

<p style="text-align: center;">Universal Access Sheltering Space and Floor Plan Considerations</p>

On January 26, 2007, members of the Connecticut Universal Access Workgroup – comprised of a broad range of representatives from local government, state government, emergency management directors and planners, first responders and disability advocates – held a demonstration to explore space requirements for disabled individuals in shelters. They mapped out a floor space of 200 square feet to assess the space needs that would be required to shelter persons with disabilities, their personal care assistants, service animals, and personal care equipment in a sheltering environment. The results of that exercise are contained in this document. The participants invite you to review this material, but please keep the following in mind:

1. Within the illustrations and text, several products are displayed and described. The equipment used during this exercise is not exclusively produced by any one manufacturer, and resources for obtaining equipment are not limited to those referred to in this text. Brand names and model numbers, where available, have been provided. The purpose of this information is SOLELY to give the reader an idea of the equipment that was used in the demonstration. Any mention of the product brand names or model numbers is not, and should not be construed by the reader as an endorsement of a particular product, resource or vendor.
2. The purpose of this demonstration was to evaluate space needs within a shelter. In order to assess the maximum needs that would have to be addressed in a shelter, the demonstration was conducted with individuals who required motorized wheelchairs, lifting/moving equipment, personal care assistants, and service animals. The demonstration took into account what is estimated to be the most space-consuming equipment that would appear in a shelter.
3. The layout and solutions presented in this text are neither comprehensive of all situations nor all disabilities. Planners are encouraged to conduct similar assessments with local disability and aging advocacy groups along with willing volunteers to create a plan that will work in their local shelter with their identified populations.

Sheltering People with Disabilities
Draft Space and Layout Considerations
Universal Access Committee
February, 2007

American Red Cross Sheltering guidelines recommend that 20 square feet per person be made available for short-term, or “evacuation” sheltering, and up to 40 square feet per person for “long term” sheltering. “Long term sheltering” is generally defined as any period longer than seventy-two hours.

Typical ARC (made by Precise Kit Promotions, Inc.) or military surplus cots require about 21 square feet (7ft X 3 ft) of floor space, as shown in Figure 1. By allowing space for maneuverability around the cot, expanding the assigned space to approximately 4 feet X 10 feet, you can arrive at the recommended floor space of 40 ft² per occupant. The relatively narrow, long space allotment allows for the storage of belongings at the foot of each cot. Figure 2 shows an operating shelter with roughly 4ft X 10ft space allotments per person.



Figure 1. Typical cots stocked by ARC consume 21 square feet of floor space.



Figure 2. Example of a shelter.

DEMHS has recently purchased and stockpiled 1,800 cots per region. The DEMHS cots, Tent Cot Model 911, which require roughly 8 ft X 3 ft, or 24 square feet. In an emergency, these can be requested through your DEMHS Regional Office for use in local shelters.

In most cases, accommodating the needs of people with disabilities in shelters requires only minor modifications of the standard operating guidelines and some forethought concerning the floor plan of the shelter facility. Some additional equipment considerations are also worth considering. A detailed assessment of your local population, as well as a close working relationship with local advocacy groups, can help you determine the exact type and quantity of



Figure 3. DEMHS has stockpiled the Tent Cot 911, which requires roughly 24 square feet.

equipment that may be required in your shelter, in addition to resources for obtaining those supplies. Following is a brief discussion of some of these considerations.

Space issues are always of great concern when it comes to sheltering large populations. The idea of accommodating individuals with wheelchairs, lift equipment, personal care assistants, and service animals can, at first, seem unreasonable. However, some experimentation with floor planning shows that even one individual who brings all of these needs to a shelter can fit into about 100 square feet. That translates to 50 square feet per person—only ten square feet more than the Red Cross per-person allotment for long term sheltering. Figure 4 provides an example of how a motorized wheelchair, a manual Hoyer Lift, a service animal, a personal care assistant, and a person with a disability can all share 100 ft² relatively comfortably.

Figure 4. 100 Square foot layout to accommodate one person with a disability, a motorized wheelchair, a service animal, a personal care assistant, a manual Hoyer lift, and an appropriate cot.



Some particular features of this layout bear more detailed explanation. Starting with the motorized wheelchair, careful consideration should be given to placement of individuals with power needs within the shelter. While many motorized wheelchairs can go several days between charges, it bears keeping in mind that sudden disasters may bring people to

Figure 5. Motorized wheelchairs provide more than mobility.



your shelter whose chairs may need immediate charging, and as days wear on nearly all people relying on wheelchairs will need to charge them. As illustrated by the collage in Figure 5, it should be emphasized that motorized wheelchairs are not simply wheelchairs that move on their own. While implying that these apparatus are “life support” equipment would be an overstatement, they are certainly “quality of life support” equipment. Not just providing mobility, they are custom made, 400+ pound, sophisticated pieces of medical equipment that also prevent skin degradation and ulceration, prevent circulatory disorders and respiratory infections, and help individuals care for themselves. With that in mind, motorized wheelchairs can create a significant draw on electrical circuits while

charging. This is an important consideration, and should be coupled with other power demands, such as breathing machines (CPAP, BiPAP) or other equipment that may be in use. In general, consider distributing your power-consuming shelter residents across multiple walls and/or circuits. Even relatively large chairs can be parked for the night without taking up too much space (Figure 6). Placing the chair at the head of its owner's bed not only creates a compact storage area, it also provides a sense of security (as opposed to having to "surrender" the chair to a common storage area) as well as a platform for personal effects, perhaps including assistive breathing equipment.

Figure 6. A large chairs takes 8ft²



Spacing individuals with disabilities throughout the shelter to distribute power demand, and integrate the entire population, presents some challenges. While individuals who are ambulatory can walk to bathrooms, perform personal hygiene, and change clothes, persons with certain disabilities cannot. Portable privacy screens may be a suitable option for providing privacy at the individual's cot. Alternatively, if the shelter is a school, the nurse's office can be designated as a private room for addressing personal needs of persons with disabilities. Such a room should be at least 100 square feet and should include an examination table or massage-type table to help facilitate change of clothing or addressing other personal care needs.

The cot pictured in Figure 4 is a Westcot 400, (www.emergencyresources.com) which provides a wider sleeping surface, a thicker mattress pad, and a higher surface. A similar version, the Westcot 300, has been purchased by the Department of Public Health for use in the Mobile Field Hospital (pictured in Figure 7). Similar to the Tent Cot 911, the broader sleeping surface is created while only minimally increasing floor space requirements (28 ft² v. 21 ft²). The sleeping

Figure 7. The Westcot 300.



Figure 8. MX-PRO® Bariatric Transport



surface of the Westcot models is 18", which is slightly higher than the level of the Precise Kit Promotions (ARC) cot. This makes the cot more versatile when dealing with populations that may have trouble getting in and out of low beds. Eighteen inches is generally not, however, high enough for self-transfer in and out of wheelchairs. One way of providing adjustable height bedding is to consider utilizing EMS stretchers, such as the MX-PRO® Bariatric Transport (Figure 8). The Bariatric version is pictured, since it provides a broader sleeping surface than a standard EMS stretcher. As shown in Figure 8, the stretcher consumes about 21 ft² of floor space. While versatile, widespread use of options such as the MX-PRO® may be cost prohibitive.

Many individuals with disabilities rely on family members, friends, or personal care assistants to provide support with activities of daily living to live in and participate in the community. Therefore, to live independently within a shelter, persons with disabilities will likely bring more than one family member or personal care assistant with them to a shelter. However, only one family member or personal care assistant can stay in the 100 square foot area at a time. Other family members or personal care assistants may stay in the general population section of the shelter and rotate into the 100 square foot area as needed.

An additional consideration that leads to the 100 ft² floor space requirement is the need to access the bed area by wheelchair, and the potential need for lifting / moving equipment such as a Hoyer Lift. Figure 9 shows that a minimum of a four foot aisle space will accommodate

Figure 9. Aisle Space



moderately sized wheelchairs as well as a fully deployed Hoyer Lift. The third photo indicates that this aisle space is also adequate for using the Hoyer Lift to place an individual into bed. Finally, the bottom photo shows that a Hoyer Lift can be easily stored with the base under the bed and the top portion over the cot. Alternatively, Hoyer Lifts made available at the shelter for general use may help minimize both equipment storage concerns as well as the need for individuals to transport their own lift during an evacuation. Emergency planners could arrange for memorandums of understanding (MOUs) with companies to supply equipment such as Hoyer lifts to enhance accessibility, should the need to open a shelter arise. Some other equipment to consider having available by MOU might include:

- Portable showers for people in wheel chairs
- Shower chairs
- Egg crate mattress pads

Finally, you will note space included in Figure 4 (within the 100 square foot floor plan) to accommodate a service animal. As seen in Figure 10, service animals require a minimal amount of floor space (6 square feet), or may even sleep on the bed with their owner.



In order to assess the number of specialized cots, amount of space dedicated to accessible sheltering, power supply requirements, etc. needed in each community, local officials should review available demographic or statistical data for their community. Working closely with community partners (area agencies on aging, disability advocates, etc) during the planning stages will help to better prepare both the emergency management staff as well as people with disabilities for a disaster. If no estimation of

Sheltering People with Disabilities
Draft Space and Layout Considerations
Universal Access Committee
February, 2007

local requirements is available, it is recommended that a figure of 10% of the shelter population be used in calculating the need for specialized cots and space.

