



# The CITY OF DAYTONA BEACH

“THE WORLD'S MOST FAMOUS BEACH”

Office of the Deputy City Manager/Administrative and  
Development Services Department

To: James V. Chisholm, City Manager  
From: James Morris, Deputy City Manager/Administrative Services  
Date: August 30, 2017  
Re: First Step Shelter Design

The design for the First Step Shelter structure has been generally viewed in two ways. One design conceptually presented by architect William Chapin anticipates a temporary structure utilizing use of a tensile fabric roof over a central common area together with portable adjacent “wings” created by an assembly of portable (i.e. pre-fab) structures. The Chapin design concept anticipates that a slab will be poured to create the floor of the common area over which tensile fabric roof will be placed. Mr. Chapin has alluded to the slab being elevated and placed on pilings or wing walls to accommodate a “stormwater retention vault” to be under the slab. The Chapin concept was developed as Mr. Chapin voluntarily participated in the various discussions that led to the current decision for the City, with funding from the County and others, to move forward to build the First Step Shelter. It was only recently that the Chapin concepts, never endorsed by any entity or previously vetted by building or design professionals, has been carefully evaluated.

After the decision was made to move forward to build the First Step Shelter, City staff from Public Works and a licensed contractor (Doug Kurtock), employed by the City, evaluated the Chapin design concepts and internally questioned whether or not the structure promoted by Mr. Chapin was durable enough to withstand the passage of time, whether it was practical and durable enough that pursuing its methodology was superior to either traditional concrete block, concrete tilt wall or metal building construction and whether the shelter with tensile fabric roof could possibly serve as a hurricane shelter. After considering materials prepared by Mr. Chapin and Big Top, the supplier of the tensile fabric roof material, the staff reached a number of conclusions which led to the current intent by staff to move forward with masonry block or cast in place tilt wall construction of the First Step Shelter. Tensile fabric is not proposed to be included in the staff proposal. Due to staff concerns about building maintenance costs, construction reliability, on budget construction and utilization of traditional versus under slab stormwater retention, traditional construction methods and roof materials, staff has concluded the best interest of the

City are served by rejecting Mr. Chapin's well intended and voluntarily prepared tensile fabric design concept.

With those thoughts in mind, the City staff, in conjunction with Parker Mynchenberg Civil Engineer and Hall and Ogle Architects, the design concept supported by City staff has been created. The City's design plan anticipates use of a traditional roof constructed of trusses and standard roofing materials for a finish. The roof will be affixed to a foundation and slab sufficient to allow the roof to be part not only of a "homeless shelter" but also an emergency shelter to address events such as hurricane evacuation. Concrete block walls with cells filled with concrete as needed or cast in place tilt wall construction in a site located outside the flood zone, with appropriate windows, will also be qualified as a hurricane shelter.

The tensile fabric approach, as orally acknowledged by Architect Chapin, is regarded as a temporary design solution. In recent conversations, Mr. Chapin indicated that additional insulation characteristics could be added to the tensile roof or adding to the tensile roof with an additional layer of fabric that would create insulation in the form of dead air. This step would further increase cost but it would not extend project life.

The City's design approach is to use standard roof construction with insulation materials and form a permanent roof shelter over a concrete common area that will be used for communal dining purposes. In the Chapin design concept, the common area sheltered by the tensile roof would be used to house bunks and common area that would be occupied by clientele of the shelter. In the City's approach, the common area sheltered by the roof is to be a common area that could be used by both genders for dining. In the City's approach the areas for sleeping of each gender will be separated and monitored by shelter personnel, sleeping will be facilitated with a mixture of bunks, cots and pallets, and air condition/heated space in a dormitory style, permanent structure. In the Chapin approach purpose built temporary or portable pre-fab modular structures would be ordered and installed to provide additional shelter or dormitory space.

When City staff looked at the design sketches proposed by Mr. Chapin and by Hall and Ogle and began to consider what design approach should be used, it was observed that lowering the elevation of the slab for the structure as proposed by staff would make it unnecessary to construct handicapped accessible ramps. This effect occurs because the elevation of the slab from finished grade would not be so significant as to cause elevation of the slab necessary to require handicapped accessible ramps. In respect to the Chapin concept, while it is not absolutely clear that handicap ramps would be required, the documentation with the shelter proposal indicates that the slab for the shelter would be elevated to accommodate a stormwater retention vault that would be under the slab of the structure. The design proposed by City staff uses an outside unenclosed stormwater pond to accommodate stormwater and also to provide minimal fill on the site to accommodate construction

of a shelter at a required elevation to meet flood plain elevation needs as well as City and County standards.

A comparison of the two design approaches is most clearly illustrated by considering the roof and stormwater designs of each concept. One version of the Chapin design anticipates a stormwater vault under the slab of the tented area to be occupied by the clientele of the shelter. Part of the rationale for this approach appears to be based on a design assumption that use of fill on the site will require a three or four month settling or compaction period to allow the fill to become adequately stable to proceed. Since part of the Chapin approach is to utilize speed to construct, it appears that the Chapin concept pursues a non-traditional construction and stormwater system that requires placement of fill over a stormwater vault that creates a difficult to access and maintenance intense stormwater system.

The City's design approach utilizes dry fill with a monolithic slab or foundation with stem wall. Stormwater is provided separately away from the premises in a typical stormwater retention pond. A traditional stormwater pond can ordinarily be maintained simply with a lawn mower and minor ease to access slope maintenance as needed from year to year.

In discussion of the two design concepts, emphasis has been given to the belief that the tensile roof structure can be constructed more quickly than the traditional construction proposed by the City. Speed of construction is an advantage of the tensile roof approach. The resulting construction is temporary and will need to be maintained or replaced. The tensile roof construction and portable structures will not be able to meet the required wind speed standards to serve as a hurricane shelter. Additionally, due to the current national demand for all types of residential use, purpose built modular structures may have a three to five month production date after order.

The City's approach uses typical, traditional excavation methods to construct a stormwater retention pond and create fill for the slab which will support the shelter. There is strong disagreement from all the design professionals other than Mr. Chapin that the compaction of fill will take anytime more than the time needed to place and mechanically compact the fill.

The policy trade-off suggested by the Chapin concept is that the temporary structure anticipated under the tensile roof approach should be superior to a permanent structure primarily because it will be constructed sooner than the traditional construction methodology proposed by City staff. Staff does not agree with the Chapin approach while possibly it may be constructed sooner it will also have to be replaced sooner. Additionally, the City will handle all maintenance costs. That is the reason the tensile roof structure approach has been rejected by the staff as the appropriate superior design to be utilized by the City.

Staff's approach is tied to: a) predictability, b) on budget construction cost, c) permanence, d) lower maintenance costs, e) dual purpose of hurricane and homeless shelter use of the building, f) commonly available competitive Central Florida construction expertise, and g) avoidance of the future cost to recreate or replace an outmoded temporary structure and pay the costs associated with that task.

The grant from the County for construction of the First Step Shelter is a limited grant. Any construction above the projected budget cost will be something that must be made up by outside sources or by the City. The projected cost for construction of the traditional methodology proposed by City staff is within the Two Million Dollar budget. The initial cost of the Chapin proposal, while not seeming to take into account construction of the stormwater vault system is similar. The recurring cost factors and anticipated issues with the stormwater vault and relatively rapid replace or rebuilt requirement all point to high overall costs.

The policy choice is always one for the City Commission to make. Staff's recommendation is that the Commission should take the "long view" and build a structure that will be useable for any years to come and should needs change or expand the structure recommended by staff is economically modifiable.

Note: A line item comparison prepared by Dr. L.R. Durham is attached.