and accessory to a residential building and which is used for the parking and storage of vehicles owned and operated by the residents thereof and which is not a separate commercial enterprise available to the general public. Most accessory buildings, including sheds that are over 160 square feet will be defined as a detached garage.
2. Q. What zoning districts allow detached garages to be installed?
A. This handout applies to detached residential private garages that serve single family dwellings located in zoning districts A-1, R-1, and R-4 and single and two family dwellings located in zoning districts R-2, R-3, and R-5. Note: Detached garages located in an R-4 district in all three communities and in A-1 districts located in Mitchellville will need to be individually reviewed, since certain restrictions apply.
3. Q. Can a detached garage be built on a lot before the principal dwelling unit is built?
A. No. The principal structure, such as the single family dwelling, is required to be built first.
4. Q. How many detached garages are allowed per lot?
A. Only one detached garage is allowed per lot.
5. Q. Can the detached garage be built anywhere on the lot?
A. No. The detached garage shall be placed only in the rear yard. See the attached sheet labeled "Location of Rear Yard".
6. Q. Is there a limit as to how big a detached garage can be?
A. Yes. The maximum allowable building area is 1,000 square feet. Note: A-1 zoned properties located in Mitchellville may be able to be larger than 1,000 square feet based on the intended use, but will require individual review.
7. Q. Is there a minimum distance that is required between a detached garage and the single family dwelling?
A. Yes. The minimum distance between finished outside wall dimensions is 6'. Note: If in an R-4 zoning district in Altoona and Bondurant, the minimum distance is 4'.
8. Q. Is there a limit to the amount of rear yard that a detached garage and other accessory structures can occupy?
A. Yes. The total of all accessory structures within the rear yard such as detached garages, sheds, gazebos, playhouses, etc shall not occupy more than 30% of the rear yard.
9. Q. Is the height limited for detached garages?
A. Yes. The height shall not exceed 14'. See sheet "How Roof Height is Measured".
10. Q. How many stories can a detached garage have?
A. Only one story is allowed.
11. Q. Are there any regulations regarding the type of material used to build a detached garage?
A. Yes. Detached garages shall be constructed of materials that are the same or similar to the principal dwelling.
12. Q. Is there a minimum distance off the property lines that a detached garage has to be placed to meet zoning?
A. Yes. Altoona: a minimum of 3' from lot lines to the garage's wall line, but in no case shall any portion of the detached garage, including the overhang, be placed into an easement. Bondurant: a minimum of 5' from lot lines to the garage's wall line, but in no case shall any portion of the detached garage, including the overhang, be placed into an easement. Mitchellville: a minimum of 3' from lot lines to the garage's wall line, but in no case shall any portion of the detached garage, including the overhang, be placed into an easement. Mitchellville requires there to be at least 3' between any easements and the garage. See sheet "Roof and Ceiling Construction" and "Exterior Walls Located Less Than 5' to the Property Line" for additional requirements. Note: The setbacks for A-1 in Mitchellville are 50' for both the rear and side yard.
13. Q. Is there a minimum distance the detached garage has to be from other detached accessory structures such as sheds, gazebos, playhouses, etc.?
A. No. As long as they are physically and visually separated, there is no minimum distance required.
14. Q. On a corner lot, what is considered the rear yard?
A. See sheet "Location of Rear Yard".
15. Q. On lots that have streets both in the front and the rear of the property, what is considered the rear yard?
A. See the sheet "Location of Rear Yard". Altoona has special requirements for double frontage lots for subdivision plats or plat of surveys recorded after February 7, 2003.
16. Q. Can more than one approach (driveway entrance) be installed to access the garage?
A. Corner lots may be eligible for a maximum of two approaches. (One from each street.) Each project needs to be individually reviewed.

Location of Rear Yard

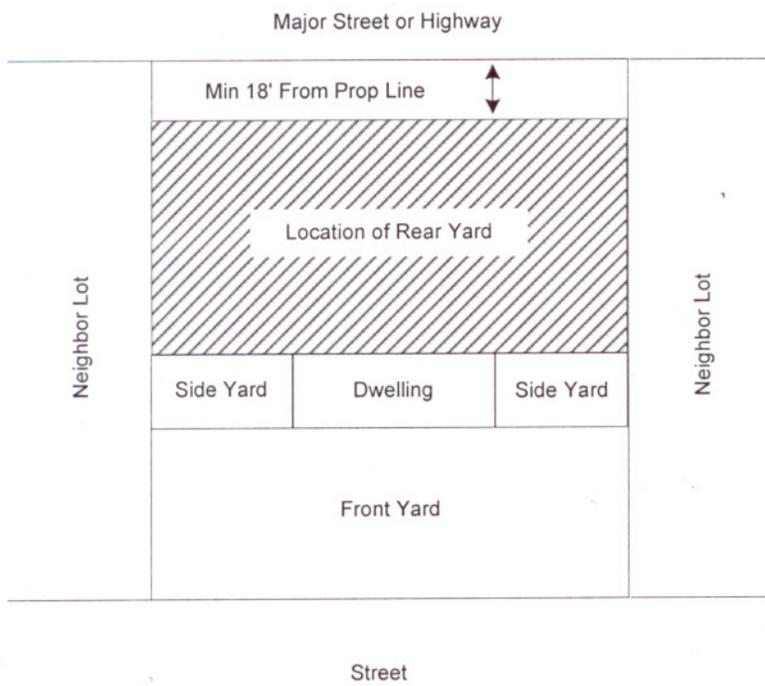
Typical Non-Corner Lot



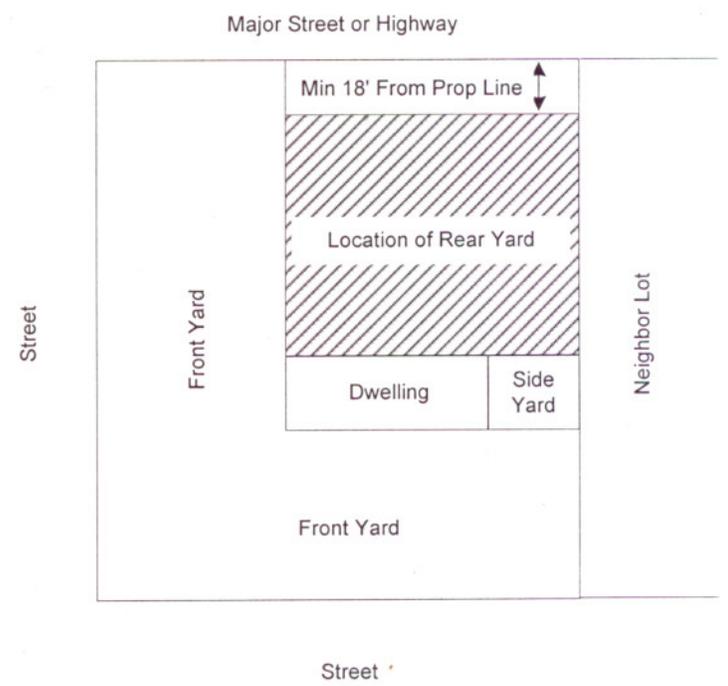
Typical Corner Lot



Typical Non-Corner Through Lot
(Altoona only)

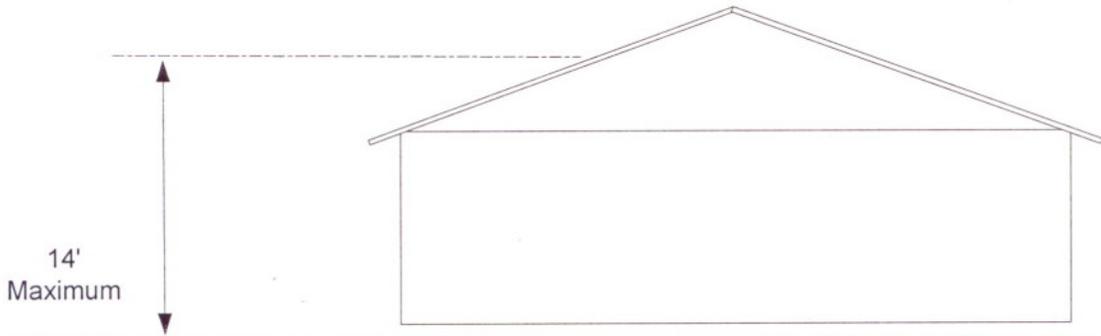


Typical Corner Through Lot
(Altoona only)

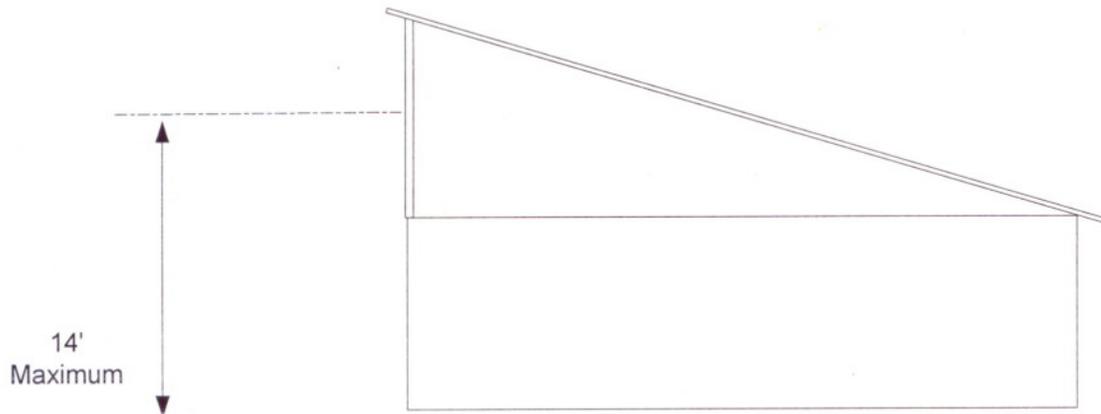


How Roof Height is Measured

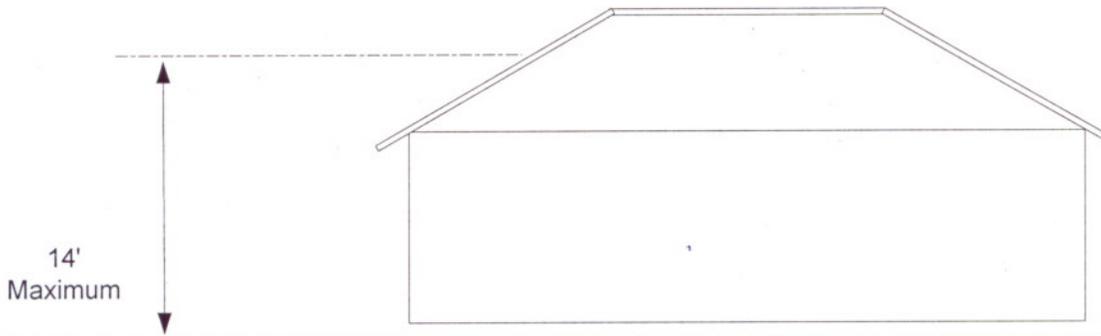
Note: For other than the gambrel roof style at the bottom of the page, roof height is measured from the surrounding adjacent grade to the mean of the roof. Mean is measured from the midpoint between the peak of the roof and the top of the wall.



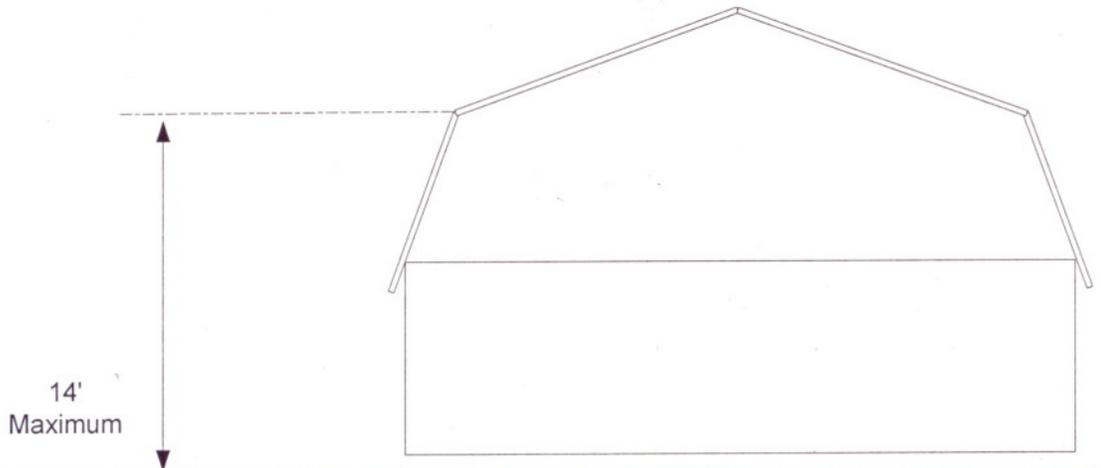
Gable Style Roof



Shed Style Roof



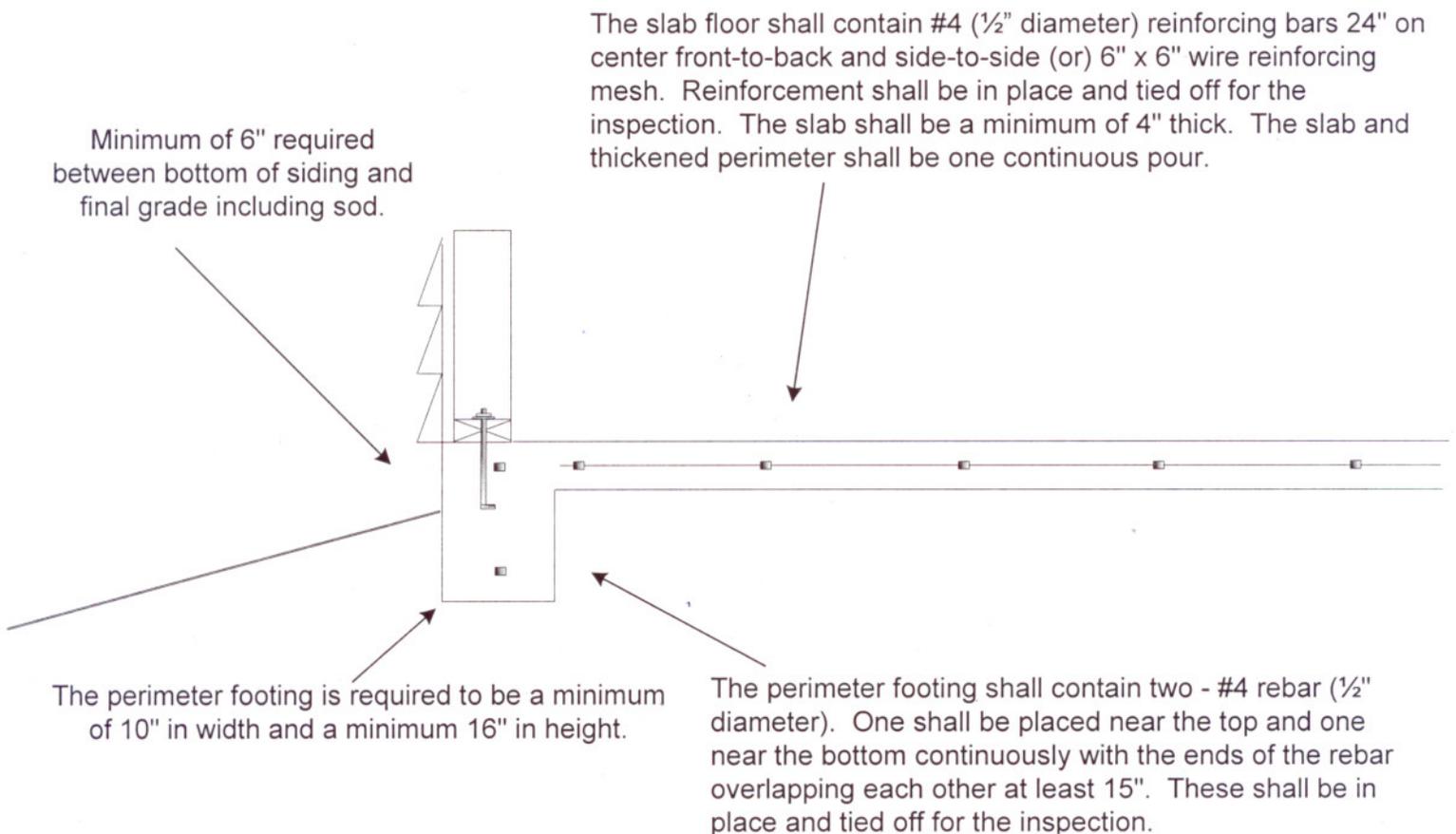
Hip Style Roof



Gambrel Style Roof

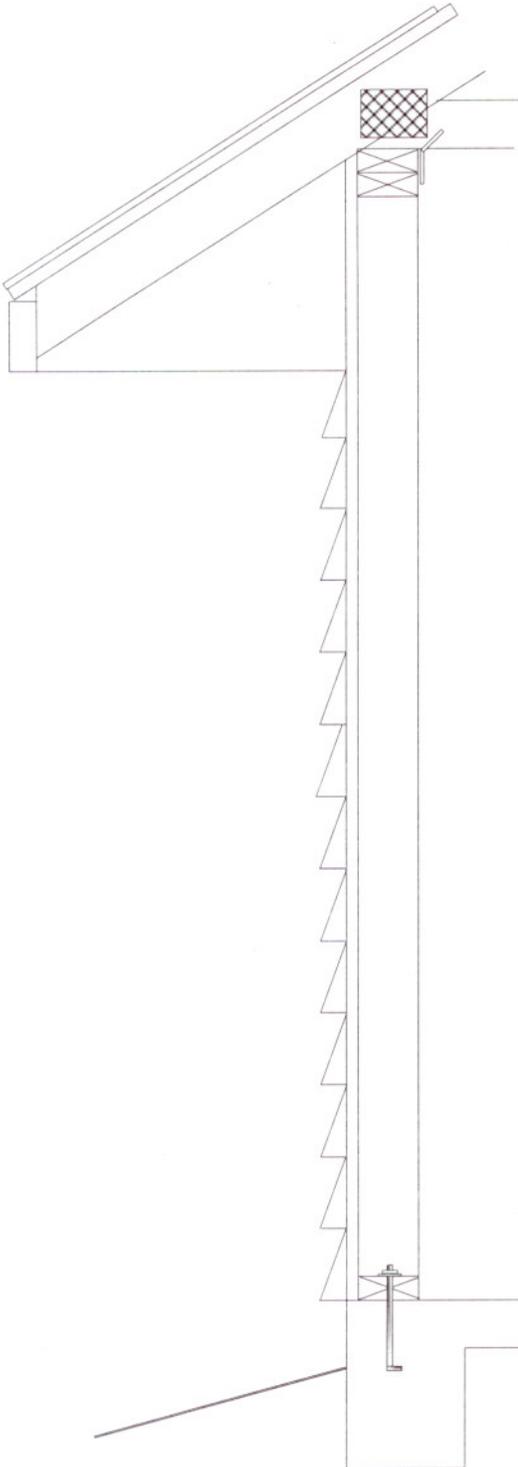
Footings and Foundation

1. Footings serving detached garages that are over 160 square feet shall be constructed per the details provided.
2. All organic material such as grass, roots, etc. must be removed from the area where the concrete is to be placed. Where backfill for sub-grade is required, a permeable and granular material shall be used and compacted.
3. The strength of the concrete shall not be less than 3,000 p.s.i. The concrete shall be air entrained. The total air content shall be not less than 5% or more than 7%.
4. J-bolts shall be installed around the perimeter during the pour of the footing. The J-bolts shall be at least ½" in diameter. Typically, a 10" long J- bolt will be sufficient to allow for the minimum 7" embedment and allow 3" for the bottom plate, galvanized washer and galvanized nut connections. J-bolts shall be spaced within 12" from each corner, 12" from any opening, 12" from where two bottom plates butt into each other, and a maximum of 6' on center thereafter. **Note:** Each plate shall have at least two bolts installed.



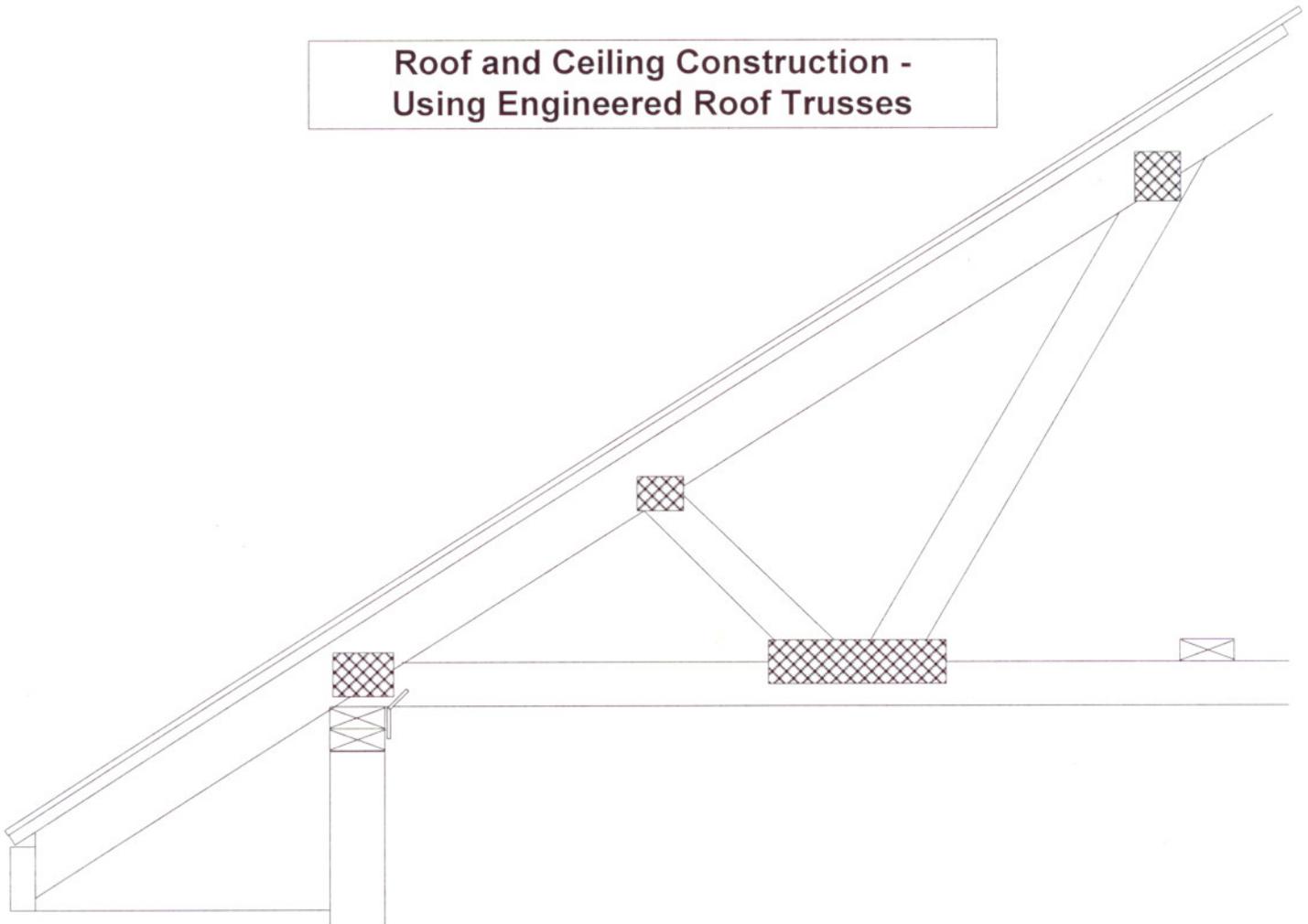
Note: If there is more than 24" of exposed foundation wall measured between the top of final grade and the top of the slab, then the footing may have to extend into the ground a certain distance for lateral support. Please communicate with city staff if your project fits this description.

Wall Envelope



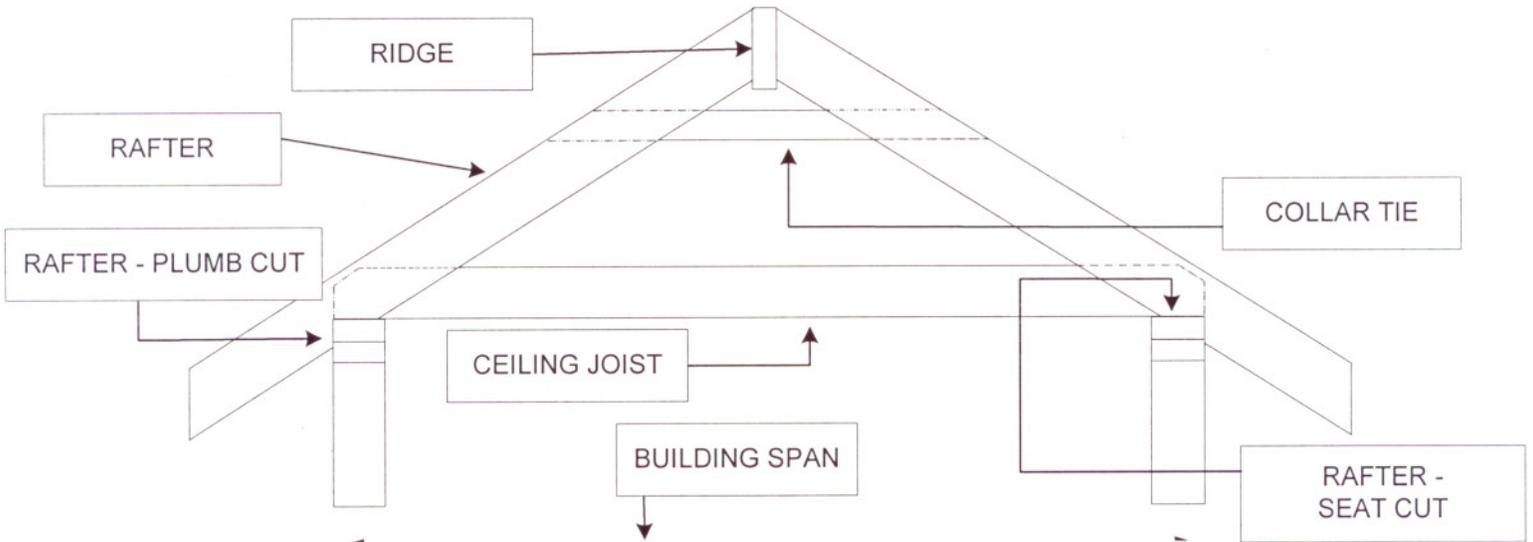
1. The finished ceiling height shall not be less than 7'-0".
2. The bottom plate shall be at least a 2" x 4" and shall be treated lumber.
3. The wall framing needs to be a minimum of 2" x 4" stud construction and shall not exceed 10' in height. The studs shall be a minimum #3, standard or stud grade lumber.
4. The stud spacing shall be 16" maximum on center. The connection between the studs and the top and bottom plates shall be made with 2-16d nails. Nails used to connect into the treated bottom plate shall be properly coated to prevent corrosion.
5. A double top plate shall be used to tie the walls together. This double top plate shall be nailed to the top plate using 2-10d nails every 24" on center around the entire perimeter. Where double top plates tie the corners together, they shall be at least 24" long. These two plates shall have joint offsets of at least 24".
6. The exterior wall sheathing shall consist of a minimum of 7/16" x 4' x 8' approved wall panel. Plywood/osb wall sheathing shall be face nailed to the studs by not less than 6d common nails at 6" around the perimeter of the panel and not less than 12" in the field (or) face nailed to the studs by staples that are at least 15 ga. (1-3/4" long) at 4" around the perimeter of the panel and not less than 8" in the field. By code a certain percentage of each exterior wall is required to be properly braced. In most cases, the whole exterior wall line will be required to have continuously sheathed structural wall panels such as o.s.b. or plywood installed in order to meet wall bracing requirements. See the "Wall Bracing" section within this handout to properly calculate the correct required amount of wall bracing.
7. Prior to installing the siding, obtain information from the siding company to see if a weather resistive barrier (building wrap) is required to be applied between the siding and the sheathing. Most vinyl sidings and cement board sidings will require a building wrap. Nailing and sealing of the exterior siding and envelope in general shall be per the manufacturer's instructions.
8. If windows are to be placed within the garage, safety glazing may apply. Typically, if windows are installed more than 24" away from pedestrian doors and are at least 18" above the finished floor they will not be required to be safety glazed. Please contact the inspector assigned to your area if in doubt.
9. For header sizing see "Minimum Header Sizing Based On Eave to Ridge Distance and Opening Width".
10. If the exterior wall is less than 5' to the property line see "Exterior Walls Less Than 5' to the Property Line". The walls will need to be of fire resistive rated construction.

Roof and Ceiling Construction - Using Engineered Roof Trusses



1. Most roofs today are being designed and built using manufactured trusses. At a minimum, the live load for the trusses shall be designed for 30# per square foot. Additionally, the dead load will need to be designed based on the weight of the construction materials used for the roof. This is typically around 10# per square foot. **If you plan on using the attic area for storage, the lumberyard will need to know so that they can increase the loading as required.** The overall roof load will need to be designed for the total live and dead loads of the roof. For proper installation of the trusses, the manufacturer shall provide a job site installation guide and design sheet which shall include, but not be limited to, the live and dead loads, bracing requirements, bearing locations, truss manufacturer's name and contact information, etc. This paperwork is required to be on site during the framing rough. The construction of onsite built trusses will not be acceptable.
2. Roof trusses shall not span greater than 24" on center and the pitch shall be at least a 3/12.
3. Each truss shall be connected to the double top plate with approved fasteners such as a Simpson Strongtie (H1) or (H2.5) clip (or) a USP Structural Connector (RT7) or (RT15) clip. The size and amount of nails used to make the connections shall be as required by the manufacturer and are usually stamped on the fastener. Other connectors may work, but pre-approval is required.
4. The maximum roof overhang is 24". **Note:** In no case shall the end of the overhang extend any closer than 12" to the property line nor shall it extend into any easement.
5. Roof sheeting shall consist of a minimum of 7/16" x 4' x 8' osb or plywood panels installed with the 8' length perpendicular to the trusses. The panels shall be face nailed to the top of the trusses with 8d nails at 6" around the perimeter and 12" within the field (or) by 15 ga. staples (1-3/4") at 4" around the perimeter and 8" within the field. Most manufacturers require an 1/8" gap between joints to allow for contraction/expansion. Plywood clips/spacers can be used to help maintain this gap and they can help support the plywood span between trusses.
6. If the roof construction is not manufactured trusses, go to the "Rafter, Ceiling Joist, Collar Tie and Ridge" section in this handout.

Roof and Ceiling Construction - (Stick Framed) Using Rafters, Ceiling Joists, Collar Ties and Ridge



1. Roofs may be designed on site if they are built per the requirements listed herein. The requirements are intended to cover roofs with a pitch of 3/12 and greater.
2. The ridge board serving both common rafters, hip rafters and valley rafters shall be at least one inch nominal thickness and at least as wide as the cut end of the rafters.
3. The rafters shall be connected to the ridge board by either toe nailing 4-16d nails (or) face nailing 3-16d nails. Hip or valley rafters shall be nailed to the rafters with the same nailing pattern.
4. The rafters shall be connected to the double top plate by toe nailing 2-16d nails as well as approved fasteners such as a Simpson Strongtie (H1) or (H2.5) clip (or) a USP Structural Connector (RT7) or (RT15) clip with approved nails.
5. The rafter's plumb cut shall be 1- 1/2" deep. The rafter's seat cut cut shall extend the full width of the double top plate, typically 3- 1/2". Cuts made deeper than mentioned may not pass inspection.
6. Ceiling joists shall be connected to the rafters by face nailing 3-10d nails. They shall connect to the double top plate by toe nailing 2-16d nails. Each rafter shall have a ceiling joist properly attached to it.
7. Collar ties are required to be installed in the upper 1/3 of the attic. They shall consist of minimum 1" x 4" material, be installed not to exceed 48" on center and be face nailed to the rafters with 3-10d nails.
8. The maximum roof overhang is 24". **Note:** In no case shall the end of the overhang extend any closer than 12" to the property line and it shall not extend into any easements. See other parts of this handout for more specific details.
9. Roof sheathing shall consist of a minimum of 7/16" x 4' x 8' for rafters spaced 24" o.c. and 7/16" x 4' x 8' for rafters spaced 16" o.c. and consist of osb or plywood panels installed with the 8' length perpendicular to the trusses. The panels shall be face nailed to the top of the rafters with 8d nails at 6" around the perimeter and 12" within the field (or) by 15 ga. staples (1-3/4") at 4" around the perimeter and 8" within the field. Most manufactures require an 1/8" gap between joints to allow for contraction/ expansion. Plywood clips/spacers can be used to help maintain this gap and they can help support the plywood span between trusses.
10. **Note:** If the roof construction is not designed using rafters and ceiling joists, please refer to the "Using Engineered Roof Trusses" section in this handout.

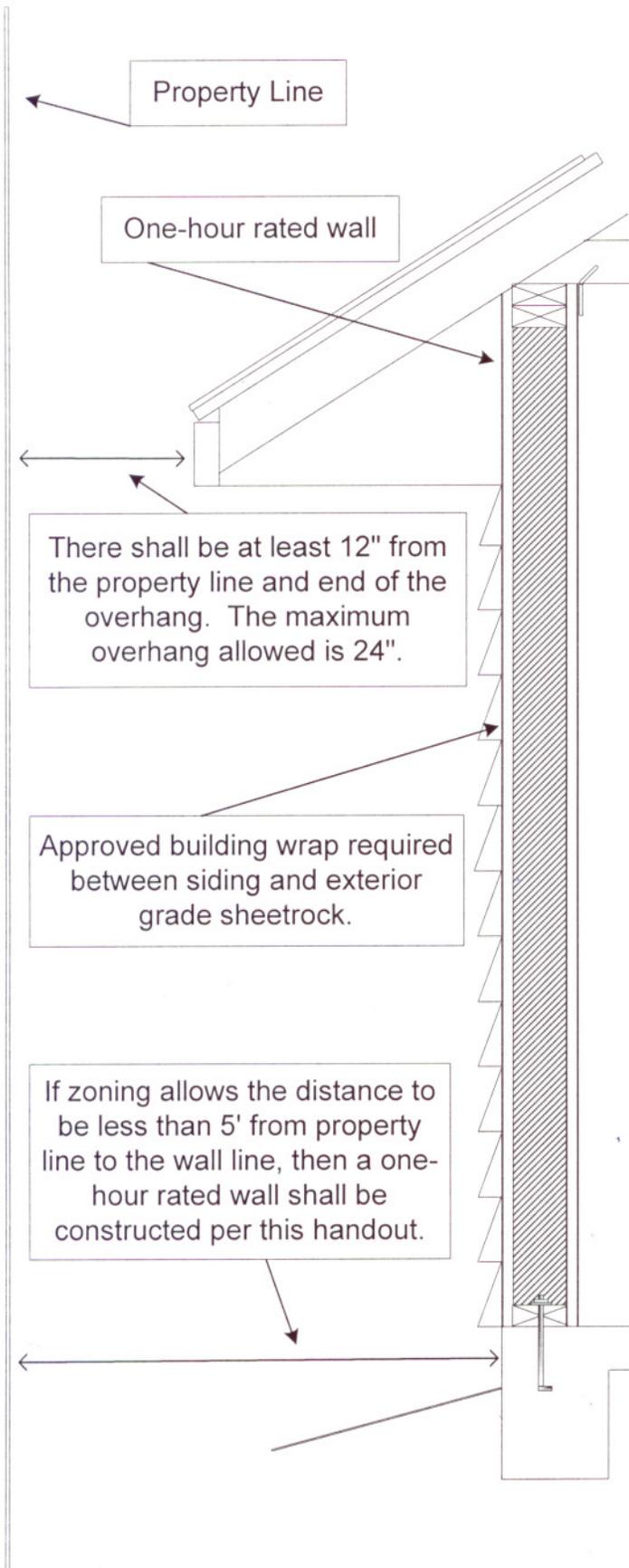
RECOMMENDED ALLOWABLE SPANS - RAFTERS AND CEILING JOIST

BUILDING SPAN	RAFTERS @ 16" O.C.	CEILING JOISTS @ 16" O.C.	RAFTERS @ 24" O.C.	CEILING JOISTS @ 24" O.C.
20'	2" X 6"	2" X 8"	2" X 8"	2" X 8"
22'	2" X 6"	2" X 8"	2" X 8"	2" X 8"
24'	2" X 8"	2" X 8"	2" X 8"	2" x 10"
25'	2" X 8"	2" X 10"	2" X 8"	2" x 10"

Notes:

1. Wood shall be #2 Doug-fir-larch or #2 Spruce-pine-fir or better.
2. Assuming ceilings not applied to the bottom of the rafters, such as sheetrock.
3. Assuming attics are uninhabitable and without storage.
4. Assuming ceiling joists will not have sheetrock or similar installed.
5. Building spans greater than 25' will need to be designed by a licensed structural engineer that is registered with the state of Iowa. Two sets of signed and stamped plans shall be submitted for review along with structural calculations.

Exterior Walls Located Less Than 5' to the Property Line



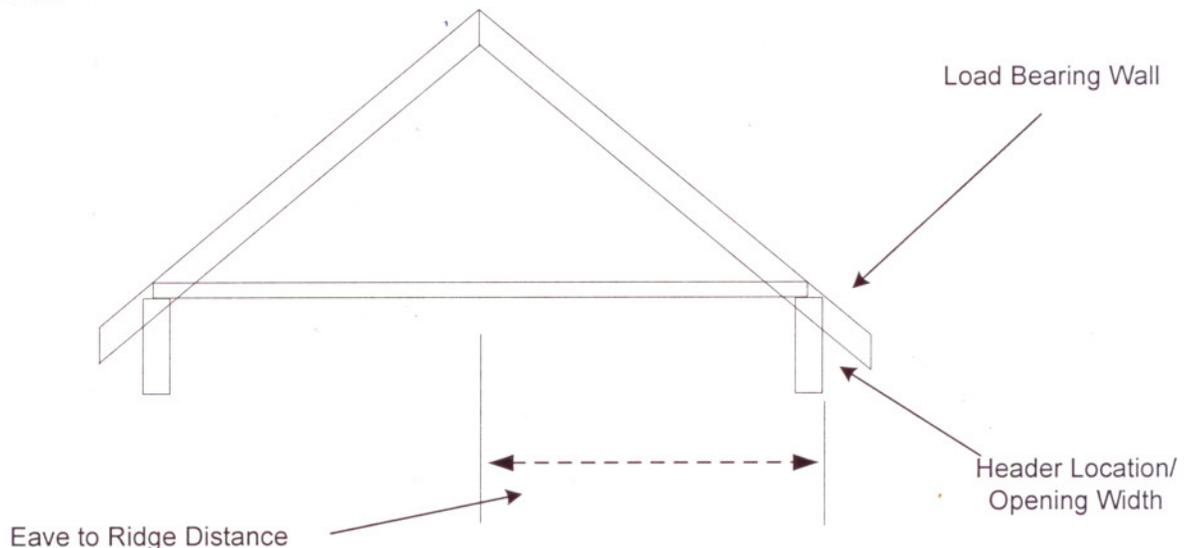
1. In order for the garage to be placed closer than 5' to the property line, the zoning must allow it. See "General Zoning Regulations" in this handout. If so, this detail for a one-hour rated construction would apply.
2. An inspection of this fire rated construction is required once the garage is framed and the exterior grade sheetrock is in place on the exterior side. The inspector will need to see the fastening of the sheetrock to make sure that the joints of the sheetrock are butted tight to each other prior to it being covered with building wrap and siding.
3. The wall shall consist of the following: One layer of 5/8" type X gypsum sheetrock applied parallel or at right angles to the studs on each side of the 2 x 4 wall. The studs shall be spaced at 16" on center. The screws to connect the sheetrock to the studs shall be 1-1/4" type W sheetrock screws installed at 12" on center. The edges of the sheetrock shall be butted tight to each other. The joints of the sheetrock shall be staggered 16" apart on opposite sides of the wall.
4. As shown in the detail, the roof is running perpendicular to the fire rated wall and the fire rated wall shall terminate at the top plate. If the roof above the fire rated wall runs parallel to the wall (gable end above wall), then the fire rated wall shall continue up this gable end and the sheetrock shall extend on each side of this gable and terminate at the bottom of the roof sheeting. The framing members for the gable end shall not exceed 16" on center.
5. Openings such as doors and windows are allowed within these fire rated walls. These openings do not have to be protected, but are limited to 25% of the overall area of the wall.
6. See other parts of this handout for the maximum length of the overhang. In no case shall the overhang be closer than 12" to the property line.
7. **NOTE:** No part of any overhang shall be allowed to extend into an easement.
8. **NOTE:** If the exterior walls require minimum 7/16" continuous osb on the exterior walls, per the "Wall Bracing" section, then the osb shall be installed over the sheetrock. The nails used to secure the osb through the sheetrock and into the wall studs shall be 8d common.

Minimum Header Sizing Based On Eave to Ridge Distance and Opening Width

Opening Width	Eave to Ridge Distance for Load Bearing Headers (Includes up to 2' overhang) See Example Below				
	10'	12'	14'	16'	18'
4' or less	2 - 2 x 4	2 - 2 x 6	2 - 2 x 6	2 - 2 x 6	2 - 2 x 8
6'	2 - 2 x 8	2 - 2 x 8	2 - 2 x 8	2 - 2 x 10	2 - 2 x 10
8'	2 - 2 x 10	2 - 2 x 12	2 - 2 x 12	3 - 2 x 10 (or) 2 - 7- ¹ / ₄ LVL	3 - 2 x 10 (or) 2 - 9- ¹ / ₄ LVL
9'	2 - 2 x 12	3 - 2 x 10 (or) 2 - 9- ¹ / ₄ LVL	3 - 2 x 10 (or) 2 - 7- ¹ / ₄ LVL	3 - 2 x 12 (or) 2 - 9- ¹ / ₄ LVL	3 - 2 x 12 (or) 2 - 9- ¹ / ₄ LVL
10'	3 - 2 x 10 (or) 2 - 7- ¹ / ₄ LVL	3 - 2 x 12 (or) 2 - 9- ¹ / ₄ LVL	3 - 2 x 12 (or) 2 - 9- ¹ / ₄ LVL	4 - 2 x 12 (or) 2 - 9- ¹ / ₂ LVL	4 - 2 x 12 (or) 2 - 9- ¹ / ₂ LVL
12'	3 - 2 x 12 (or) 2 - 9- ¹ / ₄ LVL	3 - 2 x 12 (or) 2 - 9- ¹ / ₄ LVL	4 - 2 x 12 (or) 2 - 9- ¹ / ₂ LVL	2 - 11-7/8 LVL	2 - 11-7/8 LVL
16'	2 - 11-7/8 LVL	2 - 11-7/8 LVL	2 - 14 LVL	2 - 16 LVL	2 - 18 LVL

Notes:

1. Headers that are over 7' long will need to have two jack studs installed under each end of the header.
2. If the eave to ridge distance is over 18', then engineering is required.
3. Opening widths larger than 16' wide will need to be individually reviewed. Paperwork shall be submitted and engineering may be required.
4. Wood is assumed to be Douglas fir-larch or hem-fir and grade #2 or better for other than engineered LVL headers.
5. The header sizes are assuming there is no or very limited storage in the attic.
6. If using engineered products for headers (LVL), please have a copy of the paperwork on the job site. The paperwork should show the allowable spans. If paperwork indicates different spans, the paperwork will override the above chart. The LVL headers in the chart have a minimum (E) factor of 1.9 and a minimum (Fb) value of 2,600 psi. Please check manufacturer's paperwork to verify the proposed headers meet these requirements.
7. Each piece of header shall be nailed together by the use of 10d nails (3" x 0.128"). The ends shall have nails at the top and bottom. The headers shall be nailed every 16" on center thereafter with fasteners at the top and the bottom.
8. Spacers used between headers to build them out to the wall width shall be at least 7/16" thick and shall consist of plywood, o.s.b. or other approved material.
9. Non-load bearing headers for 8' garage doors shall be at least 2" x 8" material and non-load bearing headers for 16' garage doors shall be at least 2" x 12" material. The material shall be Douglas fir-larch or hem-fir and grade #2 or better. A solid sheet of 7/16" osb shall be installed between the header for structural strength. The osb shall act as one continuous spacer and any joints in the osb shall butt tight to each other prior to being nailed to the header. Non-load bearing headers for 18' garage doors shall be at least 1-³/₄" LVL engineered lumber. LVL headers used in non-load bearing applications will not require the structural osb spacer.



Wall Bracing

NOTE: Please detach, fill out and submit this sheet with the building permit application.

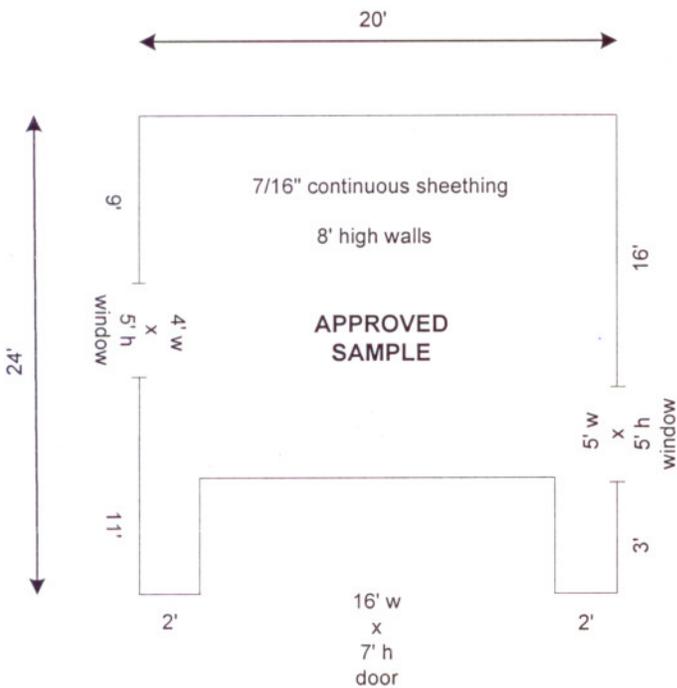
NAME _____ PROJECT ADDRESS: _____ CITY _____

Steps to Ensure That Exterior Wall Bracing is Met

1. Will all exterior walls of the garage have a minimum 7/16" continuous structural o.s.b. sheathing installed? YES or NO
If no, please explain type of wall sheathing proposed. (Note: Other types may not be allowed based on wall openings, etc.)

2. What will the wall height be from the top of foundation to the garage's top plate? (Ex. 8', 9' or 10') _____

3. Has the BLANK DRAWING below been filled out with the correct information? Insufficient submittals may delay the permit process.
 - a. The overall length of each exterior wall shall be shown.
 - b. The location of all windows and doors shall be shown.
 - c. The width and height of all windows and doors shall be shown.
 - d. The distance that each window or door rough opening starts measured from the outside corner of the garage shall be shown.



BLANK DRAWING: Please draw the proposed garage below.

Note: Minimum wall widths are required next to the overhead doors and they are based on wall height. If the following widths are not met next to the overhead door, engineering may be required:

8' walls need to be at least 24" wide 9' walls need to be at least 27" long 10' walls need to be at least 30" long

- Staff Use:** If item #1 is not answered "YES", the below items need to be reviewed and met:
- a. Verify that walls on each side of the overhead door have an approved wall braced panel that is 4' long (or) the walls are properly portal framed with an extended header that is at least 16" long per approved APA detail. (Detail not in this handout.)
 - b. Verify that a wall braced panel starts within 12.5' from the outside corner of the garage.
 - c. Verify that the wall braced panels do not exceed 25' on center.
 - d. Verify that each exterior wall has at least 16% of the exterior wall braced.

Approved/ Comments: _____