Alternative Construction Research Guide

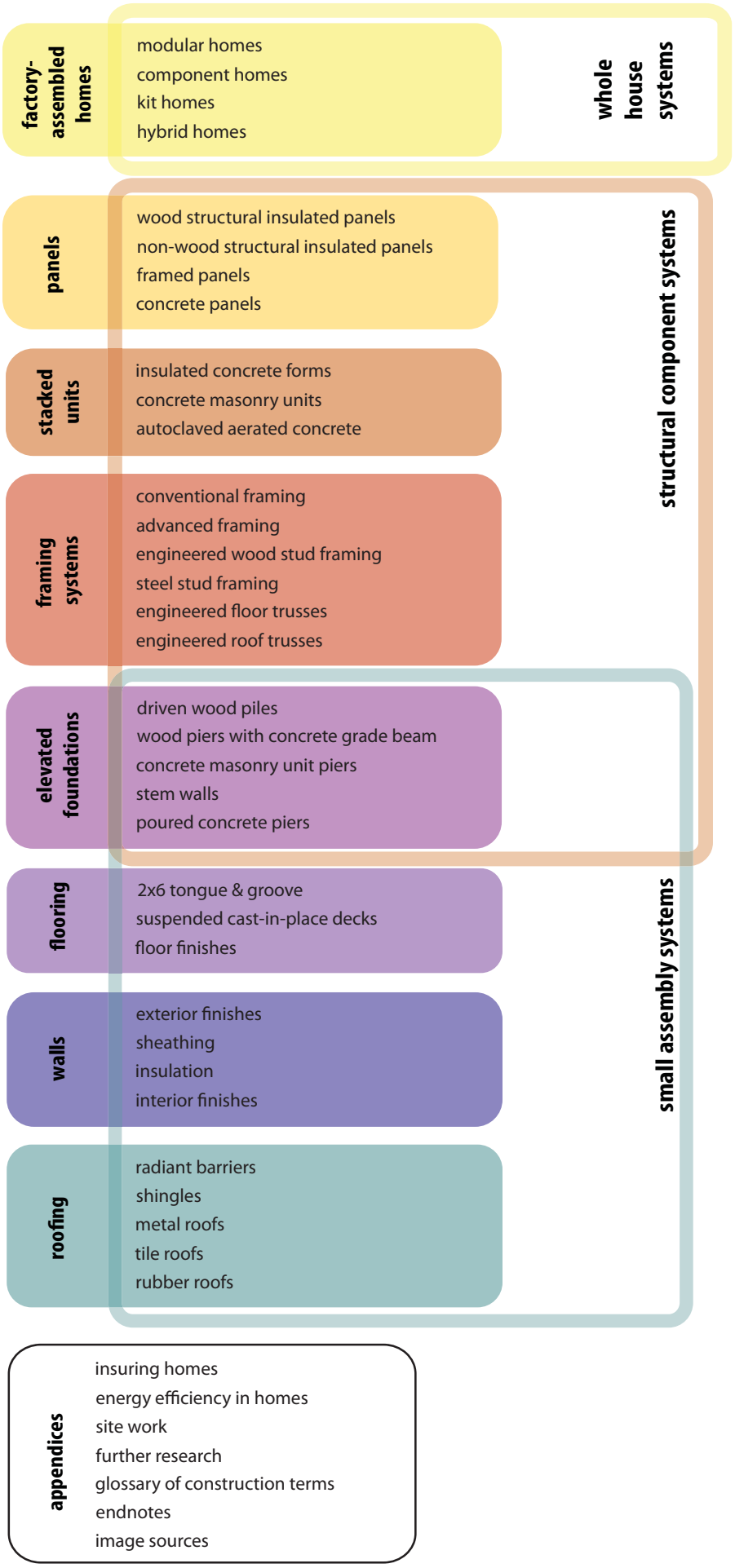
Methods for Building Communities
Gulf Coast Community Design Studio










factory-assembled homes
modular homes
component homes
kit homes
hybrid homes
whole house systems
panels
wood structural insulated panels
non-wood structural insulated panels
framed panels
concrete panels
stacked units
insulated concrete forms
concrete masonry units
autoclaved aerated concrete
framing systems
conventional framing
advanced framing
engineered wood stud framing
steel stud framing
engineered floor trusses
engineered roof trusses
structural component systems
elevated foundations
driven wood piles
wood piers with concrete grade beam
concrete masonry unit piers
stem walls
poured concrete piers
flooring
2x6 tongue & groove
suspended cast-in-place decks
floor finishes
walls
exterior finishes
sheathing
insulation
interior finishes
roofing
radiant barriers
shingles
metal roofs
tile roofs
rubber roofs
small assembly systems
appendices
insuring homes
energy efficiency in homes
site work
further research
glossary of construction terms
endnotes
image sources

The Gulf Coast Community Design Studio hopes that this report will enhance the reader's awareness of alternative construction methods for residential systems. It must be emphasized that no specific product, material, technology, building system, or business practice included in this report is being endorsed by Mississippi State University, the College of Architecture, Art, and Design, or the Gulf Coast Community Design Studio. All research is provided in good faith, but accuracy is not guaranteed.

Before starting any construction it is important to consult with licensed architects, engineers, and contractors.

This project was partially funded by a grant from the U.S. Small Business Administration.

GCCDS

Gulf Coast Community Design Studio

Mississippi State University College of Architecture Art + Design

Chapter Index

Introduction to the Alternative Construction Research Guide

PREFACE

Along the Gulf Coast, reduced volunteer labor, concern for structural stability, and increased awareness of environmental responsibility have caused many community builders to question their residential construction methods.

The Gulf Coast Community Design Studio (GCCDS), a research arm of Mississippi State University's College of Architecture, Art, and Design, is developing a series of tools to help those meeting housing needs in their communities. Our research will introduce housing providers to some alternative construction systems. Exposure to these systems will broaden the palette of construction choices housing providers use to build homes and communities.

This publication is a tool to help housing providers understand alternative construction systems. This continuing research is intended to inform community builders and housing providers of the variety of building choices available in the residential construction market place.

The GCCDS focused research on construction systems that have unusual performance capabilities and/or unique assemblies. We have tried to limit the discussion to building systems that seem reasonable for use regionally along the Gulf Coast, taking into consideration the availability, cost, performance, and suitability of a system. This is not meant to include all of the innovative construction systems that are available, and is merely an introductory guide to the alternative systems.

Our research is divided into categories based on the strategy of construction used, such as whole house systems, large structural component systems, or small assembly systems. Each strategy of construction is divided into smaller components that highlight a method or element of construction, such as panels, framing, floors, or roofs. These components are the basis for our chapters and the focus of our research. We have created an organizational system that can expand and accept new information as research or innovations make new construction products and methods available.

Each category is summarized, including common practices and some alternatives we find promising. A matrix on the back of each divider represents the advantages and disadvantages we see in sub-categories of the subject. We encourage housing providers to take this research guide as a starting point and add their own information and preferred products into the appropriate categories.

As availability and cost affect systems, or as new products become available, a document such as this could adjust and expand to include different content.

The GCCDS will be publishing both web and hard copy versions of this report and our continuing research on the web. For more information, please visit our web site at http://www.gccds.org/

RESEARCH CATEGORIES AND QUESTIONS:

Overview: Research in this guide does not directly rate one product or system against another. Many of the systems are too complex and the advantages and disadvantages too nuanced for a quantitative rating system. Instead, we have tried to ensure that we ask the same questions of each product or system. Across such a wide spectrum of material the same question has yielded many different answers. We have tried to cover important issues so that a reader can grasp the general strengths and weaknesses of each system. We also note when a system has met a certain bench mark, such as Energy Star or Wind-Resistant construction. We anticipate this will spur additional questions and research on the part of the user.

A list of categories and the questions asked:

INSTALLATION

Construction Process

How many people are needed? Are there a lot of steps? What is the general order of procedures? Are there a lot of details and measurements? What might be unusual about the way this product or system is put together?

Speed of Construction

How long does it take to complete this process? Does it take time to cure? How long does each step take? How does it compare to similar systems?

Delivery Method

How do the materials get to the site? What vehicles are used? Is it delivered from a warehouse or directly from a factory? Is it ready for installation or does it require on-site work after delivery?

Required Equipment

What specialized equipment is needed beyond typical construction tools? Are special cranes, machines, vehicles, or tools needed to lift, place, or secure the products or systems?

Specialized Labor

Are any specialized contractors or installers needed? Do the builders need to have any extra skills or training? Does it require other contractors to have a working knowledge of how their system works with it?

PERFORMANCE

Wind Load

What level of wind speeds can the material handle without damage? Does it qualify for insurance reductions? Is it more costly to insure than similar products?

Water Resistance

How well does the material handle exposure to water? Does it become damaged or stop working if it gets wet? Is it particularly susceptible to mold growth?

Fire Resistance

What is the fire rating for this system? Is it particularly resistant to fire? Is the smoke toxic when the material is burned?

Energy / Thermal

How well does this insulate a home? Does it act as a thermal bridge? Does it seal the house tightly? Does it help reduce the amount of energy needed to cool or heat the home?

Life Span

How long does this product last? Will it need to be replaced? How long does it keep working, and what happens to it after it is taken out of a home?

Common Failure

What are the likely problems one might have with this product? Where is it likely to fail? Under what conditions is it likely to fail? What are the warning signs? What happens when it stops working?

DESIGN

Environmental Impact

How does this product affect the environment in positive or negative ways? How can it be used to be least taxing on the environment? Does it create health concerns for the home owner?

Versatility/ Flexibility

What are the different ways one can use this product? Does it work well in connection with other products? Can it be used inside and outside? Can it be modified on site as the project changes?

Market Exposure

How available is the product? Is it available through suppliers, subcontractors, light manufacturers, or through special order? How easy is it to find people who can install this product? In what quantities does one have to order these products?

Code Approval

Which building code governs this product? During what inspections are systems checked? Is a special inspection required? Is there a particular professional needed to stamp or approve the use of this product?

Affordability

How much does the product cost to buy? How much does it cost to install? How much does it cost to maintain? How does it compare to other forms of construction? Does it provide lifetime savings to the homeowner?

Coastal Considerations

What about the climate might affect the performance of this building system? Can it handle the extremes of the climate? What about the local construction industry might affect the usability of this product? Is there a particular like or dislike of the product along the Gulf Coast?

GULF COAST AVAILABILITY / LOCAL MANUFACTURES

When choosing a manufacture/installer/contractor it is extremely important to research and get references. Do your due diligence. Check with your state and local licensing boards, ask for bonding and insurance. Always get more then quotes from more then one contractor.