

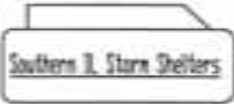
**F.E.M.A. DESIGN REQUIREMENTS
FOR IN-GROUND RESIDENTIAL TORNADO SHELTERS**

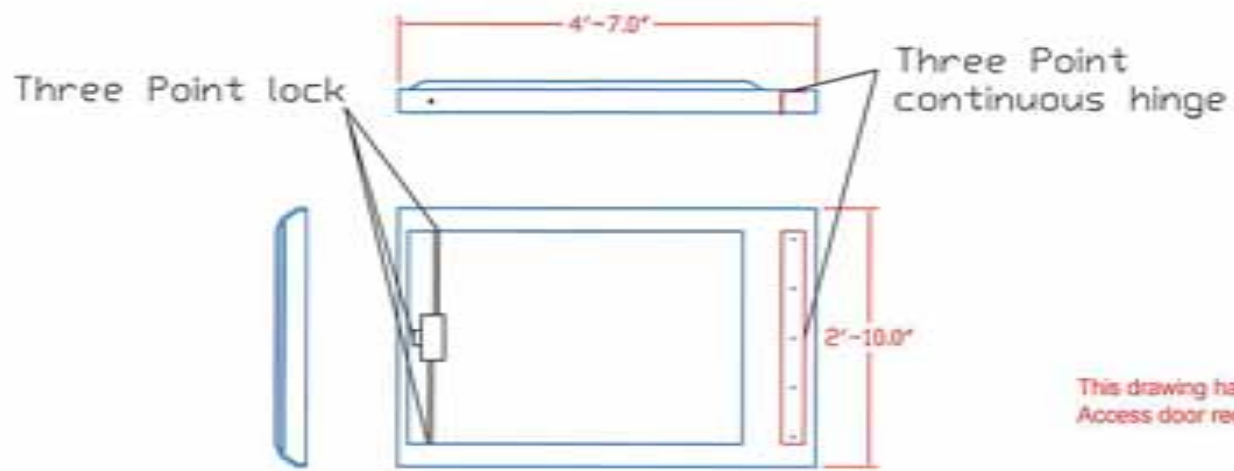
Based on Criteria Listed in Federal Emergency Management Agency publication
FEMA 320 /August 2008;
ICC 500-2008 ICC/ISSA Standard For The Design and Construction of Storm Shelters;
ASTM E 1886-05 Standard Test Method for Protective Systems Impacted by Missiles
NPCTS -National Performance Criteria for Tornado Shelters

ICC 500 Sect 502.2	Access Opening -- Requires access opening minimum size 24" wide x 30" long.
ICC 500 Sect 502.3.1	Vertical Access -- Requires minimum tread depth 8" and maximum riser height 9-9/16"
ICC 500 Sect 502.3.1	Vertical Access -- Requires minimum Stair width 22" and slip resistant surface.
ICC 500 Sect 502.3.1	Overhead Clearance -- Requires minimum overhead clearance 6'-8" or 5'-0" with signage.
ICC 500 Sect 502.3.1.2	Handrail required on stairways having more than three stairs.
ICC 500 Sect 502.4	Occupant Density -- Requires minimum 3 sq ft usable shelter area per occupant for 1 & 2 Family residential dwellings.
FEMA 320 & 361 NPCTS	Requires minimum 3 hinge attachment points and 3 positive latch points.
NPCTS	Requires exterior key accessibility for post storm Emergency Entry by EMS personnel if needed when latches are engaged from the inside.
ICC 500 Sect 302303/304	Loads and load combinations, Hydrostatic loads, wind loads, required for the construction of shelters
ICC 500 Sect 305/306 FEMA 320/361 NPCTS ASTM E 1886	Windborne Debris Hazards -- Requires tornado shelters exposed surfaces to be designed and tested in the worst case to emulate wind speeds of 250 mph. 15-lb sawn lumber 2x4 missiles impacting exposed surfaces less than 30 degrees from horizontal at 67 mph and exposed vertical surfaces at 100 mph.
ICC 500 Sect 702.1	Requires 2 sq. in. or 4 sq. in. of natural ventilation based on location of ventilation ports per occupant.

This drawing has been verified to conform to code requirements as described.

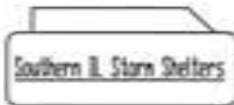


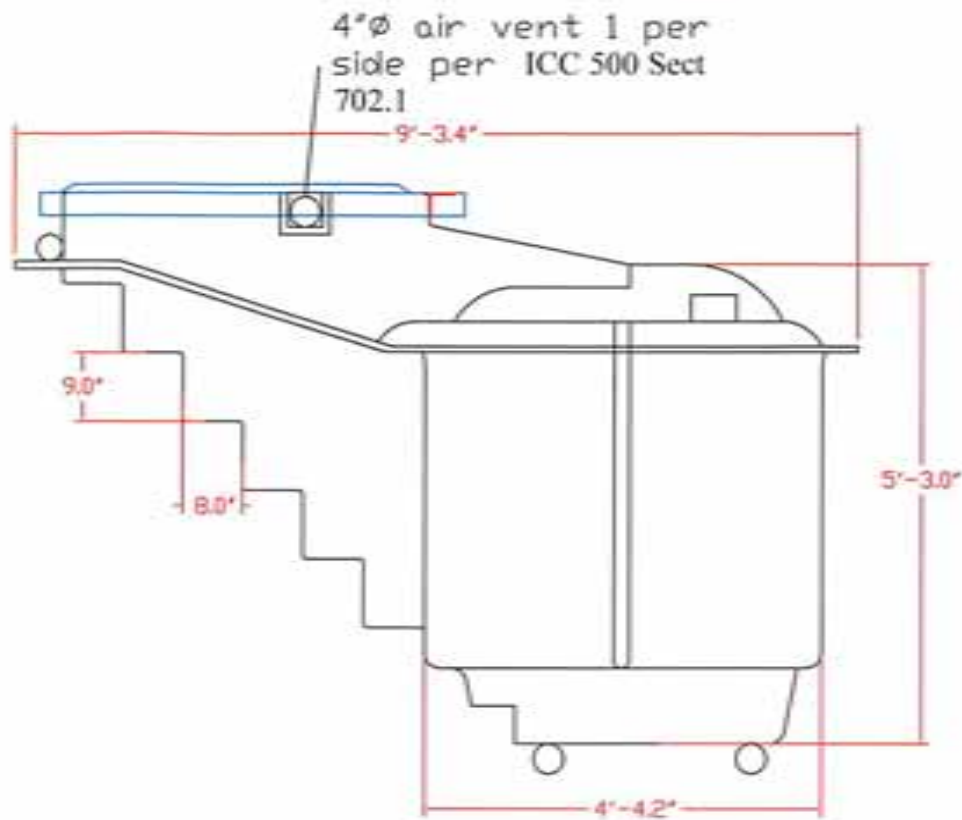
REV.	DATE	CHANGE OR ADDITION
		PAPER SIZE _____ SCALE _____ SHEET <u>1</u> OF <u>1</u> DATE _____ MODEL NUMBER _____ DRAWN BY _____
PART NAME FEMA DOCUMENT		
APPROVED BY _____		DRAWING NUMBER _____



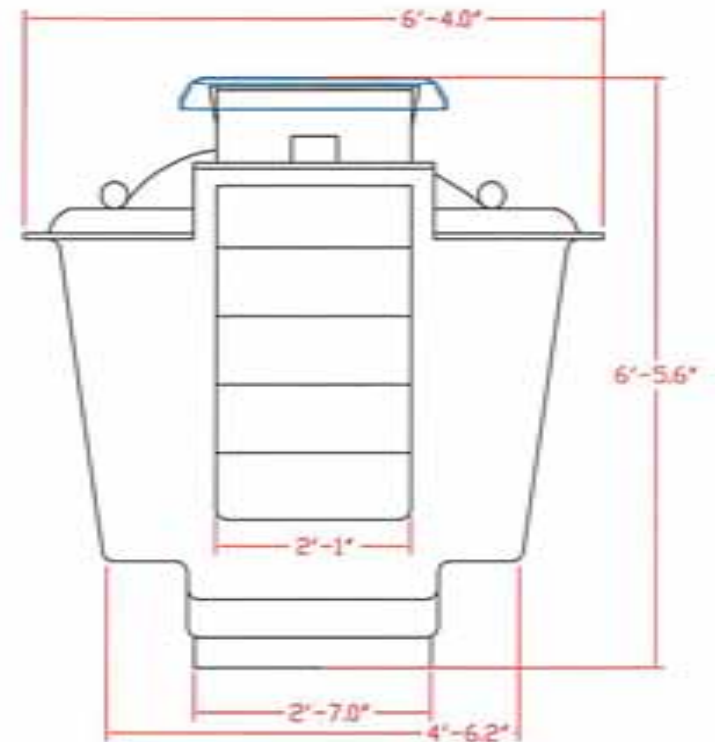
This drawing has been verified to conform to ICC/ANSI 500-2008 provisions for Access door requirements.



REV.	A	DATE	CHANGE OR ADDITION
		PAPER SIZE	SCALE 1-1
		SHEET 1 OF 1	DATE 3-15-07
		MODEL NUMBER LS ALL	DRAWN BY HAG
PART NAME LS Storm Shelter Hatch			
APPROVED BY			DRAWING NUMBER



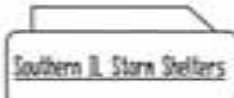
Door opening 24" X 45.5" per ICC 500 Sect 502.2

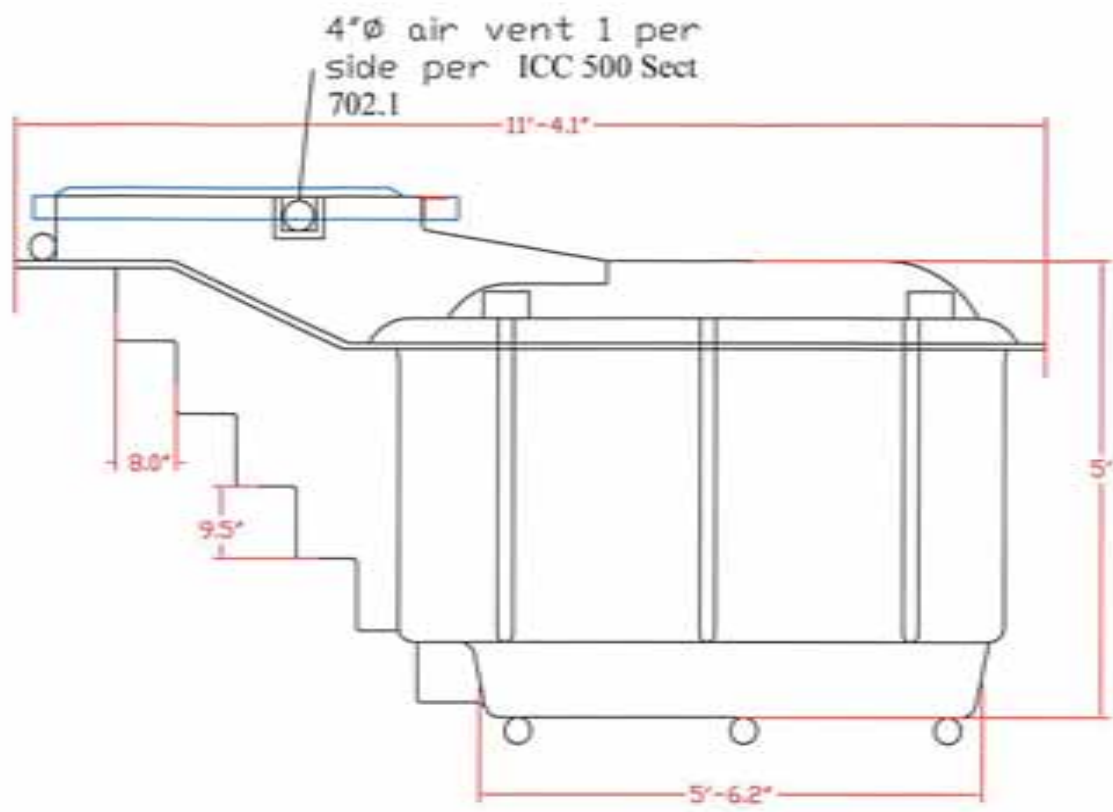


SHELTER WILL ACCOMMODATE 4 ADULTS PER NPCTS.
 SHELTER IS WATERPROOFED AT FACTORY.
 SHELTER MEETS OR EXCEEDS ICC 500 SPECIFICATIONS WHEN
 INSTALLED PER FACTORY INSTRUCTIONS.

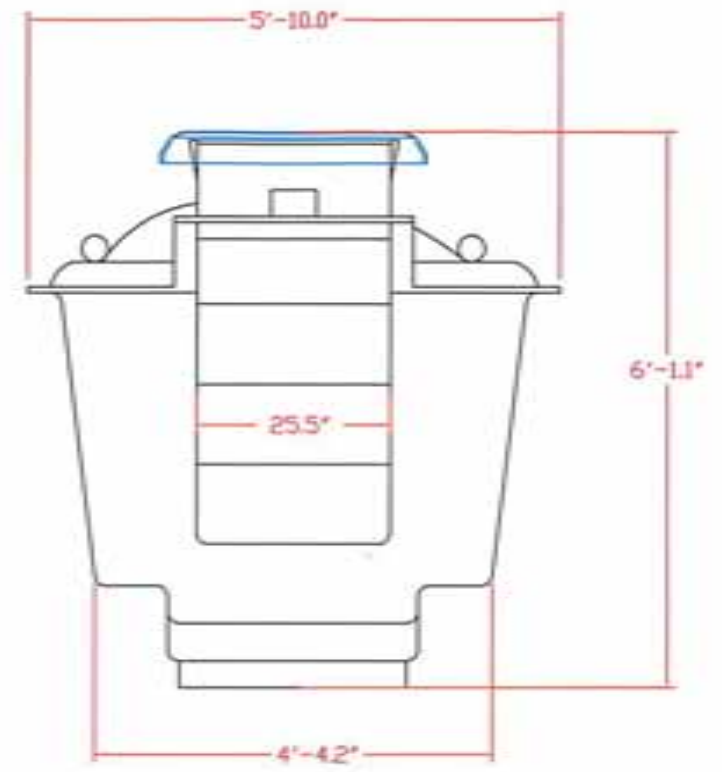
This drawing has been verified to conform to ICC/ANSI 500-2008 provisions for:
 Occupant density, ventilation and access requirements.



REV.	A	DATE	CHANGE OR ADDITION
		PAPER SIZE	SCALE 1-1
		SHEET 1 OF 1	DATE 3/25/06
		MODEL NUMBER LS 4	DRAWN BY HAG
PART NAME LS 4 Storm Shelter			
APPROVED BY			DRAWING NUMBER



Door opening 24" X 45.5" per ICC 500 Sect 502.2



SHELTER WILL ACCOMMODATE 6 ADULTS PER NPCTS.
 SHELTER IS WATERPROOFED AT FACTORY.
 SHELTER MEETS OR EXCEEDS ICC 500 SPECIFICATIONS WHEN
 INSTALLED PER FACTORY INSTRUCTIONS.

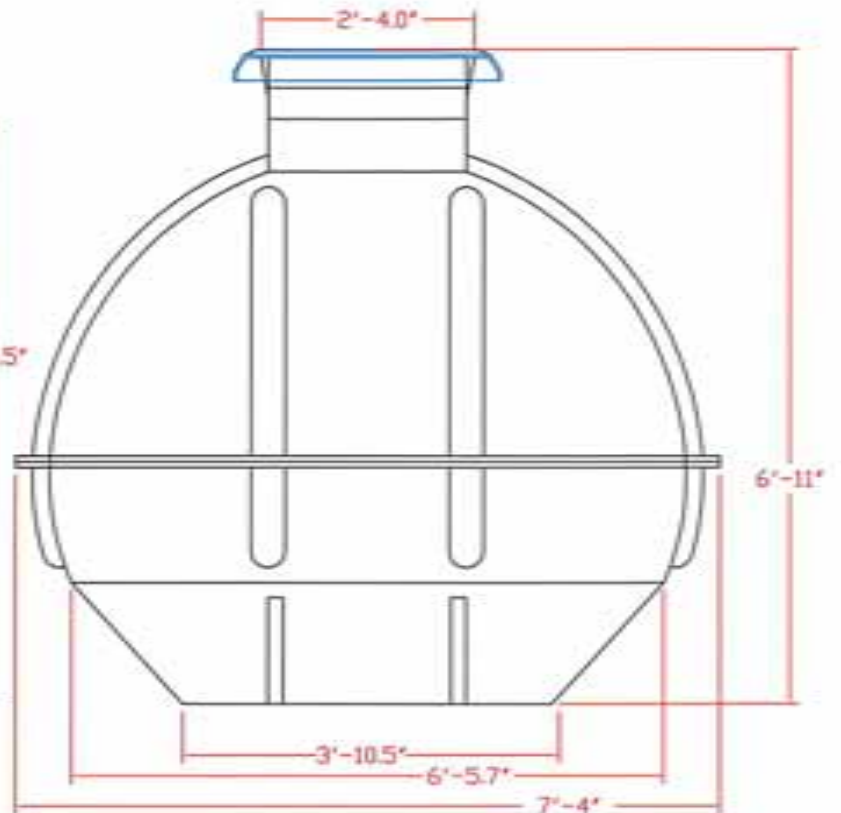
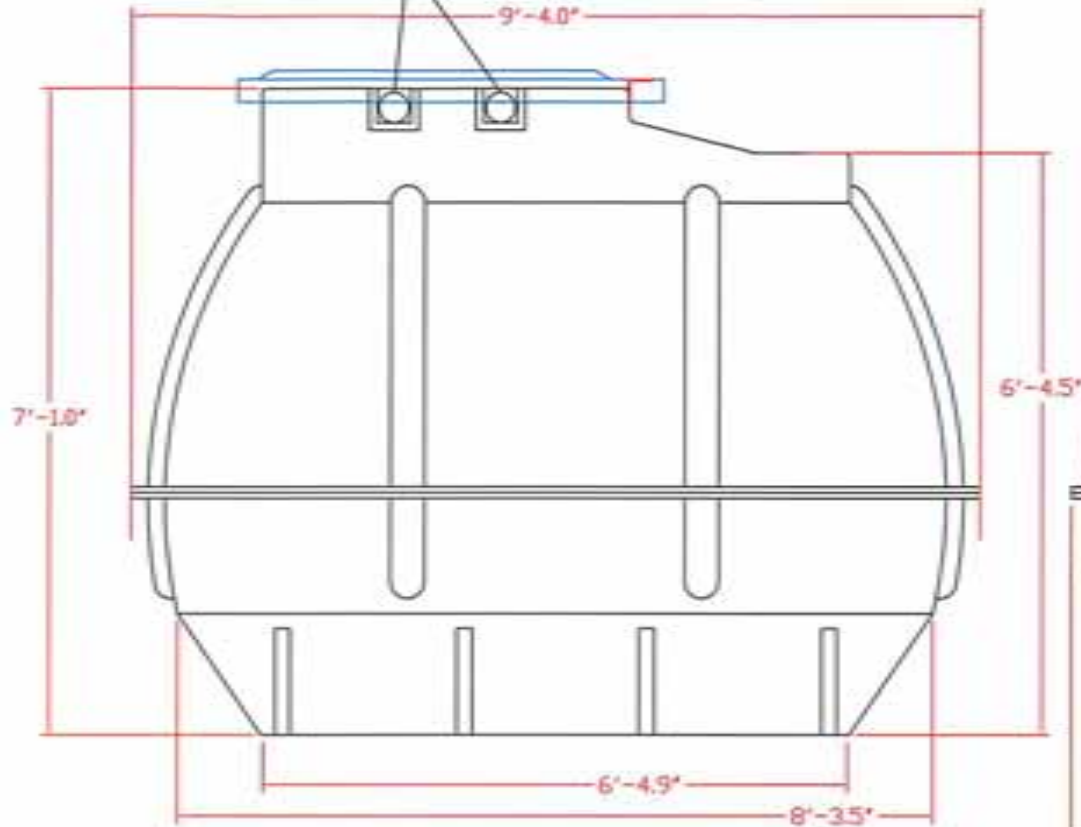
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 Occupant density, ventilation and access requirements.



REV.	A	DATE	CHANGE OR ADDITION
PAPER SIZE		SCALE 1-1	
SHEET 1 OF 1		DATE 3/25/06	
MODEL NUMBER LS 6		DRAWN BY HAG	
PART NAME LS 6 Storm Shelter			
APPROVED BY			DRAWING NUMBER

4"Ø air vent 2 per side per ICC 500 Sect 702.1

Door opening 24" X 45.5" per ICC 500 Sect 502.2



SHELTER WILL ACCOMMODATE 10 ADULTS PER NPCTS.
 SHELTER IS WATERPROOFED AT FACTORY.
 SHELTER MEETS OR EXCEEDS ICC 500 SPECIFICATIONS WHEN
 INSTALLED PER FACTORY INSTRUCTIONS.

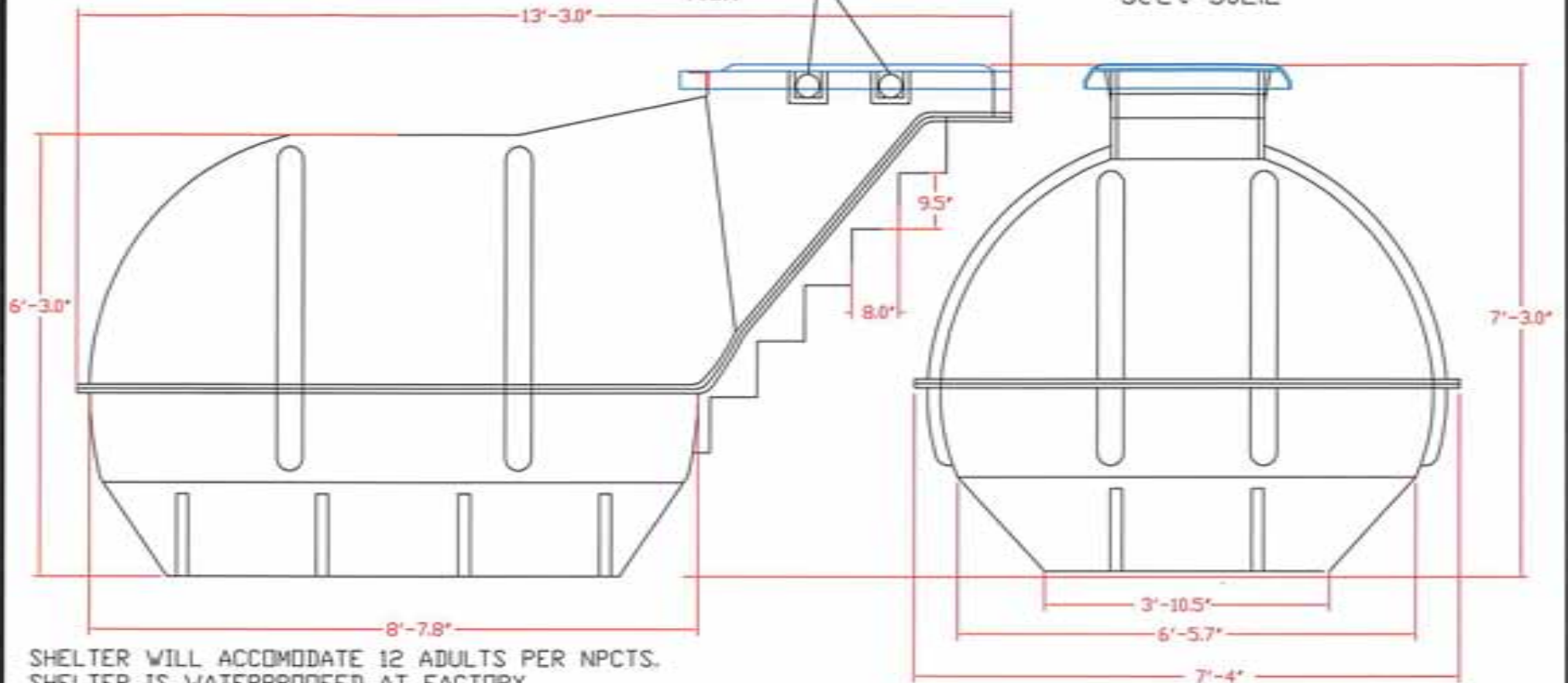
This drawing has been verified to conform to ICC/ANSI 500-2008 provisions for
 Occupant density, ventilation and access requirements.



REV.	A	DATE	CHANGE OR ADDITION	
			PAPER SIZE	SCALE 1-1
			SHEET <u>1</u> OF <u>1</u>	DATE 12/01/2001
			MODEL NUMBER LS 10	DRAWN BY HAG
PART NAME			LS 10 Storm Shelter	
APPROVED BY			DRAWING NUMBER	

4"Ø air vent 2 per side per ICC 500 Sect 702.1

Door opening 24" X 45.5" per ICC 500 Sect 502.2



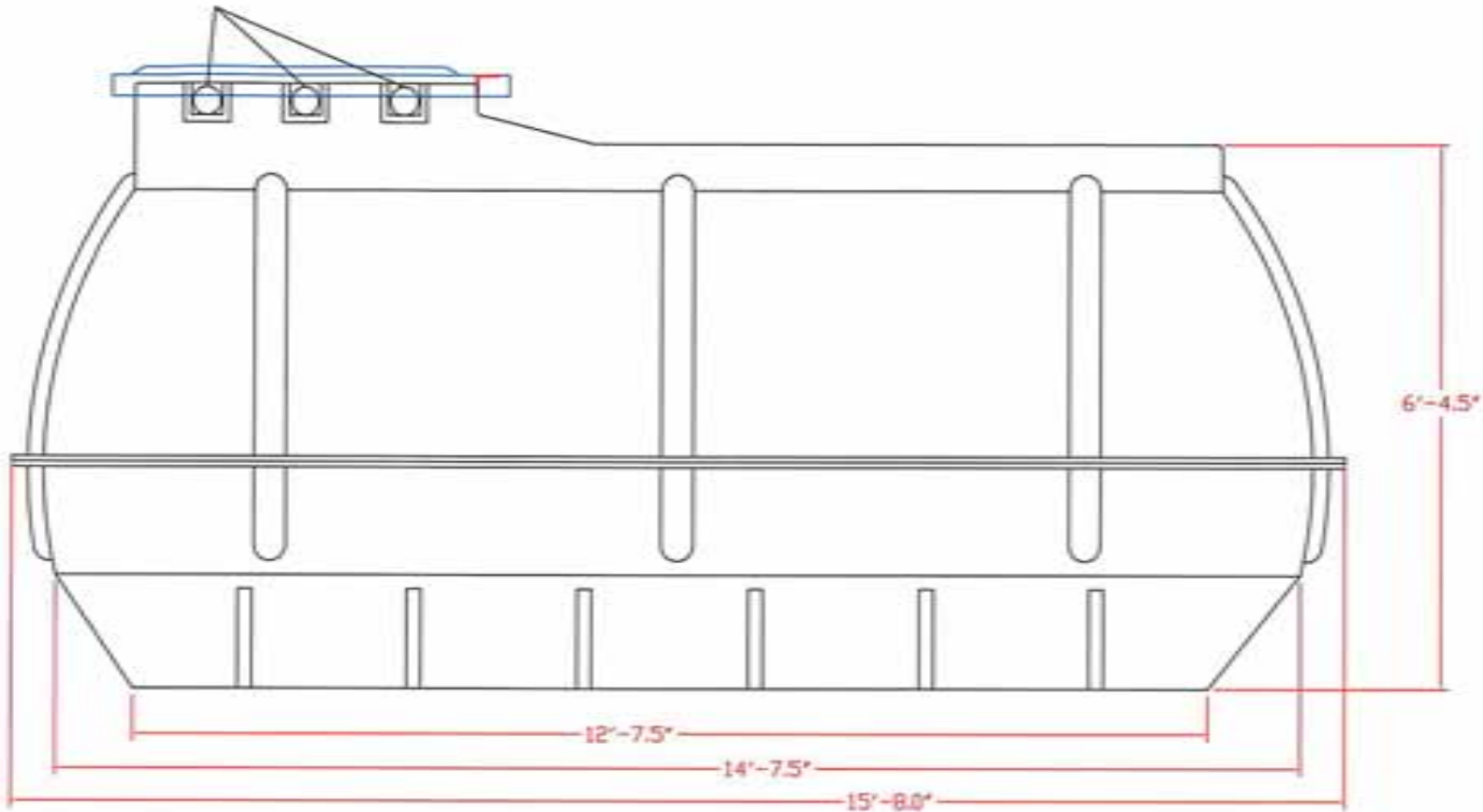
SHELTER WILL ACCOMMODATE 12 ADULTS PER NPCTS.
 SHELTER IS WATERPROOFED AT FACTORY.
 SHELTER MEETS OR EXCEEDS ICC 500 SPECIFICATIONS WHEN
 INSTALLED PER FACTORY INSTRUCTIONS.

This drawing has been verified to conform to ICC/ANSI 500-2008 provisions for:
 Occupant density, ventilation and access requirements.



REV.	A	DATE	CHANGE OR ADDITION
PAPER SIZE		SCALE 1-1	
SHEET _1_ OF _1_		DATE 3-15-07	
MODEL NUMBER LS 12		DRAWN BY HAG	
PART NAME LS 12 Storm Shelter			
APPROVED BY			DRAWING NUMBER

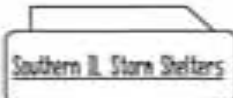
4"Ø air vent 3 per
side per ICC 500 Sect
702.1



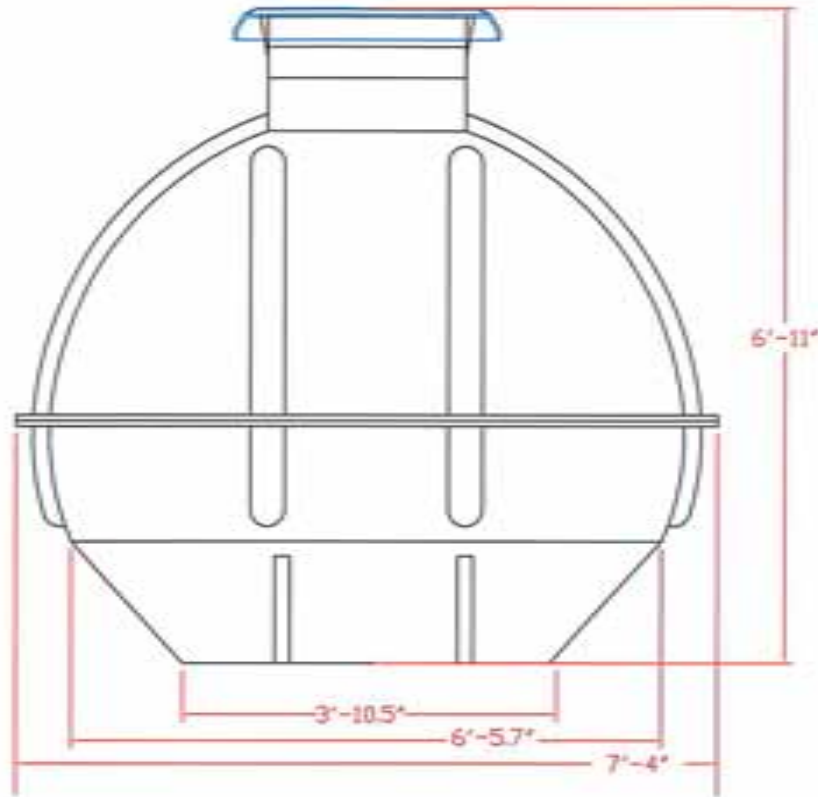
This drawing has been verified to conform to ICC/ANSI 500-2008 provisions for:
Occupant density, ventilation and access requirements.

SHELTER WILL ACCOMMODATE 20 ADULTS PER NPCTS.
SHELTER IS WATERPROOFED AT FACTORY.
SHELTER MEETS OR EXCEEDS ICC 500 SPECIFICATIONS WHEN
INSTALLED PER FACTORY INSTRUCTIONS.



REV.	A	DATE	CHANGE OR ADDITION	
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			SHEET _1_ OF _2	DATE 1/30/04
			MODEL NUMBER LS 20	DRAWN BY HAG
PART NAME LS 20 Storm Shelter				
APPROVED BY				DRAWING NUMBER

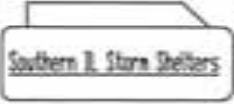
Door opening 24" X
45.5" per ICC 500
Sect 502.2



This drawing has been verified to conform to ICC/ANSI 500-2008 provisions for Occupant density, ventilation and access requirements.



SHELTER WILL ACCOMMODATE 20 ADULTS PER NPCTS.
SHELTER IS WATERPROOFED AT FACTORY.
SHELTER MEETS OR EXCEEDS ICC 500 SPECIFICATIONS WHEN
INSTALLED PER FACTORY INSTRUCTIONS.

REV.	A	DATE	CHANGE OR ADDITION
		PAPER SIZE	SCALE 1-1
		SHEET 2 OF 2	DATE 1/30/04
		MODEL NUMBER LS 20	DRAWN BY HAG
PART NAME LS 20 Storm Shelter			
APPROVED BY			DRAWING NUMBER