Exhibit B2 Scope of Work

Capital Improvement Project Emergency Sheltering (004180A)

I. SCOPE OF WORK

- A. The identified building(s) below have been designated by the County emergency management agency as a potential public hurricane evacuation shelter wind retrofit project. Eligible costs are limited to costs associated with the retrofit/modification of the existing structures, as specifically mentioned in "Exhibit A2" and this scope-of-work.
- B. Upon completion of this scope-of-work, at a minimum, the Building(s) shall be deemed to meet the prescribed minimum safety standards of the State Division of Emergency Management's Least Risk Decision Making (LRDM) matrix (Table 3) in the preferred or less preferred column.
- C. At a minimum, all products prescribed shall meet the wind load design requirements of ASCE 7, Risk Category IV and Exposure Category "C" (unsheltered exposure). Also, all products prescribed shall have been tested and passed the large missile impact test procedures of ASTM E 1886 and ASTM E 1996, or Florida Building Code (High Velocity Hurricane Zone/Miami-Dade) Testing Protocols TAS 201, TAS 202 and TAS 203.
- D. It is understood and agreed by the County and the School Board that the Building(s) may have vulnerabilities due to age, design and location which may result in damage to the building from high wind events even after the completion of the mitigation measures prescribed under this Agreement. It is further understood and agreed by the County and the School Board that the level of wind protection provided by the mitigation action, although meeting State codes and standards and enhancing the structural integrity of the Building(s), does not ensure the safety or survival of building occupants.

II. <u>DELIVERABLES</u>

- A. The School Board shall prepare and submit a final timeline with key milestone activities/tasks, schedule, including start and estimated end dates for each activity. Table 1, Revised Timeline, may be altered to meet this task product.
- B. The School Board shall provide the County with a copy of accepted vendor bid form(s) or other procurement procedure documentation to show compliance with procurement policies.
- C. The School Board shall provide the County with copies of large missile impact envelope protective system or product test certifications, reports or Notices of Acceptance. Documentation shall demonstrate that the system(s) and product(s) meet the large missile impact performance requirements as defined in Table 3 of this scope-of-work.
- D. If applicable, the School Board shall provide the County with copy of pertinent construction and regulatory permits, detailed construction schedule, observation/inspection reports (if any), certificate of completion (or written acceptance of completed work by building official), and photographs documenting pre-construction conditions and post-construction completed work.
- E. The final closeout report shall provide a breakdown of actual funds used for each building, and include the total amount of funds the School Board received for this project under the Agreement, and the balance of unused funds, if any, that will not be used by the School Board for this project Agreement and may be de-obligated from this project Agreement by the County.

III. PAYMENT SCHEDULE

- A. The Payment schedule for school hardening projects is designed to synchronize with work completion invoicing milestones for the varied hardening projects aligning with vendor invoicing and subsequent payments by the school board to contractors. Recognizing that each project may entail unique requirements, this payment schedule is adaptable to the specific timeline of each project. This flexibility ensures that the school board can receive timely payments for funds expended.
- B. This logical progression ensures a transparent and efficient payment process aligning with project milestones and allowing for adaptability to the unique dynamics of each school hardening initiative.
- C. The payment process follows a structured path:
 - 1. Payments are contingent upon the school board's receipt of an invoice and payment to the contractor.
 - 2. The School Board shall submit vendor invoices, accompanied by payment records to the contractor(s), to the County for payment processing.
 - 3. The County recognizes that all invoices accompanied by School Board proof of payment to the contractor shall be payable on demand.

4. In cases where applicable, the County may conduct a comprehensive inspection of the completed work. Upon successful verification, the County will initiate the payment process through established processes.

	Table 1 Revised Timeline							
PROJECT PHASE/ ACTIVITY	Start Date	End Date	Funding Source					
Original Board Contract Approval	02/09/2021	03/23/2021	Capital Improvement Funds – Penny for Pinellas					
Environmental Review	04/01/2021	05/01/2021	Capital Improvement Funds – Penny for Pinellas					
Engineering / Electrical & Building Design	05/01/2021	10/01/2021	Capital Improvement Funds – Penny for Pinellas					
First Amendment	12/19/2023	04/12/2023	Capital Improvement Funds – Penny for Pinellas					
Competitive Contractor Bids & Contracts	04/15/2024	05/31/2024	Capital Improvement Funds- Penny for Pinellas					
Second Amendment	04/01/2025	05/30/2025	Capital Improvement Funds – Penny for Pinellas					
Third Amendment	12/01/2025	01/15/2026	Capital Improvement Funds – Penny for Pinellas					
Construction Phase	06/01/2025	06/30/2027	Capital Improvement Funds – Penny for Pinellas					
Post Construction Auditing & Reporting	7/30/2027	10/30/2027	Capital Improvement Funds – Penny for Pinellas					

Table 2
Pinellas County School Board List of Projects and Estimates

Site Names	Original Description of Work	2023 Description of Work	Initial Estimate (Galvannealed Steel)	2023 Estimate (Stainless Steel)	2025 Estimate (Stainless Steel)	2026 Estimate (Stainless Steel)	Gen Population Risk Capacity Maintained (20 sq. ft.)	Capacity	Special Needs Population Risk Capacity Maintained (60 sq. ft.)	Capacity
Joseph L. Carwise Middle School - Second Floor Screens Existing.	Furnish and install hurricane protection for 51 openings to	Direct Replacement of all Screens covering Doors, Louvers & Windows, including Egress Operable Windows. Buildings 5 and 6. 109 Windows, 20 Doors, and 12 Louvers.	\$339,195	\$456,000	\$656,438		1967	NA	NA	NA
East Lake High School - Removed - In Surge Zone	Furnish and install hurricane protection for 31 openings to harden 22 classrooms.		\$305,478							
Clearwater Fundamental MS - School added with Screens not Previously Included.	NA	Direct Replacement of all Screens covering Doors, Louvers & Windows, including Egress Operable Windows. Building 1. 47 Windows, 28 Doors and 12 Louvers.	NA	\$422,320	\$503,754		1557	NA	NA	NA
Fairmount Elementary School - Adding Second Floor Screening	Furnish and install hurricane protection for 6 openings to harden 6 classrooms.	Direct Replacement of all Screens covering Doors, Louvers & Windows, including Egress Operable Windows. Buildings 4 and 5. 46 Windows, 21 Doors, and 4 Louvers.	\$78,359	\$415,200	\$567,544		662	600	NA	NA
John Hopkins Middle School - Screens and Building Hardening	Furnish and install hurricane protection for 11 openings to harden 3 classrooms.	Direct Replacement of all Screens covering Doors, Louvers & Windows, including Egress Operable Windows. Buildings 5 and 6. 2025 Updates are focused on buildings 3 & 4 only. For 109 windows, 20 Doors, and 12 Louvers.		\$456,000	\$514,902		NA	NA	758	691
	Furnish and install hurricane protection harden buildings 2, 3 and 4. Labor and materials associated with the electrical requirements needed for this location	Furnish and install hurricane protection harden buildings 2, 3 and 4. Labor and materials associated with the electrical requirements needed for this location. Inlcuding design fees.	\$140,270	\$725,481	\$580,394					

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Pinellas County School Board List of Projects and Estimates

<u>Site Names</u>	Original Description of Work	2023 Description of Work	Initial Estimate (Galvannealed Steel)	2023 Estimate (Stainless Steel)	2025 Estimate (Stainless Steel)	2026 Estimate (Stainless Steel)	Gen Population Risk Capacity Maintained (20 sq. ft.)	Capacity	Special Needs Population Risk Capacity Maintained (60 sq. ft.)	Population Risk Capacity
McMullen Booth Elementary School - Adding Second Floor Screening	Furnish and install hurricane protection for 7 openings to	Direct Replacement of all Screens covering Doors, Louvers & Windows, including Egress Operable Windows. Buildings 4 and 5. 46 windows, 21 Doors, and 4 Louvers.	\$89,567	\$411,520	\$567,544		605	600	NA	NA
Palm Harbor University High School	Furnish and install hurricane protection for 43 openings to	Direct Replacement of all Screens covering Doors, Louvers & Windows, including Egress Operable Windows. Buildings 5 and 11. 65 windows, 5 Doors, and 2 Louvers.	\$144,343	\$272,560	\$379,350		1883	NA	NA	NA
	Furnish and install hurricane protection for 16 openings to harden the gymnasium for Pet Sheltering	Furnish and install hurricane protection for 16 openings to harden the gymnasium for Pet Sheltering - Work Completed	\$33,000	\$38,200	\$38,200		NA	Adds space for 800 Pets	NA	NA
James B. Sanderlin K-8 School - Adding Second Floor Screening	Furnish and install hurricane protection for 19 openings to	Direct Replacement of all Screens covering Doors, Louvers & Windows, including Egress Operable Windows. Buildings 4 and 5. 46 windows, 21 Doors, and 4 Louvers.	\$146,119	\$411,520	\$567,544		679	600	NA	NA
John M. Sexton Elementary School Adding Second Floor Screening	Furnish and install hurricane protection for 6 openings to	Direct Replacement of all Screens covering Doors, Louvers & Windows, including Egress Operable Windows. Buildings 4 and 5. 46 windows, 21 Doors, and 4 Louvers.	\$77,470	\$411,520	\$567,544		667	600	NA	NA

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Gibbs High School (Removed in agreement with schools)	Furnish and install hurricane protection to the first and second levels of the building 2 corner hubs. Eabor and materials associated with the electrical requirements needed for this location	protection to the first and second levels of the building 2 corner hubs. Labor and	\$118,800						NA.	NA.
		A/E Design Fees	\$32,400							
Palm Harbor Middle School	Furnish and install hurricane protection for the opening in the building 1 hallway.	Furnish and install hurricane protection for the opening in the building 1 hallway.	\$3,882	\$87,000	\$56,625		1457	NA	NA	NA
		A/E Design Fees	Not Included at the Time	\$16,549	\$16,549		NA	NA	NA	NA
Projects Analysis (completed work)		Feasibility study for Gibbs and John Hopkins Auditorium hardening	Not included at the time	\$41,000	\$41,000		NA	NA	NA	NA
2023 Exeter Screen A/E Design Fee	NA	A/E Design Fees	Not Included at the Time	\$272,126	\$282,202		NA	NA	NA	NA
Campbell Park Elementary	NA	New Project identified in August 2025 Furnish ad install hurricane protection for buildings 4 and 5 both floors, including A/E design fees	Not included at the Time	Not Included at the Time	Not Included at the Time	\$600,000	1600	NA	NA	NA
		All Projects Totals	\$1,568,373	\$4,436,996	\$5,323,041	\$5,923,041	11,077	3,600	758	691
	143 openings	725 openings included second floors, doors and louvers			increase in sq ft by 2,801					
			Screen Projects	\$3,528,766	\$4,606,822					
			Square Ft Install Rate	\$86.25	\$98.73		14.47%			
			Hardening Projects	\$908,230	\$716,219		-21.14%			

Table 3 - State of Florida Least-Risk Decision Making: Hurricane Evacuation Shelter Prescriptive Summary Guidance **Revised Rankings** Criteria **Preferred Less Preferred / Marginal Further Investigation / Mitigation Required** 1. Storm Surge - Building is located outside a - Building is located inside a hurricane storm - Building is located inside a near maximum hurricane storm surge surge inundation zone, and subject to inundation Inundation maximum hurricane storm surge inundation zone inundation zone, and is subject to from a maximum storm surge event inundation by a maximum storm For building's located surge event in storm surge hazard - Building is not subject to - Shelter floor is potentially subject to a storm evacuation zones. surge inundation in excess of one (1) foot; for isolation due to a maximum provide the building's comparison, reference the most recent SLOSH hurricane storm surge - Shelter floor FFE is potentially finished floor elevation inundation event subject to a storm surge inundation MOM still-water inundation depth (FFE) as shown on of up to one (1) foot; for construction comparison, reference the most documents, site recent SLOSH MOM still-water survey or other - Shelter floor FFE is not subject - Avoid basements if there is any chance of inundation depth to a maximum storm surge reliable source. flooding inundation; for comparison, Provide the FFE of all reference the most recent Sea floors if the building is Lake Overland Surge from - Building is subject to isolation due multistory. Confirm - Avoid buildings located on coastal barrier Hurricane (SLOSH) Maximum of to a maximum storm surge reliability of the given islands Maximum (MOM) still-water inundation event FFE value(s) by inundation depth comparison to the applicable site elevation shown on USGS or other authoritative topographic map products.

	T =	T =	r =
2. Rainfall Flooding /	- Building is located outside of	- Building is located within the 500-	- Building is located within the 100-year floodplain
Dam Safety	500-year floodplain	year floodplain	
For building's located in storm surge evacuation zones, provide the building's finished floor elevation (FFE) as shown on construction documents, site	- Building is located in Flood Insurance Rate Map (FIRM) Zone C or X (unshaded) area - Building is not subject to isolation due to 100-year flood event (1% annual chance of	- Shelter building is located in FIRM Zone B or X (shaded) area - Shelter floor FFE is less than two (2) feet above the Base Flood Elevation (BFE) of the most recent FIRM or Flood Insurance Study	- Shelter floor is below the BFE of the most recent FIRM - Shelter building is located in FIRM Zones V and AH
survey or other reliable source. Provide the FFE of all floors of multistory	being equaled or exceeded)	(FIS)	- Avoid basements if there is any chance of flooding
buildings. Confirm reliability of the given FFE value(s) by comparison to the	- Building is not subject to flooding or isolation due to dam or reservoir containment failure	- Building is subject to isolation due to 100-year flood event	- Building is subject to velocity flooding and/or still-water inundation due to dam or reservoir containment failure
applicable site elevation shown on USGS or other authoritative topographic map products. Documentation must include FEMA Flood Map # and revision date.		- Building is subject to isolation due to dam or reservoir containment failure	

3. Hazmat and	- Building that does not store	- Building that stores certain	- Building that stores certain reportable types or
Nuclear Power Plant	certain reportable types or	reportable types or quantities of	quantities of hazardous materials, or Building that
Considerations	quantities of hazardous	hazardous materials, or Building is	is located within a precautionary zone for facilities
	materials	located within a precautionary zone	that manufacture, use or store hazardous
		for facilities that manufacture, use	materials, and
* Always coordinate		or store hazardous materials; and	
level of risk from	- Building that is not located		
hazmat facility to	within a precautionary zone for		- The hazardous material facility has not been
shelter with Local	facilities that manufacture, use	-the hazardous materials facility	reviewed by LEPC & EM or such review finds
Emergency Planning	or store hazardous materials	has been reviewed by LEPC & EM	precautions inadequate*
Council (LEPC) and		and precautions deemed	·
local Emergency		adequate*	
Management (EM).	Duilding is not leasted within	·	Building is located within the ten mile CD7 of a
LEPC and Local EM	- Building is not located within		- Building is located within the ten-mile EPZ of a
can assist in	the ten-mile emergency	Duilding is leasted within the ten	nuclear power plant, but no mitigating procedures per LEPC and local EM
determining the	planning zone (EPZ) of a	- Building is located within the ten-	per LEPC and local Elvi
suitability of a	nuclear power plant	mile EPZ of a nuclear power plant	
potential hurricane		but mitigating procedures have	
evacuation shelter or		been implemented per LEPC and	
determine		local EM	
precautionary zones			
(safe distances) for			
facilities near potential			
shelters that			
manufacture, use or			
store hazardous			
materials.			
4. Lay-down Hazard	- Buildings not exposed to very	- Buildings exposed to very	- Buildings exposed to very large/heavy trees or
Exposure	large/heavy trees or structures	large/heavy trees or structures that	structures that could cause destructive collapse or
	•	· ·	<u>'</u>

12 inch diameter or larger trees may be sufficient to cause laydown damage to	that could cause destructive collapse or lay-down impact damage (i.e., envelope breach)	could collapse or lay-down and cause minor impact damage, but not considered sufficient to cause significant envelope breach	lay-down impact damage, sufficient to cause significant envelope breach and/or crushing injuries to shelter occupants, and problem not mitigated
buildings.	- Buildings whose access routes are not tree-lined	- Buildings whose access routes are tree-lined, and appropriate mitigating measures are available (e.g., isolation plan in-place, road debris clearance plan in-place, etc.)	- Buildings whose access routes are tree-lined, and no mitigating measures available.
5. Wind and Debris Exposure	- Buildings located in areas that are sheltered/protected from strong winds	- Buildings located in areas subject to strong over-land non-coastal wind effects	- Buildings located in areas subject to strong coastal wind effects
Note: If a source of heavy/massive windborne or falling debris is present, recommend roof and walls be constructed	- Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single family dwellings or larger	- Relatively flat open terrain with scattered obstructions having heights generally less than 30 feet above grade for a distance of at least a quarter mile (1,500 feet)	- Relatively flat, unobstructed areas exposed to wind flowing over hurricane coastal shoreline, and/or open water for a distance of at least one (1) mile
of top & bottom layered reinforced 9- inch or thicker cast-in- place concrete		- Building surroundings can be described as ASCE 7 Exposure C	- Building surroundings can be described as ASCE 7 Exposure D

	<u></u>		
	- Building surroundings can be described as ASCE 7 Exposures A and B - Buildings located more than one (1) mile from a hurricane coastline	- Buildings located within one (1) mile of hurricane coastline but with mitigating measure (e.g., modern wind design, such as ANSI A58.1-1982, ASCE 7-88 or more recent editions)	- Buildings located within one (1) mile of hurricane coastline and with no mitigating measure - Significant sources of small and large debris within 150 feet, and/or very large/heavy lay-down, roll-over, or falling debris sources are present within 150 feet of shelter building's perimeter, and with no mitigating factor(s)
	- No significant sources of small, large, very large/heavy laydown, roll-over, and/or falling debris sources within 150 feet of shelter building's perimeter	- Significant sources of small and large debris are present within 150 feet, and/or very large/heavy laydown, roll-over, or falling debris sources within 150 feet of shelter building's perimeter, but with mitigating factor(s)	
6. Wind Design Additional preference may be given to buildings designed and constructed to ASCE 7-98 (or more recent editions), and IBC and FBC equivalents,	- Certification by a licensed structural engineer to be capable of withstanding wind loads according to ANSI A58.1-1982, ASCE 7, IBC and FBC equivalents, Occupancy Category III or IV (I ≥ 1.10) or Risk Category III or IV - Documentation affirms building designed by a licensed	Documentation affirms building designed and constructed to ANSI A58.1-1982, ASCE 7, IBC and FBC, Occupancy (I=1.00) or Risk Category II - Documentation affirms building designed and constructed to SBC-1988 and MBMA (1986) or more recent editions, or similar wind load	 Non-engineered or partially engineered structures Light or ordinary construction buildings designed to: Pre-ANSI A58.1-1982 wind design standard; Pre-SBC 1988 or other similar model code wind design; or Pre-1986 MBMA wind design

Occupancy Category	structural engineer and specifies	codes or standards, Occupancy	
III or IV (I=1.15) or	wind design as ANSI A58.1-	Category II (I=1.00)	
Risk Category III or IV;	1982, ASCE 7, IBC and FBC		
or higher wind design	equivalents, Occupancy		
standard, code or guidance (e.g., ICC500 or FEMA P- 361)	Category III or IV (I ≥ 1.10) or Risk Category III or IV - Massive structures or other special facilities, such as nuclear fallout shelter bunkers; e.g., roof dead load ≥ 200 psf and exterior walls ≥ 16-inch reinforced concrete or earthen bermed.	- Documentation affirms building designed by a licensed structural engineer and specifies wind design as SBC-1988, MBMA-1986 or more recent editions, or other similar wind design standards or model codes (e.g., SFBC); building must also meet other established hurricane shelter safety criteria prescribed in ARC 4496, Rev. January 2002	
		- Modern wind design by other than a licensed structural engineer, but approved and building permit issued by local AHJ	
		- Engineered heavy concrete or steel construction facility with reinforced concrete roof (i.e., a self-weight of 35 psf or greater) and designed to ASA/ANSI A58.1- 1955 wind standard, or 1961 or	

		more recent model codes and revisions; must also meet other	
		established hurricane shelter	
		safety criteria prescribed in ARC	
		4496, Rev. 2002	
		,	
7. Construction Type	- Heavy steel or reinforced	- Light steel or glulam wood	- All partially engineered (a.k.a., marginally
/ Definable	concrete skeletal frame	skeletal frame building	engineered) or non-engineered structures;
Continuous	buildings		example: light steel frame w/ unreinforced
Loadpath			masonry infill walls
Note: Unless otherwise indicated,	- 4-inch or thicker precast tilt-up reinforced concrete wall bearing structures	- ANSI A58.1-1982, ASCE 7 and IBC and FBC equivalents, Occupancy or Risk Category III or IV certified or documented	- 8 to 12-inch load-bearing unreinforced masonry walls that exceeds reinforcement spacing
assume masonry wall systems are 8 inch		buildings that do exceed 60 feet in height above grade	described as Less Preferred/Marginal
nominal thickness hollow concrete masonry units (CMU) with running bond, type M or S mortar, and continuous	- 8-inch or thicker reinforced masonry (typical max. vert. rebar spaced @ 4-feet o.c. or less) or cast-in-place reinforced concrete (typical rebar spacing	- ANSI A58.1-1982, ASCE 7 and IBC and FBC equivalents, Occupancy Category II (I=1.00) or	- Partially engineered or non-engineered light wood or metal-stud wall-bearing building
horizontal joint reinforcement spaced every 16 inches	is 18-inches o.c. or less each way) wall-bearing buildings	Risk Category II certified or documented buildings regardless of height above grade	- Pre-engineered (steel prefabricated) metal buildings built before the mid-1980s
vertically; structural concrete grout fill required in every vertically reinforced cell; intermediate	- ANSI A58.1-1982, ASCE 7 and IBC and FBC equivalents, Occupancy Category III or IV (I ≥ 1.10) and Risk Category III or IV certified or documented	- Post-1986 Pre-engineered Metal Buildings designed and constructed to ANSI A58.1-1982, ASCE 7 and IBC and FBC	

bondbeam(s)	buildings that do not exceed 60	equivalents, Occupancy Category	
recommended for	feet in height above grade	II (I=1.00) or Risk Category II, or	
walls that are 13.5 feet		model codes, such as MBMA or	
in height or greater;		SBC; bracing present in both wall	
stack bond rebar spacings are half those of running bond (e.g., 2 feet o.c. rebar instead of 4 feet for preferred ranking)	- Pre-engineered Metal Building hybrids with certified or documented wind design to ANSI A58.1-1982, ASCE 7 and IBC and FBC equivalents, and Occupancy or Risk Category III or IV	- 8-inch partially reinforced masonry (typical maximum vertical rebar spaced up to @ 4.67 to 8-feet o.c.), or 12-inch partially	
Additional preference may be given to buildings designed and constructed to ASCE 7-98 (or more	- Massive structures or other special facilities, such as nuclear fallout shelter bunkers; e.g., roof dead load ≥ 200 psf	reinforced masonry (typical max. vert. rebar spaced up to 11-feet o.c.) or precast reinforced concrete panel wall-bearing building	
recent editions), and IBC and FBC equivalents, Occupancy Category III or IV (I=1.15) or Risk Category III or IV; or higher wind design standard, code or guideline (e.g., ICC500 or FEMA 361)	and exterior walls ≥ 16-inch reinforced concrete or earthen bermed.	- Masonry wall-bearing systems equivalent to partially reinforced masonry (for 8-inch CMU with typical tie-column/pilaster and tie-beam spacing no greater than 13.5-feet o.c, or 12-inch CMU with typical tie-column/pilaster and tie-beam spacing up to 16-feet o.c.)	
		- Engineered light wood or metal- stud wall-bearing buildings	

8. Building Condition / Wind Damage History	- Building is in good condition with no observable or known structural or cladding deterioration	- Building or interior shelter core area (if applicable) has minor structural and/or cladding deterioration; deterioration does	- Building or interior shelter core area (if applicable) has major deterioration of structural and/or cladding components and assemblies; deterioration appears to significantly affect wind-
		not appear to significantly jeopardize wind-resistance	resistance
	- Building or interior shelter core area (if applicable) is approximately as sound as it was when new		
9. Exterior Wall Construction - Adequate protection	- 4-inches or thicker reinforced concrete wall panel (rebar spacing is 12-inches o.c. or less each way, or wire-welded mesh reinforcement)	- 2 to 3.9-inches of reinforced concrete wall panel (rebar spacing is 18 inches o.c. or less, or wirewelded mesh reinforced)	- 1.9-inches or thinner reinforced concrete wall panel, or rebar spacing exceeds 18-inches o.c., or no wire-welded mesh reinforcement
means building exterior walls are capable of resisting wind loads and penetration by large	- 8-inch or thicker reinforced masonry (typical maximum vertical rebar spaced @ 4-feet	- 8-inch partially reinforced masonry with typical maximum vertical rebar spaced @ 4.67 to 8-feet o.c., or 12-inch partially	- 8 to 12-inch unreinforced masonry that exceeds reinforcement spacing described as Less Preferred/Marginal
windborne debris missile impacts. - Minimum preferred	o.c or less) with or without masonry or stucco veneer (anchored @ 24-inch o.c. maximum each way)	reinforced masonry with typical maximum vertical rebar spaced @ 4.67 to 11-feet o.c.; with or without veneer (anchored @ 24-inches o.c. maximum each way)	- 26 gauge ribbed or thinner metal wall panels who impact resistant veneer no documentation affirming that assembly passed large missile impact test
large missile impact criteria means			

performance
consistent with FBC
Public Shelter Design
Criteria (EHPA) or
ASTM E-1996 Level
D: 9 lb 2x4 propelled
at 34 mph or 50 ft/sec;
additional preference
may be given to wall
assemblies that pass
or exceed ASTM E-
1996 Level E: 9 lb 2x4
propelled at 55 mph or
80 ft/sec

- Bondbeams > 8-

inches high are not

masonry with vertical

recommended for

rebar spacing that

O.C

exceeds six (6) feet

- 6-inch or thicker reinforced masonry with structural concrete grout fill in every cell; ; see definition of reinforced masonry above
 - 20 gauge or thicker ribbed metal wall panels with or without large missile impact test documentation w/ masonry or stucco veneer (anchored @ 24" o.c. max. each way)
 - 24 or 22 gauge ribbed metal wall panels with documentation affirming that assembly passed large missile impact test
 - Wall assemblies that are recognized by the Florida Dept. of Education, Miami-Dade Building Code Compliance Office or other testing or research authorities as having passed large missile impact tests

- 8-inch masonry wall systems equivalent to partially reinforced masonry: e.g., typical tie-column and tie-beam spacing no greater than 13.5-feet o.c., or 12-inch CMU tie-column and tie-beam spacing up to 16-feet o.c; with or without veneer.
- 6-inch or thicker partially reinforced masonry with structural concrete grout fill in every cell; see definition of partially reinforced masonry above
- 24 or 22 gauge ribbed metal wall panels with <u>no</u> documentation affirming that assembly passed large missile impact test
- 5/8 or 19/32-inch or thicker CD Exposure 1 grade plywood structural wood panels w/ masonry or stucco veneer (anchored @ 24-inches o.c. maximum each way or less)

- EIFS wall system on substrate other than reinforced masonry or concrete, or 5/8 or 19/32-inch or thicker CD Exposure 1 grade plywood structural wood panels
- Gypsum wall board sheathing over metal or wood studs, with or without brick or stucco veneer
- Wall construction assemblies that <u>do not</u> meet "deemed to comply" FBC HVHZ-provisions (ref: s. 1626.4, FBC-Building)
- 6 % or greater exterior wall area comprised of softspot, or direct exposure of softspot to shelter area(s)

Note: Unless otherwise indicated, assume masonry wall systems are eight (8) inch nominal thickness

hollow concrete			
masonry units (CMU)			
with running bond,	- Less than 1% of any exterior	- Wall construction assemblies	
type M or S mortar,	wall area comprised of softspot;	"deemed to comply" with FBC	
and continuous	no direct exposure to shelter	HVHZ-provisions (ref: s. 1626.4,	
horizontal joint	area(s)	FBC-Building)	
reinforcement spaced			
every 16-inches			
vertically; structural		- 1 to 5% of any exterior wall area	
concrete grout fill		comprised of softspot; no direct	
required in every		exposure to shelter area(s)	
vertically reinforced		. , , , , , , , , , , , , , , , , , , ,	
cell; intermediate			
bondbeam(s)			
recommended for			
walls that are 13.5-			
feet in height or			
greater; stack bond			
spacing are is half			
those that of running			
bond (e.g., for 8-inch			
masonry, 2-feet o.c.			
rebar instead of 4-feet			
for preferred ranking)			
- Additional preference			
may be given to			
buildings with exterior			
walls designed and			

constructed to ASCE 7-98 (or more recent editions), and IBC and FBC equivalents, Occupancy Category III or IV (I=1.15) or Risk Category III or IV; or higher wind design standard, code or guideline (e.g., ICC500 or FEMA 361)			
- Adequate protection - Adequate protection means building windows, doors, louvers and other fenestrations are capable of resisting wind loads and penetration by large windborne debris missile impacts.	- Building and/or shelter area fenestrations (e.g., windows, doors, louvers, etc) must pass one or more of the following: SBCCI SSTD 12; ASTM E 1886 & ASTM E 1996; SFBC 201, 202 & 203, and/or FBC HVHZ TAS 201, 202 and 203 - Less than 1% of any exterior wall area comprised of unprotected glass; no direct exposure to shelter area(s)	 Protected window and door assemblies that cannot be certified or documented to meet high wind missile testing protocols, but adequate barrier to envelope breach effects 5/8 or 19/32-inch or thicker CD Exposure 1 grade wood structural panel (shutters) with adequate subframing and anchorage 	 Unprotected window and door assemblies, or "protective" assemblies that cannot be certified or documented to meet high wind missile testing protocols and will not provide an adequate barrier to envelope breach effects 6 % or greater exterior wall area comprised of unprotected glass, or unprotected glass with direct exposure to shelter area(s)
- Minimum preferred large missile impact criteria means		- 1 to 5% of any exterior wall area comprised of unprotected glass; no direct exposure to shelter area(s)	

performance consistent with FBC Public Shelter Design Criteria (EHPA) or ASTM E-1996 Level D: 9 lb 2x4 propelled at 34 mph (50 ft/sec). Additional preference may be given to assemblies that pass or exceed ASTM E- 1996 Level E: 9 lb 2x4			
propelled at 55 mph (80 ft/sec)			
11. Roof Construction / Roof Slope	- Building with a heavy concrete roof system (i.e., a self-weight of 50 psf or greater)	- 3 inches (+/-) of ordinary reinforced concrete (rebar spacing is 18 inches o.c. or less, or wirewelded mesh reinforced on 22 gauge or thicker metal deck)	- Roof systems with unverifiable unobservable or inadequate discontinuous loadpath connections
** - Per ASCE 7-98, section 6.2, the area of potential roof openings must not exceed 1% of the shortest length wall face's area. This only applies to the story	- 4-inch or thicker reinforced concrete (rebar spacing is 12-inches o.c. or less each way or wire-welded mesh reinforced on 26 gauge or thicker ribbed metal deck)	- Building designed to a pre-2000 model code with light or moderate weight roof deck and a flat or moderate roof slope less than 30° (2/12 to 7/12 pitch)	- Unbraced gable-end roof geometry - Non-metal or non-wood deck assemblies***

immediately below the	- Building designed to a pre-		- Uncertified or documented roof eave or
roof.	2000 model code with light or moderate weight roof deck with a steep roof slope greater than 30° (7/12 pitch) and hipped	- Building designed to a pre-2000 model code with braced gable-end roof or hipped roof geometry	overhangs that extend more than 2 feet from exterior envelope cladding
formboard, insulation or cementitious panels; typically installed on bulb-tee sub-framing.	geometry if applicable - Building designed to a pre- 2000 model code with roof eaves or overhangs that do not	- Roof assemblies "deemed to comply" with FBC (ref: s. 1626.4); e.g., 2 to 3.75-inches of reinforced concrete, 5/8-inch CD plywood or	- Structural 26 gauge or thinner metal deck w/o structural concrete fill - Heavyweight Unanchored roof appendages
Note: If a source of heavy/massive windborne or falling debris is present, FEMA 361 recommends roof and	extend more than 2-feet from exterior envelope cladding - Building roof design is documented as capable of resisting wind loads according to	19/32-inch or thicker CD Exposure 1 structural wood panels - 19/32-inch or thicker CD Exposure 1 wood structural panel sheathing w/impact resistant	- Roof construction assemblies that <u>do not</u> meet "deemed to comply" FBC HVHZ-provisions (ref: s. 1626.4, FBC-Building)
walls be constructed of two layers (one each top & bottom) of bi-directionally	ANSI A58.1-1982 and ASCE 7 wind design standards, Occupancy Category III or IV (I ≥ 1.10) or Risk Category III or	- Building roof design is	- Significant breach potential (6+ %**)
reinforced 9-inch or thicker cast-in-place concrete	IV, and IBC and FBC equivalents with roof eave or overhangs that extend more than 2-feet from exterior envelope cladding	documented as capable of resisting wind loads according to ANSI A58.1-1982 or ASCE 7, Occupancy Category II (I=1.00) or Risk Category II, and IBC and FBC	
Additional preference may be given to		equivalents with roof eaves or overhangs that extend more than	

	T	T	
buildings designed	- Structural 24 gauge or thicker	2-feet from exterior envelope	
and constructed to	ribbed metal roof deck with	cladding	
ASCE 7-98 (or more	documentation affirming that		
recent editions), and	assembly passed large missile		
IBC and FBC	impact test	- Structural 22-24 gauge or thicker	
equivalents,		metal deck, or structural 26 gauge	
Occupancy Category		or thicker metal deck w/ concrete	
III or IV (I=1.15) or	- No unanchored roof	structural fill	
Risk Category III or IV;	appendages	Structural IIII	
or higher wind design	appendages 		
standard, code or			
guideline (e.g.,		- Lightweight unanchored roof	
ICC500 or FEMA 361)	- Negligible breach potential,	appendages present	
,	less than 1%**		
		- Moderate breach potential, 1-	
		5%**	
		070	
12. Roof Open Span	- Building with long open roof	- Building with long open roof	- Building with long open roof span ≥ 40 feet and
	span(s) < 40-feet and design is	span(s) < 40-feet and design	design <u>cannot</u> be documented as capable of
	documented as capable of	cannot be documented as capable	resisting wind loads according to ANSI A58.1-
Additional preference	resisting wind loads according to	of resisting wind loads according to	1982, ASCE 7, IBC nor FBC
may be given to	ANSI A58.1-1982, ASCE 7, IBC	ANSI A58.1-1982, ASCE 7, IBC	
buildings designed	or FBC Occupancy Category II	nor FBC	
and constructed to	(I=1.00) or Risk Category II		
ASCE 7-98 (or more			
recent editions), and		- Building with long open roof	
IBC and FBC	- Building with long open roof	span(s) ≥ 40-feet and design is	
equivalents,	span(s) ≥ 40-feet and design is	documented as capable of	
	span(s) < 40-leet and design is	documented as capable of	

Occupancy Category III or IV (I=1.15) or Risk Category III or IV; or higher wind design standard, code or guideline (e.g., ICC500 or FEMA 361)	documented as capable of resisting wind loads according to ANSI A58.1-1982, ASCE 7, IBC or FBC Occupancy Category III or IV (I=1.10 or greater) or Risk Category III or IV	resisting wind loads according to ANSI A58.1-1982, ASCE 7, IBC or FBC Occupancy Category II (I=1.00) or Risk Category II	
13. Roof Drainage / Ponding Note: 100-year, 1-hour rainfall rate per Figure 1106.1, FBC Plumbing	- See ASCE 7-98, section 8.2 & FBC, s. 1503.4; 100-year, 1-hour rainfall rate - Building with no roof drainage confining parapet walls or curbs	- Building with roof drainage confining parapet walls or curbs; flow capacity of overflow scuppers is not less than primary drains, and/or mitigating factor(s) present	- Building with roof drainage confining parapet walls or curbs; unknown flow capacity, or flow capacity of overflow scuppers is less than primary drains - Evidence of ponding that exceeds 5 inches in
indicates approx. 4.4 to 5.0-inch per hour for Florida	- No evidence of ponding that exceeds 2 inches in accumulation	- No evidence of ponding that exceeds 5 inches in accumulation	accumulation
14. Interior Safe Space	- At a minimum, all "preferred" criteria described in 1 – 13 above apply to the interior safe space envelope	- At a minimum, all criteria ranked as "marginal" described in 1 – 13 above apply to the interior safe space envelope	In the case where the surrounding building does not meet ARC 4496, and the interior shelter space (e.g., corridor) does not meet ARC 4496, describe why it does not.
Note: An interior safe space/core	- Example: 8-inch or thicker reinforced masonry or 4-inch or	- Example: 8-inch or thicker partially reinforced masonry (vert.	- Interior spaces that cannot independently meet ARC 4496 guidelines

area is not required if	thicker inch reinforced concrete	rebar @ 8-feet o.c., or tie-column &	
the proposed	perimeter wall panels with cast-	beam @ 13.5-feet o.c.) or 2-inch or	- Unreinforced masonry walls
hurricane shelter	in-place 4-inch or thicker	thicker reinforced concrete panel	- Official order masonly walls
	reinforced concrete roof/ceiling	perimeter walls with cast-in-place	
building, as a	slab; windows and doors meet	2-inch or thicker reinforced	
whole or in part,	high wind debris impact	concrete roof/ceiling slab or min.	- Gypsum wall board on metal or wood stud walls
meets ARC 4496	resistance requirements	24 gauge metal deck (or concrete	
		& metal decks combined); no	
guidelines/standards		windows or doors w/ glass with	- Windows or doors present w/ glass (larger than
	- Structural separation from	direct exposure to shelter space	a small view window) with direct exposure to
	surrounding building(s) is		shelter space(s)
- If applicable, interior	required (i.e., expansion, control		Silenter space(s)
shelter space must	or slip-joints)	- Roof of shelter framed separately	
independently meet		from surrounding building, but	
ARC 4496 guidelines		complete structural separation not	- Significant very large/heavy or falling debris, lay-
7 11 to 4430 galacillics		required	down, and/or structural collapse hazards
	- Massive structures or other	, required	
	special facilities, such as		
Additional preference	nuclear fallout shelter bunkers		- Roof/ceiling of interior space is not framed
may be given to		-In the case where the surrounding	separately from surrounding building (i.e., roof
buildings designed		building meets ARC 4496 this	support members are continuous through or over
and constructed to	-In the case where the	criteria is not applicable.	interior space partitions)
ASCE 7-98 (or more	surrounding building meets ARC		, ,
recent editions), and	4496 this criteria is not		
IBC and FBC	applicable.		
equivalents,	• •		
Occupancy Category			
III or IV (I=1.15) or			
Risk Category III or IV;			
or higher wind design			
standard, code or			

guideline (e.g., ICC500 or FEMA 361)			
15. Life Safety / Emergency Power	- Building must be in compliance with all local building and fire codes	- Building must be in compliance with all local building and fire codes	- Building that is not in compliance with local building and fire codes; a local authority having jurisdiction must make this determination.
	- Building and/or hurricane shelter space(s) must be supported by a standby back-up generator capable of supporting critical fire and life-safety systems, ventilation systems, adequate shelter lighting and if applicable, special needs requirements - Generator must be independent of off-site	- No provision for standby or emergency back-up electrical system; or - Standby or emergency back-up electrical system or generator present but dependent upon one or more off-site utilities/ infrastructure (e.g., water, fuel, etc.), and/or less than a 24-hour on-site fuel supply; or	
	utilities/infrastructure (e.g., water, fuel, etc.) with a minimum of 24-hour on-site fuel supply (72 hours or greater recommended)	- generator and ancillary equipment are not adequately protected from major hurricane effects	
	- Generator and ancillary equipment must be adequately		

	protected from major hurricane effects	
Notes:		