



RURAL DEVELOPMENT

Rural Housing Service
Rural Business – Cooperative Service
Rural Utility Service

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Dedicated to Strengthening and Serving Rural America

SUBJECT: **ARCHITECTURAL TECHNICAL GUIDE 0007 (December 19, 2002)**
Required Designs for Permanent Perimeter Enclosures for
Direct Financed and Guaranteed Manufactured Housing

PURPOSE:

The purpose of this technical guide is to provide recommendations for achieving quality permanent perimeter enclosures for manufactured housing financed under the authorities of the Section 502 Rural Housing Program. It discusses several recommended conceptual designs as well as some proprietary building systems specifically manufactured for this purpose. It also establishes a policy of requiring review by the State Architect in those cases where an alternative fundamental design solution, other than one of the above, is proposed.

IMPLEMENTATION RESPONSIBILITIES:

FmHA Instruction 1924-A, Exhibit J, requires that all manufactured homes financed by the Section 502 Rural Housing Program be constructed with a “permanent perimeter enclosure”. Three standard design concepts (poured-in-place concrete, concrete masonry unit, and pressure-treated wood) for such an enclosure system are provided as Exhibit A. A close variation of one of these three systems should normally be employed by the dealer/contractor. In the event a substantially different design concept (i.e. use of a proprietary product or construction with a different basic material, such as aluminum or plastic) is proposed, pertinent information about the different concept should be forwarded directly to the State Architect for evaluation and concurrence. Two such systems have already been reviewed and accepted by the State Architect, with conditions: (1) “Base Panel for Premanufactured Housing” by StoneWall Products and (2) “InsulCrete” by Modular Products, Inc. and further information in their regard is included in Exhibits B and C. Others may be equally suitable. No one system is recommended over another.

The ultimate intent of all these designs is to provide relatively strong and durable (“permanent”) perimeter enclosures which would adequately resist wind, soil heave, and frost heave forces and offer a grading scenario and appearance relatively similar to that of conventional “stick-built” construction removing the need for complex entry deck/stair systems. Additionally, these designs should result in fully functional crawlspaces built to the standards of the *Uniform Building Code* with inherently improved thermal characteristics.

The actual construction of all such perimeter enclosures, though they would fundamentally serve as only nonloadbearing structures, should conform to the Rural Development “development standards” (reference FmHA Instruction 1924-A, subparagraph 1924.4 (h)) and, therefore, be designed and certified in accordance with the Colorado supplement to FmHA Instruction 1924-A entitled, “*Professional Foundation Design and Certification: Requirements for Single Family Housing New Construction and Additions*”, just as the actual bearing foundation systems should. This, thus, requires, the dealer/contractor to build the entire structure below the factory-built units in accordance with the Uniform Building Code. Again, two foundation system aspects (the loadbearing foundation system and the perimeter enclosure system) would need to bear the

evidence (i.e. seal) of design by a Colorado registered Architect or Engineer though an Agency-preapproved manufactured proprietary enclosure system (see Exhibits B and C) would not.

We hope the above requirements will result in improved manufactured homebuyer pride of ownership. Any questions regarding these provisions should be directed to the State Architect.

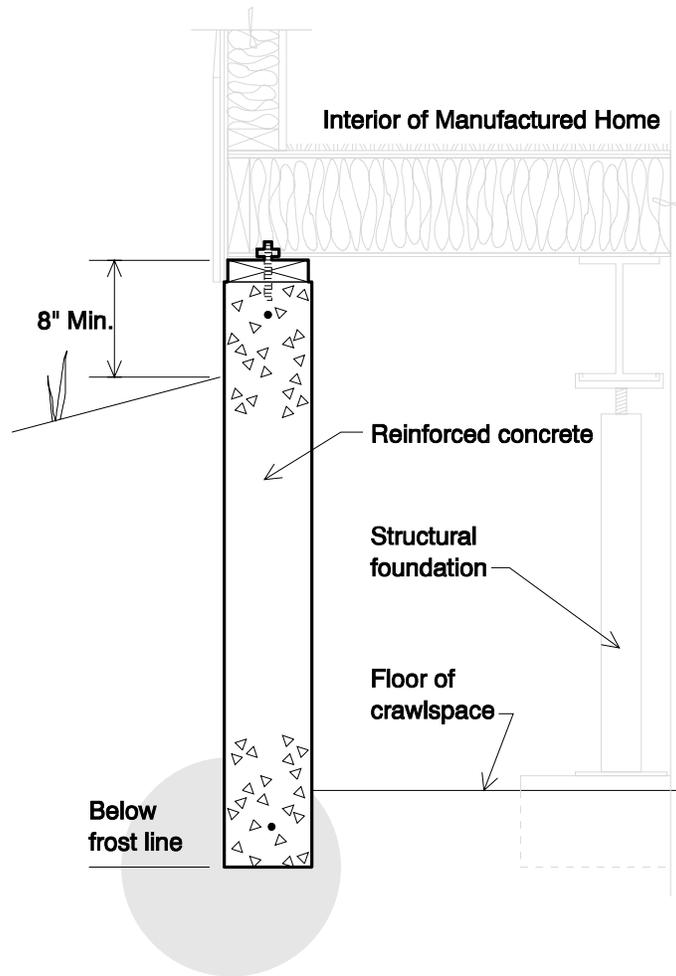
DAVID W. RIGIROZZI
State Architect
USDA/Rural Development

Attachments:	Exhibit A:	“Permanent Perimeter Enclosure: Three Recommended Designs”
	Exhibit B:	Alternative System: “Base Panel for Premanufactured Housing” by StoneWall Products
	Exhibit C:	Alternative System: “InsulCrete” by Modular Products, Inc.

Exhibit A

**PERMANENT PERIMETER ENCLOSURE
Three Recommended Designs**

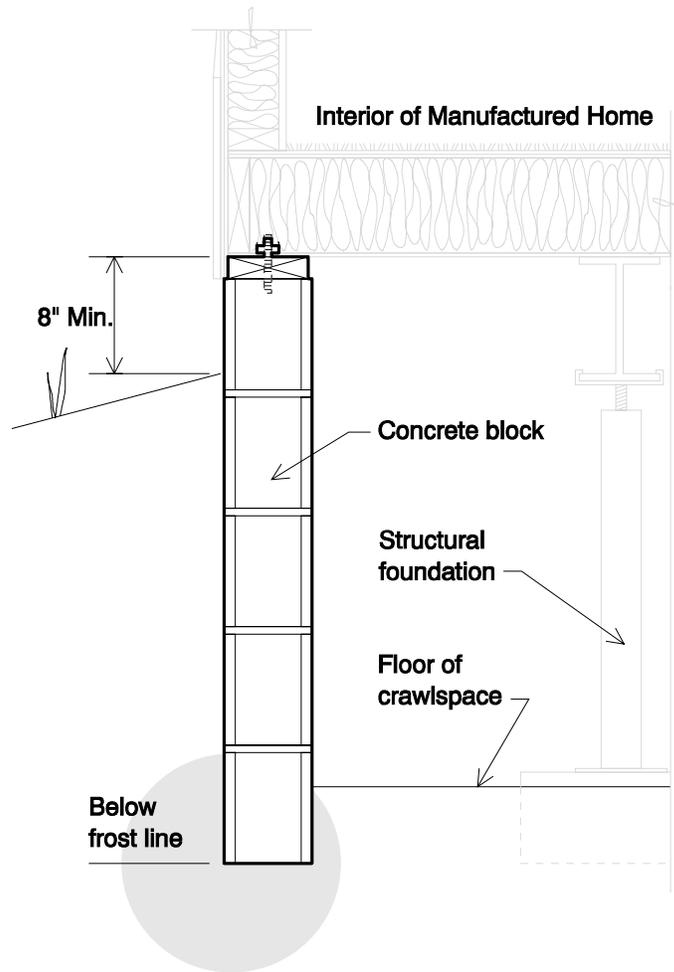
(to be used in conjunction with manufactured housing proposals)



POURED CONCRETE PERIMETER WALL
CARRIED BELOW FROST DEPTH
(Not to Scale)

GENERAL NOTES:

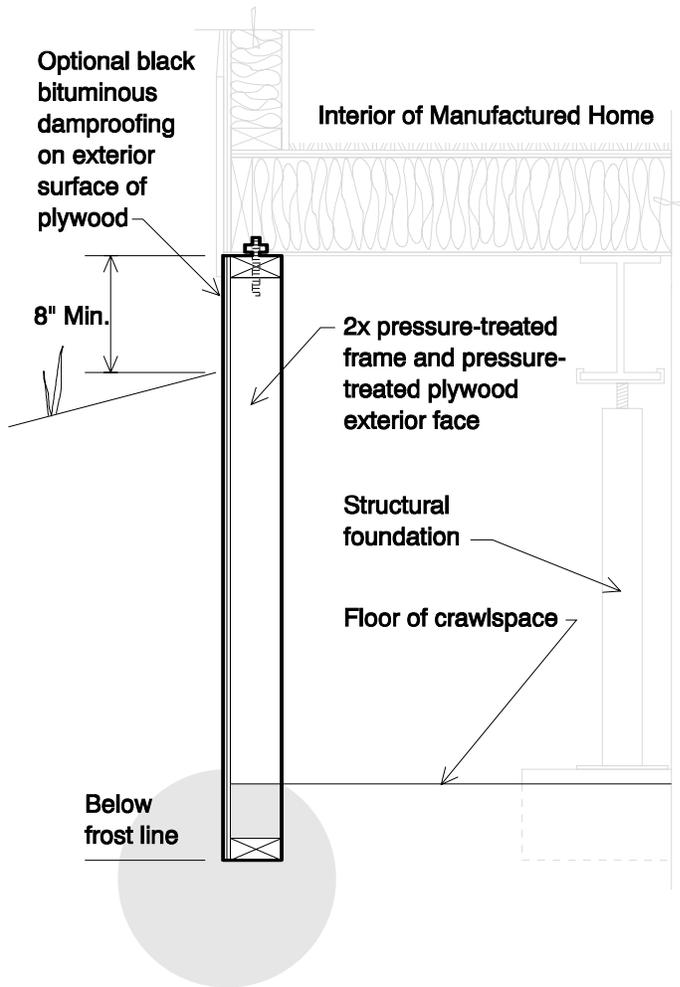
1. Provide an architect or engineer designed perimeter subdrainage system if determined necessary by the architect or engineer for actual site conditions.
2. Provide a design certified by an architect or engineer meeting the criteria of the Edition of the Uniform Building Code currently adopted by the USDA/Rural Development, Colorado State Office, as the "Development Standard" for the Section 502 Rural Housing Program.



CONCRETE MASONRY UNIT PERIMETER WALL
CARRIED BELOW FROST DEPTH
(Not to Scale)

GENERAL NOTES:

1. Provide an architect or engineer designed perimeter subdrainage system if determined necessary by the architect or engineer for actual site conditions.
2. Provide a design certified by an architect or engineer meeting the criteria of the Edition of the Uniform Building Code currently adopted by the USDA/Rural Development, Colorado State Office, as the "Development Standard" for the Section 502 Rural Housing Program.



PRESSURE-TREATED WOOD PERIMETER WALL
CARRIED BELOW FROST DEPTH
(Not to Scale)

GENERAL NOTES:

1. Provide an architect or engineer designed perimeter subdrainage system if determined necessary by the architect or engineer for actual site conditions.
2. Provide a design certified by an architect or engineer meeting the criteria of the Edition of the Uniform Building Code currently adopted by the USDA/Rural Development, Colorado State Office, as the "Development Standard" for the Section 502 Rural Housing Program.

Exhibit B

BASE PANEL FOR PREMANUFACTURED HOUSING

**StoneWall Products
943 D Road
Grand Junction, Colorado 81501**

This foundation skirting system utilizes a primered 18 gauge structural steel frame over which sheet metal is applied over which a layer of washed aggregate is applied using a urethane sealant. It is manufactured in custom sized panels and can be backfilled against. Installation requires no special rollover systems or cranes. Apparently minimal construction seams show in the end product and a moderate degree of ventilation is accounted for via small holes predrilled continuously into the top of the system. It is fairly strong in vertical loading, capable of withstanding vertical forces up to 1,000 pounds per linear foot independent of the support of the main building. Its weakness may be its susceptibility to corrosion potential being a ferrous metal system in contact with or near proximity to soils and to damp conditions in some instances.

This system is presently considered acceptable for installations with respect to USDA/Rural Development financed manufactured housing in the State of Colorado on condition the following criteria are satisfied in the final installations:

1. The system should not be substantially backfilled against in cases where it is not installed on and connected to a footing system. Backfilling should be performed strictly in accordance with manufacturer requirements and locally enforced codes and standards.
2. Ventilation of the crawlspace should be upgraded to at least the minimum criteria of the 1991 or newer edition of the *Uniform Building Code*. Installing a vapor barrier on the floor of the crawlspace is strongly recommended to reduce moisture entrance into the crawlspace.
3. The system should not be installed in any situation where elevated moisture levels (i.e. due to a local drainage scenario or an elevated water table) could be anticipated to occur.
4. The system should either be (1) installed on a foundation system carried below frost depth in accordance with the *Uniform Building Code* or (2) installed with provisions for vertical movement of at least 2-1/2" due to soil pressures from ground frost and expansive soils.

Exhibit C

“INSULCRETE” CONCRETE SKIRTING SYSTEM

**Modular Products, Inc.
4485 Delaware Avenue
Des Moines, Iowa 50313**

This concrete foundation skirting system consists of a factory-manufactured lightweight concrete panels which are installed into a top channel for upper securing and onto set blocks and grade for lower securing. “InsulCrete” panels come in two heights, 26 inches (standard) and 30 inches (optional). All panels are 48 inches wide and may be cut to size on-site. A very worthwhile system feature is provision for up to 2-1/2” of hidden vertical travel in the top channel guide. The system may be backfilled to a maximum of 18 inches vertically. The system’s strengths are probably decent final appearance because it utilizes concrete to resemble a concrete foundation wall and durability because it does not employ materials which could easily corrode.

This system is presently considered acceptable for installations with respect to USDA/Rural Development financed manufactured housing in the State of Colorado on condition the following criteria are satisfied in the final installations:

1. The system should not be substantially backfilled against since it was designed with a limitation. Backfilling should be performed strictly in accordance with manufacturer requirements and locally enforced codes and standards.
2. Ventilation of the crawlspace should provided to at least the minimum criteria of the 1991 or newer edition of the *Uniform Building Code*. Installing a vapor barrier on the floor of the crawlspace is strongly recommended to reduce moisture entrance into the crawlspace.
3. The system should either be (1) installed on a foundation system carried below frost depth in accordance with the *Uniform Building Code* or (2) installed with provisions for vertical movement of at least 2-1/2” due to soil pressures from ground frost and expansive soils.