



Mayer Community Center – Council Chambers - 413 Bluejay Avenue, Mayer, MN 55360

**PLANNING COMMISSION
REGULAR MEETING**

**Tuesday
July 2, 2019
6:30 PM**

- 1. Call the meeting to order.**
- 2. Approval of the agenda.**
- 3. Approval of the minutes from the June 4, 2019 Planning Commission meeting.**
- 4. Review of the proposed text amendment to the Zoning Ordinance regarding storm shelter requirements.**
- 5. Next Meeting - Tuesday, August 6, 2019**
- 6. Commissioners Report**
- 7. Adjournment.**

City of Mayer
Planning Commission
Meeting Minutes
Tuesday, June 4, 2019

Commission Members Present: Chairperson Tom Stifter, Council Liaison Tice Stieve-McPadden, Commissioners Les Hahn, Michael Sommerfeld, Don Wachholz and Barney Johnson.

Commission Members Absent: Commissioner Patty Lanting.

Others Present: None.

Staff Present: John Anderson of Municipal Development Group, LLC

CALL MEETING TO ORDER.

Meeting called to order at 6:30 PM by Chairperson Tom Stifter.

ADOPT AGENDA.

A motion to approve the agenda was made by Commissioner Wachholz and seconded by Commissioner Johnson. Motion carried 6/0.

APPROVAL OF MINUTES.

A motion to approve the May 7, 2019 Planning Commission minutes was made by Commissioner Wachholz and seconded by Commissioner Johnson. Motion carried 6/0.

FINAL REVIEW OF THE CITY OF MAYER COMPREHENSIVE PLAN 2040 UPDATE.

At 6:33 PM, Planning Consultant Anderson, presented the information on the City of Mayer 2040 Comprehensive Plan update. Planning Consultant Anderson stated that the draft plan was submitted for the mandatory six month review in September of 2018 and that this plan was updated to include all the recommendations that were received during the six month review.

Commissioner Hahn asked if the plan could be changed after the official approval of the plan.

Planning Consultant Anderson stated that once the official plan is adopted, that amendments to amend the comp plan could be made at that time. He further stated that the current plan is still in effect until the new Comprehensive Plan is adopted and that the Metropolitan Council is no longer allowing the current Comprehensive Plan to be amended.

A motion to recommend the City Council approve the submittal of the final draft of the City of Mayer 2040 Comprehensive Plan to the Metropolitan Council was made by Commissioner Johnson and seconded by Commissioner Hahn. Motion carried 6/0.

NEXT MEETING.

Next scheduled meeting is Tuesday, July 2, 2019.

COMMISSIONERS REPORT.

None.

ADJOURNMENT.

A motion was made by Commissioner Johnson and seconded by Commissioner Wachholz to adjourn the meeting at 6:54 PM. Motion carried 6/0.



Text Amendment Regarding Storm Shelter Requirements

APPLICATION DATA

Meeting Date: July 2, 2019
Applicant: This is a City of Mayer initiated text amendment.

BACKGROUND DATA

Action Requested: The City of Mayer has initiated a review of language in relation to storm shelter requirements. The draft text is proposed to be added as a new section 152.103 within the zoning ordinance for the City of Mayer. Definitions are also proposed to be added to section 152.103 Definitions of the zoning ordinance as well.

Background: Staff has been directed to draft a Residential Storm Shelter Ordinance that addresses short term protection for slab on grade home from tornadoes and extreme straight line winds. Potential new text is listed below and is proposed to be inserted into Title XV: Land Usage, Chapter 152: Zoning as a new section 152.103.

152.003 DEFINITIONS.

STORM SHELTER. A structure or portion of a structure designed to protect its occupants from extreme winds such as tornadoes and straight line winds and the flying debris propelled by them.

DUAL PURPOSE STORM SHELTER. A structure or portion of a structure designed for use as a storm shelter and also for some other secondary permitted use.

SINGLE PURPOSE STORM SHELTER. A structure or portion of a structure designed for use only as a storm shelter.

152.103 STORM SHELTERS.

(A) *Purpose.* The purpose of this section is to provide short term protection from tornadoes and extreme straight line winds by providing minimum standards of design for the construction of any dwelling or dwelling unit that is constructed as a slab-on-grade or any manufactured home. Provisions shall be made to provide for storm protection internally to the dwelling or dwelling unit.

(B) *Requirements.* All residential dwellings or dwelling units constructed slab on-grade, shall provide storm protection, either internally to the structure or in a separate storm shelter structure. Storm shelters internal to the dwelling or dwelling unit shall be provided in a bathroom, laundry room or multi-purpose room so as to ensure accessibility.

(1) Storm shelters shall be constructed to repel debris propelled by EF-5 tornadoes or extreme straight line wind speeds of up to two hundred (200) miles per hour. (*per what building standard?*)

(2) Storm shelters constructed internally to the structure may be designed as a single or dual purpose storm shelter.

(3) If a storm shelter is externally attached to the principal structure, it shall be considered part of the principal structure and shall be meet all setback and zoning requirements required for the principal structure. Said externally attached storm shelter shall be located on the side or rear of the dwelling unit and shall consist of the same exterior materials as the principal structure.

- (4) A minimum floor space of five (5) square feet per person and a minimum ceiling height of not less than seven feet (7') over sixty percent (60%) of the floor space is required within the storm shelter.
 - (5) A minimum of two (2) persons per bedroom in each dwelling or dwelling unit shall be used to determine the minimum floor space required or the number of occupancy spaces within the storm shelter.
 - (6) Separate external storm shelters shall not be considered an accessory structure unless it is designed as a dual purpose storm shelter. (*External storm shelters shall be considered accessory structures and shall be subject to the accessory structure provisions.*)
 - (7) All storm shelters shall not be obstructed by storage.
- (C) *Compliance.* Additional compliance with this section shall be based upon Federal Emergency Management Agency (FEMA) guidelines and standards, except that the shelter door shall be solid core construction (not limited to metal) and only one deadbolt lock shall be required.

PLANNING COMMISSION ACTION REQUIRED

After review and discussion by the members of the Planning Commission, direction should be given to staff on what direction to go on the proposed text amendment. General feedback is expected.

If you have any questions relating to the text amendment prior to the Planning Commission meeting, please feel free to contact me at: jandersonmdg@gmail.com or call direct at 952-855-4596.

Sincerely,

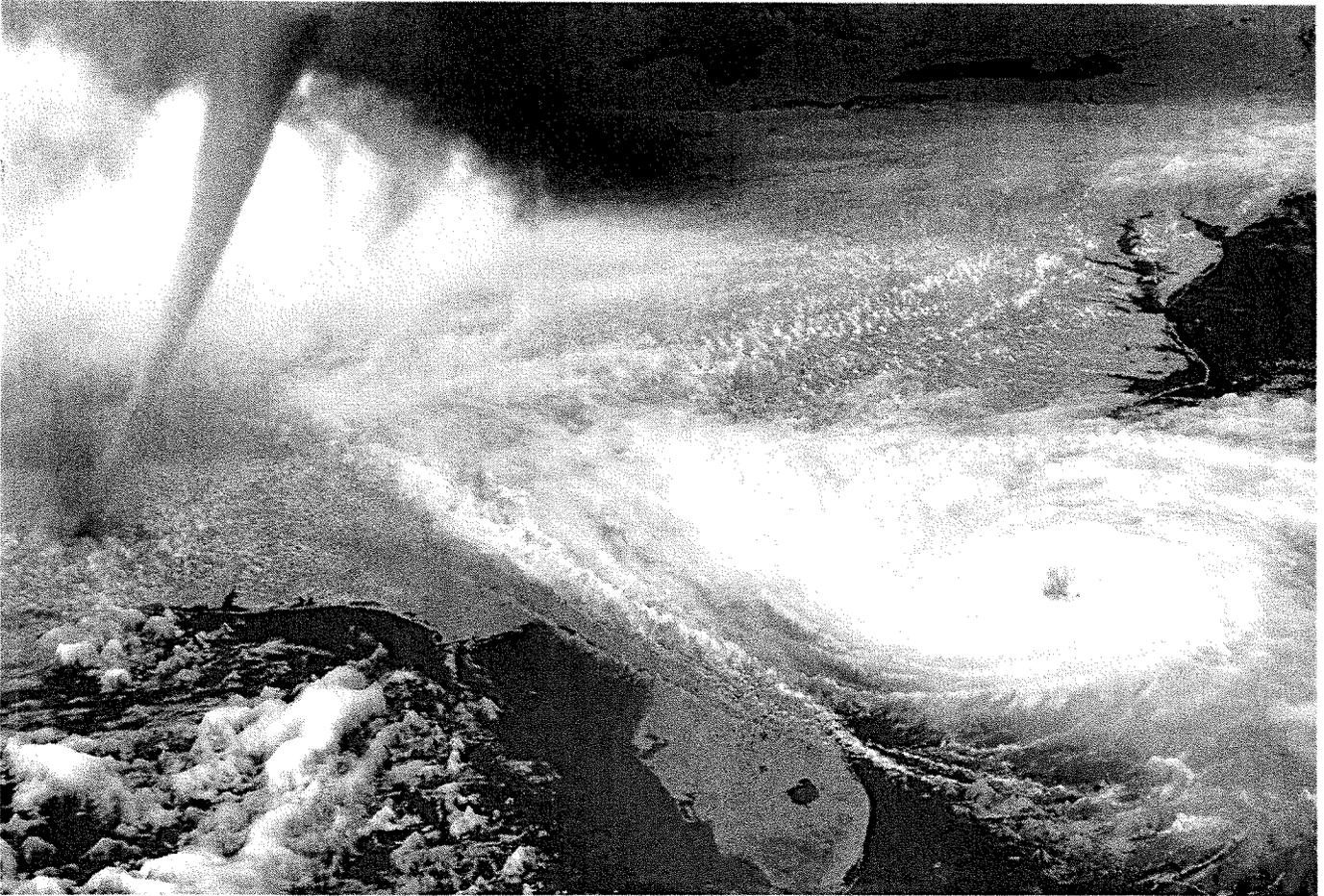
MUNICIPAL DEVELOPMENT GROUP, LLC

John Anderson

John Anderson, Associate
Consulting Planner, City of Mayer

LIST OF ATTACHMENTS

Storm Shelter Handout Provided by Planning Commission Member Les Hahn



Residential Structural Storm Shelter Ordinance

**Storm protection for slab on grade
residential structures**



It has come to my attention that a slab on-grade home is becoming a popular form of housing that is being utilized in many if not all areas of our carver country and the state of Minnesota. It is not hard to understand the motivation and reasoning in relation to this type of structural design. It is without a doubt, that a slab no-grade home has its benefits, especially when it comes to economics and the convenience of living in a ground level floor home, as in the case of handicapped residents, which some day we will all be, in some way or another.

Although there are many benefits to a slab on-grade home, there are also some drawbacks to this type of structure. One of these drawbacks relates to protection from extreme winds such as those produced by straight line winds and tornados that can and do produce winds in excess of 200 mph. Not only are the winds a concern, but the debris the winds propel and turning them into proven maiming and killer projectiles.

There are few municipalities in our area that have ordinances that protect their citizens from these types of natural disaster dangers, especially those living in slab on-grade housing, where there is no such protection unless provided by some type of a storm shelters. In the past residence were led to believe that hiding in their bathtub was all the protection they needed. This of course came about by those how were in the business of selling their product and couldn't care less about the safety of their clients. Reasons as pale as this, should cause one to promote the adoption of an ordinance that would protect such home owners from this and other types of danger at hand.

As it is the duty of the city officials to protect its citizens of their municipality from harm and or dangers, a draft of a structural storm shelter ordinance is being proposed. Hopefully the following pages will give some insight as to the need for this type of protection should such an event take place. Below is a list of some many references that can be utilized for more information.

IBC = International Building Code

ICC = International Code Council (ICC 500 Standards).

IRC = International Residential Code

NSSA = National Storm Shelter Association

FEMA = Federal Emergency Management Agency (In researching FEMA, I found that it was no more than a regulatory agency referencing many other agencies or organizations, through Federal status and uses it for enforcement when referenced or implemented in a ordinance and therefore should not be referenced or adopted as part of an ordinance).

Proposed Residential Structural Storm Shelter Ordinance

Chapter 152. _____ Storm protection for slab on grade residential structures.

Purpose;

The purpose of this ordinance is to provide short term protection from Tornadoes and Extreme Winds in regards to a public safety emergency.

Definitions;

Storm Shelter

A structure or portion of a structure designed to protect its occupants from Extreme Winds such as Tornadoes and flying debris propelled by them.

Single purpose storm shelter

A structure or portion of a structure designed for use only as a storm shelter.

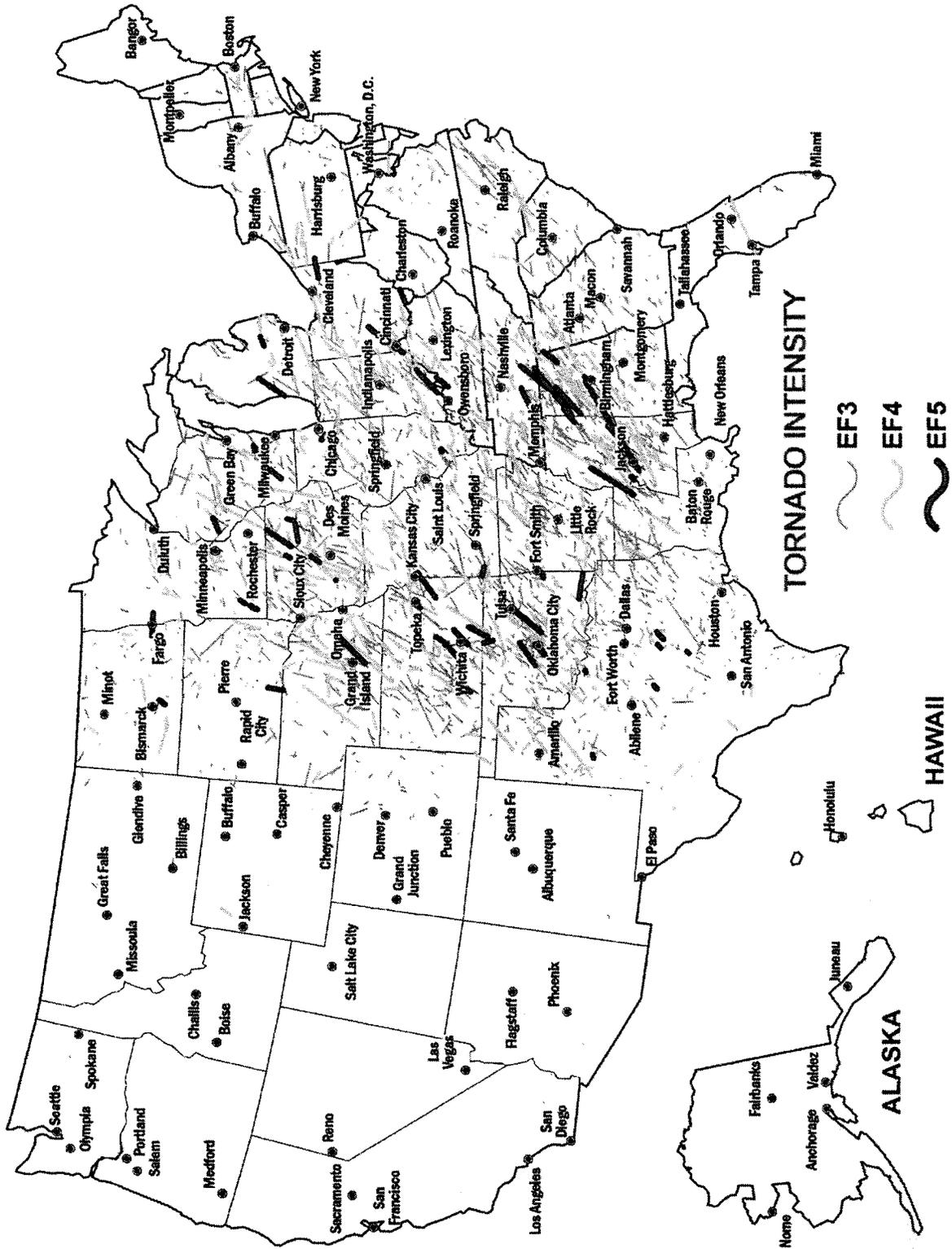
Dual purpose storm shelter

A structure or portion of a structure designed for use as a storm shelter and also for some other secondary permitted use.

Residential Storm Shelter Requirements

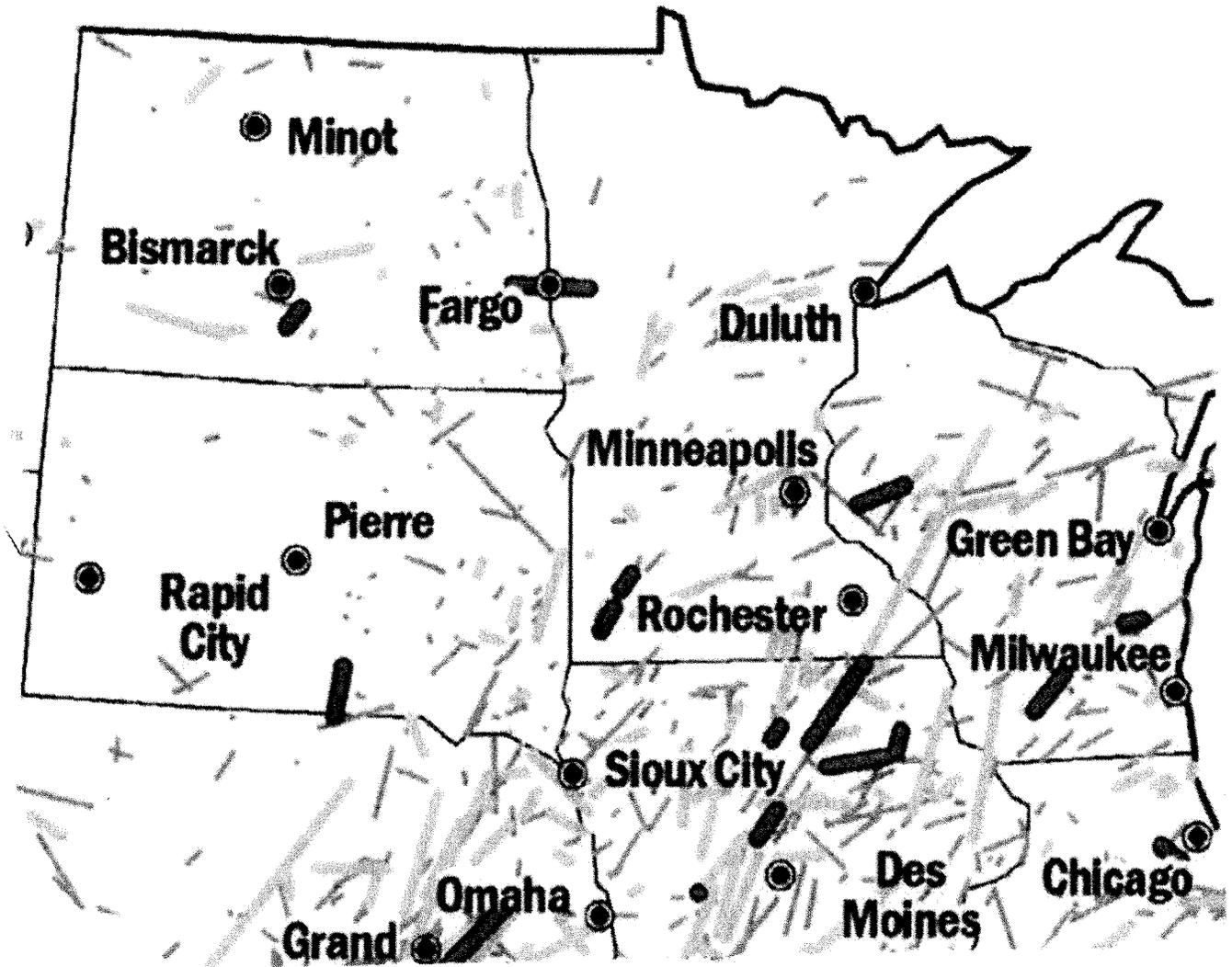
A. All residential dwellings constructed slab on-grade, shall provide storm protection, either internally to the structure or in a separate storm shelter structure.

1. Storm shelters shall be constructed to repel debris propelled by EF-5 Tornadoes or Extreme wind speeds of 200 mph.
2. Storm shelters constructed internally to the structure may be designed as a single or dual purpose storm shelter.
3. A storm shelter may be externally attached to the main structure if it is within the setback boundaries and has exterior decor in relation to the main structure.
4. A minimum space of four square feet per person, within a storm shelter, and a ceiling not less than seven feet over sixty percent of the floor space.
(FEMA recommends 5 sq ft for standing or sitting space)
5. A minimum of two persons per bedroom shall determine the minimum number of occupant spaces of the shelter. A loft is to be considered a bedroom.
6. Separate or external storm shelters shall not be considered an accessory structure unless it is designed as a dual purpose structure.
7. All storm shelters shall not be obstructed by storage.



Recorded EF3, EF4, and EF5 tornadoes in the United States from 1950 to 2013

(SOURCE: NOAA NATIONAL WEATHER SERVICE, STORM PREDICTION CENTER, WWW.SPC.NOAA.GOV/GIS/SVRGIS/)



TORNADO INTENSITY

- ~ EF3
- ~ EF4
- ~ EF5

**Recorded EF3, EF4, and EF5 tornadoes in the Upper Mid West
from 1950 to 2013**



Typical tornado damage descriptions to one- and two-family dwellings and their corresponding intensity according to the EF Scale (wind speeds are estimated 3-second-gust wind speeds)

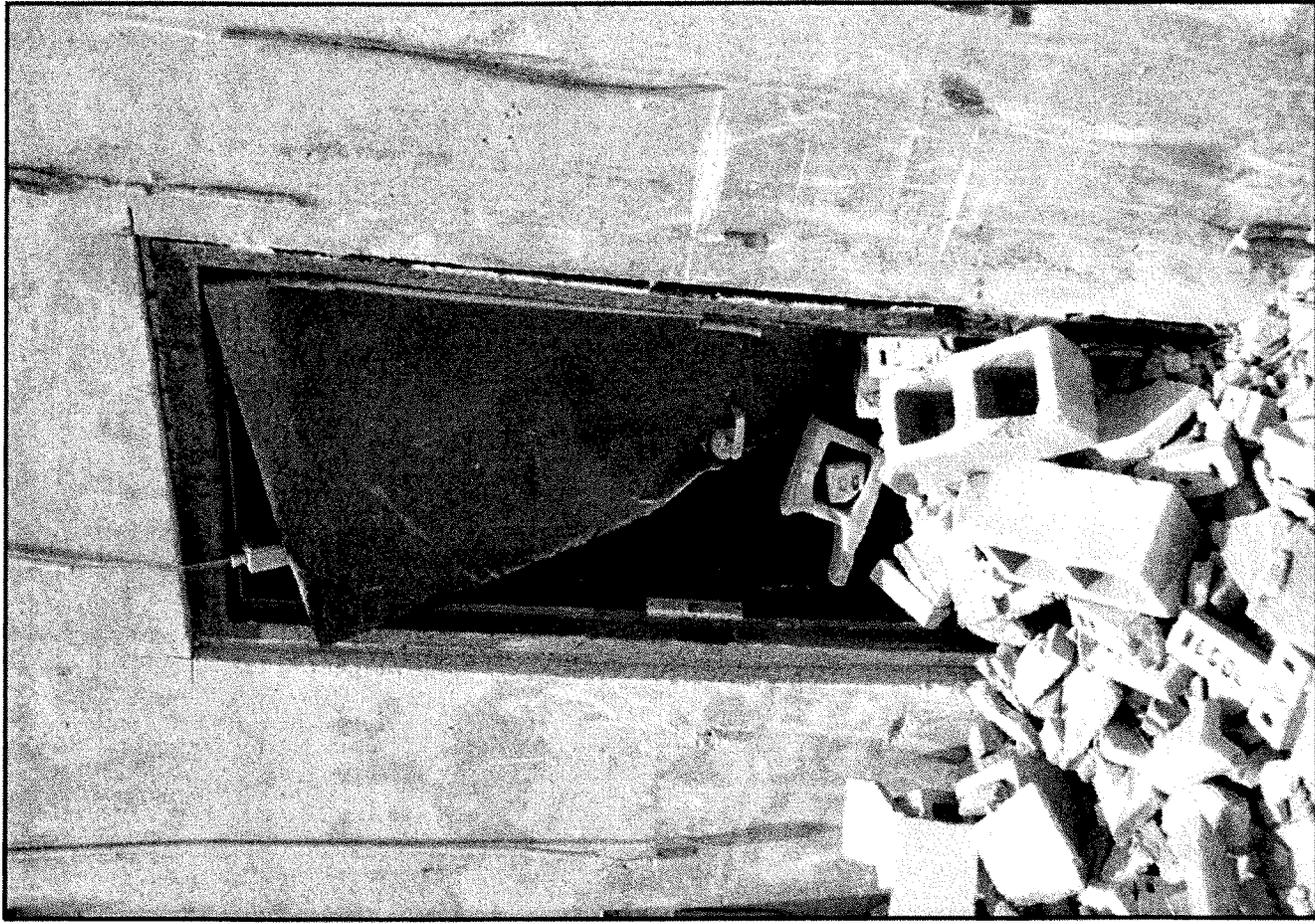
(SOURCE: NOAA NATIONAL WEATHER SERVICE, STORM PREDICTION CENTER. WWW.SPC.NOAA.GOV/EFSCALE/EF-SCALE.HTML)

Wind-borne Debris in Tornadoes

Although safe room doors are designed to resist test missiles, a door may be struck by debris that has greater momentum than the test missile. If a missile breaches the building envelope, wind may enter and increase the internal pressure of the building (Figure B8-1).

Figure B8-1. Metal door breached by wind-borne debris.

(this door was not designed to resist debris).

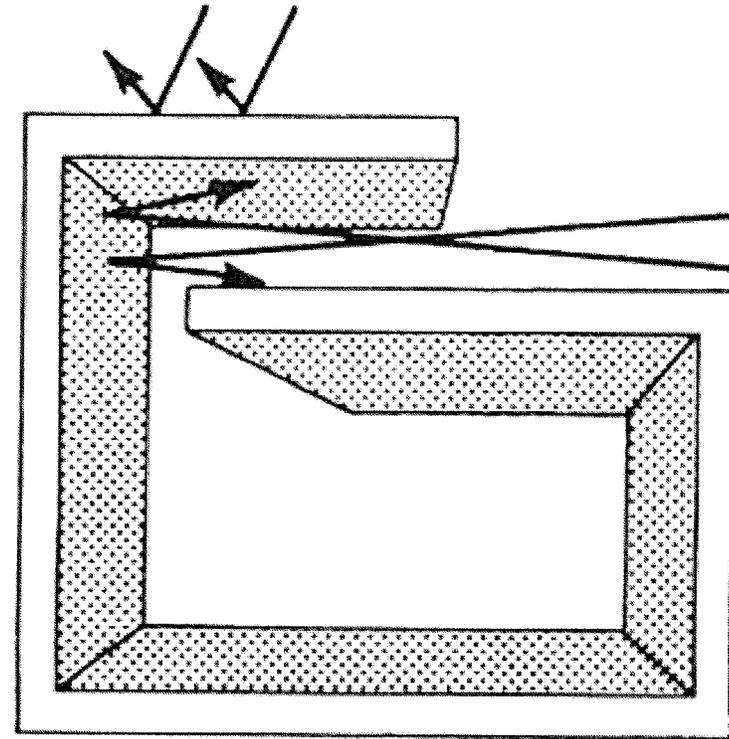


Debris impacting buildings during tornadoes can originate from the building itself to fail. However, as buildings break apart, roof and wall coverings are typically the first elements failure sometimes initiates when the entire roof structure blows off. With loss of the roof structure or roof decking, exterior walls are often blown down. During violent tornadoes, failure progresses until many or all of the interior walls are also blown away. Debris can also originate from the surrounding area.

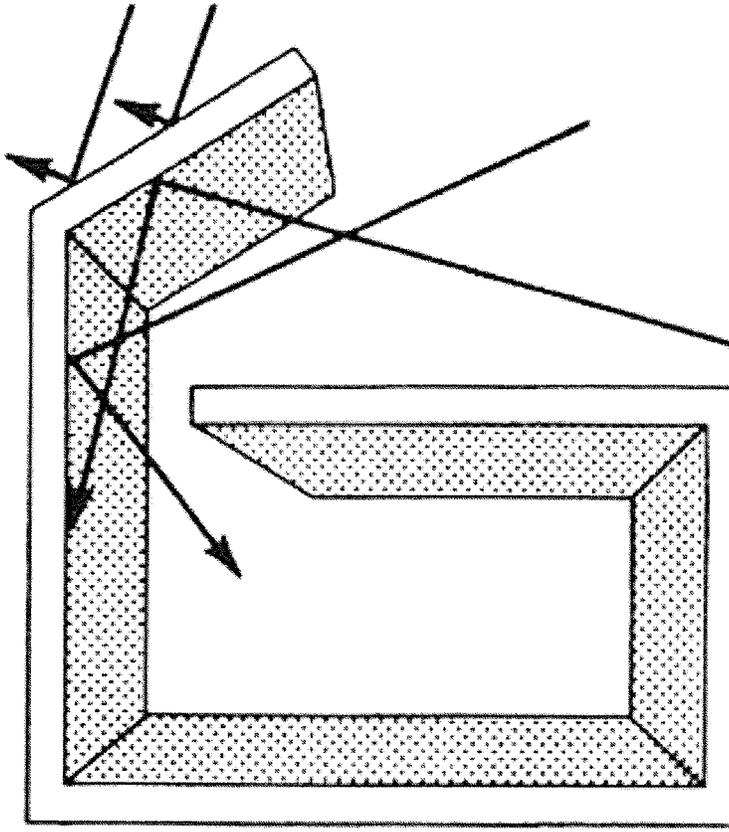


Representative quantity, size, and type of debris that is often generated by a strong or violent tornado. The building damage at this site was indicative of an EF3 tornado.

TOP VIEW



THIS



NOT THIS

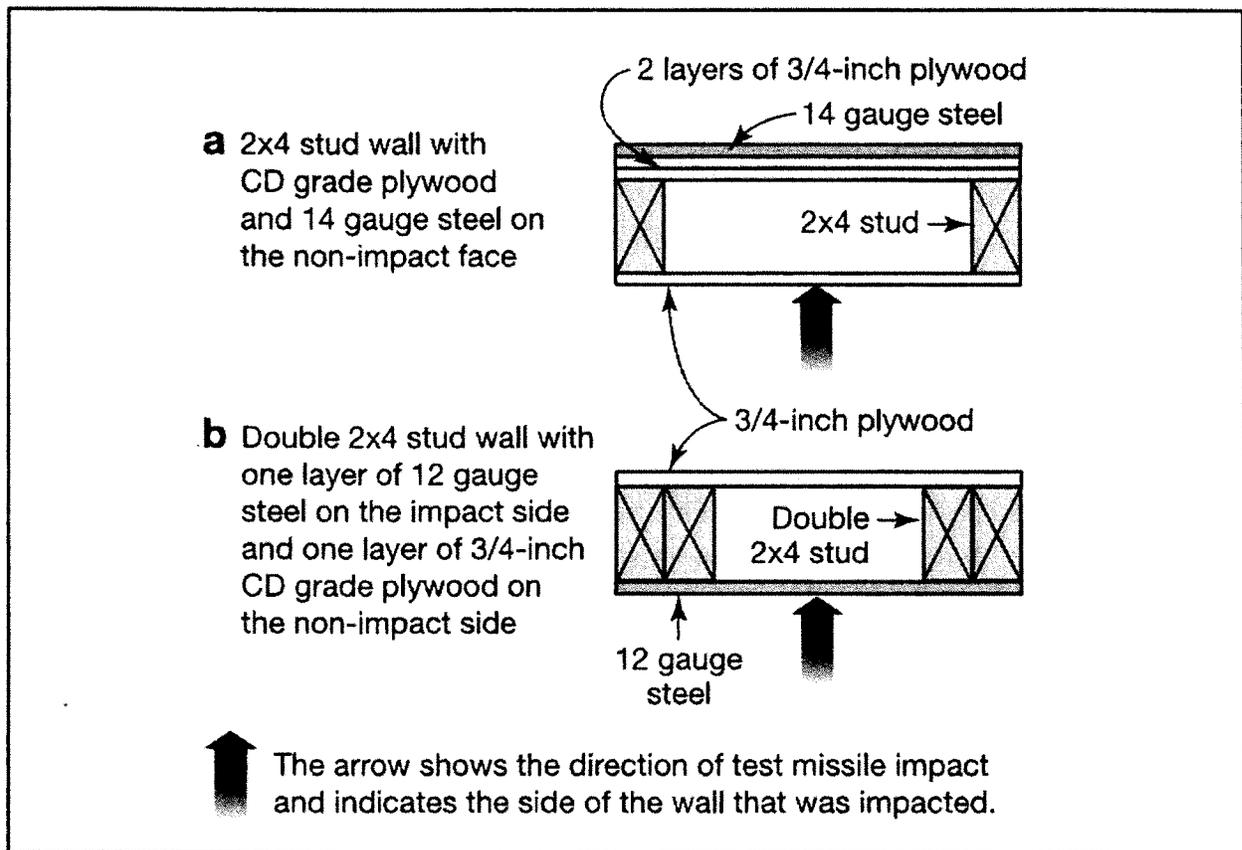
Entrance with right angle turn.

Impact Resistance Wall Assemblies

Refer to Figure B8-17 for two examples of wood frame wall assemblies with steel sheathing that have passed safe room testing. For more examples, see *Wall Sections that Passed Previous Missile Impact Tests* on the safe room website at www.fema.gov/wall-sections-passed-previous-missile-impact-tests. Prescriptive wood frame solutions for residential safe rooms (including wall assemblies with 14 gauge steel sheathing) are available in FEMA P-320.

TTU found that 12-gauge or heavier steel sheets always pass the tornado missile impact test. Test configurations included 12-gauge steel directly over studs and the steel sheet mounted over plywood. Test samples used the standard stud spacing of 16 inches on center. Wider stud spacing affects the permanent deformation of the steel sheet. Permanent deformation of 3 inches or more into the safe room is deemed unacceptable. Tests have not been performed to determine the maximum stud spacing that would control the 3-inch permanent deformation limit.

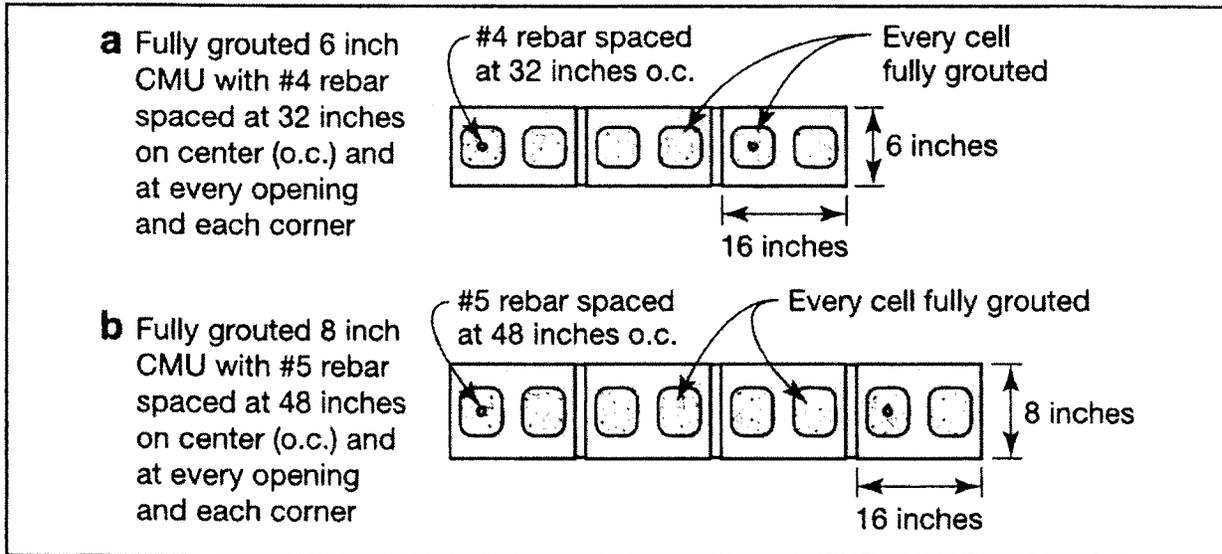
Figure B8-17. Use of steel sheet metal in wall assemblies



B8.2.3.3 Impact Resistance of Concrete Masonry Unit Wall Assemblies

TTU found that 6-inch CMU walls that are fully grouted with ASTM C476 grout and reinforced with #4 rebar at 36 inches on center, and 8-inch CMU walls that are fully grouted and reinforced with #5 rebar at 48 inches on center, can withstand the tornado test missile (Figure B8-18). However, more reinforcing steel may be required to resist wind loads.

Figure B8-18. CMU wall assemblies



B8.2.3.4 Impact Resistance of Reinforced Concrete Wall and Roof Assemblies

Research related to the design of nuclear power facilities has produced a relatively large body of information and design guides for predicting the response of reinforced concrete walls and roofs to the impact of wind-borne debris.⁶ The failure modes have been identified as penetration, spalling, barrier perforation, and complete debris perforation, as described in the text box.

The design of reinforced concrete walls for wind-borne debris impact protection should focus on establishing the minimum wall thickness to prevent threshold spalling under the design (test) missile impact. Wall designs should be validated by impact testing per ICC 500 Section 804; pass/fail criteria is provided in Section 804.10.

TERMINOLOGY

Penetration: When wind-borne debris penetrates into, but not through, the wall assembly. This condition is of no consequence unless it creates spalling.

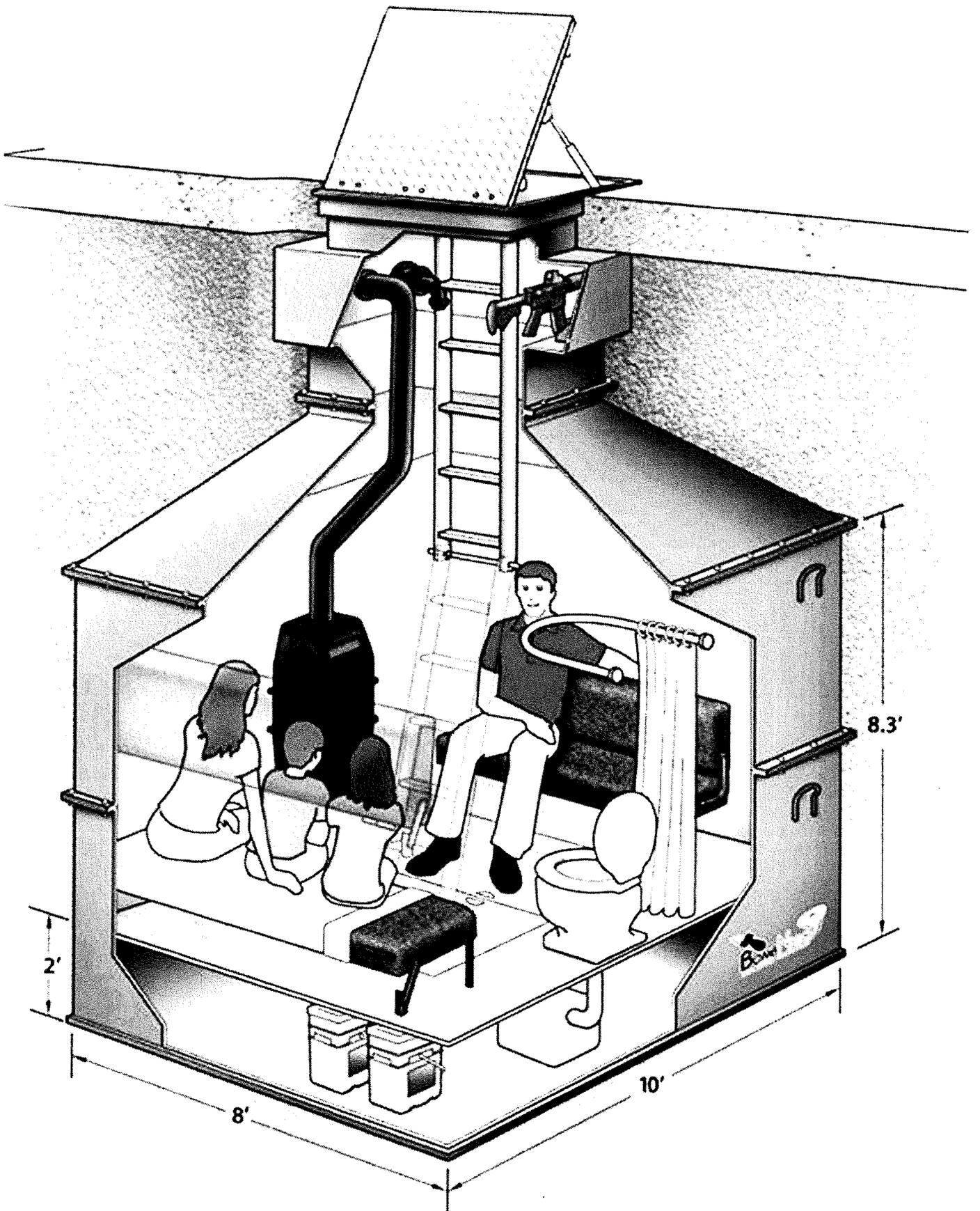
Spalling: When concrete is ejected into the safe room. Spalling occurs when the shock wave produced by the impact creates tensile stresses in the concrete on the interior surface that are large enough to cause a segment of concrete to burst away from the wall. Threshold spalling is when spalling is just being initiated, and is usually characterized by small fragments of concrete being ejected. When threshold spalling occurs, a person struck by the spall debris might be injured, but is not likely to be killed. However, as the size of the spall increases, so does the velocity with which it is ejected from the wall or roof. A person struck by large spall debris will likely be injured and possibly die, par-

ticularly if the spall falls from high up on a wall or the roof. ICC 500 pass/fail criteria for spalling employs a witness screen on the interior side of the storm shelter wall (or roof section) to determine whether or not test missile-induced spalling could potentially endanger occupants.

Barrier perforation: When wind-borne debris creates a hole through the wall (the debris may bounce off the wall or it may become stuck in the hole). A plug of concrete about the diameter of the impacting debris is knocked into the safe room. The plug can cause injury or death.

Complete debris perforation: When the wind-borne debris itself enters the safe room. The debris or dislodged wall fragments can cause injury or death.

Source: Twisdale and Dunn (1981)

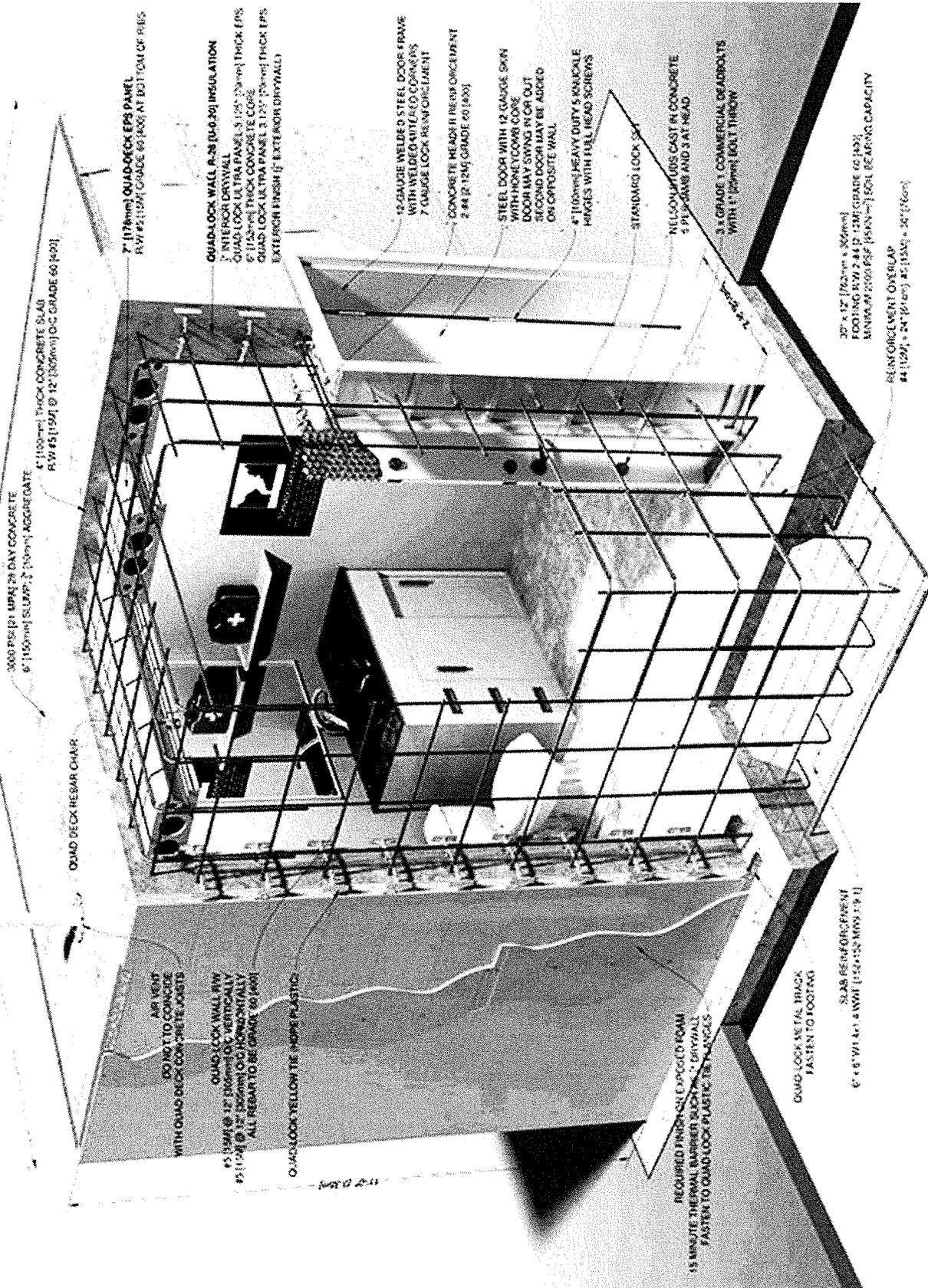


SAFE ROOM WITH QUAD-LOCK AND QUAD-DECK FEMA 361 COMPLIANT

14'-0" x 18'-0"

WITH QUAD-LOCK AND QUAD-DECK
FEMA 361 COMPLIANT

14'-0" x 18'-0"



3000 PSI (24 MPa) 28 DAY CONCRETE
6" (152mm) SLUMP, 2" (50mm) AGGREGATE
R/W #5 (19A) @ 12" (305mm) OC GRADE 60 (A01)

7" (178mm) QUAD-DECK EPS PANEL
R/W #5 (19A) GRADE 60 (A01) AT BOTTOM OF REIS

QUAD DECK REBAR CHAIR

AIR VENT
DO NOT TO CONCRIDE
WITH QUAD DECK CONCRETE JOISTS

QUAD-LOCK WALL R/W
#5 (19A) @ 12" (305mm) OC VERTICALLY
#5 (19A) @ 12" (305mm) OC HORIZONTALLY
ALL REBAR TO BE GRADE 60 (A01)

QUAD-LOCK YELLOW TIE NOPS PLASTIC

QUAD-LOCK WALL R-20 (R-0.20) INSULATION
3" INTERIOR DRYWALL
QUAD-LOCK ULTRA PANELS (1-5/8" (39mm) THICK EPS
6" (152mm) THICK CONCRETE CORE
QUAD-LOCK ULTRA PANEL 3 1/2" (89mm) THICK EPS
EXTERIOR FINISH (EXTERIOR DRYWALL)

12 GAUGE WELDED STEEL DOOR FRAME
WITH WELDED ANTI-LEAD CORNERS
7 GAUGE LOCK REINFORCEMENT
CONCRETE HEADER REINFORCEMENT
2 #4 (20.1mm) GRADE 60 (A01)

STEEL DOOR WITH 12 GAUGE SKIN
WITH HONEYCOMB CORE
DOOR MAY SWING IN OR OUT
SECOND DOOR MAY BE ADDED
ON OPPOSITE WALL

4" (102mm) HEAVY DUTY 5/8" (16mm) ANCHOR
PLATES WITH FULL HEAD SCREWS

STANDARD LOCK SET

NEELON PULVIS CAST IN CONCRETE
SUPER FRAME AND SAT HEAD

3/4" (19mm) COMMERCIAL DEADBOLTS
WITH 1" (25mm) BOLT THROW

REQUIRED THERMO-SEALING FOAM
15 MINUTE THERMAL BARRIER SUCH AS 2" DRYWALL
FASTEN TO QUAD-LOCK PLASTIC TIE ANCHORS

QUAD-LOCK METAL TRACK
FASTEN TO FOOTING

6" x 6" W/ 4 #4 W01 (15.2 x 15.2 MPa) 1.1 I
SLAB REINFORCEMENT

27" x 12" (687mm x 305mm)
FOOTING W/ 2 #4 (20.1mm) OC GRADE 60 (A01)
MINIMUM 2000 PSI (138MPa) SOIL BEARING CAPACITY
REINFORCEMENT OVERLAP
#4 (19A) @ 24" (609.6mm) OC (19A) @ 30" (762mm)

MINNESOTA RULES, CHAPTER 1370 STORM SHELTERS

1370.0100 PURPOSE.

The purpose of parts 1370.0100 to 1370.0230 is to provide minimum standards of design and construction of buildings to provide protection for manufactured home park occupants from tornadoes and extreme winds.

1370.0110 SCOPE.

Parts 1370.0100 to 1370.0230 apply to buildings or portions of buildings that are designed for use as manufactured home park storm shelters.

1370.0120 DEFINITIONS.

Subpart 1. **Scope.** The definitions in this part apply to parts 1370.0100 to 1370.0230.

Subp. 2. **Storm shelter.** "Storm shelter" means a structure or portion of a structure designed in compliance with parts 1370.0100 to 1370.0230.

Subp. 3. **Dual purpose storm shelter.** "Dual purpose storm shelter" means a structure or portion of a structure designed for use as a storm shelter and also designed for some other secondary permitted use.

Subp. 4. **Single purpose storm shelter.** "Single purpose storm shelter" means a structure designed for use only as a storm shelter.

1370.0130 APPLICABLE REQUIREMENTS.

Subpart 1. **Incorporation by reference.** "Interim Guidelines for Building Occupant Protection from Tornadoes and Extreme Winds," TR-83A January 1980, sections 1 and 2, published by the Federal Emergency Management Agency, Washington, D.C., is incorporated by reference and must be used to determine design loads and as a guide for use

in designing storm shelters. The document is not subject to frequent change and is available: (1) in the Minnesota State Law Library; (2) from the Printing and Publications Division, Federal Emergency Management Agency, P.O. Box 8181, Washington, D.C. 20024; and from the Minnesota Department of Public Safety, Division of Emergency Management, 85 State Capitol, Saint Paul, Minnesota 55155.

Subp. 2. **Dual purpose storm shelters.** A dual purpose storm shelter must comply with other applicable requirements of the state building code for its other intended uses.

1370.0140 PLANS, SPECIFICATIONS, PERMITS.

Storm shelter plans, engineering calculations, diagrams, and other required data must be prepared by a registered architect or engineer licensed to practice in Minnesota. For permit procedures, see section 106 of the Uniform Building Code, incorporated by reference in part 1305.0010.

1370.0150 SPACE REQUIREMENTS.

A minimum of four square feet per person must be provided within a storm shelter. A ceiling height of not less than seven feet must be provided over 60 percent of the floor area.

1370.0160 REQUIRED EXITS.

Subpart 1. **Exits; openings.** At least two exits must be provided in compliance with chapter 10 of the Uniform Building Code. The second exit from a single purpose storm shelter may have an opening of at least nine square feet with a minimum of 20 inches in width and the bottom of the opening not more than 44 inches from the floor.

Openings in the exterior walls of the shelter must be protected to prevent flying

missiles from entering the interior of the shelter.

Subp. 2. **Handicapped access.** At least one of the exits must comply with chapter 1340, facilities for the handicapped.

Subp. 3. **Exit to exterior.** When a portion of a structure is designed as a storm shelter, one exit must be directly to the exterior of the building or to an exit system complying with the state building code.

1370.0170 DRY INTERIOR.

Provisions must be made to construct storm shelters outside of flood-prone areas and other nonwater ponding areas and so that the interiors remain reasonably dry.

1370.0180 UTILITY LINE HAZARDS.

Hazardous utility lines must not be located in or near a storm shelter. The underground electrical service required by part 1370.0200 is exempt from this requirement.

1370.0190 MINIMIZING FIRE DANGER.

Storm shelters must be constructed to minimize the danger of fire from both external and internal sources.

1370.0200 ELECTRICAL POWER.

Underground electrical service must be provided to a storm shelter.

1370.0210 ILLUMINATION.

Subpart 1. **Minimum illumination.** At least five foot candles of illumination must be provided at floor level.

Subp. 2. **Source.** An emergency lighting system must be supplied from storage batteries or an on-site generator installed in accordance with the requirements of the National Electrical Code, incorporated by reference in chapter 1315.

1370.0220 VENTILATION.

Ventilation must comply with the criterion

on page nine of the interim guidelines incorporated in part 1370.0130.

1370.0230 SANITATION FACILITIES.

Sanitation facilities and water for drinking are not required for storm shelters.

LAKEVILLE

11-17-27: STORM SHELTER:

- A. Any dwelling or dwelling units that are constructed slab on-grade, provisions shall be made to provide for storm protection internally to the dwelling or dwelling unit. Storm shelters internal to the dwelling or dwelling unit shall be provided in a bathroom or laundry room so as to ensure accessibility and that the storm shelter is not obstructed by storage.
- B. Compliance with this requirement shall be based upon federal emergency management agency (FEMA) guidelines and standards, except that the shelter door shall be solid core construction (not limited to metal) and only one deadbolt lock shall be required.

RUSH CITY

- 1. Storm Shelter: In cases where residential dwelling units are constructed slab on-grade, provisions shall be made to provide for storm protection either internally to the unit or in a separate storm shelter structure. Storm shelters internal to the dwelling or dwelling unit shall be provided in a bathroom, laundry room, multi-purpose room or interior hallway so as to ensure accessibility and that the storm shelter is not obstructed by storage. External storm shelters shall be considered accessory structures and shall be subject to the provisions of Section 1005.01, Subd. 3 of this Chapter.