

PART I

REPORT on EXISTING FEDERAL PROTOCOLS for the PROVISION OF EMERGENCY HOUSING and POST-KATRINA IMPLEMENTATION OBSERVATIONS

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Introduction

The purpose of this report is to present a distillation of the current national protocol for the provision of housing assistance after a disaster, and to document on-site observations regarding the implementation of those protocols specific to the Hurricane Katrina aftermath in Louisiana and Mississippi. This report is part of an ongoing effort by Steven Winter Associates, Inc. that will ultimately consider, evaluate, and recommend technological and performance-based improvements to each of the housing models that FEMA procures for emergency and temporary use, and will address opportunities for improved site planning to both facilitate the process of maintaining the units, and promote a safe and decent quality of life for displaced households throughout their tenure in FEMA housing.

Methodology

The information presented in parts one and two of this report is based on a thorough evaluation of the regulations, planning guides, and standard operating procedures documents that are the framework for national disaster response. This information is generally publicly available, though in some cases it is unclear the order of precedence or priority of the many planning guides. A full list of material reviewed is available in Appendix B.

On September 18 – 21, 2006, researchers from Steven Winter Associates, Inc. conducted interviews with FEMA contractor teams working in Louisiana and Mississippi. Part of these interviews included visits to FEMA disaster housing sites constructed in response to housing needs since Hurricane Katrina. The observations outlined in part three of this report were collected during this trip.

1. Key Concepts in Disaster Response

1.1. Federal Regulations

There are several regulatory documents that define the mission and scope of the government agencies responding to disasters. These documents, updated on a continual basis to reflect lessons learned and up-to-date interagency coordination, are critical to the understanding of disaster housing.

1.1.1. The Stafford Act

The Robert T. Stafford Act, Public Law 93-288, enables the Federal Government to assist state and local governments to systematically and effectively alleviate suffering and damage caused by major disasters. The Act gives the **Federal Emergency Management Agency (FEMA)** the primary responsibility for coordinating the efforts of multiple government and non-governmental agencies (such as the American Red Cross) and sets up a framework for providing direct and financial assistance.

In Section 102, a major disaster is defined as:

any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

Section 408 defines the nature and extent of financial and direct assistance that can be provided to individuals and households. Under this provision, eligibility for housing assistance is defined as:

individuals and households who are displaced from their pre-disaster primary residences or whose pre-disaster primary residences are rendered uninhabitable as a result of damage caused by a major disaster.

Going forward in this report, individuals and households who meet this criterion and who have applied to FEMA for housing assistance will be referred to as *displaced households*, and can represent one or more people depending on the pre-disaster household structure. Housing assistance can be provided to displaced households in the form of direct or financial assistance for:

- *Temporary housing*¹: assistance in securing alternate housing from the existing rental housing stock, manufactured housing, recreational vehicles, or other readily fabricated dwellings.
- *Housing repairs*: assistance in the repair of residential structures, utilities, residential infrastructure
- *Housing replacement*: financial assistance for replacement of owner-occupied dwellings
- *Permanent housing construction*: financial assistance for the construction of new housing if no temporary housing is available.

Note: As the focus of this report is on direct assistance for temporary housing, the three other types of housing assistance will not be discussed going forward.

1.1.2. 44 CFR Part 206

Chapter 1 of Title 44, Emergency Management and Assistance, dictates the operation of the FEMA. Part 206, Federal Disaster Assistance for Disaster Declared on or after November 23, 1988, includes the policies and procedures of FEMA, supporting agencies and state/local governments in implementing the Stafford Act. After an emergency disaster declaration is made by the President, all state/local governments must operate under the coordination of FEMA. Within Part 206, subparts 206.117 and 206.118 address the provision of financial or direct assistance for disaster-related housing needs of individuals and households. Within Part 206, the FEMA Regional Director is given authority to plan and construct disaster housing, and to authorize assistance to families in need. States and local governments provide support in the execution of housing assistance, particularly through the identification of viable housing sites.

1.1.3. National Response Plan²

The National Response Plan (NRP), authored by the Department of Homeland Security (DHS) represents a step in unifying incident management. The Plan requires the federal government to integrate domestic prevention, preparedness, response, and recovery activities into a single all-discipline, all-hazards plan. According to the DHS:

The plan incorporates best practices and procedures from incident management disciplines—homeland security, emergency management, law enforcement, firefighting, public works, public health, responder and recovery worker health and safety, emergency medical services, and the private sector—and integrates them into a unified structure. It forms the basis of how the federal government coordinates with state, local, and tribal governments and the private sector during incidents. (source: www.dhs.gov)

¹ While the Stafford Act specifically uses the term ‘temporary housing’, other federal and supporting documents use the term in different capacities (outlined below). For the purposes of this report, the general designation of housing provided by the federal government to victims of disasters will be called ‘disaster housing’.

² Designation has since been changed to *National Response Framework*

Within the NRP, disaster housing falls under the umbrella of the *Mass Care, Housing and Human Services* Emergency Support Function (ESF #6), and is coordinated at the highest level by DHS and FEMA. Agencies that provide supporting functions related to housing include:

- **Department of Defense/US Army Corps of Engineers (USACE)**
Provides temporary housing support, such as temporary structures and expedited repair of damaged homes (to include temporary roofing or other repairs that facilitate reoccupation of minimally damaged structures), as necessary.
- **Department of Housing and Urban Development (HUD)**
Provides information on available habitable housing units, owned or in HUD possession, within or adjacent to the incident area for use as emergency shelters and temporary housing.
- **Department of Veteran’s Affairs (VA)**
Develops and maintains plans to make available housing assets that are habitable to which VA has title and possession, for use by victims.

The USACE has been involved in carrying out on the ground tasks for FEMA and has an extensive library of planning and standard operating procedure (SOP) documents. Much of this report going forward is based on the documents.

1.2. Lifecycle of Direct Disaster Housing Assistance

Under the Stafford Act, direct temporary housing assistance has the following expiration clause:

Period of assistance: The President may not provide direct assistance with respect to a major disaster after the end of the 18-month period beginning on the date of the declaration of the major disaster by the President, except that the President may extend that period if the President determines that due to extraordinary circumstances an extension would be in the public interest.

Thus, it can be inferred that any housing provided by FEMA need only be effective for eighteen months, and is thus non-permanent in nature. This classification, set up by the Stafford Act, is critical to the understanding of the types of housing that FEMA provides, and will be discussed later in this report.

Within the eighteen month assistance period there are several variations of housing assistance provided by FEMA. These variations are defined according to the intended period of assistance for the displaced households, and the basic services provided. They are defined below.

Table 1. Variations of Direct Disaster Housing Assistance

| <i>Name</i> | <i>Period of Assistance</i> | <i>Function</i> |
|---|---|---|
| Emergency Shelters Also known as <i>spontaneous shelters</i> | First 72 hours during and immediately post-disaster Note: As the focus of this report is on housing strategies, sheltering will not be discussed in this report going forward. | To provide an interim safe haven for the community while the situation stabilizes. Schools, places of worship, and non-essential government buildings are typical settings. |
| Emergency Housing Also known as <i>expedient housing, mass shelters or temporary shelters</i> | First 60 – 90 days (short term) | To provide housing and feeding to displaced households. A short-term solution while longer term temporary housing is acquired. Tents and travel trailer group sites, re-purposed military or government warehouse facilities, as-built dwelling units (hotels, school dormitories, cruise ships, etc) are typical options. |

| | | |
|---|---|---|
| <p>Temporary Housing</p> <p>Also known as <i>interim housing</i></p> | <p>Up to 18 months and beyond (long term)</p> | <p>To provide temporary housing, safe and secure shelter, water, power, and heating/cooling to displaced households while efforts are underway to make permanent repairs to dwellings or to find other suitable permanent housing.</p> <p>HUD-code manufactured housing, hotels, housing authority units, privately held units are typical options.</p> |
|---|---|---|

This categorization assumes that the displaced population needs the most assistance (shelter, food, medical services) immediately following a disaster and that over time the population will seek out these services on their own as normalcy is restored. It is important to note that even as long as the first 60-90 days, the population might not be able to feed itself and thus FEMA will provide food services (and the housing units will not need to support cooking or food storage in these conditions).

1.3. Types of Sites

A factor that directly impacts the success of FEMA’s disaster housing mission is the caliber of sites on which the emergency housing units are placed. FEMA sites are designed to be logical groupings of housing units that facilitate quick installation and de-activation, and cost-effective maintenance. There are three types of disaster housing sites supported by FEMA which are used in both emergency (short-term) and temporary (long term) housing situations. Definitions for each vary based on land available for the placement of housing units. The types of sites are:

- *Commercial Site*
Land previously used as or still is a mobile home park, rented by FEMA from private owner. Utilities are pre-existing.
- *Group Site*
Land that is leased/acquired by FEMA. Typically federal or state land, preferably parkland, but can also be leased from private landowners. Site should accommodate two or more units. Utilities are installed after land acquisition.
- *Private Site*
Housing unit placed on private land that is owned or acquired by displaced household. Site can accommodate more than one unit as space allows. Utilities are pre-existing.

1.4. Types of Housing Units

Housing Units and their availability, size, amenities, quality, maintenance and durability directly impacts the quality of FEMA’s temporary housing mission. FEMA units are designed to provide residents temporary housing that is livable, comfortable (within parameters), and safe. Units are also provided to meet requirements of the United Federal Accessibility Standards (UFAS) and American’s With Disability Act (ADA) for residents with special needs. They also are built for quick initial installation and deactivation, and initial cost and maintenance effectiveness. FEMA has developed series of standards for the procurement, delivery, installation, inspection, maintenance, repair and deactivation of various housing units.

There are different types and manufacturers of temporary housing currently used by FEMA.³ They are generally categorized as:

- *Travel Trailer*

Factory-built units were initially designed for recreational use. Some are custom made to FEMA specifications and others are purchased from existing inventories. Units vary in size, materials, configuration and features. Travel trailer sizes range from 8' wide x 28' to 32' long. Some trailers are equipped with slide out expansion sections that will increase the usable space.⁴ Trailers are made to sleep two adults in a bedroom and up to four children in other areas (although this may vary with trailer model). They are furnished and have a kitchen, bathroom, heating and roof-mounted air conditioning. Some units are provided for special needs occupants. Typical fuel source for heat is propane except for the all-electric special needs units.



- *Manufactured/Mobile Home*

Factory-built homes that meet Manufactured Home Construction and Safety Standards (HUD Code) are made in various configurations including models for special needs. Typically, FEMA provides single wide units with at least 3 bedrooms. Manufactured homes vary in size from 12' or 14' wide x 60' long. Units are more house-like and have larger bathrooms and kitchens than travel trailers. Typically air conditioning units have a ground-mounted outdoor compressor section.



- *Park Model*

The Park Model or Recreational Park Model, governed by ANSI 119.5, is a factory built house that is smaller than 400 square feet. Units over 400 square feet trigger HUD-code requirements. Many manufacturers and models are found including models for special needs. Park models range in size from one bedroom 12' x 35' with and without UFAS compliant units to 11' x 34' ADA compliant 2 bedroom units.



³ For more information on a typical housing units used by FEMA, refer to Appendix D.

⁴ Slide out units are typically 18 to 32 inches and are usually installed on trailer sides; however, some models do expand to the front and rear. Slide outs can create layout problems, including code separation requirements; therefore, it is recommended that units with slide-outs be placed on individual lots instead of an emergency group sites unless no other alternative exists, and alternate planning cannot be accommodated.

Each of these three housing types can exist in any of the aforementioned site types. However, travel trailers, being quickest and easiest to install, and also being smaller and more rudimentary in residential features, are preferred for emergency housing conditions. HUD Code and Park Model units, which are larger and require more skill and equipment for installation, are typically used for temporary housing.

Two housing types, panelized units and modular units, were not specifically addressed in planning documents but seem to be possible solutions to the deficiencies in the disaster housing process that were reported in the media after Hurricanes Katrina and Rita.

- *Modular*

A modular house is a long-term housing solutions and built of one or more factory-built modules to comply with local building codes. Contrasted to Manufactured Homes, modular units do not have their own integral frame for transport and require a trailer for delivery. Many “Katrina” cottage modular models have been produced and displayed by various parties. Local comment indicted these types would be considered “permanent” housing and thus beyond the scope of FEMA housing.



- *Panelized*

Panelized units are factory built units that are shipped “knocked down” for site assembly. A wide variety of panelized configurations exist, both in level of completeness upon arrival and assembly requirements. They can be stacked and interconnected depending on space and housing needs. These units were observed during the site visits and are described in Part 3 of this report.



1.5. FEMA Scope for Direct Disaster Housing Assistance

Depending upon the site, FEMA provides a variety of services to support disaster housing sites. These services are provided in cooperation with state and local governments, supporting agencies and contractors, each of whom has a designated scope of work or assigned regional territory. Support services are listed below, and addressed in more detail later in this report:

1. Site Acquisition (Section 2.2)
2. Site Planning/Preparation (Section 2.3)
3. Housing Unit Installation (Section 2.4)
4. Move-in (Section 2.5)
5. Maintenance (Section 2.6)
6. Deactivation (Section 2.7)

The following table outlines site characteristics and FEMA support provided to each type of emergency and temporary housing site.

Table 2. FEMA Disaster Housing Sites

| <i>Type of Site</i> | <i>Definition</i> | <i>Site Characteristics</i> | <i>FEMA Support Provided</i> |
|------------------------|--|--|---|
| Commercial Site | Land previously used or in use as a mobile home park, rented by FEMA from private owner. | <ul style="list-style-type: none"> ▪ General condition of site varies. ▪ Utilities generally pre-existing and underground. ▪ Amenities vary and are pre-existing. ▪ Pre-existing and FEMA-placed residents share site. | <ol style="list-style-type: none"> 1. Site acquisition 2. Site planning/ preparation (as needed) 3. Housing unit installation 4. Move-in 5. Maintenance 6. Deactivation |
| Group Site | Land rented or acquired by FEMA. Typically federal or state land, preferably parkland. | <ul style="list-style-type: none"> ▪ General condition of site varies. ▪ Utilities installed above-ground ▪ Limited amenities, except where pre-existing. | <ol style="list-style-type: none"> 1. Site acquisition 2. Site planning/ preparation (as needed) 3. Housing unit installation 4. Move-in 5. Maintenance 6. Deactivation |
| Private Site | Housing unit placed on private land, owned or acquired by displaced household. Site can accommodate more than one unit, as space allows. | <ul style="list-style-type: none"> ▪ General condition of site varies. ▪ Utilities installed above ground, connect into home or public infrastructure. ▪ FEMA's preferred method of providing housing. | <ol style="list-style-type: none"> 2. Site planning/ preparation 3. Housing unit installation 4. Move-in 5. Maintenance 6. Deactivation |

In general, the condition of sites varies greatly and is based primarily on the condition and land use of the site prior to FEMA control. The focus of this report is to review all current procedures related to the selection and installation of commercial and group sites and to identify any deficiencies in the process.

Group sites include both emergency and temporary housing sites; each of which has some unique site planning requirements. Emergency group sites (EGS) are designed for the efficient installation of travel trailers, and have been used effectively in the past for short term applications (60 – 90 days) while temporary sites are being constructed. Group sites for temporary housing applications are ideally designed to accommodate manufactured housing units, or travel trailers in extreme situations.

Private sites have unique installation procedures and are not specifically addressed in this report.⁵ It is important to note that it is widely accepted that private site placements are preferred by FEMA to commercial or site placements. This is because experience shows that displaced households are homeowners and more quickly able to return to pre-disaster living conditions and lifestyle when they are able to remain in their original community.

⁵ For more information on private sites, see Appendix C, Table 1.

2. Disaster Housing Implementation

The following section is a summary of emergency housing implementation protocols for commercial and group sites.

2.1. Overview

The implementation of emergency housing response requires collaboration between Federal (Federal Emergency Management Agency), regional (U.S. Army Corps of Engineers, regional office) and local government agencies (state/regional emergency housing agencies). The process is similar for most site types, with the on-ground tasks primarily executed by the USACE (Table 3). In some cases, private contractors may execute tasks typically carried out by the USACE such as site identification, right of entry, permit acquisition, site design, and ready for occupancy inspections.⁶

Table 3. Summary of the disaster housing process⁷

| Stage | Task | Primary Responsibility | |
|--|--|---|------------|
| Existing Commercial Sites | | | |
| 1. Site Acquisition | Assign task to assess existing commercial parks | FEMA | |
| | Develop a list of parks and inquire about availability and willingness to lease | USACE | |
| | Perform site assessment. | USACE | |
| | Approve site, negotiate and sign pad lease | FEMA | |
| 2. Site Planning/Preparation | Issue task order to contractor | USACE | |
| | 3. Unit Installation | Site preparation, repairs, and hauls and installs | Contractor |
| | Provide Quality Assurance (QA) inspection | USACE | |
| | Complete Ready for Occupancy (RFO) inspection | USACE/FEMA | |
| 4. Move in | Lease occupant | USACE/FEMA | |
| 5. Maintenance | Short-term/long-term maintenance. | USACE/FEMA | |
| 6. Deactivation | Deactivate units | USACE | |
| Group/Emergency Group Sites/Commercial Park Expansion | | | |
| 1. Site Acquisition | Assign task to conduct recon of potential group sites. | FEMA | |
| | Identify potential sites and give list to FEMA. | USACE | |
| | Approve sites (through coordination with FEMA). | State/County/Local Government | |
| | Approve site, initiate leasing process, issue task to USACE for site design and environmental assessment | FEMA | |
| | Perform site design, environmental assessment and cost estimate. | USACE | |
| | Approve design, provide environmental approvals, and authorize utility connections. | State/County/Local Government | |
| 2. Site Preparation | Obtain lease and issue task to USACE to construct site. | FEMA | |
| | 3. Unit Installation | Develop and award contracts. | USACE |
| | Provides QA inspection of site construction. | USACE | |
| | Initiate and completes construction of site and/or housing units. | Contractor | |
| | Provide QA of inspection of units installed | USACE | |
| | Complete RFO inspection | USACE/FEMA | |
| 4. Move in | Lease to occupant | USACE/FEMA | |
| 5. Maintenance | Short-term/long-term maintenance. | USACE/FEMA | |
| 6. Deactivation | Deactivate units and sites | USACE | |

⁶ For a summary of disaster housing processes for private sites and contractors, see Appendix C, Table-1.

⁷ Source: Summarized from Temporary Housing Mission Standard Operating Procedure, USACE.

2.2. Site Acquisition

Ideally, in areas prone to disasters, identification of temporary housing sites would begin prior to the event. Site planning and disaster readiness is typically carried out by the state and local disaster housing agencies through funding provided by FEMA. This may be difficult in some regions where real estate frequently transfers ownership and funding for such planning activities are limited.⁸

2.2.1. Site Selection

Housing sites that are identified after an event may be found through internet and phone book queries. This activity is typically carried out by the USACE with help from local organizations. In some cases, states may provide a list of available/potential sites.

Sites that are readily available are the most desirable, such as sites owned by the local government. Establishing lease agreements with private site owners can be time consuming, causing delays in project completion.

The construction of emergency housing, which serves as an interim (60-90 day) housing solution while more long term temporary housing is being procured/constructed, should occur within a short timeframe, typically 14 days or less, and therefore is best located on sites that require minimal preparation.

Temporary housing sites, in which communities of displaced households may reside up to 18 months after a disaster (and longer in special circumstances), should be located in areas that can easily absorb the added population and additional capacity requirements of existing infrastructure and community amenities.

2.2.2 Site Assessment

Once FEMA has identified emergency and temporary housing needs, the USACE (or in some cases private contractors) will conduct a preliminary site assessment of potential sites that have been identified.⁹ While there are unique site recommendations for commercial and group sites, both sites types are assessed for general condition, should be located above the 100-year flood plain,¹⁰ and have access to utilities, shopping areas, schools, public transportation, and emergency services such as police and fire department.

2.2.2.1 Commercial Sites

Site occupancy should be evaluated when identifying and prioritizing commercial sites. Commercial sites that are fully leased (i.e. no available pads) should be eliminated from the list of potential sites and those with few available trailer pads should be given low priority. Those assessing the sites should confirm that the dimensions of the trailer/mobile home pads on site are compatible with the dimensions of the housing units to be installed. Commercial sites should have adequate existing utilities and connections available although if warranted, minor repairs and upgrades can be made prior to the installation of the housing unit. There are currently no minimum requirements in place against which to select and/or to rank available commercial sites.

⁸ For example, Florida does not maintain a list of potential emergency commercial housing sites due to the demand for real estate and frequent change of ownership and land use. Florida is currently composing a list of government sites that could be used for housing during and after a disaster. A completion date for the housing site list is not available (Roy Dunn. *Florida Disaster Housing Chief, October, 2006*).

⁹ For an example Site Assessment form, see Appendix C, Form-1 and 2.

¹⁰ Only travel trailers may be within the 100 yr flood plain (2)

2.2.2.2 *Group Sites*

Given that both temporary group and emergency groups require the development of land that previously did not contain housing, it is likely that the site will be assessed for similar characteristics. A distinction is that integration into the surrounding community is very important for temporary group sites.

The following is a list of recommended site characteristics for group sites:

- **Size:** sites that are 5+ acres are the most desirable.
- **Utility infrastructure:** sites should have municipal water, sanitary sewer, and power supply nearby, all of which will meet the needs of site occupants.
- **Topography:** paved sites are desirable, however well drained unpaved areas are also adequate.¹¹
 - Drainage that is sheet flow across site is preferable, with water collecting at adequate existing storm drains or runoff areas. The allowable longitudinal gradient of 0-5% and a 1% cross gradient for surface drainage should be used. When continuous cross slope gradient is not necessary, crow sloping of 1% should be used.
- **Environmental assessment (EA)¹²:** EAs may delay site development and sites that are exempt from an EA are preferred. A Category X exclusion from an EA may be allowed when the site has been previously disturbed, minimal earthwork is required, and no significant environmental or cultural resources are present. Paved sites where utilities will be above ground may not need an EA.
- **Quality of life:** considerations should include the effects of the site on the surrounding area (e.g.. traffic flow, noise, safety, etc).

2.3. **Site Planning and Preparation**

The layout/design and installation of disaster housing sites will also depend upon the type of housing that will be placed on that site. Generally, sites are designed by the USACE and typically follow a standard format. Consideration is given to functionality, speed, economy of construction, ease of maintenance, as well as environmental impacts.

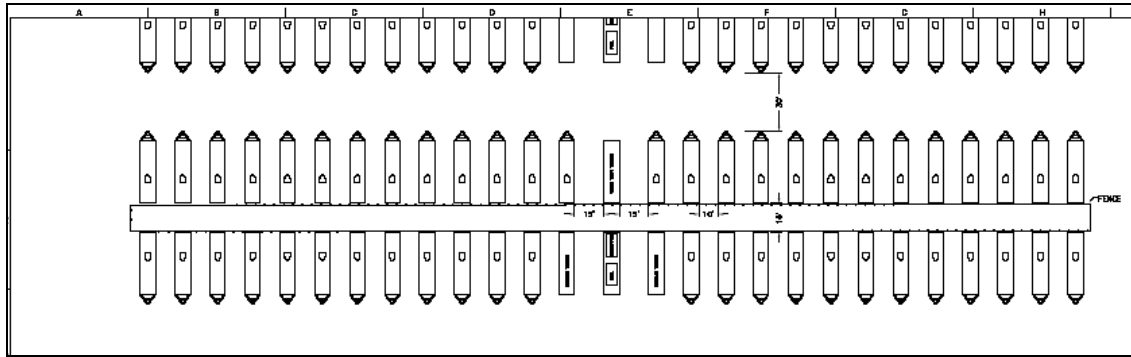
2.3.1. *Group Sites*

Group sites will require more site planning, specifically in regard to placement of housing unit and utility connections (above and below ground). The goals of the recommended layouts are to reach preferred housing units per acre quotas, and to group utility connections and run alleyways for all piping and wiring (Figure 1). Rear utility corridors should be fenced off from residents. Group sites with manufactured homes are typically for longer-term housing. Therefore, more time may be taken to install utilities below ground.

¹¹ Other topography considerations: is the existing storm drainage area adequate, is data available for the 50/100-year rainfall in the area, will a storm retention pond be necessary, are existing patterns from drainage being reasonably maintained.

¹² An Environmental Assessment, required under the National Environmental Policy Act of 1969, assesses the potential environmental impact that could result from the implementation of the housing site.

Figure 1. Standard pod layout for a group site.



2.3.2. Commercial Sites.

Commercial sites will require less site planning and preparation given the pre-existing trailer pads and utility connections (Table 4). Depending on the results of the site inspection, upgrades and repairs may be made to existing utility connections. If additional housing units are added to the site, they are typically placed in an area with access to utilities.

Table 4 compares site planning guidelines for each type of site.

Table 4. Site planning guidelines for typical commercial and group sites.

| | COMMERCIAL | | GROUP | |
|----------------------------|--|--------------|--|--|
| | Travel Trailers | Mobile Homes | Travel Trailers | Mobile Homes |
| Site Design | | | | |
| Size of lots | ▪ Predetermined | | ▪ 5+acres or at least 2 units | |
| Number of units | ▪ Predetermined | | ▪ 26 units/acre | ▪ 6-8 units/acre |
| Orientation of units | <ul style="list-style-type: none"> ▪ Predetermined ▪ If additional units are added to site, units should be placed with access to utilities. | | <ul style="list-style-type: none"> ▪ 2 rows of 13 trailers ▪ 10' between each trailer ▪ 15' between each row. | <ul style="list-style-type: none"> ▪ 40' x 80' lots (with a trailer that is 14' x 60') ▪ Layout of units will depend on: codes, lot size, road and utility requirements. |
| Utility Connections | | | | |
| Electrical | <ul style="list-style-type: none"> ▪ Connection of service from the electrical assembly to the unit weatherproof electrical disconnect pedestal. | | <ul style="list-style-type: none"> ▪ Electrical connection is established between the housing unit and electrical service ▪ Should meet all federal, state, and local codes and requirements | <ul style="list-style-type: none"> ▪ Underground service should be provided ▪ Should meet all federal, state, and local codes and requirements |

Table 4. Site planning guidelines for typical commercial and group sites (continued).

| | COMMERCIAL | | GROUP | |
|-------------|--|--|--|-----------------|
| | Travel Trailers | Mobile Homes | Mobile Homes | Travel Trailers |
| Water | <ul style="list-style-type: none"> Initiated by connecting unit to the existing water connection via approved RV water hose or appropriate piping for manufactured home. | <ul style="list-style-type: none"> A tap on the water service line should be made and piping and riser connection Installed in accordance with local codes and the Uniform Plumbing Code Service lines beneath the travel trailer should be installed clear of the ground, made with the minimum number of joints, be of the shortest practical length, and be supported by metal straps at 4-foot intervals. Connection to a municipal water supply is usually at a fire hydrant or a stub-out from the water line. | <ul style="list-style-type: none"> A tap on the water service line should be made and piping and riser connection. Service line should be laid a minimum of 6" below frost line and not less than 24" below the surface of the ground. The service line must be placed in a trench separate from the sewer line and at a distance that is in compliance with State and local codes. | |
| Waste Water | <ul style="list-style-type: none"> At sites with a sewer riser already installed, a connection should be made between the travel trailer or manufactured home connecting point and the riser. | <ul style="list-style-type: none"> Sewer tap on the sewer collection line should be made and the necessary piping and riser connection installed. A clean-out fitting should be installed in a location to facilitate snaking-out a clogged up line. Slope should be continuous and at least 1/4" per ft and no more than 1/2" per ft. Overhead sewer straps should be placed at 4' intervals to prevent any deflections. | <ul style="list-style-type: none"> Sewer tap on the sewer collection line should be made and the necessary piping and riser connection installed. A clean-out fitting should be installed in an accessible location to facilitate snaking-out a clogged up line. Line should be shortest practical length and include a clean-out wye. Installation shall be in accordance and compliance with State and local codes and the Uniform Plumbing Code. Sewer lines should be placed in a trench separate from the water line and at a distance from the water line, burial below the surface of ground, and securing the installation to reduce deflections. | |

2.3.3. *Site Amenities*

To the displaced households, the emergency and temporary communities serve as standby communities providing governance, security, and access to amenities while permanent housing is being repaired or acquired. Planning documents generally provide mention of preferred community amenities, but do not address specific site planning strategies or requirements in detail. Some of the recommended amenities are: postal service, garbage service, parking,

minimal sight lighting, and proximity to existing infrastructure. There is no minimum for site amenities specified.

2.4. Housing Unit Installation

2.4.1. Methodology for Procuring Units

Housing units may be procured by FEMA prior to and/or after a disaster. Units that are procured prior to a disaster are obtained, or earmarked, through a specification process in which potential housing suppliers are issued a request for housing units. The specification indicates that units will only be requested immediately after a disaster and should be ready for installation at that time. Travel trailers and mobile homes must meet typical FEMA specifications and be delivered to a staging area location, to be determined post disaster. The procurements of housing units after a disaster may vary with each event.

2.4.2. Set up Procedures for Units

Generally, FEMA store housing units ready for installation at logistical staging areas prior to their distribution to sites. Housing units ready for installation are typically installed on sites by private contractors.

Each housing unit should receive a Quality Assurance inspection of unit installations, followed by a Ready for Occupancy (RFO) inspection.¹³

2.4.2.1. Travel Trailers

Trailers should be placed on level piers constructed of cement blocks and capped with wood shims.¹⁴ Piers should not hinder any piping that may run below the trailer. The trailer should be anchored with four anchors, two on each side of the unit. Although travel trailers are equipped with folding stairs, stairs or a ramp should be installed when placed on an emergency group site.

2.4.2.2. Mobile Homes and Park Models

Units should be placed on level piers constructed of concrete blocks and secured to manufacture specification.¹⁵ Exterior installations on the housing units include steps or ramp and a level platform as well as skirting on the entire perimeter of manufactured home.¹⁶

2.5. Move-in

2.5.1. Assignment of Displaced households to Sites

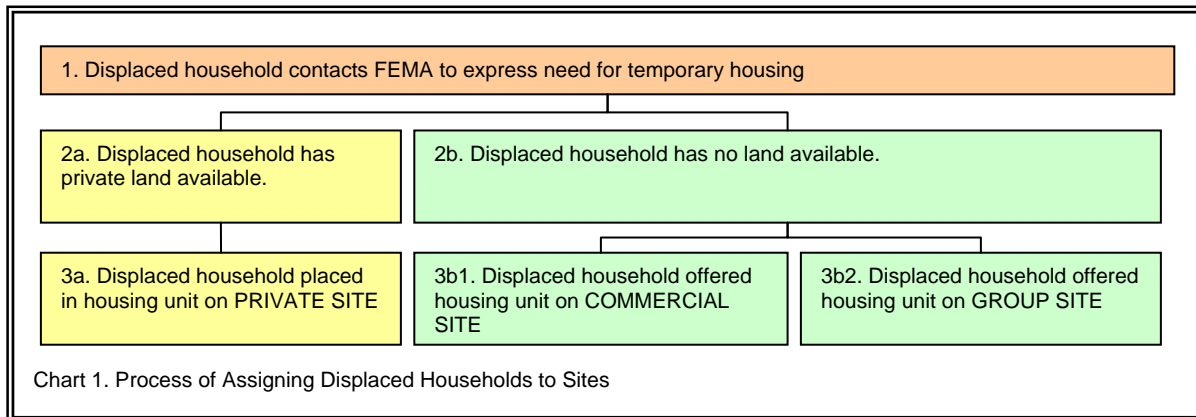
The process for assigning displaced households to temporary housing sites is based upon the level of need of the displaced household and the vacancy within the sites at the time of placement. The following chart depicts the process by which FEMA assigns displaced households to each type of site.

¹³ For an example Quality Assurance housing inspection form and Ready for Occupancy inspection form, see Appendix F, Form-1 and 2.

¹⁴ Pier description: The base will be ¾" X 24" X 24" exterior grade plywood (a ¾" X18" X 18" vinyl ABS pad is acceptable). The piers will have at a minimum two solid cap blocks on the base and two solid cap blocks at the top of the piers. The space between the top of the pier's solid cap blocks and the bottom of the travel trailer I-beam frame shall not exceed seven inches (7"). Up to four inches (4") of this space may be filled with a solid concrete block laid parallel to the travel trailer steel I-beam frame. Up to three inches (3") of this space may be filled with clocking timber and wedges laid perpendicular to the travel trailer steel I-Beam. No more than one inch (1") of this area shall be shimmed with wedges.

¹⁵ The base of each pier should be 24" x 24".

¹⁶ Steps should be wood and 48" wide between 2 handrails. If needed, a wood ramp can be installed.



Not stated in any of the federal planning guides reviewed was any commitment to placing displaced households in sites that are within close proximity to their pre-disaster residences. Media coverage of disaster housing after Hurricane Katrina criticized the placement of families more than 50 miles (often several hundred miles) from their communities. Also absent from reviewed material is mention of the displaced families rights to *accept* an available unit on a particular site, or stay in queue until a more favorable unit becomes available.

2.5.2. *Leasing of Units*

The leasing of the housing units to displaced households may be executed by USACE, FEMA or through coordination between both agencies. Documentation on this process was not available; however an interview with a former FEMA employee provided some insight on how the leasing process was executed post Katrina.

Those who previously resided in an area that was considered significantly damaged were able to request temporary housing. The application process for obtaining a housing unit consists of providing the following information:

- 1) Address prior to disaster (pre-qualification)
- 2) Condition of property post disaster (qualification for private or non-private site)
- 3) New address for placement of trailer, if applicable
- 4) Current contact info
- 5) Special needs:
 - i. Is bathroom assistance required?
 - ii. Is assistance entering a trailer required?
 - iii. Do you have small children?

Families with small children were often placed on ‘emergency’ waiting lists, which were shorter. Those who were requesting a trailer to be placed on private property with existing utilities had a much shorter wait. The size of the unit leased depended upon the size of the family; although, certain types and sizes of units were often not be available.

At the time the housing unit is transferred from FEMA control to a displaced household (when keys are turned over), the residents are given a brief orientation to the unit, including regular maintenance procedures and emergency situations.

2.6. **Maintenance Procedures**

Once the unit is occupied, FEMA contracts out short-term or long-term operations and maintenance. Contractors are typically responsible for correcting problems that could not be corrected by the occupant and might require the services of a professional maintenance technician such as an electrician, carpenter, or plumber. Maintenance includes consist of routine service, grounds maintenance, warranty repairs, water, sanitary sewer, electrical and mechanical maintenance, routine and emergency maintenance. Contractors will also be responsible for responding to emergencies such as gas leaks, and loss of electricity, heat, or cooling. In some cases, maintenance contractors will provide and maintain dumpsters. The maintenance contractor should be available on a 24-hour basis to respond to operations and maintenance needs.

2.7. Deactivation Procedures

Existing commercial sites will not be deactivated because these sites will most likely continue to be used by commercial tenants. Deactivation of a group site can occur in increments (for example, removal of a few units at a time) or all at once depending on FEMA's requirements. Therefore, it is possible that deactivation work will occur at various times throughout the active life of a group site.

2.7.1. Site Deactivation

Ideally, a group site would be deactivated in its entirety or in large increments to maximize efficiency of contractor and Government resources and to minimize disruptions at the site. Spare parts and equipment should be removed from site and salvaged for government reuse. This includes mail boxes, traffic controls, blocking and anchoring materials, generators, RV pedestals, utility materials, etc. Utilities must be disconnected and any repairs need must be made. Any earthwork that results from site deactivation should be filled to match existing or preexisting conditions.

2.7.2. Housing Unit Deactivation

The deactivation of units consists of disconnecting the units from the utilities, preparing the units for storage, and transporting the units to a designated storage facility. Long-term storage of housing units is FEMA's responsibility. Preparing units for storage includes cleaning and fumigating, winterizing, and securing fixtures and other movable parts.

2.7.3. Housing Unit Reuse

If a unit is deemed unusable for later government use, FEMA will determine the appropriate action. As specified in 44 CFR 206, FEMA may sell disaster housing units to existing occupants or to the local state and voluntary organizations.

3. Observations

3.1. Overview

In September 2006, Steven Winter Associates, Inc. interviewed staff from two companies, Del-Jen/PRI and The Shaw Group, Inc., both under contract to provide installation, maintenance and deactivation support for disaster housing occupied by households displaced by Hurricane Katrina, which struck the gulf coast in late August, 2005.

Observations were collected during these interviews and during visits to several commercial and group sites in Louisiana and Mississippi. Interview questions covered the entire contractor scope, from early post Hurricane Katrina efforts (during site installation) and throughout the year

following (including move-ins, site maintenance, and housing unit and site deactivation). The purpose of the interviews were to collect first hand information on the process for and difficulties encountered during the installation, maintenance and deactivation of the sites and housing units.

Unsolicited comments by many maintenance staff stated how well they thought FEMA handled this huge effort. It was also noticed that staff recognized the limitations of disaster response planning and sought opportunities to troubleshoot and problem-solve during special situations, noting that this was an unprecedented disaster event. The observations below are a listing of not just what was seen on the site visits, but also an attempt to capture creative solutions that FEMA and the contracted staff incorporated into the existing process as needed.

At the time of the interviews, both Del-Jen and Shaw had, under multiple contracts awarded in late 2005 and 2006, each been responsible for the maintenance of no fewer than 45,000 disaster housing units. Both company operated central offices outside Baton Rouge, LA that coordinated the efforts of multiple field offices in Louisiana and Mississippi. The field offices, of which three of Del-Jen's and one of Shaw's were visited, operated as both offices for staff, storage for parts and supplies needed to maintain units and, in the case of Shaw's site, a large staging site used to clean and inspect units prior to installation and to temporarily store deactivated units. A separate staging site operated by Del-Jen was also visited.

Contracted maintenance for the sites and housing units included monthly inspections of all units and service calls as needed. Inspections and service calls were logged using a central FEMA database; units requiring service were organized by an identification number designating its location and unit number, and were expected to be initially responded to within 6 hours if an emergency and within 48 hours if not an emergency. For a sample monthly maintenance checklist and work order, see Appendices G and H.

It is important to note that the disaster housing sites that were visited would all be defined as *temporary sites* according to the planning documents referenced in part one given that they were in operation just over one year since the disaster. However, planning principles unique to *emergency site* planning documents, such as the abundance of travel trailers and utilities installed above ground, were seen at many of the sites visited. It can only be assumed that the catastrophic nature of this particular disaster event and the magnitude of the displaced population caused many emergency sites to become temporary sites after 90 days of occupancy. Furthermore, the current news coverage of FEMA's obligation to continue to house displaced populations after the eighteen month expiration of the Stafford Act (which can be extended by Presidential authority), is critically related to the condition and durability of the sites that are currently in operation, especially those originally intended and constructed for emergency use.

A detailed list of people interviewed and sites visited is included in Appendix F. The following sections describe observations through written text and photographs.

3.2. Housing Sites

3.2.1. Configuration

- Sites were generally laid out in a grid – with housing units organized such that utilities were grouped in alleyways. One site had units diagonally oriented versus perpendicular to access road.

- Some sites had grading issues with standing water or mud near units while the majority of others observed did not. While it rained early during the site visit trip, heavy rainfall was not experienced at the sites.
- Sites with lawn were substantially nicer than sites placed on asphalt lots.
- One site impressed with underground utilities, interesting site planning on the gently sloping site, creative unit layouts and parking areas, screened trash enclosures and privacy fencing at the front road. Site had a mix of manufactured and park models and all units had skirting.
- Commercial Sites. It was observed that FEMA housing units (travel trailers and manufactured housing) were either added to existing pads that were unoccupied just prior to the disaster, or were added on open space that allowed for easy connection to existing services.
- Trees made a big difference on sites, adding much needed shade and character.
- Both contractors in Louisiana mentioned “industrial sites” which were group sites that were occupied by a group of displaced families who shared a pre-disaster relationship with a private entity, such as an employer (e.g. colleges, sugar or oil facilities, or a Piggly Wiggly grocery store chain). These sites were placed on land owned by the private entity. In these situations FEMA contractors did not do any monthly inspections of the units, but did offer on-call maintenance services. It was mentioned that these sites and their housing units were typically better maintained, as the private entity had its own maintenance staff who were handling service calls (versus residents trying to fix things themselves.) Deactivated units were reported to be in better condition when returned from “industrial site” use.
- Two central New Orleans commercial parking lots featured “COGIM” steel panelized units from Italy. COGIM’s website claims it is a major international provider of modular pre-engineered shelter systems and the deliverer of turnkey camps to some of the world’s military. The facilities were just being completed in New Orleans and were unoccupied. They were being maintained by Shaw.



Image 3.2.1a. Commercial site with FEMA unit installed next to an existing unit.



Image 3.2.1b. Spacing between units was less than 12 feet. Entrances face each other.



Image 3.2.1c. Spacing between units was less than 12 feet. Entrances face the back of another unit. Path to entrance is dirt/gravel which is a problem during wet conditions.



Image 3.2.1d. Sites with existing landscaping were cooler and more pleasant.



Image 3.2.1e. Diagonal configuration of units was preferred to horizontal configuration. Notice lack of shading.



Image 3.2.1f. Diagonal configuration with wide access road that also serves as parking.



Image 3.2.1g. A unit placed on an existing pad in a commercial site. Notice the proximity of the stairs from another unit to this unit.



Image 3.2.1h. This site boundary was screened. Not all sites had screening – it seemed to depend on which firm had been contracted to do the site installation.



Image 3.2.1i. The two group sites with panelized units installed were placed in urban parking lots. The asphalt created a lot of heat. This site was not yet occupied.



Image 3.2.1j. The panelized units are placed very close together – less than ten feet apart.

3.2.2. *Utilities*

- Both above ground and below ground utility installations were seen.
- Some commented on the size of the sanitary sewer lines, citing a common problem with sewage blockage at the point where the unit line joins the main. See 3.3.4.
- Some sites had chain link fencing installed around utilities. Some of this fencing had screening fabric added. This feature added to the residential character of the sites, and was a safety measure as utilities lines were inaccessible by children and pets.
- Some commercial sites sold refilled propane tanks to residents.



Image 3.2.2a. Above ground utilities grouped into a central alley. There is no fencing around the utilities.



Image 3.2.2b. Detail of above ground utilities. There is no fencing around the utilities.



Image 3.2.2c. Connection from unit to underground service lines.



Image 3.2.2d. Detail of connection from unit to service lines. No fencing.



Image 3.2.2e. Fenced off water treatment area.



Image 3.2.2f. Fenced and screened utilities protect them from abuse.



Image 3.2.2g. Fenced off utilities.



Image 3.2.2h. Utility meters.

3.2.3. *Site Amenities*

- At some sites, a temporary FEMA mobile office unit was located right at one of the two entry points.
- The Southern University of New Orleans (SUNO) site had several modular free laundry facilities. A few commercial sites had small laundry facilities (pre-existing) but otherwise group sites had none.
- One was sited on a public inner-city park so a few recreational amenities were there plus picnic table and benches.
- Security provisions were different for various sites. A gate guard was encountered on a three sites. The sheriff was reported patrolling some site and evicting certain residents. Crime was a serious problem at some of the larger sites – Del-Jen maintenance crews were required to conduct site visits in teams, as individual maintenance staff had experienced problems with residents at several sites.
- Parking conditions varied from site to site, although it was apparent that making space available for resident parking was a priority during site planning. Some sites had enough designated space for two cars to park near each unit. Some sites had parking placed away from the units in a lot. These lots had ADA spaces situated near ADA units.
- There was no place visible for resident storage. It was unclear if this was an issue to the residents. Some units had outdoor furniture, bicycles, cooking grills and animal cages directly outside of their units. Many residents added extra or external structures or covers or decks to units. Some added porch roofs and a variety of plants and site ornamentation.



Image 3.2.3a. All sites visited had postal boxes for each unit.



Image 3.2.3b. Covered postal collection area with message board (unused).



Image 3.2.3c. Free laundry facility at the university site. Laundry facilities were not seen at any other sites.



Image 3.2.3d. Paved parking with ADA spaces. Most parking was not paved (gravel or dirt).



Image 3.2.3e Resident added a covered porch to stairs. Many units were equipped with DirectTV service (added by resident post-occupancy).



Image 3.2.3f. Resident with outdoor furniture.



Image 3.2.3g. Existing playground in a group site.



Image 3.2.3h. Children playing in front of their unit. Most sites lacked any amenities for children.



Image 3.2.3i. Waste receptacle at group site.



Image 3.2.3j. Security tent at entrance to site.

3.3. Housing Units

3.3.1. Exterior

- Housing units were labeled on the front end (where the hitch is located). Maintenance staff had difficulty finding ID numbers (or bar codes) of many units, as they were not visible on the exterior of the units. Typically, this information was on a piece of paper taped to the unit that the residents often took down after moving in. The contractor staff usually came up with a solution to write the ID number in large text on the front of the unit.
- Observed missing or loose siding on many varied models along with missing skirting on manufactured or park models that had skirting. Many sites didn't provide skirting.
- Roll-out awnings were seen on some travel trailers and some in disrepair. An effort was made to remove awnings from units was made by one maintenance contractor.
- Trailers would rock back and forth in windy conditions, even when anchored.

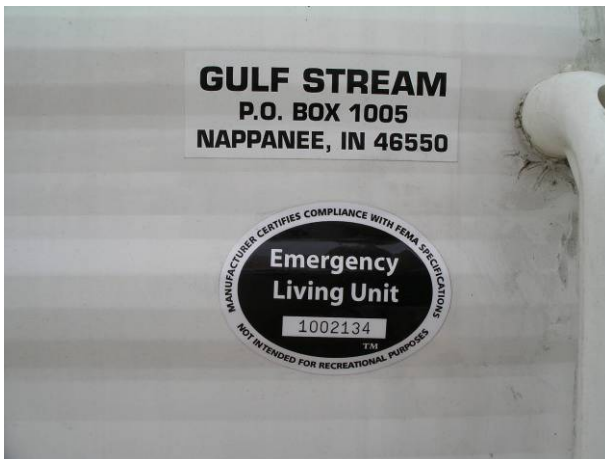


Image 3.3.1a. Travel trailer unit identification from manufacturer.



Image 3.3.1b. Trailer unit with a slide next to several units without slides. ID number on trailer references both the site and the unit number.



Image 3.3.1c. Many different trailer manufacturers represented on each site. Diverse replacement parts needed.



Image 3.3.1d. Park models were often used as ADA units.



Image 3.3.1i. Observed missing or loose siding on many varied models.



Image 3.3.1j. Many sites didn't provide skirting.



Image 3.3.1k. Anchor strap for panelized unit.



Image 3.3.1l. Panelized units were built to be stacked and are resistant to high wind conditions. Notice fresh air intake with cap.

3.3.2. *Interior*

- During site visits, various travel trailer models were observed. The travel trailers varied in size and amenities¹⁷.
- Leaks around bathtubs and broken tubs are issues.
- Damage to the bed platform in travel trailers is a common issue. The particle board base under the mattress is designed for partial under-bed storage. The assembly fails with some occupants.
- The mattresses supplied in travel trailers are quite thin and easily crushed by a larger user.



Image 3.3.2a. Trailer interior with no slide out.



Image 3.3.2b. Reverse view of trailer interior.



Image 3.3.2c. Bunk beds in trailer unit.



Image 3.3.2d. Patchwork on a trailer sofa.

¹⁷ For a list of travel trailers observed and associated specifications, see Appendix G, Table-1 and 2.



Image 3.3.2e. Mattress quality varied but was generally poor.



Image 3.3.2f. Damage to bed platform in travel trailers is a common issue. The particle board base under the mattress is designed for partial under-bed storage. The assembly fails with some occupants. The mattresses supplied in travel trailers are quite thin and easily crushed by a larger user.



Image 3.3.2g. Interior of occupied mobile home. This was an ADA unit.



Image 3.3.2h. Bedroom of occupied mobile home.



Image 3.3.2i. Rear door of occupied mobile home. Resident installed washer and drier.



Image 3.3.2j. Master bedroom of occupied mobile home.



Image 3.3.2k. ADA sink being used by a resident without a wheelchair.



Image 3.3.2l. Damage to occupied mobile home wall.



Image 3.3.2m. Interior of panelized unit.



Image 3.3.2n. Second bedroom in panelized unit.



Image 3.3.2o. Panelized units had durable sliding windows with blackout shading.



Image 3.3.2p. Panelized units had small refrigerators. Units were all electric.



Image 3.3.2q. Panelized units had full size shower.



Image 3.3.2r. Water heater and storage in exterior closet of panelized unit.

3.3.3. *Heating & Cooling*

- Many roof-mounted AC units failures on travel trailers, requiring repair, replacement or installation of a smaller capacity window-mounted AC. Interviewees indicated AC units not designed for that climate and use. Unit freeze up was reported as common. A six hour response is required to an AC problem call.
- Failure of roof mounted travel trailer AC units caused a smaller window AC unit to be installed. When this AC unit was removed and the roof mount replaced the window was covered with plywood. Rather than being replaced, the window reinstallation created another subsequent trip for service technicians.

- A specific “park model” presented problems because the HVAC unit was welded in an inaccessible location in the floor chassis. This required adding a new split-system HVAC unit with outside compressor unit or adding smaller capacity window units.
- Travel trailer bath and unit ventilation is a reported problem. A manually operated non-powered vent is located in the bath ceiling directly above the bathtub.
- Some travel trailer models have the propane heater exhaust discharge near the entry door. This created a fire hazard with this outlet being near or blocked by the wooden steps or ramp and handrail system.
- Propane tank issues involved stolen tanks, missing plastic tank covers, insects nesting inside covers. Two tanks are mounted on travel trailer tongues usually with one plastic cover for both tanks. Some sites initially offered free propane to residents but that program has stopped. Some commercial sites sold propane (\$25 pre refilled tank seen advertised) but some didn't. Interviewees noted ADA units are all electric and have no propane issues.



Image 3.3.3a. Propane tanks and cover at travel trailer tongue.



Image 3.3.3b. Battery at travel trailer tongue.



Image 3.3.3c. Window unit added to Park model.



Image 3.3.3d. Roof mounted AC replaced but window still has plywood from temporary smaller AC unit.



Image 3.3.3e. Some travel trailers have heat vent too close to wood stairs.



Image 3.3.3f. Attempt to fix the problem.

3.3.4. *Utilities*

- Toilet stoppage and backup created many service calls. Interviewees indicated the problem was usually at the point where trailer sewer connected to the main line. That is also the point of demarcation between trailer maintenance contractors' responsibility and that of the site contractor.
- Electrical issues in travel trailers including missing batteries. The dual 12 and 120 volt systems require a battery. If the battery is missing, the expensive inverter is fried and needs replacement.
- Circuit breaker problems were reported.
- Residents are responsible for light fixture bulbs and reported having difficulty finding the specialty 12 volt replacement bulbs.
- Some reported damage to accessible above ground water and sewer utilities was mentioned—"by kids playing." Some sites had utilities fenced and screened. Sites with above grade utilities that were fenced and screened seemed better.

3.3.5. *Safety*

- Some smoke alarm and carbon dioxide alarms problems were reported.
- One resident said there were rainwater leaks under one exterior door and that she slipped and fell because of it injuring her back. We believe she reported this incident.

3.4. **Set Up and Operations**

- In the case of Katrina and the procurement of mobile homes, FEMA identified existing stocks of housing units and awarded initial contracts based on the largest volume of homes that could be moved the fastest. After this phase of housing relief, FEMA distributed specifications for the purchase of new mobile homes (31). The procurement of travel trailers post Katrina is not clear and manufacturers are reluctant to share information due to a pending law suit.
- Many service calls by occupants not understanding how to operate various systems in their units. There is a walk through of unit at move-in but the problem remains.
- Maintenance personnel interviewed indicated the manufactured and park models generally required fewer maintenance efforts than travel trailers.
- Industrial sites had their own maintenance and ranged from large industrial sites at sugar plants to downtown sites for a local supermarket.

- General quality of many travel trailers supplied (before set-up) required installation contractors to establish yards to do their own quality control inspections and make repairs or additions. While we didn't have access to records to review items, units from retailer's lots were reported to be of better quality than those built to FEMA standards. The production time crunch was cited as a possible cause. Missing plumbing traps and other issues along with electrical and other system problems were reported. "Every assembly leaks" was noted in conversation.
- Concerning units there are so many manufacturers with some many divergent replacement parts it's a challenge to inventory and supply the needed parts and pieces.



Image 3.4a. Del-Jen field office in Gulfport, MS



Image 3.4b. Shaw staging site in New Orleans, LA



Image 3.4c. Del Jen staging site in Slidell, LA



Image 3.4d. Multiple markings on unit are used to identify it.

3.5. Assignment of Displaced Households

- Reports of residents being placed remotely in cities or areas far from their desires or original locations.
- Reports of unhappy residents who didn't get a unit to adequately meet their family size. Some single occupants received larger units than those with big families.
- Talking with a travel trailer resident indicated happiness with unit.
- Talked with a mobile home resident who was unhappy with not having cabinets under the sinks-not recognizing it was an ADA unit: it installed with normal exterior steps and was not meant to be used for disabled.

Appendix A. – List of Appendices

| | |
|--------------------|--|
| Appendix B. | List of Literature Reviewed |
| Appendix C. | Additional Site Information |
| Appendix D. | Additional Housing Unit Information |
| Appendix E. | List of Sites Visited |
| Appendix F. | List of People Interviewed |
| Appendix G. | Additional Site and Housing Observation Information |
| Appendix H. | Contractor Monthly Preventative Maintenance Checklist |
| Appendix I. | Contractor Work Order |

Appendix B. – List of Literature Reviewed

| <i>Reference Number</i> | <i>Resource Name</i> | <i>Publisher/Source</i> | <i>Date</i> |
|-------------------------|---|-------------------------------|-------------|
| 1 | EGS Field Guide Manual (Travel Trailers) | USACE | Aug-05 |
| 2 | Disaster Guidebook: Temporary Housing | USACE | Jul-03 |
| 3 | Guide for All-Hazard Emergency Operations Planning | FEMA | Sep-96 |
| 4 | Catastrophic Housing Decision and Implementation Guide | FEMA? | Mar-05 |
| 5 | Research Findings for FEMA Catastrophic Strategy and Implementation Plan (draft) | USACE/FEMA | Nov-02 |
| 6 | Hurricane Katrina Catastrophic Sheltering Plan for 50,000 Citizens | USACE | Sep-05 |
| 7 | Temporary Housing Planning Response Team (PRT) CD #1 | USACE | Ver. 3.20 |
| 8 | Temporary Housing Planning Response Team (PRT) CD #2 | USACE | Ver. 3.20 |
| 9 | Anchorage Earthquake CDRP – DRAFT Response Plan | USACE | Nov-03 |
| 10 | Assessing Community Impacts of Natural Disasters | National Hazards Review | Nov-03 |
| 11 | Leaving New Orleans: Social Stratification, Networks and Hurricane Evacuation | SSRC | Sep-05 |
| 12 | Sheltering and Housing after Major Community Disasters: Case Studies and General Observations | Disaster Research Center/FEMA | 1982 |
| 13 | Creativity in Emergency Response after the World Trade Center Attack | Disaster Research Center | 2002 |
| 14 | The Disaster Recovery Process: What we know and do not know | Disaster Research Center | 1998 |
| 15 | Predicting Long-Term Business Recovery from Disaster | Disaster Research Center | 2002 |
| 16 | Housing Mission Haul and Install QA (PowerPoint presentation) | USACE | N/A |
| 17 | Critical Facilities Mission Standard Operating Procedure | USACE | N/A |
| 18 | Temporary Housing Mission Standard Operating Procedure (SOP) | USACE | N/A |
| 19 | (appendix to Temporary Housing SOP, above) Travel Trailer Installation Specifications, E-1.3 (P) Haul and Install Scope | USACE | N/A |
| 20 | (appendix to Temporary Housing SOP, above) Manufactured Homes, Installation Specifications, E-1.0 (T) IA TAC Contract 2005 Ex 6 | USACE | 2005 |
| 21 | (appendix to Temporary Housing SOP, above) Site Assessment Standard Operating Procedure E-1.1(C) | USACE | N/A |
| 22 | (appendix to Temporary Housing SOP, above) Local Community Responsibilities, E-1.2 (G) | USACE | N/A |

| <i>Reference Number</i> | <i>Resource Name</i> | <i>Publisher/Source</i> | <i>Date</i> |
|-------------------------|---|-------------------------|-------------|
| 23 | (appendix to Temporary Housing SOP, above) Initial Assessment of Potential Expedited Group Shelter | USACE | N/A |
| 24 | (appendix to Temporary Housing SOP, above) Site Selection, Permitting and Community Coordination | USACE | N/A |
| 25 | (appendix to Temporary Housing SOP, above) Community Assessment Guide, Commercial Sites, E-1.1(c) | USACE | N/A |
| 26 | (appendix to Temporary Housing SOP, above) FEMA Mobile Home Spec E-1.2 (G) | FEMA | N/A |
| 27 | Temporary Housing Mission Doctrine Guide (GG) | USACE | |
| 28 | Expedited Group Shelter, Operations & Maintenance Scope of Work | USACE | N/A |
| 29 | Travel Trailer Requirements for Expedited Group Shelters | USACE | Aug-05 |
| 30 | Travel Trailer Inspections, Field Inspectors Guide | FEMA | N/A |
| 31 | Mobile Home Industry Association, http://www.manufacturedhousing.org | MHIA | |
| 32 | Personal Communication: Evan Smith, Former Manager of FEMA Disaster Resource Center | | June 2006 |
| 33 | Park Model and Mississippi Cottage | FEMA | N/A |

N/A= Non available

Appendix C. Additional Site Information

Table-1 Summary of site selection and acquisition process for private sites and technical assistance contractors.

| Organization | Task |
|---|---|
| Private Site | |
| FEMA | Provide Site Inspection Task Form |
| USACE | Conduct site inspection |
| | Develop site plan |
| FEMA | Approves and issues work order |
| USACE | Issue task order to contractor |
| Contractor | Hauls and installs housing unit |
| USACE | Provides quality assurance inspection |
| USACE/FEMA | Complete Ready for Occupancy Inspection |
| USACE/FEMA | Lease to occupant |
| USACE/FEMA | Short-term/long-term maintenance |
| Technical Assistance Contractors (TAC) | |
| FEMA | Assign tasker to identify potential group/EGS/commercial park expansion sites. |
| TAC | Identify potential sites. |
| FEMA/USACE/State and Local | Review and recommend sites. |
| TAC | Obtain ROE* for site. |
| USACE | Perform environmental assessment. |
| FEMA/USACE/State and Local | Review site design. |
| FEMA/GSA | Approve environmental assessment, complete leasing, issue NTP** for construction to TAC. |
| TAC | Obtain permits and initiate and completes construction. |
| USACE | Provide QA [#] inspection of site construction. |
| TAC | Haul and install units. |
| USACE | Provide QA inspections of housing units. |
| TAC | Complete RFO [¥] inspection, lease in occupant, establish maintenance service, provide site restoration. |

Source: Summarized from Temporary Housing Mission Standard Operating Procedure, USACE.

* Right of Entry

** Notice to Proceed

[#] Quality Assurance

[¥] Ready for Occupancy

Form-1 Site Assessment for Existing Mobile Home / Travel Trailer Parks

| | |
|---|---|
| County: | |
| Park Name: | |
| Address: | |
| City: | Zip: |
| Phone: | Fax: |
| Alt Phone: | |
| POC: | Owner <input type="checkbox"/> Manager <input type="checkbox"/> |
| GPS Coordinates: N: | E: |
| Overall Assessment of Park: | |
| Park Amenities: | |
| Travel Trailer Pads: | Mobile Home Pads: |
| # of Pads Available – No Work Req'd: _____ | # of Pads Available – No Work Req'd: _____ |
| # of Pads Req'ng Debris Removal Only: _____ | # of Pads Req'ng Debris Removal Only: _____ |
| # of Pads Req'ng Utility Repair: _____ | # of Pads Req'ng Utility Repair: _____ |
| Utilities / Infrastructure <i>(Describe repairs needed):</i> | |
| Water Connection Condition: | |
| Sewer Connection Condition: | |
| Electrical Service Condition (include amperage): | |
| FEMA | 100-Yr Flood Plain Verification: IN <input type="checkbox"/> OUT <input type="checkbox"/> |
| | Pad Lease Signed / Contracting Officer Executes: |
| | Number of TT Pads Leased: Leased TT Pad Numbers: |
| | Number of MH Pads Leased: Leased MH Pad Numbers: |
| USACE | Right of Entry Signed for Pads w/ Debris Removal and/or Site Prep: YES <input type="checkbox"/> NO <input type="checkbox"/> |
| | Leased Pad Numbers Requiring Debris Removal Only: |
| | Leased Pad Numbers Requiring Utility Repair: |

| | |
|--------------------------------------|------------------------|
| | Site Prep Description: |
| FEMA Inspector Name (Print): | |
| USACE Inspector Name (Print): | |

Ranking: Green Amber Red Black

Form-2 Group Site Assessment

| | | | | |
|---|--|-------------|--|--|
| County: Velusia <input type="checkbox"/> Brevard <input type="checkbox"/> Indian River <input type="checkbox"/> St Lucie <input type="checkbox"/> Martin <input type="checkbox"/> Palm Beach <input type="checkbox"/> Other | | | | |
| Site Name: | | | | |
| Address / Location: | | | | |
| City: | | | | |
| Phone: | | Fax: | | |
| Alt Phone: | | | | |
| Owner / POC: | | | | |
| GPS Coordinates: N: | | E: | | |
| Area Available (Acres): | | | | |
| Utilities / Infrastructure: | | | | |
| Water Connection Condition: | | | | |
| Sewer Connection Condition: | | | | |
| Electrical Service Condition (include amperage): | | | | |
| Overall Assessment: | | | | |
| USACE Inspector Name (Print): | | | | |

Ranking: Green Amber Red Black

Appendix D. – Additional Housing Unit Information

Table 1 – Typical FEMA specifications for travel trailers and manufactured homes.

| | Manufactured House* | Park Model Home** | Trailer* |
|----------------------------------|---|---|---|
| Length | 60' | 38' (including porch) | From 28' to 32' |
| Width | 14' | 11', 2" | 8', 6" |
| Height | UK | UK | 10 feet tall from the ground level. |
| Slide outs | No. | No. | 18" to 32" and are usually installed on trailer sides. |
| Electrical system- AMPS | 200 A., panel is located in the back bedroom on the right wall behind the bedroom door. | 50 A exterior main panel. | 30 A |
| Electrical system- Volts | 120/240 V | UK | 12V and 110V power, larger upscale models may have larger system. (The 12V system is not expected to be used and must be energized by battery.) |
| Propane | No | Yes | Yes |
| Washer and dryer capacity | Yes | UK | No |
| Air conditioning | Electric, central air (no window units) | UK | Roof-mounted 120V, 13,000 to 15,000 BTU. |
| Heating | Electric furnace | 40,000 BTU propane furnace, | Onboard propane 12,000 to 16,000 BTU furnace. |
| Appliances | 1.2ft ³ microwave, 18 ft ³ refrigerator, and electric range and oven. | Electric 30" gas range, and 14 ft ³ refrigerator | Propane stove, electric refrigerator (full size), and microwave oven. |
| Water heater | Electric, 40 gallon, located behind the kitchen and bathroom. | 20 gallon | Propane, capacity between 6- and 10-gallons. |
| Furnishing | Fully furnished. | UK | Fully furnished |
| Sleeping Areas | 3- Each bedroom designed for 2 people. | 2-3 sleeping areas. | 3 sleeping areas. |
| Master sleeping area | 9'x13' | Queen size bed | Full or queen size bed. |
| Sleeping – 2 | 7'x9' | Queen size sofa bed | Double bunk for children (does not fit a full sized adult) |
| Sleeping – 3 | 8'x13' | Can mount a twin fold-down bed above sofa. | Sofa bed (does not fit a full sized adult). |
| Bathroom | Yes, 1 | Yes, 1. | Yes, 1 |
| Living room | Yes, 1 | Yes, 1. | Yes, 1 (also serves as a sleeping area) |
| Laundry area | yes, 1 | No. | No |
| Hallways | 42" wide. | None. | None. |
| Doorways | 36" wide | | 32" - non-ADA units. ADA units - 36" to 60". |
| Exterior covering | Vinyl siding, white or off white. | Cementitious siding, vinyl or backed enamel.. | External appurtenances may include: awnings, antennas, satellite dishes and other devices. |
| Safety equipment | Smoke detector, electric w/battery back-up, and fire extinguisher. | Smoke detector and fire extinguisher. | Smoke detector, fire extinguisher, safety glass windows, multiple egress windows, and dual hitch safety chains, break-away switch |
| Warranty | | | Warranty for unit and furnishings. |

UK= Unknown

* Source: Manufactured Housing Industry Association, <http://www.manufacturedhousing.org/>.
 ** Source: (33), and Cavco Industries, <http://www.cavco.com/parkmodel/default.asp>.
 ‡ Source: (29).

Methodology for placing units on private sites

The FEMA Temporary Housing Mission as defined in the Corps of Engineers (USACE) QA Travel Trailer Installation Guide describes typical procedures for a travel trailer placement and occupancy on a private homeowner’s site. The process begins with the homeowner applying for a trailer to be located at a primary residence. The USACE QA or other representative will make an appointment with the applicant to discuss and sketch the location of the trailer, locate a sewer tie in point, electrical and water source. FEMA may direct GSA to purchase the trailers and may have a separate contractor haul and install the trailer based on the QA sketch showing the tie in points. Permit(s) may be required by local jurisdictions. The QA will then inspect the trailer to ensure that it is properly installed and verify the operation of the trailer's critical systems. Once the trailer has been verified to be installed properly and is clean and in good working order, FEMA will lease the applicant into the trailer and provide training on the use of the trailer's critical systems. It is at this point that the applicant will be furnished a key and allowed to occupy the trailer. An agreement on progress on the primary residence may be required.

Form-1 USACE Travel Trailer/ Mobile Home Quality Assurance Inspection Form

COUNTY _____ CONTRACTOR _____

| READY FOR OCCUPANCY STATUS | | | | |
|--|---|--|---------------------------------------|--------------------------------------|
| FEDERAL EMERGENCY MANAGEMENT AGENCY (Disaster Temporary Housing Program) | TEMPORARY HOUSING REQUEST NUMBER | CONTRACT WO NUMBER | TT/MH BAR CODE NUMBER | |
| <input type="checkbox"/> MH <input type="checkbox"/> TT <input type="checkbox"/> OTHER | | | | |
| APPLICANT NAME | ADDRESS | CITY | | |
| INSPECTION: | | | | |
| TT/MH SERIAL No./VIN #: _____ | | | | |
| INSTALLATION ON THE IDENTIFIED ABOVE IS COMPLETED AS FOLLOWS: | | | | |
| <input type="checkbox"/> Blocked No. of blocks _____ | <input type="checkbox"/> Propane Tanks | <input type="checkbox"/> Fire Extinguisher | <input type="checkbox"/> Heat | <input type="checkbox"/> Toilet |
| <input type="checkbox"/> Jacked No. of Jacks _____ | <input type="checkbox"/> Sewer Connected | <input type="checkbox"/> CO Detector | <input type="checkbox"/> Stove | <input type="checkbox"/> Bath/Shower |
| <input type="checkbox"/> TT/MH Level ? | <input type="checkbox"/> Electric Connected | <input type="checkbox"/> Smoke Detector | <input type="checkbox"/> Refrigerator | <input type="checkbox"/> Lights |
| <input type="checkbox"/> Strapped No. of Straps _____ | <input type="checkbox"/> Water Connected | <input type="checkbox"/> Hot Water | <input type="checkbox"/> Microwave | <input type="checkbox"/> Keys |
| <input type="checkbox"/> Steps/Ramp | <input type="checkbox"/> PRV | <input type="checkbox"/> Air Conditioning | <input type="checkbox"/> Sinks | |

MARK LOCATION OF EXTERIOR DAMAGE ON DIAGRAM BELOW:

REAR

RIGHT SIDE

LEFT SIDE

FRONT

OCCUPANT SIGNATURE

INSPECTOR SIGNATURE

DATE

FEMA REPRESENTATIVE SIGNATURE

DATE

Form-2 Ready for Occupancy (RFO) CHECK LIST

| | |
|---|------------------------|
| Name: | Contractor: |
| Site Address: | Inspector: |
| City/State: | Date Completed: |
| 1. Run water in kitchen sink | |
| 2. Run water in bathroom sink | |
| 3. Flush toilet | |
| 4. Run water in bathtub | |
| 5. All furniture present? | |
| 6. All cabinet doors present? Do they operate freely? | |
| 7. Check range and vent hood operation | |
| 8. Check water heater operation | |
| 9. Are there two keys per door? | |
| 10. Did the contractor level the trailer? | |
| 11. Do all the lights work? | |
| 12. Is the trailer clean? | |
| 13. Any damage to interior walls? | |
| 14. Any damage to exterior panels/walls? | |
| 15. Check electrical receptacles | |
| 16. If no water service, is the water heater breaker turned off? | |
| 17. Number / location of tie downs | |
| 18. Is there a sewage clean-out? | |

Appendix E. List of Sites Visited

Appendix F. List of People Interviewed

1. DEL JEN

Chuck DeBellevue

(310) 941-8872 cell

cdebellevue@del-jen.com

Baton Rouge, LA Office

PRI/DJI FEMA IA MDC

10988 N. Harrells Ferry Road

Baton Rouge, LA 70816

(225) 272-8570

John “Jack” Donohoe (interview)

Program Manager

(225) 272-8570 x4510

(225) 241-8245 cell

jdonahoe@del-jen.com

Slidell, LA Field Office

2263 2nd Street

Slidell, LA 70458

(985) 641-9962

Sites visited:

- Tammany Mobile Home Park, total of 458 with 12 park models (these are the mini mobiles) the rest Travel Trailers (TTS)
- I-59 MHP 135 mostly MH models, a few TTS and the rest are not FEMA
- Azalea Lane MHP has 20 TTS
- Sandra Johnson RV Park has 20 TTS
- Camp Villerre having 15 TTS (did not see)

Glenn Lott

Curtis Brown (brief interview)

Ray Stallworth, Quality Control Inspector (led tour)

Rodney Murphy, Quality Control Inspector (led tour)

(985) 265-6207 cell #1

(225) 226-2808 cell personal

rmurphy@pridji.com

Gulport, MS Field Office

14410 Creosote Road

Gulfport, MS 39503

(228) 868-8921

Sites visited:

- Elzey MHP – 162 MHs and park models
- EGS – 3 separate contracts ~ 150 MHs with no skirting

Phil Price (228) 868-8921 x4610 (interview)

Mark Sarver (228) 868-8921 x4612

Gwendolyn Clement (985) 707-4133 cell (led tour)

New Orleans, LA Field Office

5700 Bullard Ave.

New Orleans, LA 70114

Sites visited:

- SUNO campus ~ 500 TTs and ADA park models
- Various EGS – smaller, all TTs and ADA park models
- 2 Convent sites

Jerry Tullos (DCRecovery) (interviewed)

Project Manager

(504) 784-2420

jtullos@delthacorporation.com

Mark Rudison (led tour)

Site/Operations Manager

(504) 784-2343

(310) 292-997 cell

mrudison@del-jen.com

2. SHAW

Chris Rinaudo

Chris.rinaudo@shawgrp.com

Charlie Hess

Vice President

(202) 261-1944

Charlie.hess@shawgrp.com

Baton Rouge, LA Office

(225) 932-2500

Chip Desonier

(225) 987-7101

Mike Budro

New Orleans, LA Office

Mounes Street (off of Clearview exit) – in Metairie

Sites visited:

- Re-activation/Deactivation lot
- Urban EGS with playground
- Urban EGS with Modular Units

John “Kevin” Neal (led tour)

Project Manager

(913) 915-4436

John.neal@shawgrp.com

Jason (led tour)

(225) 303-7671

Other (led tour)

Appendix G – Additional Site and Housing Observation Information

Table-1 Travel trailers observed during site visits

Gulf Stream Coach, Cavalier
 R-Vision, Trail Sport and Max-Lite
 Jayco, Jay Flight
 Thor, Wanderer and Dutchmen
 Shadow Cruiser, Liberty
 Fleetwood RV
 Springdale
 Forest River
 Heartland
 Aberdeen
 Celebrity
 Morgan
 Timberlodge

Table-2 Specifications for some of the trailers used for displaced Katrina survivors

| Specifications | Trail Sport* | Max-Lite** | Jay Flight# |
|----------------------------------|--|--------------------------------|--|
| Length | 21'2"- 31'8" | 27'6" – 31'6" | 22'6" – 30'6" |
| Width | 96" | 8' | UK |
| Height (w/o AC) | 9'9" | 10'3" | 124" - 130" (w/AC) |
| Electrical System | 120V, 30 Amp | 55 Amp | 120V 30 Amp |
| Propane | Yes | Yes | Yes |
| Washer and Dryer Capacity | | | |
| Air conditioning | Optional | | Optional |
| Heating | 20,000 BTU furnace | 30,000 BTU furnace | Furnace |
| Appliances | Propane stove and electric refrigerator | Stove and refrigerator | Stove and refrigerator |
| Potable water system | 30 gallon tank | 40 gallon tank | 37 – 57 gallon tank |
| Waste water | 30 gallon tank | 40 gallon tank | 33 gallon tank |
| Water heater | | 6 gallon | 6 gallon gas-electric |
| Smoke detector | Yes | UK | Yes |
| Fire extinguisher | Yes | UK | Yes |
| Furnishing | UK | UK | UK |
| Bedrooms | Between 1 and 3 sleeping areas | Between 1 and 2 sleeping areas | Sleeps between 4-10 |
| Exterior covering | Fiberglass skin, rubber roof | Fiberglass skin, rubber roof | Aluminum |
| Exterior lighting | Patio light | Patio light | Patio light |
| Warranty | For unit and furnishings | For unit and furnishings | For defects in materials and workmanship |
| Other Safety Equipment | LP Detector Safety Chains Ground Fault Protected Circuit(s) Dead Bolt Door Lock | UK | Propane/gas leak detector Break-away switch Dead-bolt lock on entrance Dual hitch safety chains Multiple egress windows Carbon Monoxide detector Tinted safety glass windows |
| Notes | The information provided was for typical trailers; it is possible the units used by FEMA varied. | | |

*Source: R-Vision website, <http://www.trail-lite.com/PDFs/Trail-Sport.pdf>

**Source: R-Vision website, <http://www.trail-lite.com/PDFs/Max-Lite.pdf>

Source: Jayco website, <http://www.jayco.com/php/products/floorplans.php?id=122>

Appendix H – Contractor Monthly Maintenance Checklist
Appendix I – Contractor Work Order