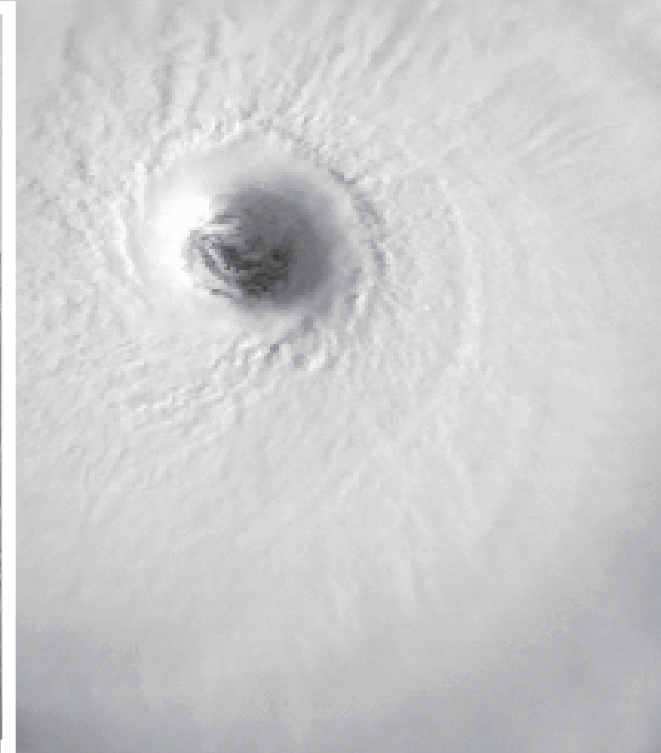
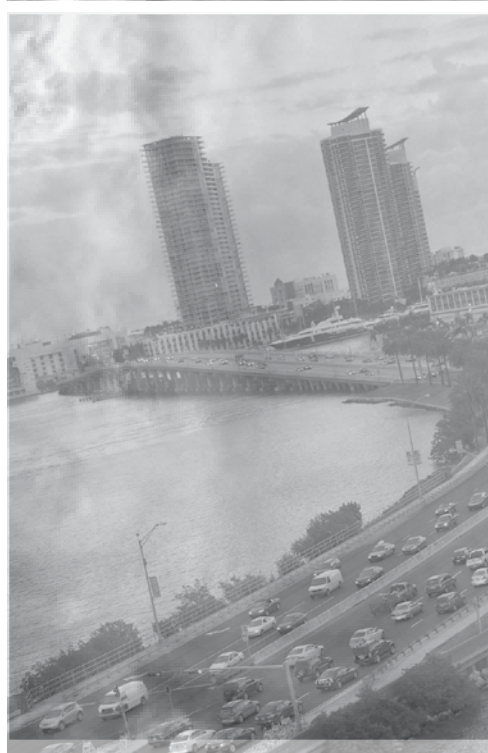
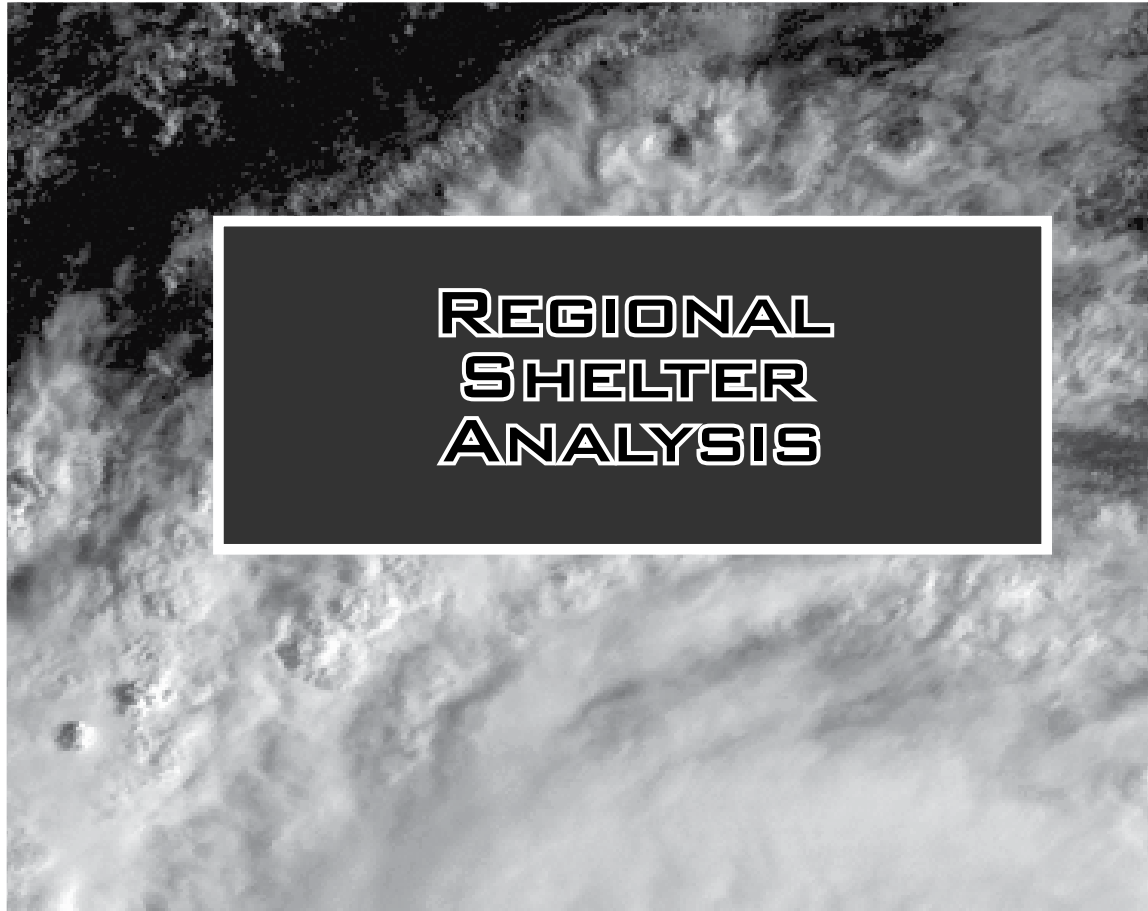




# FLORIDA STATEWIDE REGIONAL EVACUATION STUDY PROGRAM







**Volume 1-11**  
**Technical Data Report**  
**South Florida Region**

**Chapter V**  
**Regional Shelter Analysis**



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# CHAPTER V REGIONAL SHELTER ANALYSIS



## A. Overview

An essential element of any evacuation plan is the ability to shelter the relocated residents throughout the duration of the event. Evacuees will seek several alternative forms of shelter at various distances from their origin. These alternatives may include a local public shelter, a hotel or motel, a friend or relative's home, and destinations in an adjacent county or outside of the region. Shelter destination tendencies of potential evacuees must be identified for two major reasons. First, so that adequate public shelter facilities can be provided for the numbers of evacuees expected to seek them. Secondly, the shelter analysis is needed to more accurately simulate the expected destination assignments and vehicle volume movement in the quantification of evacuation times.

Shelter preparedness is a very crucial element in the Statewide Regional Evacuation Study (RES) because of the vast numbers of evacuees and the potential number of vulnerable residents seeking shelter. While other types of hazards (flooding, wildfire, hazardous materials and terrorism/civil disturbances) may result in the need for mass care and shelter operations, the event which is both the most probable and potentially most challenging is an approaching hurricane.

Historically, major disasters result in large scale shelter operations. For example, operations during the Hurricane Andrew evacuation in August 1992 resulted in the largest county shelter operation in US history (approximately 200,000 sheltered). One of the largest regional evacuation shelter operations in the U.S. occurred in the Tampa Bay region in response to Hurricane Elena in 1985 (350,000 sheltered). In 2005 when hurricanes threatened the Gulf Coast, Red Cross disaster relief workers and local governments were preparing hundreds of evacuation shelters. The organization pre-positioned supplies, including kitchens, prepackaged meals and emergency response vehicles (ERVs). Nearly 500,000 evacuees of Hurricanes Katrina, Rita and Wilma stayed in Red Cross shelters ([www.redcross.org](http://www.redcross.org)).

Pre-storm evacuation shelter demand has significantly decreased in South Florida as well as other areas. Public education in Florida has stressed to evacuees that the choice to go to a public shelter should not be the first choice in destinations. Other options – especially the homes of friends and relatives and hotel/motels in non-evacuation zones – provide a more comfortable alternative for most residents. According to the behavioral surveys conducted in 2006 and 2008 for the Statewide Regional Evacuation Study Program, part of that message is getting across to residents. The vast majority of evacuees go to the homes of friends or relatives (50 – 65%). Approximately 5% - 20% will seek a hotel or motel for refuge depending on age, income and other demographic characteristics. Hotel availability will also be a key factor.

## B. Hotel Availability

In the South Florida Region there are a total of 36,868 hotel/motel rooms (March 2010). These facilities are identified in the Critical facility Inventory database and their locations within vulnerable areas (tropical storms and hurricanes, flood zone, wildfire and hazardous materials) are identified.

In the Region as a whole, 18.7% of available hotel/motel rooms are outside of the storm surge area (for categories 1 to 5), but almost half are within the surge area for storms of levels A to C (categories 1-3), which makes them unavailable for sheltering for such storms. Over 25% of hotel/motel rooms are out of storm surge zones in Miami-Dade and Broward, but less than 4% are out of the surge area in Monroe. Regionally, in a category 5 hurricane threat, approximately 6,893 rooms should be available (see Table V-1 below).

**Table V-1**  
**Hotel Availability in Hurricane Evacuation Scenarios**

Storm Surge Area (Category)	Broward	Miami-Dade	Monroe	Regional
A	386	477	4,170	5,033
B	1,106	1,157	3,554	5,817
C	1,119	3,055	2,762	6,936
D	2,838	4,048	1,189	8,075
E	1,953	1,442	719	4,114
Non-Surge	2,738	3,667	488	6,893

Source: Florida Department of Business and Professional Regulation (2010) and South Florida Regional Planning Council.

Some of the Tourist and Visitors Bureaus in major metropolitan areas currently have a mechanism in place to track available units throughout a regional evacuation. This capability is essential to assist those evacuees looking for hotel/motel units. It should be strongly recommended that families seeking accommodations make those reservations before they begin their evacuation trip. In a major evacuation, the State Tourism and Development Council will seek to consolidate and augment this local information in real time. The second major challenge is to then communicate hotel/motel availability within the region and the state to evacuees locally as well as those on the road. This information is transmitted over Florida Public Radio and evacuation route signs along roadways will display the frequency in tune. The second method of communicating this information is over the message boards located on interstate roadways as well as through 511 on cell phones. This may reduce the trip of those searching



for hotel/motels in the vicinity thereby hopefully reducing the evacuation congestion and clearance times.

## C. Providing Public Shelter

Although there are other options for most evacuees, there will always be a demand for public shelter. The demand for public shelter has the potential to be significant in the South Florida Region because of the magnitude of the evacuation population, the demographics of the population and limited ability to evacuate out of the region.

Public shelter demand is the result of several factors:

- Evacuees may not have friends or relatives in a safe location.
- Evacuees may not have the means to evacuate to a hotel/motel or out of the region.
- Evacuees may not be able to locate vacant hotel/motel rooms outside of evacuation zones in the region. (Space is limited and demand will be high.)
- Evacuees may not plan ahead or understand their options.
- Some evacuees choose public shelter because they feel it is safer there than in their home.
- Some evacuees may wish to be with others.
- Evacuees may not evacuate in a timely fashion or may get stuck in evacuation traffic and may have to seek public shelter at the last minute as a last resort.

## D. Criteria for Hurricane Evacuation Shelter Selection

Shelter selection involves a number of factors - structural and non-structural - and requires close coordination with local officials responsible for public safety. Technical information contained in evacuation studies, storm surge and flood mapping, and other data can now be used to make informed decisions about the suitability of shelters. Accordingly, an interagency group under American Red Cross leadership, has prepared criteria for the selection of shelters and printed as *ARC 4496, July 1992*.

In the experience of the Red Cross and emergency management officials, the majority of people evacuating because of a hurricane threat generally provide for themselves and seek hotels or motels or stay with friends and relatives. However, for those who do seek public shelter, safety from hazards associated with hurricanes is paramount. These hazards include surge inundation, rainfall flooding, high winds, and hazardous materials.

Recommended guidelines for each of these hazards follow:

### 1. Storm Surge Inundation

In general, hurricane evacuation shelters should not be located in areas vulnerable to hurricane surge inundation. The National Hurricane Center SLOSH model for the South Florida Region is very helpful in determining the potential level of surge inundation in this area. Within ARC 4496, the guidelines state the following:

- *Carefully review inundation maps in order to locate all hurricane evacuation shelters outside (Category 4) storm surge inundation zones, if possible.*
- *Avoid buildings subject to isolation by surge inundation in favor of equally suitable buildings not subject to isolation. Confirm that ground elevations for all potential shelter facilities and access routes obtained from topographic maps are accurate.*
- *Do not locate hurricane evacuation shelters on barrier islands.*

To determine whether particular public shelter structures are vulnerable to future potential storm surge, an analysis of each structure's elevation and geographic location in relation to surge was conducted utilizing the SLOSH model.

The results of this analysis for each county are presented on Tables 48-51. The magnitude of the storm surge values shown in each hurricane category column on the tables are in relation to mean sea level. They represent the predicted maximum height of surge from that particular category of hurricane on the Saffir-Simpson Scale. Additionally, the surge height values were increased by one-foot for the expected tidal anomaly as well as a one-foot addition for a potential high astronomical tide (total 2 feet). The shelter data base contains information concerning the elevation, evacuation zone and surge zone.

Although most sites were not projected to receive storm surge flooding under any evacuation scenario, in some areas, because of potential shelter shortage, shelters remain on primary shelter inventories even though they will not be utilized in the most severe of storms (evacuation levels D and E). Using the SLOSH data and information in the shelter database, emergency managers will be able to determine the potential depth of the water at these shelter sites for each category of hurricane.

## **2. Freshwater Flooding**

While it is not historically considered life-threatening, rainfall flooding should be considered in the hurricane evacuation shelter selection process. Riverine inundation areas shown on Flood Insurance Rate Maps (FIRMs), as prepared by the National Flood Insurance Program, should be reviewed. FIRMs should also be reviewed in locating shelters in inland areas. ARC Guidelines state:

- *Avoid, where possible, hurricane evacuation shelters within the 100-year floodplain.*
- *Avoid hurricane evacuation shelters in areas likely to be isolated due to riverine inundation of roadways.*
- *Make sure a hurricane evacuation shelter's first floor elevation is equal to or higher than that of the base flood elevation level for the FIRM area.*
- *Consider the proximity of shelters to any dams and reservoirs to assess flow upon failure of containment following hurricane-related flooding.*

The appropriate flood plain designation is identified on the tables along with the storm surge analysis. While locating facilities outside of the 100-year floodplain is a priority, this is very difficult in the South Florida Region. Therefore, measures such as documenting the elevation of the first floor above the base flood elevation (BFE), meeting NFIP regulations and the provision of adequate emergency supplies sufficient to meet the immediate response needs until flood waters recede, etc. are ensured. Please note: The ARC 4496 guidelines also recommend avoiding the 500-year floodplain.

### 3. Wind Hazards Vulnerability

Consideration of any facility for use as a hurricane evacuation shelter must take into account wind hazards. Both design and construction problems may preclude a facility from being used as a shelter. Structural Considerations identified in ARC 4496 include:

*Avoid uncertified buildings of the following types:*

- *Buildings with long or open roof spans, i.e., gymnasiums and cafeterias*
- *Un-reinforced masonry buildings*
- *Pre-engineered (steel pre-fabricated) buildings built before the mid-1980s*
- *Buildings that will be exposed to the full force of hurricane winds*
- *Buildings with flat or lightweight roofs*

*Give preference to the following:*

- *Buildings with steep-pitched, hipped roofs, or with heavy concrete roofs*
- *Buildings more than one story high (if lower stories are used for shelter)*
- *Buildings in sheltered areas not subject to "lay down" hazards*
- *Buildings whose access routes are not tree lined nor subject to flooding*

The State of Florida has an aggressive survey program for all structures considered for public shelter use. State and County work with local school boards and emergency management agencies to identify structures for retrofit and to implement the requirements of the Enhanced Hurricane Protection Areas (EHPA) in new school construction. The requirements and retrofit projects have dramatically increased the public shelter capacity in the region since 2000.

### 4. Hazardous Materials

The possible impact from a spill or release of hazardous materials should be taken into account when considering any potential hurricane evacuation shelter. All facilities manufacturing, using, or storing hazardous materials (in reportable quantities) are required to submit Material Safety Data Sheets (emergency and hazardous chemical inventory forms) to the Local Emergency Planning Committee (LEPC) and the local fire department. These sources can assist in determining the suitability of a potential hurricane evacuation shelter or determining precautionary zones (safe distances) for facilities near potential shelters that manufacture, use, or store hazardous materials.

- *Facilities that store certain types or quantities of hazardous materials may be inappropriate for use as hurricane evacuation shelters.*
- *Hurricane evacuation shelters should not be located within the ten-mile emergency planning zone (EPA) of a nuclear power plant.*
- *Service delivery units must work with local emergency management officials to determine if hazardous materials present are a concern for potential hurricane evacuation shelters.*

Those (Section 302) facilities with extremely hazardous materials on-site have been identified in relation to schools and hospitals. This information is contained in the Critical Facilities Inventory database.

## E. Hurricane Evacuation Shelter Selection Process

In Florida, the Emergency Managers select shelters based up on the Florida Hurricane Shelter Model which does incorporate ARC 4496 guidelines. As mentioned in the previous sections, there are a number of criteria used to determine the suitability of a building or facility for use as a hurricane evacuation shelter. In summary, when emergency management departments are choosing a shelter, it is important for a complete risk assessment for each potential site to be conducted. This should include data from the SLOSH model (storm surge), FIRM (flood hazard), facility base elevation, hazardous materials information, and previous studies concerning each building's suitability.

The facility should be inspected and a *Red Cross Facility Survey Form* and *Self-Inspection Work Sheet/Off-Premises Liability Checklist* should be completed in accordance with ARC 3031. Note all potential liabilities and the type of construction. Consider the facility as a whole; one weak section may seriously jeopardize the integrity of the building. Emergency managers should review, on a regular basis, all approved hurricane evacuation shelters. Facility improvements, additions, or deterioration may change the suitability of a selected facility as a hurricane evacuation shelter. Facility enhancements may also enable previously rejected facilities to be used as hurricane evacuation shelters. Officials, facility managers, and school districts should continue to work together on mitigation opportunities. Continue to advocate that the building program for new public buildings, such as schools, should include provisions to make them more resilient to possible wind damage. It may also be possible to suggest a minor modification of a municipal, community, or school building, such as the addition of window protection in the planning stages, to make for a useful hurricane evacuation shelter site.

## F. Least Risk Decision Making

Safety is the primary consideration in providing hurricane evacuation shelters. When anticipated demands for hurricane evacuation shelter spaces exceed suitable capacity as defined by the preceding criteria, there may be a need to utilize *marginal* facilities. It is critical that these decisions are made carefully by a team including representatives from county emergency management agencies, the local chapter of the American Red Cross, School Board and engineering professionals.

### 1. The Selection Process

The process should include the following considerations:

- All hurricane evacuation shelters should be located outside of storm surge inundation areas. Certain exceptions may be necessary but only if there is a high degree of confidence that the level of wind, rain, and surge activities will not surpass established shelter safety margins.
- When a potential hurricane evacuation shelter is located in a flood zone, it is important to consider its viability. By comparing elevations of sites with FIRMs, one can determine if the shelter and a major means of egress are in any danger of flooding. It is essential that elevations be carefully checked to avoid unnecessary problems.

- In the absence of certification or ranking by a structural engineer, any building selected for use as a hurricane evacuation shelter must be in compliance with all local building and fire codes.
- The Red Cross and State of Florida use the planning guideline of 20 square feet of space per shelter resident. During hurricane conditions, on a short-term basis, shelter space requirements may be reduced. Ideally, this requirement should be determined using no less than 20 square feet per person; however, some counties use 10-15 square feet as the standard. Before and after the hurricane strike, evacuees will be allowed to use gymnasiums, auditoriums, etc. However, once a hurricane is affecting the area, all evacuees will be moved to safer areas of the shelter. For the duration of the storm, 8-10 hours, the 10-15 square foot per person may have to be adequate until additional shelter space becomes available. In addition, sufficient space must be set aside for registration, health services, and safety and fire considerations. On a long-term recovery basis, shelter space requirements should follow guidelines established in ARC 3031, *Mass Care: Preparedness and Operations*.

## 2. Interior Building Safety Criteria During Hurricane Conditions

Based on storm data such as the arrival of tropical force winds (sustained 40 mph winds), a notification procedure developed with local emergency managers is implemented as to when to move the shelter population to pre-determined safer areas within the facility. The following guidelines are considered:

- *Do not use rooms attached to, or immediately adjacent to, un-reinforced masonry walls or buildings.*
- *Do not use gymnasiums, auditoriums, or other large open areas with long roof spans during hurricane conditions.*
- *Avoid areas near glass, unless the glass surface is protected by an adequate shutter. Assume that windows and roof will be damaged and plan accordingly.*
- *Use Interior corridors or rooms.*
- *In multi-story buildings use only the lower floors and avoid corner rooms. Avoid basements if there is any chance of flooding.*
- *Avoid any wall section that has portable or modular classrooms in close proximity, if these are used in the community.*

## G. Special Needs Shelters

A special needs shelter is a temporary emergency facility capable of providing care to residents whose medical condition exceeds the capabilities of the Red Cross Shelter but is not severe enough to require hospitalization. Health Department medical staff support these shelters.

The State of Florida Division of Emergency Management, Department of Health, local emergency management



agencies and health care agencies have worked together over the last decade to establish Special Needs Shelter standards, protocols and technical assistance that can be integrated into the Florida Emergency Management System.<sup>1</sup>

The mission is to develop a standardized, comprehensive, county and regional approach to Special Needs Shelter operation that ensures continuity in services and quality care to clients, caregivers and staff during their stay in a Special Needs Shelter.

## 1. Florida Statutes related to Special Needs Shelters

- a. [F.S. Ch. 252.355](#) – Registry of persons with special needs; notice.
- b. [F.S. Ch. 252.356](#) – Emergency and disaster planning provisions to assist persons with disabilities or limitations.
- c. [F.S. Ch. 381.0303](#) – Healthcare Practitioner Recruitment for Special Needs Shelters
- d. [FAC 64-3](#) – Florida administrative code related to Special Needs Shelter tools

## 2. Special Needs Registration

In order to accommodate residents who need evacuation assistance to a Special Needs Shelter, **it is most important that they register prior to June 1st in advance of hurricane season.** This will help in determining which shelter they should go to and what, if any, assistance they require to evacuate. This would include transportation disadvantaged residents who need transportation assistance only.

Residents who feel they may qualify are instructed to complete a [Special Needs Evaluation form](#). The forms should be mailed, e-mailed or faxed to the county office designated to maintain the special needs registration list.

When residents fill out a registration form the County Health Department determines if the special needs shelter is the most appropriate level of care and advises the resident directly or through the local emergency management or fire department.

## 3. Special Needs Population Criteria

- a. The individual meets the medical criteria for assignment to the Special Needs Shelters if:
  - They are unable to administer their own frequently required or daily injectable medicines.
  - They require daily or more frequent dressing changes because of moderate or copious drainage from ulcers, fistulas, or other similar problems.

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<sup>1</sup> <http://www.doh.state.fl.us/PHNursing/SpNS/SpecialNeedsShelter.html>

- They need assistance with ostomy management and indwelling catheters of any kind.
  - Activities of daily living are so restricted by immobility that others provide assistance to meet their basic needs and those people are unavailable at this time. Please note that special needs shelters can not accept bedbound patients.
  - They require daily assessment of an unstable medical condition by professional nursing personnel or other similar conditions.
  - They have a respiratory condition which requires special equipment such as monitors or oxygen. Counties may have a limit to the number of liters of oxygen at shelters.
  - They have a terminal illness but are ambulatory and in need of professional assistance in administering heavy doses of pain medicine (HOSPICE).
  - In some counties, individuals will receive a notification from the County Health Department, assigning them to a Special Needs Shelter. ***People assigned to the Special Needs Shelter will need to take any medication, equipment or articles of comfort they routinely use.***
  - They are elderly, homebound or alone and need assistance in relocating to a shelter.
- b. The following people SHOULD NOT go to a special needs shelter; unless otherwise stated, they should go to a hospital:
- Pregnant woman within six weeks of estimated day of delivery, or who are in labor.
  - Individuals suffering from acute infection or infestation.
  - Those having an immediate medical or emergency condition.
  - Bedridden patients.
  - Individuals with a tracheotomy that requires frequent suctioning.
  - Individuals on a ventilator.
- c. When evacuating to a shelter, evacuees are told to bring the following:
- **All Required Medications and Medical Support Equipment:** Wheel chair/walker, oxygen, dressings, feeding equipment, ostomy supplies, etc. Any specific medication or care instructions. Name, phone number of physician/home health agency/hospital where they receive care.
  - **Special Dietary Needs:** Only regular meals will be provided.
  - **Sleeping Gear:** Pillows, blankets, portable cot or air mattress, folding chairs.
  - **Important Papers:** Insurance papers, doctor orders.

- **Identification:** With photo and current address.
- **Cash:** Check cashing/credit card services may not be available for several days after the storm. However, please remember that there will be nowhere to secure money or valuables at the shelter.
- **Comfort items:** Personal hygiene items, snacks, small games, cards, etc.
- **Extra Items:** An extra set of comfortable clothing and a few extra sets of underwear, socks, towel, washcloths, soap, toothbrush and adult diapers.

#### 4. Transportation Assistance for Special Needs

Once enrolled, residents with medical special needs are the first to be evacuated. Timing is crucial during the first phases of an emergency and plays a critical role in assuring they get out long before disaster strikes. The type of evacuation transportation assistance is determined when the resident is registered.

#### 5. Standards for Hurricane Evacuation and Disaster Event Special Needs Shelter Selection<sup>2</sup>

Facilities selected as special needs shelters should meet additional structural criteria as well as shelter management standards. New legislation has identified special criteria for Special Needs Shelters which prove to be a challenge for local governments. In addition to meeting the ARC 4496 hurricane safety criteria, Special Needs Shelters should have emergency power supported air-conditioning and have capacities based upon 60 square feet per client. The State Division of Emergency Management and local agencies are working together to address the challenges of the transition to meeting these expectations as well as the resolving problems related to Special Needs Shelter.

##### a. Special Needs Shelter Design Criteria

Department of Health (DOH) guidance for design and selection of facilities to be used as a Special Needs Shelters in a hurricane/disaster event shall be consistent with the American Red Cross publication "MASS CARE – Preparedness and Operations (ARC 3041)" and "Mass Care Facility Form 6564." The Special Needs Shelter facility must also meet all Florida Building Code (FBC) and Americans with Disabilities Act (ADA) accessibility requirements.

##### b. Special Needs Shelter Occupancy Period

For planning purposes it is assumed that the Special Needs Shelter will be occupied at its maximum occupant capacity for, at a minimum, a continuous seventy-two (72) hour period during and post impact by a major hurricane (i.e., Category 3 or higher). It should also be assumed that the Special Needs Shelter may be occupied for 12 hours in advance of arrival of hurricane force winds.

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<sup>2</sup> Created: 10/14/05; revised: 11/16/05; 01/20/06  
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### c. Special Needs Shelter Structural Requirements

Special Needs Shelter Structural Requirements shall at a minimum be consistent with the *American Red Cross publication "Standards for Hurricane Evacuation Shelter Selection (ARC 4496)." Preference shall be given to school facilities designed, constructed and inspected to comply with the public shelter design criteria, Enhanced Hurricane Protection Area (EHPA) requirements as set forth in section 423.25, Florida Building Code.*

### d. Location and Site Requirements- Emergency Access

Each Special Needs Shelter should have at least two (2) major means of access for emergency vehicles. The additional need for access is due to the potential for medical emergencies associated with the fragile health conditions of the Special Needs Shelter client population. The Special Needs Shelter openings provide a means of emergency access and/or evacuation. These openings should be well supervised to monitor for safety and/or security threat to the Special Needs Shelter occupants. All occupants of the building should be within a reasonable distance from these access/exit points, providing a choice in direction of escape in case of fire. All exits should be clearly marked and visible.

### e. Special Needs Shelter Capacity

Calculations to determine the capacity of a Special Needs Shelter are identical to the EHPA calculations except that the number of square feet required for each occupant is 60 square feet.

### f. Plumbing and Sanitation

- (1) **Potable Water.** Given the planning assumption that the Special Needs Shelter will be open for a minimum of 72 hours during and post impact by a major hurricane, the Special Needs Shelter should have a minimum of five (5) gallons of potable water per person per day for all uses (i.e., drinking water, hygiene, food preparation, etc.).
- (2) **Toilets, Sinks, Showers, Waste Water and Garbage Disposal.** Requirement criteria remain equal to ARC 3041 and EHPA requirements, with the exception of the waste water reservoir capacity and garbage disposal plan shall be based on a 72-hour design occupant capacity.
- (3) **Electrical and Emergency Power Systems.** It should be assumed that utility power outages will occur and may continue for the duration of Special Needs Shelter operation. Due to the fragile health and medical condition of the Special Needs Shelter clients, it is imperative that the Special Needs Shelter have back-up emergency electric power system.
  - The emergency electric power system shall be capable of supporting life safety, branch outlet and lighting circuits, air conditioning and other systems

that are critical to the well-being of the clients, staff and caregivers. The absence of air conditioning can result in the deterioration of the Special Needs Shelter client's health status. Clients with chronic lung disease deteriorate at a rapid pace as the increase of temperature leads to increased breathing difficulty.

- The power grid and backup emergency electric power capability must also be sufficient to power receptacles utilized to run oxygen concentrators, oxygen nebulizers and other medical equipment. (Note: Oxygen concentrators draw an average of 3.5-5.5 amps per unit. Nebulizers are used intermittently and have a negligible power draw.) Additional lighting (fixed or mobile) may be needed for providing client care (i.e., wound care, dressing change, etc.) and should be considered when determining power capacity.
- Appropriately trained and equipped personnel should be present and on site at all times during the Special Needs Shelter occupancy to operate, maintain and repair the generator(s). Sufficient supplies chosen by appropriately trained personnel must be available to route the power to where it is needed, (i.e., extension cords of adequate size, plug strips, tape to secure cords to the floor, etc.).
- Sufficient fuel stores should be available for 72-96 hours of continuous generator use at full load.
- Generators should be tested after each significant incident and on a monthly basis or as recommended by manufacturer if more frequent. Sites on facility grounds (i.e., lift stations) should have quick connects (as appropriate) to provide for utilization of backup power generation equipment.

#### **g. Emergency Management Considerations**

- (1) **Posting Special Needs Shelter floor plan.** A copy of the floor plan must be posted for planning purposes.
- (2) **Food service planning** should provide for the assumption of a minimum of 72 hours for Special Needs Shelter occupancy. Additional consideration for clients with special dietary/metabolic health issues should be factored into food service planning; however it is very difficult to predict all the different types of dietary restrictions. Residents are told to bring their own food supply if they have a special or restrictive diet.
- (3) **Supplemental Space Allocations.** Additional space allocations should be considered for the following:
  - Safe play areas for children.
  - Special Needs Shelter clients with ambulatory difficulties may need additional space for assistive devices (i.e., wheelchairs and walkers). These clients may also need to be provided space allocation on the ground floor or in areas free from level changes.

- Special Needs Shelter clients with service animals may need to be provided a separate area or away from the general Special Needs Shelter client population.
- Quarantine areas for clients requiring isolation precautions. Respiratory isolation areas to be designated and assigned at each Special Needs Shelter prior to occupancy by appropriately trained/experienced personnel.
- Appropriate space should be provided for the safe storage and movement of compressed gasses (i.e., oxygen tanks, liquid oxygen) or other Special Needs Shelter equipment and supplies.

## **6. Estimating Special Needs Shelter Demand**

Estimating the demand for special needs shelter space is challenging for state and local emergency management officials. Certain key assumptions must be made and complexities addressed:

### **a. County and Regional Profiles**

The demographics of the county and region must be considered, especially age, disability and income. Typically, the older the overall population of the county/region, the older the shelter population, and the greater the demand for public shelter. Historically, the demographics of the general and special needs shelter populations have been skewed based on age, disability and income. Therefore, the shelter populations may reflect trends but will not match the overall demographic profile of the county or region. Both the general shelter population and, more definitively, the special needs population, will tend to be much older, with more disabilities and with fewer financial resources.

Below is a table that reflects the demographics of the county and region (see Chapter I – Regional Demographic and Land Use Analysis). Please note the differences between counties in the region. The differences in age and percentage with disabilities will impact the potential demand for special needs shelter.

**Table V-2**  
**Population Demographics Affecting Special Needs Shelter Demand**

Jurisdiction	Percentage 65+ 2010 <sup>3</sup>	Percentage 65+ 2015 <sup>4</sup>	Percentage with Disabilities <sup>5</sup> 2006	Percentage Age 65+ with Disabilities 2006	Percentage Age 75+ with Disabilities 2006	Percentage Over 65 below poverty level, 2006
Broward	14.27%	15.17%	13.43%	38.38%	49.94%	11.35%
Miami-Dade	13.92%	14.90%	14.93%	44.81%	57.09%	22.66%
Monroe	18.46%	22.63%	14.32%	29.69%	49.35%	10.02%
Region	14.14%	15.14%	14.29%	41.83%	53.75%	17.72%

### **b. Special Needs Population Data from the Behavioral Survey**

The behavioral survey of Florida residents completed as part of the Statewide Regional Evacuation Study contained four questions designed to elicit information regarding the prevalence of “special needs” households:

- In an evacuation, would you or anyone in your household require assistance in order to evacuate?
- Would the person just need transportation, or do they have a disability or medical problem that would require special assistance?
- Would that assistance be provided by someone within your household, by an outside agency, or by a friend or relative outside your household?
- Is that person registered with the County as a person who would have special needs during a hurricane evacuation?

Responses to all four questions are reported in the Statewide Regional Evacuation Study Behavioral Survey Reports for each planning region of Florida. In those reports responses are shown by region, county, evacuation zone, and housing type. The tables below show responses for the entire statewide sample. However, the responses do not constitute a statewide random sample of households. In every coastal county, regardless of population, 400 interviews were completed. In every non-coastal county 150 interviews were completed. Therefore smaller counties were “over-represented” statistically when the data is aggregated statewide.

#### **(1) Households with Special Needs**

Statewide 6.1% of the interviewees said that someone in their home had a disability or medical problem that would require special assistance, beyond requiring just transportation (Table V-3). The figure included people with those needs but who also needed transportation. Those needs were greater in mobile homes than in site-

<sup>3</sup> Tables I-1a, IA-1a, IB-1a and IC-1a.

<sup>4</sup> Tables I-1a, IA-1a, IB-1a and IC-1a.

<sup>5</sup> Tables I-14b, IA-14b, IB-14b and IC-14b.

built homes. In site-built homes the needs were lower in category 1 evacuation areas than in other evacuation zones.

**Table V-3**  
**Percentage of households having someone with a disability or medical condition requiring assistance in order to evacuate (by evacuation zone and housing)**

Type of Housing	Evacuation Zone						
	Cat 1	Cat 2	Cat 3	Cat 4-5	Coastal Non-Surge	Non-Coastal	All Zones
Site-Built Homes	4.4	6.3	6.0	6.1	5.9	6.5	5.6
Mobile Homes	8.7	6.3	13.9	8.1	8.1	8.2	8.6
All Housing	5.0	5.8	7.4	6.3	6.3	6.9	<b>6.1</b>

**(2) Households Registered as Having Special Needs**

Approximately 2.2% of the surveyed households indicated that anyone in the home was registered with their county as a person with special needs in a hurricane evacuation (Table V-4). The figure was higher for mobile home residents than site-built residents, but there was no clear trend with respect to evacuation zone. However, from the list of registrants with the county emergency management agencies or county departments of health, there are less than 1% of the general population registered for special needs and transportation assistance. In fact, the actual number of registrants is less than 24% of the number answering that they are registered as a person with (medical) special needs.

**Table V-4**  
**Percentage of households having someone with a disability or medical condition requiring assistance in order to evacuate AND registered with county as special needs (by evacuation zone and housing)**

Type of Housing	Evacuation Zone						
	Cat 1	Cat 2	Cat 3	Cat 4-5	Coastal Non-Surge	Non-Coastal	All Zones
Site-Built Homes	1.6	2.1	1.3	2.5	1.8	2.5	2.0
Mobile Homes	3.6	1.9	3.7	4.0	4.1	3.0	3.3
All Housing	1.9	2.0	1.7	2.7	2.2	2.6	<b>2.2</b>

**(3) Households Needing Agency Assistance**

Two percent of all households said that assistance from an agency (rather than assistance from a friend or relative) would be needed to help a person with a disability or medical problem evacuate (Table V-5). Some respondents said they didn't know who would provide the assistance. Both calculations were higher for mobile homes than for site-built homes.

**Table V-5**  
**Percentage of households having someone with a disability or medical condition requiring assistance in order to evacuate AND requiring assistance from an agency (by evacuation zone and housing)**

Type of Housing	Evacuation Zone						
	Cat 1	Cat 2	Cat 3	Cat 4-5	Coastal Non-Surge	Non-Coastal	All Zones
Site-Built Homes	1.4	1.8	1.6	1.8	2.0	2.5	1.9
Mobile Homes	3.2	1.3	3.3	3.0	3.9	2.2	2.7
All Housing	1.6	1.7	1.9	1.9	2.3	2.4	<b>2.0</b>

**(4) Households with Special Needs Using Public Shelters**

One of the questions asked specifically about special needs sheltering. However, all respondents were asked if they would go to a public shelter when they evacuated. 1.4% of the interviewees said BOTH that they would evacuate to a public shelter AND that they had someone in the home with a disability or medical problem who would require evacuation assistance. Residents in mobile homes were twice as likely as residents in site-built homes to reply affirmatively to both questions. Among those in site-built homes the rate increased as evacuation zones progressed inland. Among people mobile homes the spatial trend was less consistent but the rate was greater inland of the category 1 and 2 zones.

**Table V-6**  
**Percentage of households having someone with a disability or medical condition requiring assistance in order to evacuate AND intends to evacuate to a public shelter**

Type of Housing	Evacuation Zone						
	Cat 1	Cat 2	Cat 3	Cat 4-5	Coastal Non-Surge	Non-Coastal	All Zones
Site-Built Homes	0.7	0.8	1.5	1.3	1.4	1.9	1.2
Mobile Homes	1.4	1.3	3.7	3.0	2.0	3.2	2.5
All Housing	0.8	0.9	1.8	1.5	1.5	2.2	<b>1.4</b>
Broward County							0.8
Miami-Dade County							1.2
Monroe County							0.5

It is difficult to determine the most appropriate way to use these survey results. While the study provided an estimate of demand for special needs shelter for the first time based on a statewide survey, there are concerns:

- The general public interviewed in the statewide survey does not understand the complexities of the concept of “special needs” as used in emergency shelter planning. While residents may have medical needs, they would need to be screened in order to determine the most appropriate type and level of care. For example, a hospital, nursing home, ALF, etc. may be a more appropriate setting.
- Historically, respondents over-estimate the demand for any public shelter option.
- Demand will vary by storm severity and evacuation rates.

- Demand will be higher based on housing type (MH), age and income.
- The number of respondents to these questions was very low at the county level.

## 7. Other Considerations

A report was generated after the 2004 and 2005<sup>6</sup> hurricane seasons which identified that a significant portion of the registered special needs populations found alternative shelter and/or elected not to go to the special needs shelter during the event. This trend has been identified in many recent evacuations. The report stated that "the statewide total of registrants is about 38,500, but local emergency managers estimate that only about 14,000 clients will actually seek public Special Needs Shelters. In 2004 the DOH's maximum census (summation of all individual counties' highest single day totals, plus the Orlando super-shelter and a SWF regional shelter) was 6,364 or about half of local emergency managers' best estimate of demand."

However, when an event threatens, local emergency management agencies and the Department of Health are typically flooded with additional requests for special needs shelter and transportation. This puts an additional burden on emergency management and responders to follow up with these clients to determine the most appropriate level of care and shelter option. Complicating the situation is the availability of appropriate space in assisted living facilities, skilled nursing facilities and hospitals immediately prior to the event. In prior (Frances and Jeanne) evacuations, the Governor issued an executive order waiving occupancy limits in those facilities in order to provide for continuity of care for those residents who require a higher level of care. This is a critically important element in special needs planning.

What was not reflected in the 2005 report or the table below was the impact of special needs population in the general shelter population. Depending on the demographics in the community, a significant portion of the general shelter population may have or develop (as the event proceeds and stress levels increase) serious health issues.

It is estimated that in the 2004 and 2005 shelter operations from 30-60% of the general shelter population either arrived at the shelter with conditions which warranted a higher level of health care or developed health issues which warranted care associated with a Special Needs Shelters or higher levels of care. There were reports of school principals administering oxygen, monitoring health issues and even changing adult diapers. For the most part, many of these citizens had driven themselves to the shelter and found their health deteriorate given the stress of the event and shelter environment. This situation is not unique to the 2004 or 2005 hurricane season. It has been documented in many other historical events. In addition the DOH reported that many caregivers began to experience health issues as the event progressed.

It was noted that while people may be able to care for themselves or their spouse in their home, combine a stressful evacuation, shelter environment (cots or air mattresses, lack of privacy, etc.) and storm conditions and the situation can become traumatic.

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<sup>6</sup> ***2005 Special Needs Shelter Report***, June 2005, Florida Division of Emergency Management and Florida Department of Health.

These issues may be mitigated through a continued push to pre-register special needs clients through an aggressive outreach program in the community. Coordination with local home health agencies and health care professionals has reduced this impact, but it remains an issue.

As indicated earlier, each county emergency management agency is responsible for maintaining the registry of persons with special needs. The names on those lists are protected; however, the number of registrants is available and reflects a starting point for determining demand within the county. It should be noted that the registry is fluid. It varies day to day (as does the clientele receiving home health care). It also varies by month as many special needs clients are seasonal residents.

Demographics within the community as well as hazard vulnerability, available health care resources, the extent and duration of power outages and presence of extended family support all impact the potential demand for Special Needs Shelter capacity. The table below identifies the current (July 2009) registrants, current shelter capacities and emergency management estimate of demand based on the survey findings, balanced with knowledge of the county demographics and evacuee options.

**Table V-7  
Special Needs Shelter Demand Guidance**

County	Number of Registrants (Medical)	Planning Percentage (Assumed 25% of Respondents indicating need)	Existing Capacity (2009)	Evacuation Scenario (Demand based on percentage of evacuation population)				
				A	B	C	D	E
Broward	800	.20%	2,600	414	428	600	893	1,277
Miami-Dade	2,381	.30%	2,500	1,065	1,429	1,494	2,121	2,717
Monroe	448	.123%	0	90	96	91	91	91
Region	3,629		5,100	1,570	1,953	2,185	3,106	4,085

Obviously, most counties are transitioning toward the new requirements for Special Needs Shelters including the space requirement of 60 sq. ft. per person and the emergency power supported air-conditioning. As indicated, additional space must be provided for caregivers, family members, pets, medical equipment and supplies. Relocation of special needs clients long distances is dangerous as well as taxing on local resources; therefore, if there is not sufficient capacity within a county, a regional solution must be sought.

## 8. Public Private Partnerships

It was hoped that legislation in 2006 would bring more support to the local efforts to meet the challenges of addressing special needs in the community. Home health care agencies which provide care to special needs populations throughout the region have been tasked to provide continuity of care during disasters. It is hoped that this requirement will (1) provide earlier registration/ evaluation of special needs populations; (2) provide additional support for Departments of Health staff in the special needs shelters and (3) provide an overall benefit through private-public partnerships to ensure no one is "left behind."



While the courts interpreted the requirement for “continuity of care” to be provided by the home health agencies in disasters as the time contracted prior to the event, i.e., 2-4 hours a week, it was a step forward.

The legislation also recommended the identification of pediatric and other special units, provided funding for retrofit and generators at designated special needs shelters, where required, and brought together a host of state, local and private sector agencies to address the needs of their clients in a disaster situation.

## H. Pets and Evacuees

### 1. Pet Issues are People Issues

- Fifty-eight percent of U.S. households own animals.
- The media often reports the needs of animals, both domestic and wild, affected by disasters. Following Katrina thousands of pets were rescued although many did not survive.
- Some people are more concerned for their animals in disasters than they are for themselves. This may impair their ability to make sensible decisions about their own safety and that of rescue workers. Examples include evacuation failures and re-entry attempts, and unsafe rescue attempts.
- Following Hurricane Katrina some abandoned pets, hungry, disoriented and frightened became dangerous to rescue workers and returning residents. Packs of dogs – once beloved pets – had to be destroyed.



In 2006, the Florida Legislature sought to address this serious concern. Chapter 252.3568, F.S. Emergency sheltering of persons with pets.--In accordance with s. 252.35, *the division shall address strategies for the evacuation of persons with pets in the shelter component of the state comprehensive emergency management plan and shall include the requirement for similar strategies in its standards and requirements for local comprehensive emergency management plans. The Department of Agriculture and Consumer Services shall assist the Division in determining strategies regarding this activity.*

Therefore, the Division of Emergency Management has put forward the following policies:

### 2. Implementation Strategies

- Step One: Establish Policy Guidelines
- Step Two: Develop Standard Operating Guides, Procedures, and Best Practices
- Step Three: Training & Implementation

### 3. Policy Guidance to Residents

- Residents must include pets in family disaster plans.
- Take your pets with you when ordered to evacuate.

- The best plan is to evacuate with your pets to friends and/or family.
- Identify and promote pet friendly policies of hotels and motels during emergencies.
- Shelters are life boats for both you and/or your pets.
- Evacuation support should include people with pets
  - Evacuation Routes
  - Buses
  - Special Needs
- Sheltering: no one with pets should be turned away from a shelter
  - Options
  - Co-located Pet Friendly Shelters
  - Centralized Pet Shelters
  - Boarding facilities and animal shelters, volunteer groups
- Shelters: Service animals should never be turned away or separated from their owner.
- Animal rescue teams should be integrated in ESF 9 – Search and Rescue (SAR)
- Animal SAR teams should be typed and credentialed for the level of service of which they are capable.

## I. Shelter Inventories

Both the State of Florida and the counties in South Florida have aggressively sought funding to retrofit existing facilities as well as to monitor new construction/design to reach the current inventories. Literally millions of mitigation dollars have been spent to protect exterior windows and doors and install generators. New school construction meeting the requirements of the Enhanced Hurricane Protection Areas (EHPA) has increased the capacity in all counties as well.

Both Broward County and Miami-Dade County stage the opening of available shelters in accordance with the characteristics of each storm and the actual need. As shelters opened in the first phase of a storm begin to fill, additional shelters are opened as needed. Monroe County residents may seek in-county public shelters as a refuge in storms of Level A and B (categories 1-2), but for all storms of Level C or higher, those shelters are not opened and residents are ordered to evacuate the Florida Keys to the mainland. The Recreation Center at Florida International University is the designated official shelter reserved for Monroe County residents, through an agreement between Monroe County and Miami-Dade County. The *2010 Statewide Emergency Shelter Plan* shows that both Broward County and Miami-Dade County have a general population shelter surplus in both 2010 and 2015. Monroe County presents a deficit in both years.

It should be noted that the shelters listed in Table V-8 are dynamic and their capacities are estimates. Shelter inventories change annually as facilities are added or drop out for retrofit, construction or repairs. They are constantly being evaluated to ensure that the safest facilities are used. The capacities are based on useable space and an estimated 20 square feet per person. However, these estimates are, in fact, estimates and people never fit neatly into a 20 square-foot area.

**Table V-8A  
Broward County Shelter Inventory and Surge Analysis**

Name	Address	City	Risk Capacity @ 20 sq ft	Special Needs Capacity @ 60 sq ft	Pet Friendly	Agency Support	Function	Vulnerability			
								Surge	Evac Zone	Flood	Wild-fire
LAKESIDE ELEMENTARY	900 NW 136 AVENUE	PEMBROKE PINES	800		NO	ARC	SCHOOL	0	X	AH	Y
FOX TRAIL ELEMENTARY	1250 NOB HILL ROAD	DAVIE	800		NO	ARC	SCHOOL	0	X	AH	N
FLORANDA ELEMENTARY	5251 NE 14TH WAY	FT. LAUDERDALE	800		NO	SD	SCHOOL	5	X	X	N
PLANTATION ELEMENTARY	651 NW 42ND AVENUE	FT. LAUDERDALE	800		NO	ARC	SCHOOL	0	X	AH	N
LIBERTY ELEMENTARY	2450 BANKS ROAD	MARGATE	800		NO	ARC	SCHOOL	0	X	AH	N
NEW RENAISSANCE MIDDLE	10701 JEEP TRAIL	MIRAMAR	1,200		NO	ARC	SCHOOL	0	X	AH	Y
COCONUT PALM ELEMENTARY	13601 MONARCH LAKES BLVD	MIRAMAR	800		NO	ARC	SCHOOL	0	X	AH	Y
EVERGLADES HIGH	17100 SW 48TH CT	MIRAMAR	1,800		NO	SD	SCHOOL	0	X	AH	Y
SILVER LAKES ELEMENTARY	2300 SW 173 AVENUE	MIRAMAR	800		NO	ARC	SCHOOL	0	X	AH	Y
SILVER SHORES ELEMENTARY	1701 SW 160 AVENUE	MIRAMAR	800		NO	ARC	SCHOOL	0	X	AH	N
SUNSET LAKES ELEMENTARY	18400 SW 25 STREET	MIRAMAR	800		NO	ARC	SCHOOL	0	X	AH	Y
PARK TRAILS ELEMENTARY	10700 TRAILS END	PARKLAND	800		NO	ARC	SCHOOL	0	X	AH	N
PANTHER RUN ELEMENTARY	801 NW 172 AVENUE	PEMBROKE PINES	800		NO	ARC	SCHOOL	0	X	AH	Y
MILLENNIUM MIDDLE	5803 NW 94TH AVE	TAMARAC	500		YES	SD	SCHOOL	0	X	AH	Y
PARK LAKES ELEMENTARY	3925 N. STATE ROAD 7	LAUDERDALE LAKES	800		NO	ARC	SCHOOL	0	X	AH	N

Name	Address	City	Risk Capacity @ 20 sq ft	Special Needs Capacity @ 60 sq ft	Pet Friendly	Agency Support	Function	Vulnerability			
								Surge	Evac Zone	Flood	Wild-fire
POMPANO BEACH HIGH	1400 NE 6TH STREET	POMPANO BEACH	1,800		NO	ARC	SCHOOL	0	X	X	N
MONARCH HIGH	5050 WILES ROAD	COCONUT CREEK	1,800		NO	ARC	SCHOOL	0	X	X	N
LYONS CREEK MIDDLE	4333 SOL PRESS BLVD	COCONUT CREEK	1,200		NO	ARC	SCHOOL	0	X	X	N
TRADEWINDS ELEMENTARY	5400 JOHNSON ROAD	COCONUT CREEK	800		NO	ARC	SCHOOL	0	X	X	N
PARKSIDE ELEMENTARY	10257 NW 29TH STREET	CORAL SPRINGS	800		NO	ARC	SCHOOL	0	X	AH	N
CHALLENGER ELEMENTARY	5700 NW 94TH AVENUE	TAMARAC	800		NO	ARC	SCHOOL	0	X	AH	Y
GATOR RUN ELEMENTARY	1101 ARVIDA PARKWAY	WESTON	800		NO	ARC	SCHOOL	0	X	AH	Y
EVERGLADES ELEMENTARY	2900 BONAVENTURE BLVD	WESTON	800		NO	ARC	SCHOOL	0	X	AH	N
MANATEE BAY ELEMENTARY	19200 MANATEE ISLES DRIVE	WESTON	800		NO	ARC	SCHOOL	0	X	AH	Y
FALCON COVE MIDDLE	4251 BONAVENTURE BLVD	WESTON	1,200		NO	ARC	SCHOOL	0	X	AH	N
WATKINS ELEMENTARY	3520 NW 52ND AVENUE	HOLLYWOOD	800		NO	ARC	SCHOOL	0	X	AE	N
SILVER TRAIL MIDDLE	18300 SHERIDAN STREET	PEMBROKE PINES	1,200		NO	ARC	SCHOOL	0	X	AH	Y
ARTHUR ASHE MIDDLE/ROCK ISLAND ELEMENTARY	1701 NW 23 AVENUE	FT. LAUDERDALE	2,000		NO	ARC	SCHOOL	0	X	X	N
CORAL GLADES HIGH	SPORTS PLEX DRIVE	CORAL SPRINGS	1,800		NO	ARC	SCHOOL	0	X	AH	Y
CORAL COVE ELEMENTARY	5100 SW 148 AVENUE	MIRAMAR	800		NO	SD	SCHOOL	0	X	AH	Y
SILVER PALMS ELEMENTARY	1209 NW 155TH AVENUE	PEMBROKE PINES	800		NO	ARC	SCHOOL	0	X	AH	Y

Name	Address	City	Risk Capacity @ 20 sq ft	Special Needs Capacity @ 60 sq ft	Pet Friendly	Agency Support	Function	Vulnerability			
								Surge	Evac Zone	Flood	Wild-fire
HALLANDALE ELEMENTARY	900 SW 8TH STREET	HALLANDALE	300		NO	ARC	SCHOOL	5	X	AE	N
INDIAN RIDGE MIDDLE	1355 NOB HILL ROAD	DAVIE	250	250	NO	ARC	SCHOOL	0	X	AH	N
MCNICOL MIDDLE	1602 S 27TH AVENUE	HOLLYWOOD	250	250	NO	ARC	SCHOOL	0	X	X	N
NEW RIVER MIDDLE	3100 RIVERLAND ROAD	FORT LAUDERDALE	250	250	NO	ARC	SCHOOL	1	X	AE	N
ORANGE BROOK ELEMENTARY	715 S 46TH AVENUE	HOLLYWOOD	800		NO	ARC	SCHOOL	0	X	X	N
PINES MIDDLE	200 NW DOUGLAS ROAD	PEMBROKE PINES	1,200		NO	ARC	SCHOOL	0	X	AH	N
SUNSET SCHOOL	3775 SW 16TH STREET	FORT LAUDERDALE	25	25	NO	ARC	SCHOOL	0	X	X	N
WEST BROWARD HIGH	500 NW 209 AVENUE	PEMBROKE PINES	1,800	1,800	NO	ARC	SCHOOL	0	X	AH	N
WESTGLADES MIDDLE	11000 HOLMBERG ROAD	PARKLAND	25	25	NO	ARC	SCHOOL	0	X	AH	N
<b>TOTAL</b>			<b>36,200</b>	<b>2,600</b>							

Green-shaded = May not be available for category 5 hurricane events.

Yellow-shaded = Pet Shelter

Orange-shaded = Special Needs Shelter

ARC = American Red Cross

HD = County Health Department

SD = County School District

**Table V-8B  
Miami-Dade County Shelter Inventory and Surge Analysis**

Name	Address	City	Risk Capacity @ 20 sq ft	Special Needs Capacity @ 60 sq ft	Pet Friendly	Agency Support	Function	Vulnerability			
								Surge	Evac Zone	Flood	Wild-fire
JOSE MARTI MIDDLE	5701 W 24TH AVENUE	HIALEAH	500	500	NO	ARC	SCHOOL	0	X	AE	N
RUBEN DARIO MIDDLE	350 NW 97TH AVENUE	MIAMI	500	500	NO	ARC	SCHOOL	0	X	X	N
MIAMI EDISON SENIOR HIGH	6161 NW 5TH COURT	MIAMI	500	500	NO	ARC	SCHOOL	0	X	X	N
HOWARD MCMILLAN MIDDLE	13100 SW 59TH STREET	MIAMI	500	500	NO	ARC	SCHOOL	0	X	AH	N
HIGHLAND OAKS MIDDLE	2375 NE 203RD STREET	N MIAMI BEACH	2,050		NO	SD	SCHOOL	5	X	AE	N
MICHAEL KROP SENIOR HIGH	1410 NE 215TH STREET	N MIAMI BEACH			YES	ARC	SCHOOL	0	X	X	N
NORTH MIAMI BEACH SENIOR HIGH	1247 NE 167TH STREET	N MIAMI BEACH	3,152		NO	ARC	SCHOOL	0	X	X500	N
BOOKER T. WASHINGTON SENIOR HIGH	1200 NW 6TH AVENUE	MIAMI	1,028		NO	ARC	SCHOOL	0	X	X	N
FELIX VARELA SENIOR HIGH	15255 SW 96TH STREET	MIAMI	2,913		NO	ARC	SCHOOL	0	X	AH	N
HAMMOCKS MIDDLE	9889 HAMMOCKS BLVD	MIAMI	1,467		NO	ARC	SCHOOL	0	X	AH	N
W. R. THOMAS MIDDLE	13001 SW 26TH STREET	MIAMI	2,050		NO	SD	SCHOOL	5	X	AH	Y
MIAMI CORAL PARK SENIOR HIGH	8865 SW 16TH STREET	MIAMI	1,131		NO	ARC	SCHOOL	0	X	X	N
DORAL MIDDLE	5005 NW 112 AVENUE	DORAL	1,360		NO	ARC	SCHOOL	0	X	AH	Y
BARBARA GOLEMAN SENIOR HIGH	14100 NW 89TH AVENUE	MIAMI	1,356		NO	SD	SCHOOL	0	X	AE	Y
ENEIDA HARTNER ELEMENTARY	401 NW 29TH STREET	MIAMI	1,306		NO	ARC	SCHOOL	0	X	X	N

Name	Address	City	Risk Capacity @ 20 sq ft	Special Needs Capacity @ 60 sq ft	Pet Friendly	Agency Support	Function	Vulnerability			
								Surge	Evac Zone	Flood	Wild-fire
PAUL DUNBAR ELEMENTARY	505 NW 20TH STREET	MIAMI	786		NO	ARC	SCHOOL	0	X	X	N
DANTE FASCELL ELEMENTARY	15625 SW 80TH STREET	MIAMI	931		NO	ARC	SCHOOL	0	X	X	Y
CLAUDE PEPPER ELEMENTARY	14550 SW 96TH STREET	MIAMI	1,258		NO		SCHOOL	5	X	AH	N
GILBERT PORTER ELEMENTARY	15851 SW 112TH STREET	MIAMI	1,769		NO	ARC	SCHOOL	5	X	AH	N
CITRUS GROVE MIDDLE	2153 NW 3RD STREET	MIAMI	1,700		NO	ARC	SCHOOL	0	X	X	N
SHENANDOAH MIDDLE	1950 SW 19TH STREET	MIAMI	750		NO	ARC	SCHOOL	0	X	X	N
OLINDA ELEMENTARY	5536 NW 21ST AVENUE	MIAMI	899		NO	ARC	SCHOOL	0	X	X	N
KELSEY PHARR ELEMENTARY	2000 NW 46TH STREET	MIAMI	511		NO	ARC	SCHOOL	0	X	X500	N
BEN SHEPPARD ELEMENTARY	5700 W 24TH AVENUE	HIALEAH	1,420		NO	ARC	SCHOOL	0	X	AE	N
PALM LAKES ELEMENTARY	7450 W 16TH AVENUE	HIALEAH	649		NO	ARC	SCHOOL	0	X	X	N
LAKE STEVENS ELEMENTARY	5101 NW 183RD STREET	MIAMI	1,018		NO	ARC	SCHOOL	0	X	AE	N
PALM SPRINGS NORTH ELEMENTARY	17615 NW 82ND AVENUE	HIALEAH	1,029		NO	ARC	SCHOOL	0	X	AE	N
CHARLES DREW MIDDLE	1801 NW 60TH STREET	MIAMI	1,050		NO	ARC	SCHOOL	0	X	X	N
MIAMI JACKSON SENIOR HIGH	1751 NW 36TH STREET	MIAMI	500		NO	ARC	SCHOOL	0	X	AE	N
LAWTON CHILES MIDDLE	8190 NW 197 STREET	MIAMI	1,436		NO	ARC	SCHOOL	0	X	AE	N
AMERICAN SENIOR HIGH	18350 NW 67TH AVENUE	MIAMI	2,558		NO	ARC	SCHOOL	0	X	AE	N
<b>SOUTH MIAMI SENIOR HIGH</b>	<b>6856 SW 53RD STREET</b>	<b>MIAMI</b>	<b>3,224</b>		<b>YES</b>	<b>ARC</b>	<b>SCHOOL</b>	<b>5</b>	<b>X</b>	<b>X</b>	<b>N</b>
NORTH MIAMI SENIOR HIGH	800 NE 137TH STREET	N MIAMI BEACH	3,152		NO	ARC	SCHOOL	0	X	X	N

Name	Address	City	Risk Capacity @ 20 sq ft	Special Needs Capacity @ 60 sq ft	Pet Friendly	Agency Support	Function	Vulnerability			
								Surge	Evac Zone	Flood	Wild-fire
ROBERT MORGAN EDUCATIONAL CENTER	18180 SW 122 AVENUE	MIAMI	3,653		NO	ARC	SCHOOL	0	X	X	N
HIALEAH SENIOR HIGH	251 EAST 47 STREET	HIALEAH	1,352		NO	ARC	SCHOOL	0	X	X500	N
MIAMI CAROL CITY SENIOR HIGH	3422 NW 187TH STREET	OPA-LOCKA	1,131		NO	ARC	SCHOOL	0	X	X	N
JOHN FERGUSON SENIOR HIGH	15900 SW 56TH STREET	MIAMI	500	500	NO	ARC	SCHOOL	5	X	AH	N
SUNSHINE PAVILION @ TAMAMI PARK	10901 SW 24TH STREET	MIAMI			NO	ARC	SCHOOL	5	X	X500	N
RONALD REAGAN SENIOR HIGH	8600 NW 107TH AVENUE	DORAL	2,943		NO	ARC	SCHOOL	0	X	AH	N
MIAMI PALMETTO SENIOR HIGH	7460 SW 118TH STREET	PINECREST	2,313		NO	ARC	SCHOOL	4	X	AE	N
MIAMI KILLIAN SENIOR HIGH	10655 SW 97TH AVENUE	MIAMI	420		NO	ARC	SCHOOL	0	X	X	N
JAMES BRIGHT ELEMENTARY	2530 W 10TH AVENUE	HIALEAH	1,208		NO	ARC	SCHOOL	0	X	AE	N
ROYAL GREEN ELEMENTARY	13047 SW 47TH STREET	MIAMI	562		NO	ARC	SCHOOL	5	X	AH	N
BOWMAN ASHE ELEMENTARY	6601 SW 152ND AVENUE	MIAMI	1,386		NO	ARC	SCHOOL	5	X	AH	Y
OLIVER HOOVER ELEMENTARY	9050 HAMMOCKS BLVD	MIAMI	1,273		NO	ARC	SCHOOL	0	X	AH	N
CARLOS FINLAY ELEMENTARY	851 SW 117 AVENUE	MIAMI	1,407		NO	ARC	SCHOOL	4	X	X500	N
STIRRUP ELEMENTARY	330 NW 97TH AVENUE	MIAMI	775		NO	ARC	SCHOOL	0	X	X	N
CALUSA ELEMENTARY	9580 W CALUSA CLUB DRIVE	MIAMI	900		NO	ARC	SCHOOL	4	X	AH	N
NORWOOD ELEMENTARY	19810 NW 14TH COURT	MIAMI	895		NO	ARC	SCHOOL	0	X	X	N
BOB GRAHAM EDUCATION CENTER	15901 NW 79TH AVENUE	MIAMI LAKES	700		NO	ARC	SCHOOL	0	X	AE	Y
COUNTRY CLUB MIDDLE	18305 NW 75 PLACE	MIAMI	2,089		NO	ARC	SCHOOL	0	X	AE	Y



Name	Address	City	Risk Capacity @ 20 sq ft	Special Needs Capacity @ 60 sq ft	Pet Friendly	Agency Support	Function	Vulnerability			
								Surge	Evac Zone	Flood	Wild-fire
JORGE MAS CANOSA MIDDLE	15735 NW 144 STREET	MIAMI	3,340		NO	ARC	SCHOOL	4	X	X	N
KINLOCH PARK MIDDLE	4340 NW 3RD STREET	MIAMI	1,336		NO	SD	SCHOOL	0	X	X	N
MIAMI LAKES TECHNICAL EDUCATIONAL CENTER	5780 NW 158TH STREET	MIAMI	500		NO	ARC	SCHOOL	0	X	AE	N
MIAMI NORLAND SENIOR HIGH	1050 NW 195TH STREET	MIAMI	687		NO	ARC	SCHOOL	0	X	X	N
REDLAND MIDDLE	16001 SW 248TH STREET	MIAMI	500		NO	SD	SCHOOL	5	X	X	N
RICHMOND HEIGHTS MIDDLE	15015 SW 103RD AVENUE	MIAMI	1,000		NO	SD	SCHOOL	5	X	X500	N
SOUTH DADE MIDDLE	29100 SW 194TH AVENUE	HOMESTEAD	1,704		NO	ARC	SCHOOL	5	X	X	N
VILLAGE GREEN ELEMENTARY	12265 SW 34TH STREET	MIAMI	565		NO	ARC	SCHOOL	5	X	AH	N
ANDOVER MIDDLE	121 NE 207TH STREET	MIAMI	357		NO	ARC	SCHOOL	0	X	X	N
HIALEAH GARDENS SENIOR HIGH	11700 HIALEAH GARDENS BLVD	HIALEAH GARDENS	2,934		NO	ARC	SCHOOL	0	X	AE	Y
MIAMI NORTHWESTERN HIGH	1100 NW 71ST STREET	MIAMI	2,637		NO	ARC	SCHOOL	0	X	X	N
MIAMI SUNSET HIGH	13125 SW 72ND STREET	MIAMI	2,440		NO	ARC	SCHOOL	0	X	AH	N
NORTH MIAMI MIDDLE	700 NE 137TH STREET	MIAMI	0		NO	ARC	SCHOOL	0	X	X	N
SOUTH DADE SENIOR HIGH	28401 SW 167TH AVENUE	MIAMI	3,000		NO	ARC	SCHOOL	4	X	AH	N
TERRA ENVIRONMENTAL RESEARCH INSTITUTE	11005 SW 84TH STREET	MIAMI	2,018		NO	ARC	SCHOOL	5	X	X	N
<b>TOTAL</b>			<b>89,951</b>	<b>2,500</b>							

**Table V-8C  
Monroe County Shelter Inventory and Surge Analysis**

Name	Address	City	Risk Capacity @ 20 sq ft	Special Needs Capacity @ 60 sq ft	Pet Friendly	Agency Support	Function	Vulnerability			
								Surge	Evac Zone	Flood	Wild-fire
KEY WEST HIGH	2100 FLAGLER AVENUE	KEY WEST			YES	SD	SCHOOL	1	1	AE	N
STANLEY SWITLIK ELEMENTARY	3400 OVERSEAS HIGHWAY	MARATHON			YES	SD	SCHOOL	2	3	AE	N
SUGARLOAF ELEMENTARY/MIDDLE	225 CRANE BLVD	SUGARLOAF KEY			YES	SD	SCHOOL	3	2	AE	Y
CORAL SHORES HIGH	89901 OLD HIGHWAY	TAVERNIER			YES	SD	SCHOOL	4	4	X	N
Florida International University/ Rec. Center	11290 SW 13th St., RC 101	MIAMI	515	90	NO	ARC	SCHOOL				
<b>TOTAL</b>			<b>515</b>	<b>90</b>							

Note: The FIU Recreation Center serves as the designated hurricane shelter for Monroe County (the Florida Keys) in weather emergencies. When threatened by a Category 3 (and above) hurricane, Florida State Law requires the evacuation of all Monroe County residents to the mainland. Florida International University is the designated out-of-county shelter for Monroe County residents.

Green-shaded = May not be available for category 5 hurricane events.

Yellow-shaded = Pet Shelter

Orange-shaded = Special Needs Shelter

ARC = American Red Cross

HD = County Health Department

SD = County School District

## J. Public Shelter Demand

The general response model, post-hurricane behavioral surveys of residents in the South Florida region and past experience was used to determine public shelter demand. The number of evacuees who choose public shelter as their evacuation destination is based on demographic characteristics of the population including income and age, risk area and housing (mobile home vs. site built homes). The assumptions identified in the Behavioral Analysis (see Chapter III), were applied to the projected Hurricane Evacuation Population estimates. There are several different assumptions regarding the evacuation population (see Chapter VI – Regional Evacuation Transportation Analysis):

- The **Base Scenarios**, which are used for planning and growth management purposes assume that 100% of the population-at-risk evacuates plus a (smaller) percentage of non-vulnerable population (shadow evacuation).
- The **Operational Scenarios**, used in operations use the planning assumptions determined by the behavioral analysis, which are assumed to be a more realistic set of assumptions. Although they do not reflect 100% evacuation of vulnerable residents, there is a significant percentage of shadow evacuation, especially in the major storm threats.

The results are presented below:

**Table V-9 Public Shelter Demand for Hurricane Evacuation  
Baseline Scenarios, 2010**

	Scenario 1 Evacuation Level A	Scenario 2 Evacuation Level B	Scenario 3 Evacuation Level C	Scenario 4 Evacuation Level D	Scenario 5 Evacuation Level E
Monroe - Key West	860	890	592	1,480	1,480
Monroe - Lower Keys	294	307	278	694	694
Monroe - Middle Keys	457	470	244	244	244
Monroe - Upper Keys	736	779	444	444	444
Monroe County - Total	2,348	2,446	1,558	2,862	2,862
Miami-Dade County	22,762	27,659	29,419	46,163	61,894
Broward County	9,502	9,809	13,786	19,529	27,184

Source: Volume 4-11, Table IV-11.

*Note: Shelter demand is the population in each county who will seek public shelter during their evacuation, either at an in-county shelter or an out of county shelter. See Volume 4-11, Chapter III, Section C for the source of the small area data.*

**Table V-10 Public Shelter Demand for Hurricane Evacuation  
Baseline Scenarios, 2015**

	Scenario 6 Evacuation Level A	Scenario 7 Evacuation Level B	Scenario 8 Evacuation Level C	Scenario 9 Evacuation Level D	Scenario 10 Evacuation Level E
Monroe - Key West	870	901	616	1,541	1,541
Monroe - Lower Keys	302	318	302	755	755
Monroe - Middle Keys	463	475	257	257	257
Monroe - Upper Keys	744	792	474	474	474
Monroe County - Total	2,377	2,486	1,648	3,027	3,027
Miami-Dade County	23,033	28,170	30,116	48,035	64,247
Broward County	9,894	10,216	14,350	20,365	28,338

Source: Volume 4-11, Table IV-11.

*Note: Shelter demand is the population in each county who will seek public shelter during their evacuation, either at an in-county shelter or an out of county shelter. See Volume 4-11, Chapter III, Section C for the source of the small area data.*

**Table V-11 Public Shelter Demand for Hurricane Evacuation  
Operational Scenarios, 2010**

	Scenario 1 Evacuation Level A	Scenario 2 Evacuation Level B	Scenario 3 Evacuation Level C	Scenario 4 Evacuation Level D	Scenario 5 Evacuation Level E	
Monroe - Key West	810	855	414	1,184	1,332	
Monroe - Lower Keys	246	272	194	555	623	
Monroe - Middle Keys	409	437	172	196	220	
Monroe - Upper Keys	640	712	311	355	400	
Monroe County - Total	2,105	2,276	1,092	2,290	2,575	
Miami-Dade County	16,162	18,924	23,282	38,587	57,916	
Broward County	7,555	8,268	10,706	17,281	24,809	
	Scenario 6 Evacuation Level A	Scenario 7 Evacuation Level B	Scenario 8a Evacuation Level C	Scenario 8b Evacuation Level C	Scenario 9 Evacuation Level D	Scenario 10 Evacuation Level E
Monroe - Key West	810	0	414	592	0	0
Monroe - Lower Keys	246	0	194	278	0	0
Monroe - Middle Keys	409	0	172	244	0	0
Monroe - Upper Keys	640	0	311	444	0	0
Monroe County - Total	2,105	0	1,092	1,558	0	0
Miami-Dade County	16,162	0	0	0	38,587	0
Broward County	0	8,268	0	0	0	24,809

Source: Volume 4-11, Table IV-24.

*Note: Shelter demand is the population in each county who will seek public shelter during their evacuation, either at an in-county shelter or an out of county shelter. See Volume 4-11, Chapter III, Section C for the source of the small area data.*

**Table V-12 Public Shelter Demand for Hurricane Evacuation  
Operational Scenarios, 2015**

	<b>Scenario 11 Evacuation Level A</b>	<b>Scenario 12 Evacuation Level B</b>	<b>Scenario 13 Evacuation Level C</b>	<b>Scenario 14 Evacuation Level D</b>	<b>Scenario 15 Evacuation Level E</b>
Monroe - Key West	820	864	431	1,232	1,386
Monroe - Lower Keys	255	283	211	605	679
Monroe - Middle Keys	414	440	179	205	231
Monroe - Upper Keys	651	725	331	379	427
Monroe County - Total	2,140	2,313	1,153	2,422	2,723
Miami-Dade County	16,550	19,333	23,913	39,993	60,045
Broward County	7,842	8,593	11,130	17,997	25,848
	<b>Scenario 16 Evacuation Level A</b>	<b>Scenario 17 Evacuation Level B</b>	<b>Scenario 18 Evacuation Level C</b>	<b>Scenario 19 Evacuation Level D</b>	<b>Scenario 20 Evacuation Level E</b>
Monroe - Key West	820	0	0	1,232	0
Monroe - Lower Keys	255	0	0	605	0
Monroe - Middle Keys	414	0	0	205	0
Monroe - Upper Keys	651	0	0	379	0
Monroe County - Total	2,140	0	0	2,422	0
Miami-Dade County	16,550	28,170	0	0	60,045
Broward County	0	10,216	11,130	0	0

Source: Volume 4-11, Table IV-24.

*Note: Shelter demand is the population in each county who will seek public shelter during their evacuation, either at an in-county shelter or an out of county shelter. See Volume 4-11, Chapter III, Section C for the source of the small area data.*

## **K. Dealing with Shelter Shortfalls and Challenges**

Strategies have been implemented at the state and local level to address the shelter issues for the past ten years. Some additional funding for shelter retrofit and generators for special needs shelters was allocated in 2006; however, the economic downturn has taxed federal, state and local resources.

- Public information, both before the emergency and during the evacuation, should stress that while evacuation out of the most vulnerable areas is critical, (1) residents should seek alternative types of refuge before and during the emergency if feasible; and (2) that persons on high ground offer their homes as refuge to friends/relatives in hurricane vulnerable areas.
- Impact fees for development within the Coastal High Hazard Area (CHHA) and Hurricane Vulnerability Zone (Level C), Wildfire Urban Interface and the 100-year flood zone should be used to mitigate the impacts of further development in hurricane prone areas.

- Growth management strategies should minimize development which would increase allowable density or put people with special needs (critical facilities) in designated vulnerable areas.
- Both local governments and local school boards, in cooperation with local emergency management, should ensure that new schools are sited, designed and constructed to be disaster-resistant and appropriate for shelter use. In addition, windows in existing facilities should be protected/retrofitted to mitigate damage and provide more suitable public shelter. Funding to cover additional construction costs to the School Boards to upgrade to EHPA standards should be sought.
- Continue to encourage the State Legislature to fund the necessary retrofits (for both public and private facilities (particularly schools, hospitals and nursing homes) and mandate appropriate design/construction standards.
- Public outreach should stress that persons with pets prepare ahead for their pets and recognize the extremely limited capacity for pets at public shelters. Emergency management and local school boards need to continue to address this issue.
- Public outreach should stress that persons with special needs speak to their physician/health care provider and register with county emergency management if they require additional assistance.
- In a major evacuation and where necessary, the Governor's Office should, through Executive Order, waive capacity limits in assisted living facilities and nursing homes to ensure appropriate continuity of care and level of care is maintained in the region.
- It should be recognized that providing the appropriate level of care and continuity of care will take ongoing cooperation and communications between and among the public and private sector health care providers. Emergency management, the local health departments and health care providers should partner to develop the plans and shelter locations for our residents with special needs.
- Phase shelter openings: The shelter demand estimates may be high depending on the strength and projected track of the threatening hurricane as well as the response of local government and State officials. The American Red Cross chapters, local emergency management agencies and local school boards developed strategies to phase the opening of selected public shelters depending on the evacuation level and projected shelter demand.