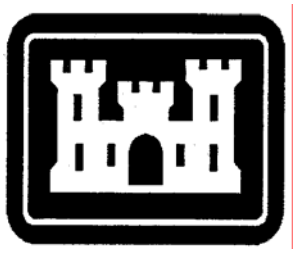
TEMPORARY HOUSING

HURRICANE KATRINA CATASTROPHIC SHELTERING PLAN FOR 50,000 CITIZENS

September 2005



US Army Corps Of Engineers

Catastrophic Sheltering Plan for 50,000 Citizens

FEMA Mission Assignment Number:

Introduction: This document has been created at the request of FEMA and outlines a method of housing 50,000 citizens in a very short order of time. It is meant to provide immediate temporary housing for citizens in or near communities capable of supporting a fairly large influx of people. It is understood that in the Hurricane Katrina event FEMA has awarded 5 Individual Assistance – Technical Assistance Contracts (IA-TAC) and that these contractors will likely be directed to implement this plan. COE participation at this time is expected to be limited to technical review of contract execution documents, quality assurance of construction in the field, participation of contractor led strike teams, and NEPA compliance review. Strike team responsibilities include assessment of potential sites for construction of temporary housing and should be provided with the site assessment criteria in this document (Attachment D).

It is further understood that FEMA Housing Area Command (HAC) has the responsibility to authorize implementation of this plan through their IA-TAC contractors or through the U.S. Army Corps of Engineers. The use of a military battalion construction group may be also considered by FEMA although it is recognized that FEMA does not have authority to directly task a military command.

Catastrophic Housing Resources: The U.S. Army Corps of Engineers has performed extensive research on expedient housing that can be used in response to natural disasters. This report summarizes a concept that could be used to house 50,000 citizens. It should be noted that extensive resources are available on the St. Paul District FTP website which can be accessed at the following URL: ftp://ftp.mvp.usace.army.mil/Temp_Housing/CatHousing/

Parameters: This planning document is intended to provide a baseline concept that could be implemented in any location that meets the minimum site selection criteria shown in Attachment D. Accordingly, the parameters of this plan are defined as follows:

- Provide expedient housing for 50,000 citizens
- A family unit is assumed to be 2.5 to 4.0 people
- 12,500 to 20,000 Dwelling units (Travel trailers, containerized units, SEA Huts etc.) will be required to house 50,000 citizens.
- It will be necessary to utilize the National Guard for security purposes.
- Group shelter and food distribution facilities will be provided in the centralized area and that Red Cross and other Non-Government Organization (NGO) assistance will be available for distribution of food.
- FEMA Strike Teams, as directed by IA-TAC Contractors will provide initial site assessments for emergency group sites and for support center areas. Support centers are located in a central area, surrounded by 5 emergency group sites and provide essential support facilities such as food distribution and medical services to citizens. Reference Attachment E.

- FEMA typically supplies dwelling units for Emergency Group Sites, but this should not be assumed. Coordination with FEMA will be required to determine this process.
- Emergency Group Sites shall be designed to standard Federal Codes and typical state codes. State and local codes, permits and zoning including floodplain requirements may or may not be waived by the state and local governments. Obtaining state and local permits can be time consuming.
- Clusters of housing should be located in a locality with a school system that can reasonably support student refugees. A cluster consists of one centralized support center with 5 emergency group sites located in the surrounding vicinity. Reference Plate 1.
- The timeline provided is based on finding sites that can receive a categorical exclusion for NEPA requirements and that real estate agreements (leasing contracts) can be obtained in very short order. Real estate acquisition is critical to the success of this plan.

Concept: The preferred method of housing mass numbers of citizens is to provide a centralized support area surrounded by several emergency group sites of approximately 200 units each. The centralized support center would provide expedient housing for citizens that would eventually flow to one of the nearby emergency group sites. It should be located in or very near a locality of at least 10,000 people so that the possibility of using public utilities exists. It is also highly desirable to locate each cluster in or near a community that can provide schools, doctors, law enforcement and fire fighting capabilities. The support center would require an area of about 10 acres so that appropriate support facilities can be provided. A large existing building (i.e. airport hanger, etc) or Large Rapidly Deployable Structures (LRD structures) could be used within the central area (Reference Attachment E). The interiors of any large building or LRD structures should be constructed to house 600 to 1000 citizens using cubicle style or tent type structures (250 units). Support facilities would include:

- Bathroom/shower facilities
- Kitchen facility and communal dining area (Potentially use Forest Service Contract)
- Laundry facilities or Service
- Centralized garbage service (dumpsters)
- A pre-packaged sewage treatment plant (~2 week lead time). Public sewer is recommended if available.

The delivery and construction of LRD structures may take 3-4 weeks. Smaller LRD structures are more readily available and may be delivered in a shorter period. Large canvas tents could be used temporarily until the LRD structures can be deployed and smaller canvas tents could be used for support facilities such as a medical facility.

Five 200-unit emergency group sites (EGS) should be located within a reasonable distance of the centralized support center and would require about 8 acres each. Bus service should be provided between the EG Sites and the centralized support facility. Housing units at each EG site may consist of travel trailers, containerized housing units, or SEA hut type structures. Full utilities would be provided to each EG site through the use of public utilities or by the use of generators, water tankers, and holding tanks for sewage. However it is highly desirable

to have power available to avoid the running of generators. Bottled water must be distributed to each EG site until such time as state testing requirements for potable water can be met. Support facilities at each EG site would include the following:

- 200 housing units consisting of travel trailers, containerized units, or SEA huts.
- A National Guard support/security structure and sleeping facility.
- Laundry service if not available in locality
- Centralized garbage collection
- Perimeter and utility corridor security fencing

In this manner each cluster can reasonably house 3-5 thousand people, and the cluster concept would be repeated as many times as necessary to meet demand. Anywhere from 10 – 16 clusters will be required to house 50,000 people (assumes 1000 units in EG sites, 250 units in the central support center and a family size of 2.5 – 4.0).

Emergency Group Site Concept
An EGS is a rapidly deployed temporary housing site for individuals and families displaced from their permanent residences as a result of natural disasters. The intent of an EGS is to provide short-term housing until longer-term housing is available. The EGS concept was first used following the 2004 Florida hurricanes using travel trailers as the dwelling unit.

Travel Trailers
A Travel Trailer EGS consists of groups of travel trailers that are connected to above ground power, potable water, and sanitary sewer services. The utilities to the trailers are constructed above ground to speed construction and are sufficient to accommodate the planned short operational period of the site. Ideally, the EGS will tie into existing utility services (power, city water, and sanitary sewer). An EGS can also be operated with on-site generators, trucked in potable water, and a service for disposal of sanitary waste.

More detailed information on EGS sites using travel trailers can be found Chapter 10 of the Catastrophic Housing Guide referenced as Attachment A. The Draft EGS Field Guide referenced in Attachment B contains detailed information concerning the use of EGS, design drawings (including CADD), checklists, and additional information.

Containerized Housing
Containerized Units are a housing option that could be utilized for temporary housing. Containerized Units have not been used at the time of this report; however, it is feasible that they could be used as an option for emergency housing. The concept identified in this plan would utilize containerized units and assemble them in a typical EGS configuration. Containerized units can be set on relatively flat ground, paved area, or a gravel pad. Utilities could be underground or above ground similar to an EGS Site. Delivery and placement of the units would require the use of a crane or large forklift to lift the unit off a truck and place it in the desired location. Supply of containerized units may be limited. A large supply would require ordering units and ramping up manufacturing plants to meet the required demand. Additional information can be found in Chapter 3 of the Catastrophic Housing Plan referenced as Attachment A.

SEA Huts (Stick Buildings)
Built in place conventionally framed wood structures are another possible temporary housing solution. These structures are very flexible and can be adapted to any climate. Possible configurations range from military style SEA Huts to row houses to multi-story apartments to small individual family units suitable for erection on a suburban lot. A wide range of utility arrangements could be used from full residential sewer, water, electric, telephone, and cable to more austere arrangements that utilize central shower and dining facilities. Time of construction is relatively long. Construction time would depend in large part on the degree of panelized or modular construction utilized. Currently, about 36,000 units of modular housing are constructed in the United States annually. Typical lead-time is 8 weeks for modular units. Modular housing units arrive pre-constructed on site in sections small enough to be transported by truck. They are then lifted into position with a crane and set on the foundation. Average construction time ranges from 4 to 8 weeks. If standard designs are used, it is estimated that these production and construction times could potentially be cut in half.

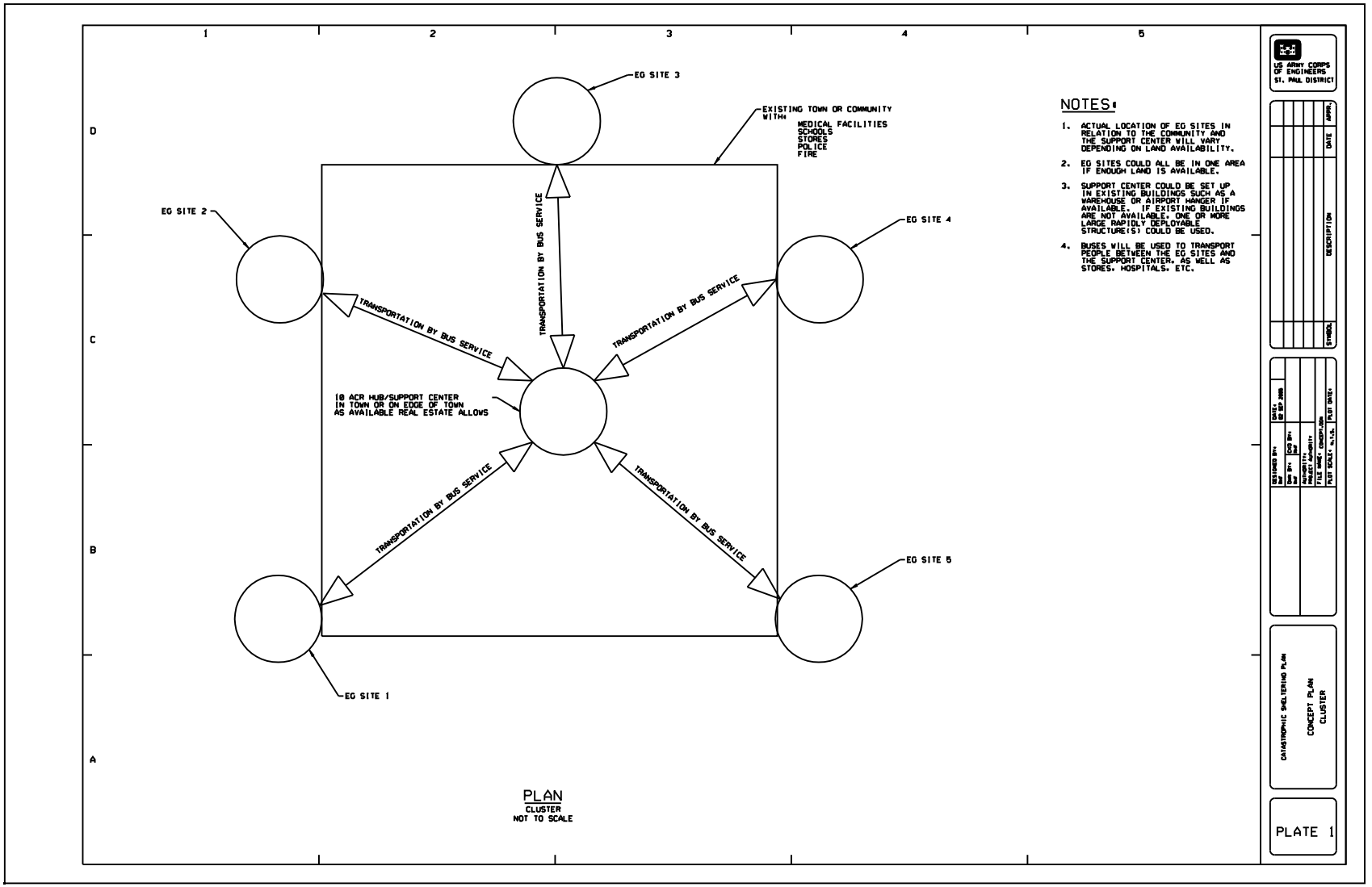
This potential solution has no value for spontaneous or emergency housing and only limited potential for interim housing. The long construction time, relatively high cost ($65-$80 per square foot), and decommissioning difficulties make this a relatively unattractive interim housing solution. This option would also add additional strain on wood product supplies that will be required in the disaster area. Due to time and resource constraints this temporary housing option is not recommended for short-term response during this disaster. Additional information on stick and modular housing can be found in Chapter 6 of the Catastrophic Housing Plan referenced as Attachment A.

Use of Mobile Homes in EG Sites
Use of mobile homes as a substitute for travel trailers in an EG Site is possible, but is not a desirable option. Construction time and cost would increase due to the large number of piers and anchors required for each mobile home, and the large size of the mobile homes would reduce the density of the developments. This would also impact the number of mobile homes available for mobile home group sites.

Mobile Home Group Sites
Mobile home group sites have been used in the past as a longer-term solution to housing; however, this report has concentrated on more immediate housing strategies. It is anticipated that mobile home group sites will be employed as a longer-term housing strategy for the response to Hurricane Katrina. Information on mobile home park development is available in Chapter 9 of the catastrophic housing plan (Reference Attachment A). The down sides of this strategy are the time required for construction and the overall cost.

Accommodating ADA units
A small percentage of housing units (approx. 1%) are expected to be configured to ADA standards. These units take more space than standard units due to the requirement for ramps, and are expected to be accommodated in the design on a case-by-case basis. Larger size housing units such as park model mobile homes would be more desirable than travel trailers in these instances. Ideally, these units should be located at the central support facility. This

will improve the access to the support services for citizens in these units and will reduce or eliminate the need for handicap accessible buses to transport citizens between the EG Sites and the support facility.


EG SITE 3
EXISTING TOWN OR COMMUNITY WITH:
MEDICAL FACILITIES
SCHOOLS
STORES
POLICE
FIRE
EG SITE 2
EG SITE 4
TRANSPORTATION BY BUS SERVICE
TRANSPORTATION BY BUS SERVICE
TRANSPORTATION BY BUS SERVICE
@ ACR HUB/SUPPORT CENTER
IN TOWN OR ON EDGE OF TOWN
AS AVAILABLE REAL ESTATE ALLOWS
TRANSPORTATION BY BUS SERVICE
TRANSPORTATION BY BUS SERVICE
EG SITE 5
EG SITE 1
PLAN
CLUSTER
NOT TO SCALE
NOTES:
1. ACTUAL LOCATION OF EG SITES IN RELATION TO THE COMMUNITY AND THE SUPPORT CENTER WILL VARY DEPENDING ON LAND AVAILABILITY.
2. EG SITES COULD ALL BE IN ONE AREA IF ENOUGH LAND IS AVAILABLE.
3. SUPPORT CENTER COULD BE SET UP IN EXISTING BUILDINGS SUCH AS A WAREHOUSE OR AIRPORT HANGER IF AVAILABLE. IF EXISTING BUILDINGS ARE NOT AVAILABLE, ONE OR MORE LARGE RAPIDLY DEPLOYABLE STRUCTURE(S) COULD BE USED.
4. BUSES WILL BE USED TO TRANSPORT PEOPLE BETWEEN THE EG SITES AND THE SUPPORT CENTER, AS WELL AS STORES, HOSPITALS, ETC.
US ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT
SYMBOL
DESCRIPTION
DATE
APPR.
DESIGNED BY:
DRAWN BY:
CHKD BY:
DATE:
PROJECT MANAGER:
FILE NAME: CONCEPT.DGN
PLOT SCALE: N.T.S.
PLOT DATE:
CATASTROPHIC SHELTERING PLAN
CONCEPT PLAN
CLUSTER
PLATE 1

Implementation Team
The implementation team is a generic team based on the premise that it would require approximately 16 clusters of centralized support areas and associated emergency group sites in an effort to house 50,000 people.

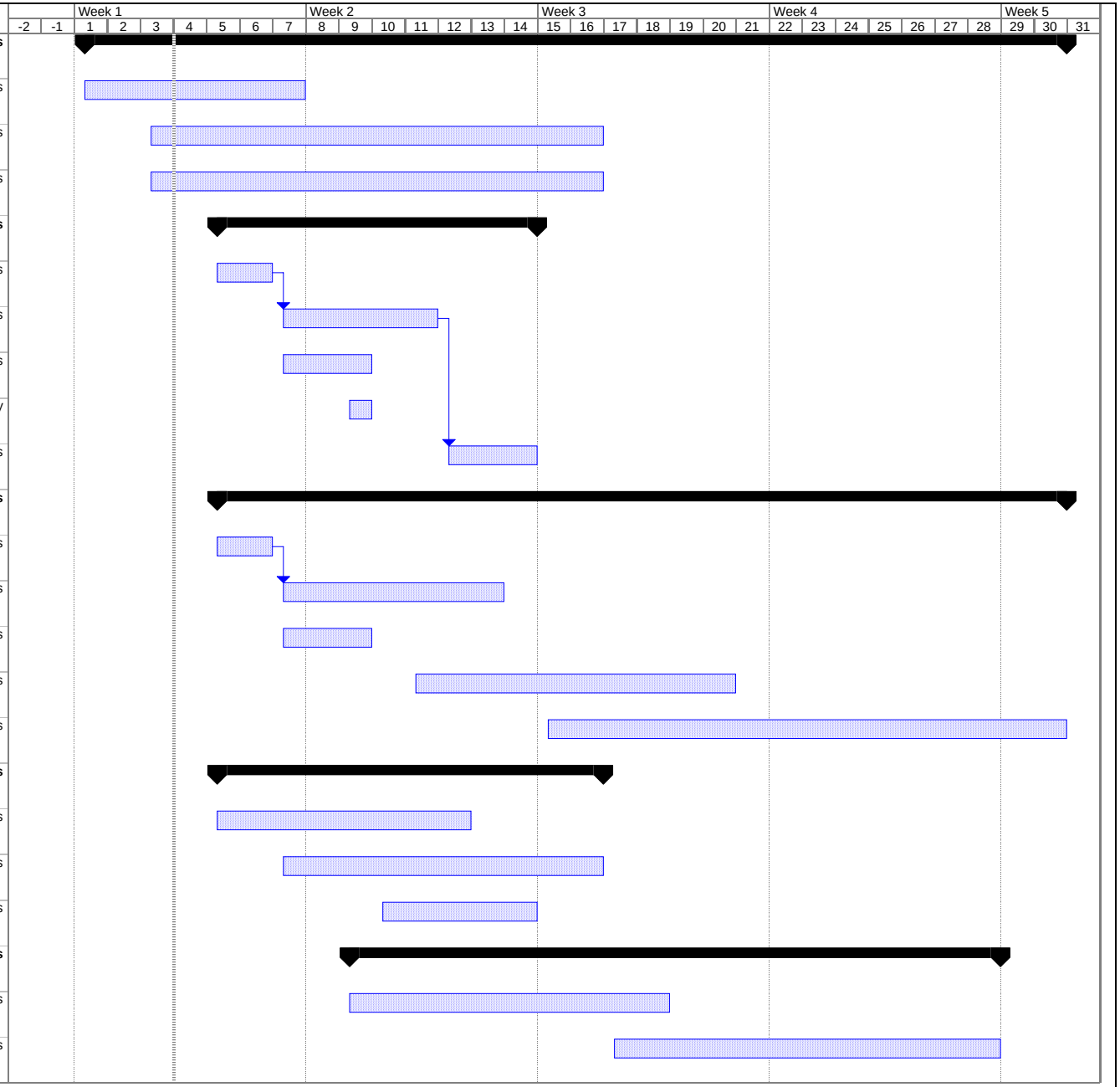
5	*Mission Managers (Project Supervisor)*
5	*Mission Specialists (Project Supervisor Assistant)*
5	*Action Officer (funding/admin/upward reporting through COE and FEMA)*
5	*Time Keepers / Clerical Staff*
2	*IM Support Staff*
16	*Project Managers*
32	*Site Engineers (16 for EGs & 16 for support centers)*
16	*Real Estate Specialists*
5	*Cost Engineers*
5	*Electrical Engineers*
8	*Environmental Specialists*
5	*GIS Specialists*
2	*Contracting Officials/Legal*
5	*Contracting Specialists/Purchasing Agents*
116	*TOTAL*

Construction QA Team

16	Resident Engineers
96	Construction Inspectors
32	Logistics Personnel
144	TOTAL

Timeline
The timeline shown below is based upon Corps of Engineers experience during the Florida hurricanes, and previous disasters. Assuming no supply problems, construction of the first 5 clusters could be accomplished in 30 days. In Florida the leasing of property for sites was a major challenge, especially when land was leased from private parties who required liability insurance. It is recommended that publicly owned lands be used whenever possible. Construction of clusters beyond the first five will take a similar amount of time and could even be built concurrently if supply of materials could keep up with construction. However it is expected that issues with availability of supplies and materials (trailers, containers, lumber, equipment, etc.) will arise, requiring at least a 120-day construction period. A typical bill of materials list for construction of a 200-unit travel trailer EG site is included in Attachment B, Section L.

ID	Task Name	Duration
1	**Timeline for first 5 Clusters**	**30 days**
2	Deploy House Team Members	7 days
3	Supply Acquistion - EG Site	14 days
4	Suppy Acquistion - Support Center	14 days
5	**Staging Area**	**10 days**
6	Staging Area Assessment	2 days
7	Staging Area Selection / Leasing	5 days
8	Staging Area NEPA Review Process	3 days
9	Staging Area Design	1 day
10	Staging Area Construciton - Existing Hard Stand	3 days
11	**Support Center - 5 sites, ~10 acres each**	**26 days**
12	Support Center Location Assessment	2 days
13	Support Center Selection/Lease	7 days
14	Support Center NEPA Review Process	3 days
15	Support Center Design	10 days
16	Support Center Construction	16 days
17	**EG Sites (EGS) - 25 sites, ~8 acres each**	**12 days**
18	Site Location Assessment	8 days
19	Site Selection / Lease	10 days
20	Site NEPA Review Process	5 days
21	**EGS - 5 clusters - 25 sites, 200 units each**	**20 days**
22	TT Site Design	10 days
23	TT Construction	12 days



Supplies, Resources and Leases will dicate the schedule.

Task | Progress | Summary | External Tasks | Deadline

Split | Milestone | Project Summary | External Milestone

Cluster Cost

It is anticipated that the design, site preparation, and installation of one Support Center with 5 - 200 unit EG sites will be approximately $16,000,000. It is assumed FEMA will provide travel trailers for the EG sites. For purposes of this estimate, travel trailers and containers are assumed to be $15,000 each, or $15,000,000 per cluster development. The estimate also includes line items for monthly maintenance and salvage/restoration cost for each cluster based on proposals from previous Hurricane deployments. The end cost will be highly variable depending on contracting method, site selection, site development, final layout and design criteria, availability of supplies, and available utilities.

Table Cost Summary

	Dwelling Units	Unit Cost	Total Cost
Design	1250	$ 800.00	$ 1,000,000.00
Construction	1250	$12,000.00	$16,500,000.00
Dwelling Unit	1000	$15,000.00	$15,000,000.00
Operation & Maintenance	1250	$ 2,800.00	$ 3,500,000.00
Salvage/Restoration	1250	$ 4,000.00	$ 5,000,000.00

Table is for design and construction of 1 cluster development consisting of 1 central support center and 5 EG Sites.
Dwelling units in this estimate includes 1000 travel trailers and 250-20x24 structures in the central support center.
The 250 central support center structures price are included in the construction cost line item.
Maintenance is an estimated monthly cost.
Salvage and Restoration is for site restoration and packaging of salvageable materials for storage.
Dwelling unit supply is assumed to be travel trailers provided by FEMA.
Real Estate costs not included.

Attachments/Links

Attachment A	Catastrophic Housing Plan

ftp://ftp.mvp.usace.army.mil/Temp_Housing/CatHousing/

Attachment B	Emergency Group Site Field Guide

ftp://ftp.mvp.usace.army.mil/Temp_Housing/CatHousing/EGS%20Field%20Guide/

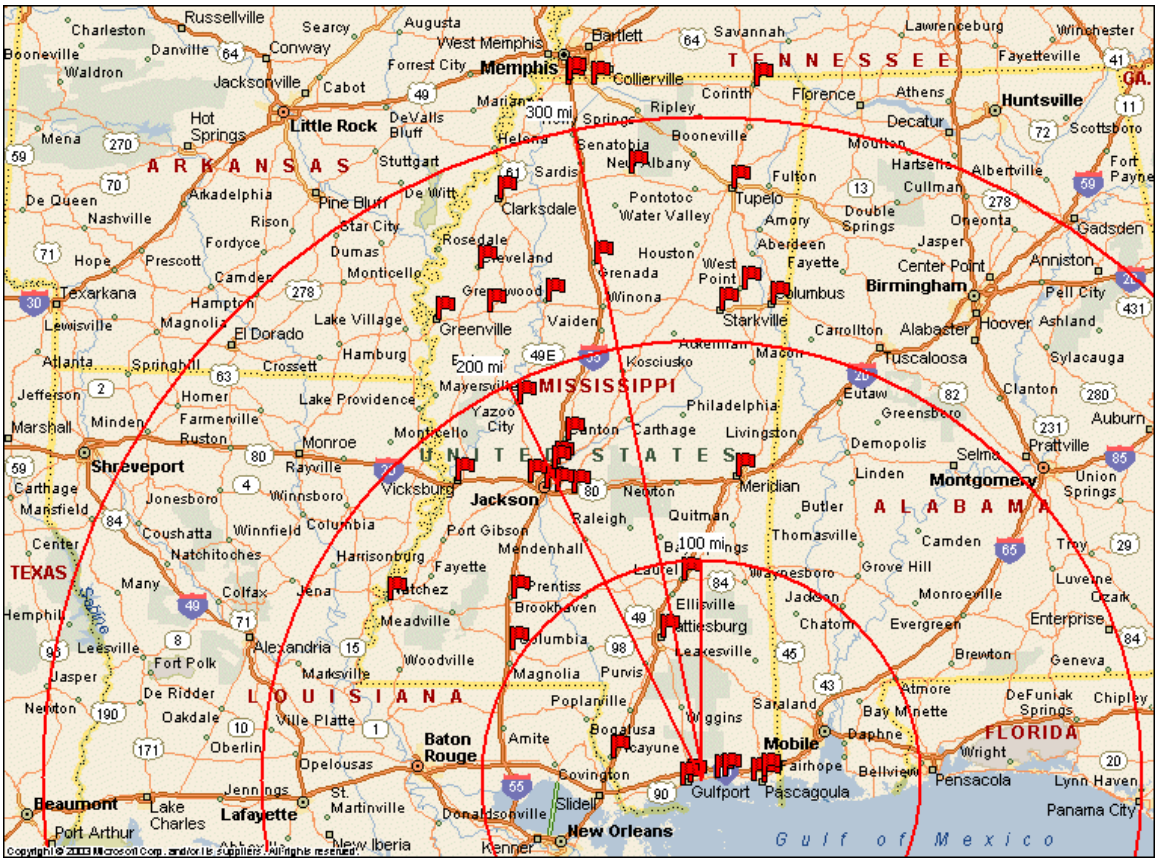
Attachment C	Population Centers over 9,000 (MS &LA)
Attachment D	Site Selection Criteria
Attachment E	Centralized Support Center Typical Layout
Attachment F	Emergency Group Site Typical Layout
Attachment G	Product Availability

ATTACHMENT C
Population Centers Over 9,000 (MS & LA)

STATE OF MISSISSIPPI
BIGGER CITIES (OVER 9,000 RESIDENTS)

CITY / TOWN	COUNTY	ELEVATION	POPULATION	DISTANCE FROM BILOXI	
Biloxi	Harrison	25	50,600	0.00	miles
Brandon	Rankin	486	16,400	175.67	miles
Brookhaven	Lincoln	487	9,800	184.38	miles
Canton	Madison	250	12,900	198.37	miles
Clarksdale	Coahoma	180	20,600	360.38	miles
Cleveland	Bolivar	140	13,800	379.50	miles
Clinton	Hinds	381	23,300	234.31	miles
Columbus	Lowndes	200	26,000	291.08	miles
Corinth	Alcorn	455	14,000	478.66	miles
Gautier	Jackson	15	11,700	17.59	miles
Greenville	Washington	125	41,600	364.69	miles
Greenwood	Leflore	130	18,400	287.12	miles
Grenada	Grenada	200	14,900	286.20	miles
Gulfport	Harrison	25	71,100	12.98	miles
Hattiesburg	Forrest	161	44,800	82.90	miles
Horn Lake	DeSoto	310	14,000	369.51	miles
Indianola	Sunflower	122	12,000	335.70	miles
Jackson	Hinds	294	184,300	174.47	miles
Laurel	Jones	264	18,400	116.25	miles
Long Beach	Harrison	15	17,300	17.02	miles
Madison	Madison	335	14,700	187.03	miles
McComb	Pike	417	13,300	160.39	miles
Meridian	Lauderdale	340	40,000	174.32	miles
Moss Point	Jackson	22	15,851	28.26	miles
Moss Point	Jackson	22	15,000	28.26	miles
Natches	Adams	230	18,500	226.73	miles
Ocean Springs	Jackson	30	17,200	4.73	miles
Olive Branch	Desoto	345	21,000	376.22	miles
Oxford	Lafayette	416	11,800	344.95	miles
Pascagoula	Jackson	16	26,200	21.36	miles
Pearl	Rankin	272	22,000	172.54	miles
Picayune	Pearl River	61	10,500	74.19	miles
Ridgeland	Madison	353	20,200	183.56	miles
Southaven	Desoto	320	29,000	376.02	miles
Starkville	Oktibbeha	374	21,900	280.17	miles
Tupelo	Lee	290	34,200	340.19	miles
Vicksburg	Warren	200	26,400	275.84	miles
West Point	Clay	240	12,145	303.49	miles
Yazoo City	Yazoo	120	14,500	279.85	miles

100 MILE, 200 MILE & 300 MILE RADIUS LINES FROM GULFPORT / BILOXI
MISSISSIPPI CITIES WITH POPULATIONS OVER 9,000 ARE FLAGGED

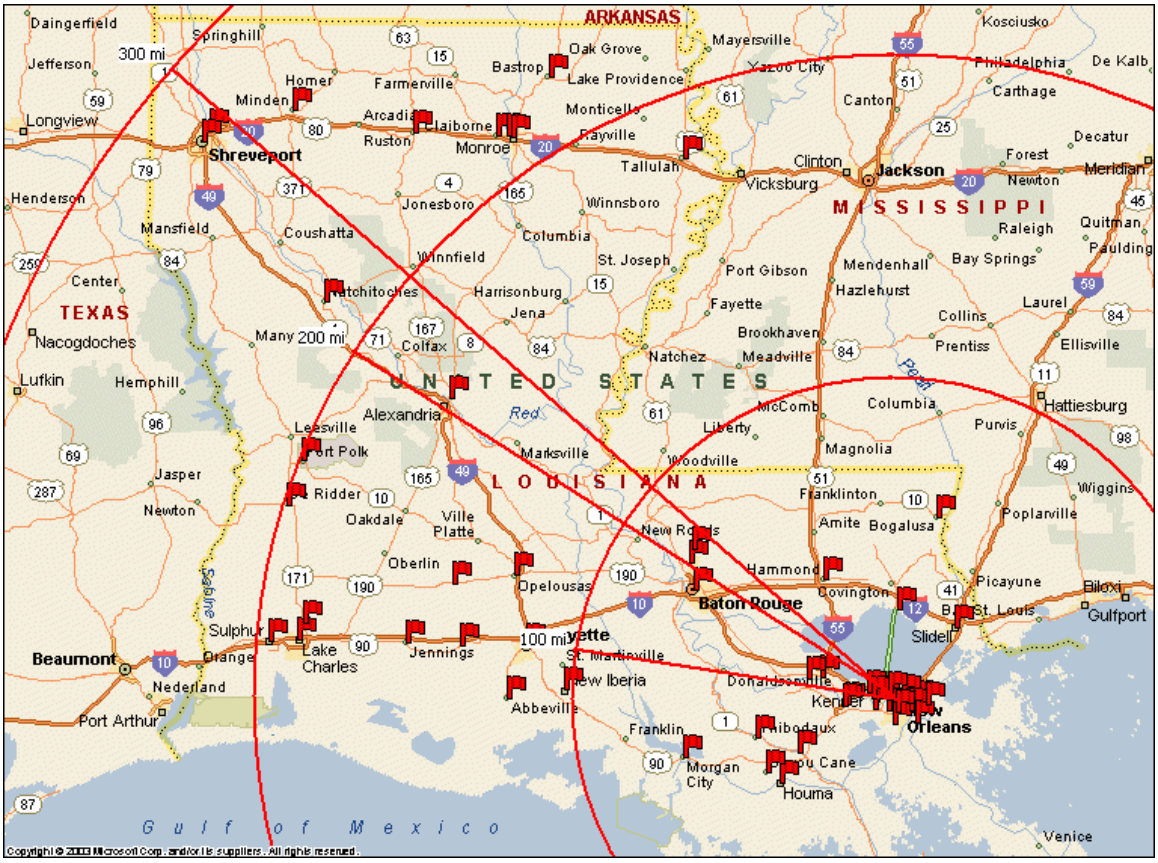


STATE OF LOUISIANA
BIGGER CITIES (OVER 9,000 RESIDENTS)

CITY / TOWN	COUNTY/PARISH	ELEVATION	POPULATION	NEW ORLEANS	
Abbeville	Vermillion	18	11,887	157.03	miles
Baker	East Baton Rouge	80	13,793	91.78	miles
Bastrop	Morehouse	126	12,988	322.78	miles
Baton Rouge	East Baton Rouge	53	227,818	79.81	miles
Bayou Cane	Terrebonne		17,046	61.96	miles
Belle Chasse	Plaquemines	3	9,848	15.79	miles
Bogalusa	Washington	101	13,365	68.92	miles
Bossier City	Bossier	170	56,461	341.87	miles
Chalmette	St. Bernard	7	32,069	8.07	miles
Claiborne	Ouachita	140	9,830	305.31	miles
Crowley	Acadia	21	14,225	156.61	miles
De Ridder	Beauregard		9,808	247.61	miles
Destrehan	St. Charles	10	11,260	23.34	miles
Estelle	Jefferson	5	15,880	12.52	miles
Eunice	St. Landry	49	11,499	173.83	miles
FortPolkSouth	Vernon		11,000	270.73	miles
Gretna	Jefferson	5	17,423	5.54	miles
Hammond	Tangipahoa	44	17,639	58.44	miles
Harahan	Jefferson	7	9,885	10.6	miles
Harvey	Jefferson	4	22,226	7.53	miles
Houma	Terrebonne	12	32,393	57.41	miles
Jefferson	Jefferson	5	11,843	6.17	miles
Jennings	Jefferson Davis	22	10,986	172.35	miles
Kenner	Jefferson	3	70,517	13.47	miles
Lafayette	Lafayette	41	110,257	135.39	miles
LakeCharles	Calcasieu	20	71,757	206.06	miles
Laplace	St. John the Baptist	13	27,684	29.11	miles
Luling	St. Charles	9	11,512	24.39	miles
Mandeville	St. Tammany	9	10,489	34.82	miles
Marrero	Jefferson	6	36,165	8.87	miles
Meraux	St. Bernard	9	10,192	8.84	miles
Merrydale	East Baton Rouge		10,427	12.78	miles
Metairie	Jefferson	2	146,136	6.13	miles
Minden	Webster	259	13,027	371.74	miles
Monroe	Ouachita		53,107	300.81	miles
MorganCity	St. Mary	8	12,703	85.26	miles
MossBluff	Calcasieu	24	10,535	206.91	miles
Natchitoches	Natchitoches	121	17,865	275.99	miles
NewIberia	Iberia	17	32,623	133.9	miles
NewOrleans	Orleans	11	484,674	0	miles
Opelousas	St. Landry	70	22,860	153021	miles
Pineville	Rapides	123	13,829	219.15	miles
Raceland	Lafourche	14	10,224	46.75	miles
Reserve	St. John the Baptist	13	9,111	35	miles
RiverRidge	Jefferson	5	14,588	10.24	miles

Ruston	Lincoln	319	20,546	322.8	miles
Shenandoah	East Baton Rouge??		17,070	298.28	miles
Shreveport	Caddo	209	200,145	341.98	miles
Slidell	St. Tammany	9	25,695	31.35	miles
Sulphur	Calcasieu	15	20,512	216.43	miles
Tallulah	Madison	87	9,189	247.32	miles
Terrytown	Jefferson		25,430	5.46	miles
Thibodaux	Lafourche	14	14,431	66.22	miles
Timberlane	Jefferson??		11,405	346.63	miles
Waggaman	Jefferson	6	9,435	16.53	miles
WestMonroe	Ouachita	88	13,250	304.28	miles
Westwego	Jefferson	5	10,763	11.87	miles
Woodmere	Jefferson		13,058	11.68	miles
Zachary	East Baton Rouge	100	11,275	96.44	miles

100 MILE, 200 MILE & 300 MILE RADIUS LINES FROM NEW ORLEANS
LOUISIANA CITIES WITH POPULATIONS OVER 9,000 ARE FLAGGED



ATTACHMENT D
Site Selection Criteria

EGS (Emergency Group Sites)

One of the more critical and time-consuming steps in the EGS implementation process can be the signing of a property lease with a private landowner or a memorandum of understanding (MOU) with a government agency. The time required to execute a lease is highly variable but may exceed what is desired for the implementation of an EGS. Typically, MOU's can be executed in a more expedient manner than a lease, with the added bonus of little or no cost. Consequently, government-owned property has an advantage over privately-owned property both in terms of cost and time. Ideally, the lease or MOU would be obtained within 72 hours of the site being investigated and approved for EGS use.

The local government is the most valuable tool in identification of potential sites. An initial meeting should be established with the local government to discuss site requirements for EGS and begin identification of potential sites. Regular meetings (daily) with the local government should be scheduled to update site identification information and status. Sites should be ranked and local governments updated on status regularly. Desired characteristics of a site include the following:

1. Site is within the identified area of demand
2. Paved Site of approximately 8 acres (based on 200 dwelling units utilizing travel trailers at a density of 25/acre) that is relatively flat with good drainage. Smaller sites are usable, but developments of less than 100 dwelling units should be avoided. Less preferable are sites with unpaved surfaces that are well drained and require minimum site preparation/modification. Unpaved sites may require an environmental assessment, which may cause detrimental delays to the project schedule. Unpaved sites that require grading and/or gravel placement for drainage and stability are less desirable.
3. Government owned sites are preferred (especially local). Privately owned sites are less desirable as leasing property can be time consuming and costly.
4. Site must be well drained with no identified flooding/internal drainage problems.
5. Minimum Site Preparation (debris removal, etc.).
6. Additional considerations include the effects of the site on the surrounding area and the effects of the surrounding area on the site. Examples include considerations of effects on and from traffic flow, site accessibility, noise considerations, safety considerations, etc.
7. Site has accessible shopping areas nearby.

Utility requirements for the EGS are as follows (refer to section on Utilities in the Emergency Group Site Field Guide for an in-depth description):

1. Municipal water nearby, operational, with adequate capacity to meet increased demand. Should have easy access. Less desirable alternative includes stainless steel tanker used for water supply.
2. Sanitary Sewer nearby, operational with sufficient depth for gravity outlet for entire site, with adequate capacity for the anticipated load increase. Less desirable alternatives include polyethylene holding tanks, lift stations or packaged sewage treatment plants. Avoid above ground polyethylene holding tanks if at all possible. These need pumping on a daily basis (sometimes more often) and can easily become health hazards because of the high potential for spillage during pumping or overflow.
3. Power supply nearby and operational. Less desirable alternative includes use of generators for power supply. Coordination with the Utility is essential to provide the required drop points and scheduling. Power companies often make restoring or running short lines into EG sites a priority.

Ideally a site will have municipal electrical, water, and sewer systems that can be directly tied into. Coordination with the local utility authority is required to ensure existing systems have adequate capacity for the increased demand or load required by the development. Limits on water usage may need to be implemented to avoid overloading available facilities.

Natural gas is not required in a typical EGS utilizing travel trailers. Typically each travel trailer is supplied with propane tanks and a maintenance contract is used to keep an adequate supply of propane for each trailer.

Support Center

During the initial meeting with the local government to discuss site requirements for EG Sites, the requirements for the support center(s) should also be discussed and identification of potential sites should be initiated. Desired characteristics of a support center site include the following:

1. Site is within the identified area of demand, preferably located to minimize transportation requirements between the EG Sites and the support center.
2. Paved Site of approximately 10 acres (for Large Rapidly Deployable Structures, tents and other support equipment and supplies) that is relatively flat with good drainage. Smaller sites may require the use of multiple sites for the support center and would be less desirable. Less preferable are sites with unpaved surfaces that are well drained and require minimum site preparation/modification. Unpaved sites may require an environmental assessment, which may cause detrimental delays to the project schedule. Unpaved sites that require grading and/or gravel placement for drainage and stability are less desirable.

3. Sites with existing large structures such as warehouses or aircraft hangers that can take the place of the LRDS are preferable.
4. Government owned sites are preferred (especially local). Privately owned sites are less desirable as leasing property can be time consuming and costly.
5. Site must be well drained with no identified flooding/internal drainage problems.
6. Minimum Site Preparation (debris removal, etc.).
7. Additional considerations include the effects of the site on the surrounding area and the effects of the surrounding area on the site. Examples include considerations of effects on and from traffic flow, site accessibility, noise considerations, safety considerations, etc.
8. Consideration should be given to separating truck traffic from citizens when selecting the site. It is preferable to use a site that has more than one access point so that citizens can enter and leave the site in an area that is separated from the entrance to be used by truck traffic bringing supplies in and refuse out.

Utility requirements for the support center are as follows:

1. Municipal water nearby, operational, with adequate capacity to meet increased demand. Should have easy access. Less desirable alternative includes stainless steel tanker used for water supply.
2. Sanitary Sewer nearby, operational with sufficient depth for gravity outlet for entire site. Less desirable alternatives include polyethylene holding tanks, large bladders, lift stations or packaged sewage treatment plants. Avoid above ground polyethylene holding tanks and/or bladders if at all possible. These require regular pumping and can easily become health hazards because of the high potential for spillage during pumping or overflow.
3. Power supply nearby and operational. Less desirable alternative includes use of generators for power supply.

Ideally a site will have municipal electrical, water, and sewer systems that can be directly tied into. Coordination with the local utility authority is required to ensure existing systems have adequate capacity for the increased demand or load required by the development. Limits on water usage may need to be implemented to avoid overloading available facilities.

Staging Areas

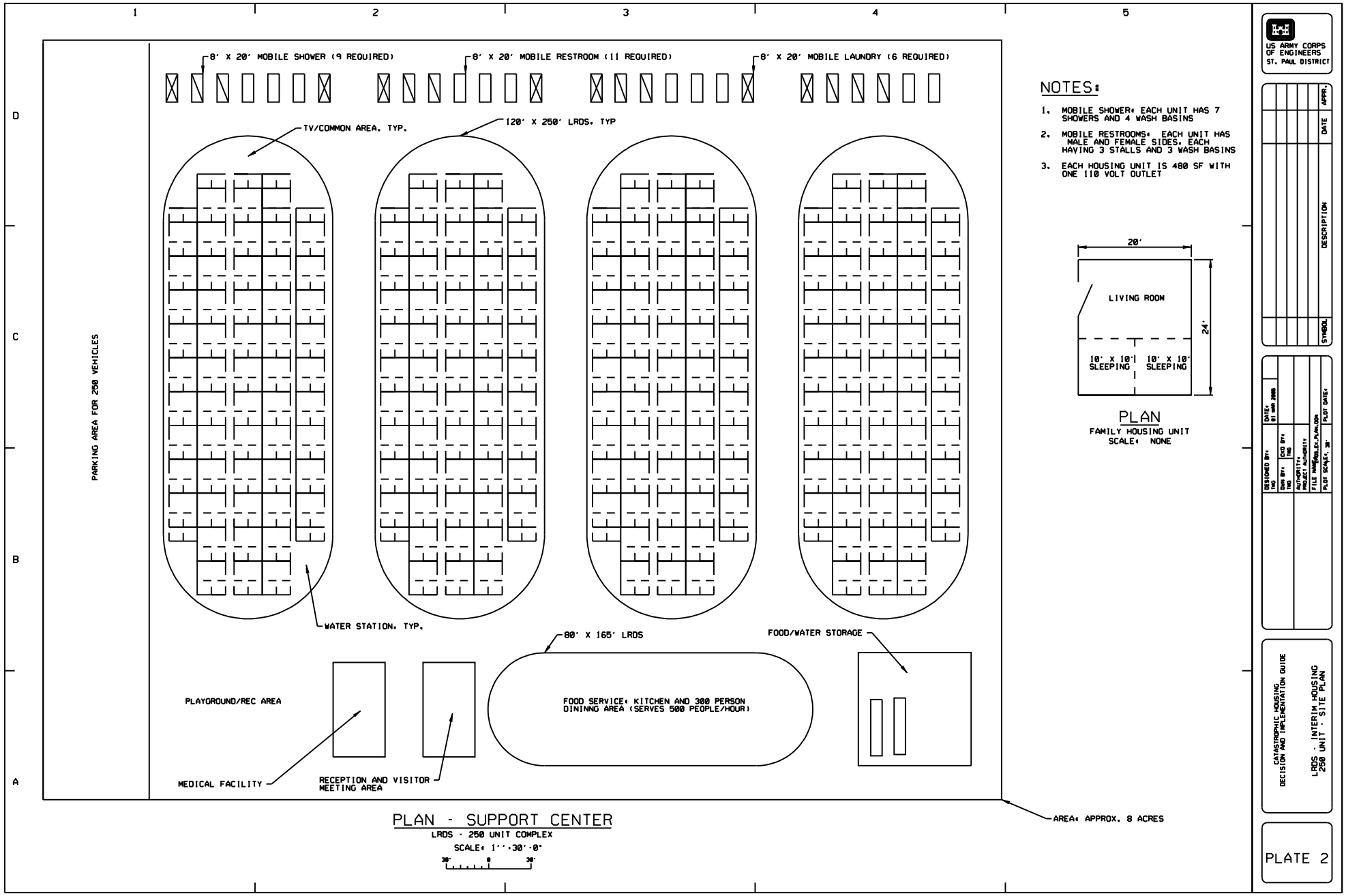
Staging areas are open space parking areas used to stockpile dwelling units such as containerized units, travel trailers, mobile homes, and associated equipment. Each staging area typically has one entrance/exit point with an office trailer used for logistics personnel assigned for tracking and inspecting each dwelling unit. Because personnel will be on site 24 hours a day to receive and inspect trailers and other supplies, provisions must be made to provide office space and shelter for logistics personnel. Normally all units are delivered to one central location, (staging area), and distributed from there. During the initial meeting with the local government to discuss site requirements for EG Sites, the requirements for staging areas should also be discussed and identification of

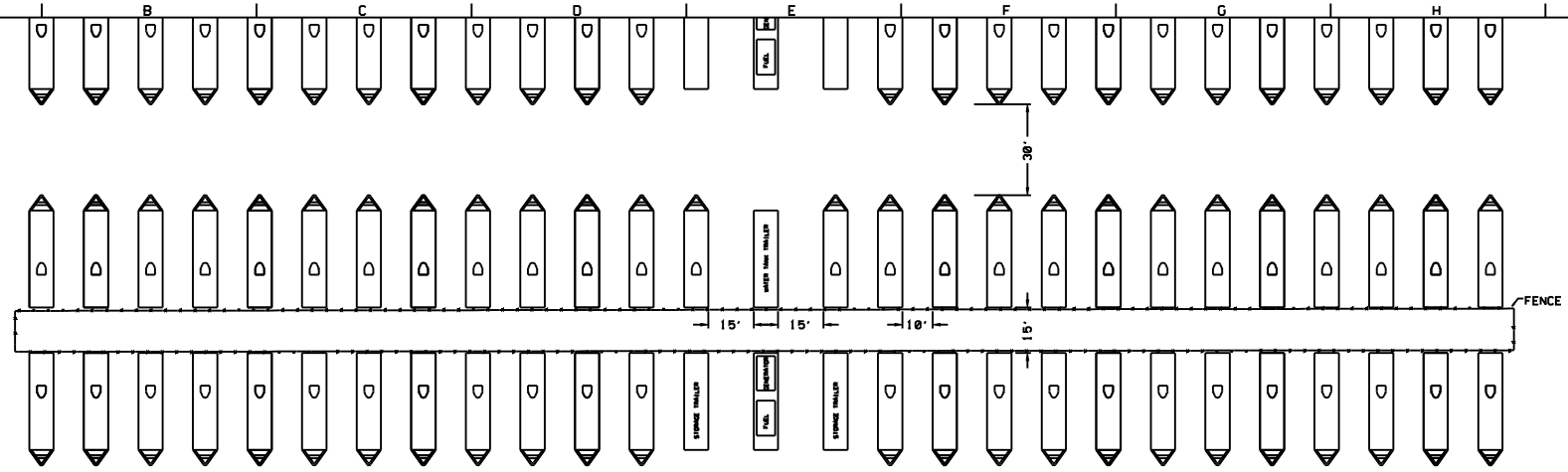
potential sites should be initiated. Desired characteristics of a staging area site include the following:

1. Site is in an area that will allow temporary holding and inspection of dwelling units prior to transfer to group sites.
2. Paved site that is relatively flat with good drainage. Less preferable are sites with unpaved surfaces that are well drained and require minimum site preparation/modification. Unpaved sites may require an environmental assessment, which may cause detrimental delays to the project schedule. Unpaved sites that require grading and/or gravel placement for drainage and stability are less desirable.
3. Government owned sites are preferred (especially local). Privately owned sites are less desirable as leasing property can be time consuming and costly.
4. Site must be well drained with no identified flooding/internal drainage problems.
5. Minimum Site Preparation (debris removal, etc.).
6. Additional considerations include the effects of the site on the surrounding area and the effects of the surrounding area on the site. Examples include considerations of effects on and from traffic flow, site accessibility, noise considerations, safety considerations, etc.
7. Because of the large number of trucks, trailers and equipment that will be passing through the staging area, convenient access to highways is a primary consideration.

Utility requirements for the staging area are as follows:

1. Drinking water will be needed and can be supplied using bottled water or drinking water dispenser. Municipal water supply connected to the office trailer is also an option.
2. Portable toilets with a service contract should be supplied for logistics personnel. Municipal sanitary sewer connected to the office trailer is also and alternative.
3. Electric power supply is required for the office trailer and lights for the staging area. Less desirable alternative includes use of generators for electric power supply.


8' X 20' MOBILE SHOWER (9 REQUIRED)
8' X 20' MOBILE RESTROOM (11 REQUIRED)
8' X 20' MOBILE LAUNDRY (6 REQUIRED)
TV/COMMON AREA, TYP.
120' X 250' LRDS, TYP
PARKING AREA FOR 250 VEHICLES
WATER STATION, TYP.
80' X 165' LRDS
FOOD/WATER STORAGE
PLAYGROUND/REC AREA
FOOD SERVICE, KITCHEN AND 300 PERSON DININNG AREA (SERVES 500 PEOPLE/HOUR)
MEDICAL FACILITY
RECEPTION AND VISITOR MEETING AREA
AREA, APPROX. 8 ACRES
NOTES:
1. MOBILE SHOWER, EACH UNIT HAS 7 SHOWERS AND 4 WASH BASINS
2. MOBILE RESTROOMS, EACH UNIT HAS MALE AND FEMALE SIDES, EACH HAVING 3 STALLS AND 3 WASH BASINS
3. EACH HOUSING UNIT IS 480 SF WITH ONE 110 VOLT OUTLET
20'
LIVING ROOM
24'
10' X 10' SLEEPING
10' X 10' SLEEPING
PLAN
FAMILY HOUSING UNIT
SCALE, NONE
PLAN - SUPPORT CENTER
LRDS - 250 UNIT COMPLEX
SCALE, 1"=30'-0"
30' 0 30'
US ARMY CORPS OF ENGINEERS
ST. PAUL DISTRICT
APPR.
DATE
DESCRIPTION
SYMBOL
DESIGNED BY, THD
DRN BY, THD
CKD BY, THD
DATE, 01 MAR 2000
AUTHORITY,
PROJECT NUMBER,
FILE NAME,
PLOT SCALE, 30"
PLOT DATE,
CATASTROPHIC HOUSING DECISION AND IMPLEMENTATION GUIDE
LRDS - INTERIM HOUSING 250 UNIT - SITE PLAN
PLATE 2



STANDARD POD LAYOUT FOR E.G. SITE

SCALE: 1"=20'

NOTES:

1. A STANDARD POD CONSISTS OF 25 TRAVEL TRAILERS AND ONE STORAGE TRAILER. THE ABOVE IS A STANDARD TWO POD LAYOUT. A WATER TANKER AND ELECTRIC GENERATOR TRAILER ARE LOCATED BETWEEN THE TWO PODS. WATER LINE SIZES, ELECTRIC GENERATORS, ELECTRIC CABLES, ELECTRICAL PANELS, ARE DESIGNED TO AND ELECTRIC PEDESTALS ARE DESIGNED FOR THIS CONFIGURATION.
2. ALL DIMENSIONS SHOWN ARE MINIMUMS IN ACCORDANCE WITH NATIONAL CODES.
3. IF ELECTRIC UTILITIES ARE AVAILABLE, THE POWER SHALL BE BROUGHT INTO THE ELECTRICAL PANEL LOCATED WHERE THE GENERATOR WOULD HAVE BEEN.
4. IF WATER IS AVAILABLE FROM A LOCAL UTILITY, THE SUPPLY LINE SHALL BE BROUGHT IN ABOVE GRADE WITH PROTECTION FOR VEHICULAR TRAFFIC IN TRAFFIC LANES.
5. AN ADDITIONAL TRAILER MAY BE SUBSTITUTED FOR THE STORAGE TRAILER IN EACH POD.
6. SITE PLAN IS ADAPTABLE TO DIFFERENT UNITS SUCH AS CONTAINERIZED UNITS, PARK MODEL MOBILE HOMES AND SEA HUTS. LARGER UNITS WILL IMPACT THE DENSITY OF THE DEVELOPMENT.

40' 0 40 80'
SCALE: 1"=40'

US ARMY CORPS OF ENGINEERS
MOBILE DISTRICT

REVISIONS
SYMBOL NO. | DESCRIPTION | DATE | APPROVED

DESIGNED BY: . DATE: .
DRAWN BY: . FILE NO. .
CHECKED BY: . SHEET FILE NAME, CAD FILE NAME, DWG
REVIEWED BY: . SOLICITATION NUMBER .

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
MOBILE, ALABAMA

FEMA
EGS
STANDARDS
.
TRAVEL TRAILER
LAYOUT

SHEET REFERENCE NUMBER:
PLATE 3

ATTACHMENT G

PRODUCT AVAILABILITY AND POTENTIAL CONTACTS

Centralized Support Center Set-up

Shower Options:

1. Existing Forest Service Contract – 2005-2008
Contract numbers available for listed Contractors
Contracting Officer – Melinda Draper, 208-387-5610
208-387-5384 (Fax)

Also see web site www.fs.fed.us/fire/contracting
I believe a Forest Service Contractor was utilized for the Florida 2004 Hurricane response (Ivan)

2. Deployed Resources
Contact numbers – 24 hours

Richard Stapleton	315-335-3943
Mike Frisch	908-403-6698
Robb Napior	603-566-9403

Web site = www.deployedresources.com
Pricing and basic utility requirements available on-line.

Mobile Laundry Units:

1. Deployed Resources
Contact numbers – 24 hours

Richard Stapleton	315-335-3943
Mike Frisch	908-403-6698
Robb Napior	603-566-9403

Web site = www.deployedresources.com
Pricing and basic utility requirements available on-line.

Toilets and Lavatory (Shave Units):

1. Deployed Resources
Contact numbers – 24 hours

Richard Stapleton	315-335-3943
Mike Frisch	908-403-6698

Robb Napior 603-566-9403

Web site = www.deployedresources.com
Pricing and basic utility requirements available on-line.

Kitchen and/or Dining Facilities:

1. Deployed Resources
Contact numbers – 24 hours
Richard Stapleton 315-335-3943
Mike Frisch 908-403-6698
Robb Napior 603-566-9403

Web site = www.deployedresources.com
Pricing and basic utility requirements available on-line.

2. Mobile Kitchens to Go
Stacy 630-355-0075
630-355-1610 Fax
Fred Stole 630-631-8116 (cell)

3 units available on 9/1/05. Units110, 362, and 557. Unit 557 very similar to 362.
Website = http://www.kitchens-2-go.com/
Pricing and information available on web site. Use KTG for username and password for design info.

Cubicle furnishings:

Per 480 sf family cubicle

Table
Chairs (4)
Cots or single beds (4)
Cardboard Dresser (2)

CONTACTS (PARTIAL LIST)

Large Rapidly Deployable Structures

http://www.sprung.com/en/product/imperial.aspx
Chris Donahue 770-933-1950
Cell 404-271-1997

http://www.asati.com/
Steve McGrath 914-937-4500
Cell 914-879-8970

Mobile Kitchens

http://www.kitchens-2-go.com/
Mobile Kitchens To Go
Password and Username are both KTG for drawing.

Portable Toilets

http://www.portakleen.com/

Showers

http://www.fs.fed.us/fire/contracting/shower/shower.htm

Tents

http://www.shelterlogic.com/
Shelter Logic
Bill Rocks
William.R.Rocks@shelterlogic.com
Cell: (203) 494-2986

http://www.gettent.com/
Celina Tents
Jeff Grieshop
Office See web site
Cell 419-305-8931

http://davistent.com/
Davis Tent – 80-100 available now Hodgepodge of sizes
Rick Davis – 303-561-1817 (office)
Home 303-467-3414

Fabric Shelters

http://www.fabricstructures-usa.com/index.html

Modular offices

http://www.starrco.com/store/default.htm

Toilets and showers, high end, 32-ft size

http://www.blacktieservices.com/products/thmshower240.asp

Portable Shower Trailers

http://www.ameri-can.co.uk/pages/820ex.htm