

TOWN OF COLUMBIA  
The Department of Public Works  
Columbia, CT

**ADDENDUM NO. 1**  
November 2, 2018

Contract Documents for  
The Department of Public Works  
Construction of a Salt Storage Structure  
Columbia, Connecticut

TO ALL BIDDERS:

All instructions contained in this addendum shall be reflected in the Bid and will be made part of the Contract Documents when the Contract is awarded. Sealed bids are still due to be received by the Office of the Town Administrator, Columbia Town Hall, 323 Jonathan Trumbull Highway, Columbia, CT 06237, until 10:00 AM prevailing time on November 13, 2018.

Addenda will be issued only to those contractors present at the mandatory pre-bid meeting held on Thursday November 1, 2018. It is the responsibility of contractors bidding the project to distribute copies of this addendum to all subcontractors, suppliers and other entities providing quotations.

This addendum is 4 pages long plus attachments.

The following items form this addendum:

1. Sign in sheet for mandatory pre-bid meeting held on November 1, 2018. (Attachment)
2. Revised Bid Proposal Form. The form has been revised to add the option for bidders to propose an alternative fabric building structure from that which is specified in the Specifications. If a bidder wishes to propose an alternative, they shall provide sufficient documentation to demonstrate that their alternative is equal to what is required by the specifications as well as the proposed cost reduction from their base bid should the alternative be accepted. However, their base bid shall conform to the Specifications. (Attachment)
3. Revised Sections 01 11 00 – Summary of Work and 13 31 33 - Fabric Structure. Changes made include height of concrete block foundation wall as well requirements for plywood to be installed along interior of block foundation wall. (Attachment)
4. Bid clarifications and answers to questions posed at the pre-bid meeting. Any questions asked at the pre-bid meeting but not answered herein must be submitted in writing for the responses to be considered valid and applicable to the Contract. (Included Below)

5. Responses to questions provided by prospective bidders since the pre-bid meeting on November 1, 2018. (Included Below)

**Clarifications to Bidders:**

1. ClearSpan has notified the Town that the base requirements for their block wall foundation will be different from what was discussed at the pre-bid meeting. The Town was previously provided information that suggested the blocks could be placed on compacted existing material. However, the Town has been informed today that additional preparation will be required. Specifically, the foundation drawing to be prepared by their engineer will include the following notes:
  - “Install compacted structural fill below concrete block walls & buttresses. Minimum depth of fill to be 12” or the frost depth as defined by the local building official, whichever is greater. Where existing soils are classified as granular and free draining to frost depth, structural fill below 12” is not required.
  - Compacted structural fill materials shall be well graded, course, granular fill consisting of gravel and sand mixture with no fines.

For the purposes of the bid, Bidders shall presume that 12” of existing material will need to be excavated and replaced with compacted structural fill as noted in and meeting the requirements of the above notes.

**Responses to questions posed at the Pre-Bid Meeting:**

**Question-**

Will the conduit into the existing building be allowed to penetrate through the existing concrete block wall or will it come up through the slab on the interior of the building?

**Response-**

*The conduit can be run up the outside of the concrete block wall and penetrate through the block.*

**Question-**

Are water and electric available for use on site?

**Response-**

*Limited water and electric will be made available to the contractor via existing hose bibs and electrical outlets. Anything requiring a substantial load should be provided separately by the Contractor.*

**Question-**

Will the existing bathrooms in the Public Works Garage be available?

**Response-**

*The Contractor shall provide their own port-o-let for the project.*

**Question-**

Can excess material be left on site?

**Response-**

*Yes, in a location to be identified by the Town.*

**Responses to questions posed at the Pre-Bid Meeting:**

**Question-**

Specification Sections: "Instruction to Bidders" #2 General - States RFIs must be received no later than seven (7) days prior to the bid opening. "Addenda & Interpretations" #5 states 3 days. Please set a date when RFIs need to be received

**Response-**

*Questions will be due 3 days prior to the bid day.*

**Question-**

At the mandatory site visit 11/1/2018 the following was discussed: provide door hardware requirements for man door entrance. HM Frame & HM door, no glass; Keying requirements?

**Response-**

*Door Hardware shall match existing Public Works Building hardware and shall be keyed to match the existing system on site (Medeco). Correct, hollow metal frame and door with no glass.*

**Question-**

Confirm - as discussed at the site visit: contractors can provide pricing for fabric structures by suppliers other than ClearSpan provided they meet the requirements of Section 13 31 33. Does the optional supplier need to be pre-approved as a substitution prior to the bid?

**Response-**

*Correct, see revised bid form included with this addendum. The Town will not be pre-approving substitutions prior to the bid.*

**Question-**

Confirm - the intent of the drawings and specifications is to place the block foundation on grade. Will the Town require the grade to be paved prior to block placement? Are lateral displacement blocks or bracing required in addition to the foundation blocks to keep the blocks from moving? The 8' wall height is the concern here.

**Response-**

*Refer to information on the topic of block foundation wall base preparation included in this Addendum. Pavement will not be required prior to block placement. Design of block wall foundation configuration will be provided by Contractor.*

**Question-**

Specification section 01 57 13 - Sediment & Erosion Control has specific requirements. At the site visit it was discussed that no erosion control measures are required. Please confirm

**Response-**

*We do not anticipate that silt fencing will be required unless the Contractor's operations create an erosion and sedimentation issue. The catch basin to be installed shall be protected from silt and sediment after installation.*

**Question-**

Confirm - the coiling overhead door or entrance man door are NOT required to be insulated.

**Response-**

*Correct, the coiling overhead door or entrance man door are not required to be insulated.*

**Question-**

Provide more information or louver specification. Assumed to be a standard, aluminum, fixed

**Response-**

*Correct.*

**Question-**

Confirm - no survey or engineered layout is required

**Response-**

*The Contractor shall include any survey or layout that they require to place the proposed building in the location as staked out in the field. As noted in the pre-bid meeting, the stakes that have been set are not to be relied upon for building layout but were set to provide Town forces a general idea of where the building corners are going to be during rough grading activities.*

**Question-**

Confirm - all inspections are performed by Anchor Engineering at no cost to the contractor

**Response-**

*Any inspection required by the Contractor to demonstrate conformance with the Specifications or approved building design plans shall be included by the Contractor. Any inspections performed by Anchor Engineering will be for the Town's benefit only.*

**Question-**

Confirm - there are no MBE/WBE/SBE requirements

**Response-**

*Correct, no such requirements.*

**Question-**

Please provide the site visit sign-in sheet

**Response-**

*These are included with this Addendum.*

PRE-BID MEETING SIGN-IN SHEET  
COLUMBIA SALT STORAGE BUILDING PROJECT  
COLUMBIA, CONNECTICUT

10:00 AM, November 1, 2018

NAME	ORGANIZATION	CONTACT INFORMATION
Matt Brown	Anchor Engineering	Telephone: 860-633-8770 Fax: 860-633-5971 Email: mbrown@anchoreng.com
Bill Carlson	B&W Paving and Landscaping	Telephone: 860-572-9942 Fax: 860-536-5833 Email: betty@bandw paving.com
Steve Ohlund	Zlotnick Construction, Inc	Telephone: 860-456-3221 Fax: 860-456-3981 Email: bids@zlotnickconstruction.com
Kevin Lehet	Hubert E. Butler Const	Telephone: 860-342-3880 Fax: 860-342-2142 Email: BE@hbutlerconstruction.com
GEORGE MATTELL	MATTERN CONST.	Telephone: 860-887-1990 Fax: 860-886-8091 Email: georgem@matternconstruction.com

NAME

ORGANIZATION

CONTACT INFORMATION

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NAME

ORGANIZATION

CONTACT INFORMATION

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Town of Columbia

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## BID PROPOSAL

### PROJECT IDENTIFICATION:

Department of Public Works - Construction of a New Salt Storage Structure  
Public Works Facility – 89 Willimantic Road  
Columbia, Connecticut

### THIS BID IS SUBMITTED TO:

Columbia Town Hall  
323 Jonathan Trumbull Highway  
Columbia, CT, 06237  
Attention: Mr. Mark Walter, Town Administrator

The Undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Bid Price and within the Bid Times indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

Bidder accepts all terms and conditions of the Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty (60) days after the day of Bid opening. Bidder will sign and deliver the required number of counterparts of the Agreement with the Bonds and other documents required by the Bidding Requirements within ten (10) days after the date of Owner’s Notice of Award.

In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

1. Bidder has examined and carefully studied the Bidding Documents and the following Addenda receipt all of which is hereby acknowledged (List Addenda by Addendum Number and Date):

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2. Bidder has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost, progress, performance and furnishing of the Work.
3. Bidder is familiar with and is satisfied as to all federal, state and local Laws and regulations that may affect cost, progress, performance and furnishing of the Work.
4. Bidder has carefully studied all reports and explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) which have been identified in the Supplementary Conditions. Bidder acknowledges that Owner and Engineer do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Bidding Documents with respect to Underground Utilities at or contiguous to the site. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all such additional or supplementary examinations, investigations, explorations,

tests, studies and data concerning conditions (surface, subsurface, Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be employed by Bidder and safety precautions and programs related thereto. Bidder does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the determination of the Bid for performance and furnishing of the Work in accordance with the times, price and other terms and conditions of the Contract Documents.

5. Bidder is aware of the general nature of Work to be performed by Owner and others at the site that relates to Work for which this Bid is submitted as indicated in the Contract Documents.
6. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.
7. Bidder has given Engineer written notice of all conflicts, errors, ambiguities or discrepancies that Bidder has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder, and the Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work for which this Bid is submitted.
8. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.
9. Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

### CONTRACT LUMP SUM – ENTIRE PROJECT

Bidder will complete the Work in accordance with the Contract Documents for the following price:

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Dollars (in words)

\$ \_\_\_\_\_  
(in numbers)

**OPTIONAL ALTERNATIVE FABRIC STRUCTURE BUILDING PROPOSAL**

Bidders are provided the option, but are not required, to propose an alternative fabric structure manufacturer from that specified in the Contract Documents. If an alternative option is proposed by the Bidder, information of sufficient detail to confirm the proposed alternative is equal to that included in the Specifications shall be included with their bid. Additionally, the following information must be provided. If the Bidder does not propose an alternative, the following shall be left blank.

Proposed Alternative Fabric Structure Manufacturer: \_\_\_\_\_

Proposed REDUCTION in bid amount included above if Town accepts alternative fabric structure manufacturer proposed by Bidder:

\_\_\_\_\_ Dollars (in words)

\$ \_\_\_\_\_  
(in numbers)

- 10. Bidder agrees that the Work will be substantially completed and completed and ready for final payment in accordance with Article 14 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 11. Bidder accepts the provisions of the Agreement as to liquidate damages in the event of failure to complete the Work within the times specified in the Agreement.
- 12. The following documents are attached to and made a part of this Bid:

Required Bid Security in the form of \_\_\_\_\_

- 13. Communications concerning this Bid shall be addressed to the address of Bidder below.
- 14. Terms used in this Bid which are defined in the General Conditions or Instructions to Bidders will have the same meanings indicated in the General Conditions or Instructions to Bidders.

SUBMITTED on: \_\_\_\_\_, 2018 (Seal – if Bid by Corporation)

By: \_\_\_\_\_ Title: \_\_\_\_\_

Bidder: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

SEAL – if Bid is by a Corporation

By submitting a bid, the bidder affirms that the bid prices represent the entire cost per plans, specifications, addenda, including all labor, materials, tools, equipment, overhead, profit and that no claim will be made on account of any increase in wage scales, material prices, delivery delays, taxes, insurance, cost indexes or any other rates affecting the construction industry or this project.

**SECTION 01 11 00  
SUMMARY OF WORK****PART 1 - GENERAL**

## 1.01 DESCRIPTION

- A. This work generally includes the construction of a new salt storage building at the Town's Public Works Garage in Columbia, CT. Additional work details are as follows:
- a. The Town has rough graded the area in which the storage structure will be erected. Existing grades will be available for review by the Contractor at the time of pre-bid meeting and by appointment prior to the bid if additional inspection is desired. The Contractor will be responsible for fine grading of the area as required to prepare for the installation of the proposed fabric structure and concrete block foundation. The interior of the structure will be graded as described on the Contract Plan. The Contractor shall compact the interior of the structure in preparation for future installation of asphalt millings by the Town. Grading on the interior shall be uniform from the perimeter of the foundation wall to the proposed catch basin.
  - b. The Contractor shall supply and install a new 56' wide x 112' long ClearSpan Truss Fabric Structure that is erected on an 6' high concrete block foundation wall. The concrete blocks will be plated together with hot dipped galvanized plates as required. The trusses shall be hot dipped galvanized trusses. The Contractor shall be responsible for providing engineered drawings, stamped by a CT professional engineer, for both the building and block foundation wall designs. Additional features are as follows:
    1. (2) End wall package, one on either end of the building
    2. (4) 36" wide x 36" high wall louvers, (2) per each end
    3. (1) 36" x 80 LH outswing Walk IN Door Kit (Fabric Building). Door shall be equipped with hardware that matches that of the existing public works garage building and be keyed to match this existing hardware.
    4. (1) Duracoil Galvanized Standard 22GA-16'x16' Rolling Service Door
  - c. The Contractor shall line the exposed interior of the concrete block foundation wall with 4' wide x 6' tall ¾" thick CDX ground contact pressure treated plywood that is mechanically fastened to the concrete blocks.
  - d. The Contractor will install a new catch basin, 6" SDR35 drainage piping, and 1,000 gallon holding tank as shown on the Contract Plan. The interior of the catch basin and holding tank shall be coated with an epoxy coating as specified on the Plan. The catch basin will be set 3" above grade at the catch basin to allow for future installation of asphalt millings by the Town. The holding tank will be equipped with a high level alarm that will
  - e. The contractor shall supply and install several electrical improvements, including:
    1. The Contractor shall supply and install new interior lighting. Three lights, each RAB lighting RAILP2255000KW or approved equal, shall be mounted at the bottom of the trusses along the center of the building as shown on the Plan. Control of this light shall be via switch located inside the structure adjacent to the man door.

2. The Contractor shall supply and install a new exterior floodlight. The light, RAB Lighting FXLED300T5000KW or approved equal, shall be mounted 20' above grade, centered on the overhead door. Control of this light shall be photocell located on the light.
  3. The Contractor shall supply and install 20 Amp industrial grade heavy duty 4 in 1 grounding surge outlet with indicator light inside the structure adjacent to the man door.
  4. The Contractor shall supply and install a motorized opener for the overhead door. Door shall be capable of being opened manually in case of power failure.
  5. The Contractor shall supply and install a high level alarm for the holding tank that provides visual and audible warning inside the structure, adjacent to the man door.
  6. The Contractor shall make electrical connection to the existing electrical panel within the Public Works Garage. Contractor shall familiarize themselves with this location prior to the bid. Contractor shall provide required buried conduit(s) between the Public Works Garage and new storage structure. An additional (2) conduits of equal size to those required for the new electrical service to the storage structure shall be provided as well. All conduits, wiring, connections, etc. shall be appropriate for use in the conditions in which they will be installed.
- f. The Contractor shall provide and install the proper disconnection of the existing Fueling System to the point of connection to associated electrical service panel. Existing electrical services to all other portions of the site shall remain and the Contractor shall install H-20 load rated hand holes if any may be required. All associated wiring and conduit shall be located, removed, and disposed and ground restored above to existing conditions.
  - g. Paved areas that are disturbed during the course of work shall be restored with new bituminous concrete to match existing conditions. Unpaved areas that are disturbed during the course of work shall be restored to match existing surface conditions (stone, topsoil & seed, etc.). Penetrations in buildings shall be sealed as directed by the Town.
  - h. The Contractor is responsible for obtaining all necessary permits to perform the work in accordance with Town of Columbia and State of Connecticut requirements. The Contractor is responsible for any associated permit fees, however Town related building department fees will be waived.

## 1.02 CONTRACT

- A. Complete the entire scope of work under a Lump Sum Contract as noted on the bid proposal form and in accordance with the Contract Documents.

## PART 2 - PRODUCTS

- A. Not Applicable

**PART 3 - EXECUTION**

A. Not Applicable

**PART 4 - MEASUREMENT AND PAYMENT**

A. Not Applicable.

**END OF SECTION**

## SECTION 13 31 33 FABRIC STRUCTURE

### 1.0.0. GENERAL

- 1.1.0. The purpose of this bid is for the purchase, delivery and installation on site for the Town of Columbia CT of a ClearSpan Fabric Structure measuring 56' X 112' building for the purpose of a "Salt Storage Building", following the design specifications listed below.
- 1.2.0. The workmanship of all materials and components of the structure shall commensurate with the functional requirements of the item.
- 1.3.0. Building prefabrication shall be performed under factory conditions in a plant specifically arranged for this type of work. Contractor shall provide adequate space, equipment, personnel and technical ability to coordinate the assembly and factory prefabrication of all major components of the work and all necessary operation in the packing, shipping and installation procedures. No fabrication shall be done unless the materials have been tested and approved.

### 2.0.0. GENERAL DESIGN REQUIREMENTS:

#### 2.1.0. Warranty: 50-year on the frame & 20- year on the fabric.

- 2.1.1. The membrane shall be tensioned over the framework.
- 2.1.2. The structure shall be rectangular in shape with 1 solid closed vertical gable end wall with 2ea 3'x3' vents. Front end wall to include a solid end wall with 2ea 3'x3' vents, a 16x16 Raynor Chain-hoist Duracoil steel rollup door with motorized operator, and a 36"x80" walk door.
- 2.1.3. The interior of the structure below the main trusses shall be clear span free of any structural support members and shall provide unobstructed floor space.
- 2.1.4. No exterior purlins, guy ropes or cables shall be used for anchoring the structure.

#### 2.2.0. Design Requirements-Structural Frame:

- 2.2.1. Frame to be Hot Dipped Post Fabrication (ASTM A123) with rafter spacing to be determined by building engineer in compliance with local building code.
- 2.2.2. Purlin Spacing: To provide for structural stability and to provide for installation of accessory items, the main structural trusses shall be laterally braced by tubular purlins at intervals required by the truss design.
- 2.2.3. Wind and Frame Bracing: The structure shall be appropriately stabilized with wind bracing cable as well as any required secondary node restraint assemblies so as to efficiently transfer wind, snow and

seismic induced stresses to the foundation/anchoring system. The end bay(s) of the structure shall be designed to be X – braced early during installation to allow for permanent stability of the frame during installation.

- 2.2.4. Connecting Joints: Connections between structural elements shall be designed so as to transfer the compressive and tensile forces present in a given joint. A minimum of Grade 5 bolts shall be used at each truss chord joint. Primary axial steel, secondary purlins and end wall frame connections shall be made with a minimum of Grade 5 hex bolts, carriage bolts and self drilling screws.
- 2.2.5. Mechanical Equipment Interface: The main structural roof trusses shall allow for installation of electrical and mechanical equipment based on collateral loads. Likewise, the structure shall accept penetrations through the membrane for access doors and mechanical services with minimal modification.
- 2.2.6. Ancillary Systems: The structure shall be designed such that it can be readily retrofitted with insulation systems and other ancillary systems such as lighting, sprinklers, HVAC, provided collateral load factors are taken into account.
- 2.2.7. Alternative Cladding materials: The structure shall be designed such that alternative covering materials such as metal wall cladding can be added with minimal modification, if required.
- 2.2.8. All hardware needed to assemble building to be supplied by vendor / contractor.
- 2.2.9. 56' Wide X 112' Long dome style frame mounted to 3 rows of 2'x2'x6' concrete blocks per the following minimum specifications.

Pre-Cast Concrete Block

- 1) All Pre-cast concrete block shall have a minimum 28-day compressive strength of 2500 psi.
  - 2) Concrete mix design shall use type II cement.
  - 3) All individual block units shall be free of cracks and other defects that would interfere with the placement and locking of units. Shear keys shall be free of damage.
  - 4) Unit dimensions such as height, width, depth and batter shall match the specifications included in the plans. A tolerance of +- 1/2 inch for width may be used.
  - 5) Concrete blocks to be formed with normal weight concrete.
  - 6) Concrete block foundation to be installed on a level surface.
  - 7) Concrete blocks to be a single pour (no cold seams)
- 2.2.12. Must use buttresses at defined truss locations in addition to steel plates for block walls as recommended by engineer. All plates must be Hot Dipped and all plate bolts must be stainless steel.

- 2.2.13. Building to be engineered to CT State Building Code standards for ground snow load and wind loads.
- 2.2.14 Interior of concrete block foundation wall shall be lined with ¾" thick CDX ground contact pressure treated plywood that is affixed to the foundation wall. A minimum of 6 points of connection shall be provided for each 6' high sheet of plywood, spaced evenly around each sheet. Spacers shall be provided on all sheets as necessary to eliminate conflicts with steel plates tying blocks together so all sheets on each wall are fastened in the same plane.

**2.3.0. Design Requirements – Membrane Cladding System:**

- 2.3.1 Membrane: The roof membrane shall form a weather tight shell over the structural frame. In order to provide for a good finished appearance and to insure weather tightness, the membrane shall be assembled and tensioned, in a manner to minimize wrinkles in hot and cold temperatures.
- 2.3.2. The gable wall membrane cladding shall be manufactured and connected to form one piece to the adjacent end wall and roof cladding.
- 2.3.3. Roof membrane horizontal stretch shall be maintained with horizontal purlins requiring no ongoing maintenance.
- 2.3.4. Base Tensioning System: The membrane cladding will be provided with a mechanical tensioning system that allows the membrane to be fully tensioned around the structure perimeter. The system will be designed such that the membrane can be tightly and neatly secured over the structural frame and such that the system has remaining range of adjustment.
- 2.3.5. Membrane Seal at Openings and Base: The manufacturer of the structure will provide all materials and methods necessary to fully tension and seal the membrane material around all doors, ventilation and other opening as well as around the structure perimeter below the main tensioning system. This seal shall provide a neat and finished appearance and eliminate any loose membrane cladding that would otherwise be damaged by flapping or abrasion. When a membrane base skirt is required, this shall be supplied and attached at the base perimeter to allow a reasonable seal against air and water intrusion.
- 2.3.6. The membrane shall not be designed to function as a structural member such that, should any damage to or penetrations of the membrane occur, the integrity of the structural framework shall not be affected.
- 2.3.7. The Contractor shall provide drawings and calculations acceptable to the architect/Engineer of the Record, meeting the provisions of the applicable State Building Code. The Contractor shall bear all costs for production of drawings and associated structural calculations. Contractor shall make all revisions and corrections to those documents required for approval and shall resubmit as required to obtain approvals.

**2.4.0. ENGINEERED DESIGN CRITERIA:**

- 2.4.1. The structure shall be designed using methodology as per ASCE 7 standard referenced from the applicable building code. Primary and secondary framing shall comply with current issues of ISC, AISI, NEMA and ASTM specification, as applicable.

Structural members shall be designed using Allowable Stress Design (ASD) or Load Resistance Factored Design (LRFD) for the design loads given below. Wind load factors and coefficients used in design of structural members must be in accordance with the applicable ASCE 7 guidelines.

- 2.4.2 Snow Loads: The structure shall be designed based upon a minimum ground snow load as required by the CT State Building Code
- 2.4.3. Wind Loads: The structure shall be capable of withstanding a basic wind speed (3-second gust) from any direction as specified in the CT State Building Code. The design wind pressure shall be based on an exposure category of "C" and appropriate wind load factors and coefficients in accordance with the applicable referenced ASCE 7 guidelines. In no event shall the wind load used in the design of the main wind force resisting system be less than 10 pounds per square foot multiplied by the area of the building or structure projected on a vertical plane that is normal to the wind direction.
- 2.4.4. Rainfall: The structure shall be capable of withstanding the effects of rainfall up to 4 inches per hour for at least 2 hours.
- 2.4.5. Design Loads: The design shall be based as a minimum on the following design loads. Each member shall be designed to withstand stresses resulting from combinations of design loads that produce maximum percentage of actual to allowable stress in that member as per referenced ASCE 7 standard from applicable building code.

D = Dead Load + Collateral Load

S = Symmetrical Snow or Live Load (Balanced or Unbalanced)

Ws = Wind with internal suction

Wp = Wind with internal pressure

E = Earthquake

#### 2.5.0. OPERATION AND USE:

- 2.5.1. The main structure frame shall be designed to provide a minimum of 15-year operational use period with appropriate inspection and maintenance. Owner's manual to be provided.
- 2.5.2 The structure shall be capable of being assembled, operated and dismantled in all ambient temperatures between -20 °F and 120 °F.
- 2.5.3. The structure shall be capable of being erected on concrete and of accepting differential settlement of up to 1 ½% between truss positions.

#### 2.6.0. MATERIALS:

- 2.6.1. All materials used in the structure shall be new, without defects and free of repairs. The quality of the materials used shall be such that the structure is in conformance with the performance requirements specified herein.

2.6.2. Cladding Membrane: The structure shall be clad with a polyolefin fabric manufactured by an approved and reputable supplier with demonstrated long-term performance. The polyolefin membrane fabric shall be waterproof and free from defects. All roofs, walls, end walls and connecting sections shall be weather tight. The material shall be selected from the manufacturer’s standard colors for the sidewalls and roof panels. The material scrim and coating must be UV stabilized and must carry a minimum 20-year manufacturer’s warranty. The minimum fabric specification is as follows:

Total Fabric Weight	12.0 oz/yd <sup>2</sup> (407 g/m <sup>2</sup> ) +/- 5%
Coating Thickness	4 mils average, each side
Finished Thickness	20 mils (ASTM D5199)
Grab Tensile Strength	370 lbs (ASTM D5034)
Strip Tensile Strength	275 lbs/in (ASTM D5035)
Tongue Tear Strength	115 lbs (ASTM D2261)
Trapezoidal Tear	90 lbs (ASTM D-4533)
Mullen Burst	675 psi (ASTM D3786)
Cold Crack Resistance	-60 °C (ASTM D2136)
UV Resistance & Weathering	>90% retention after 2000 hrs. ASTM G151

2.6.3. Metal: The main structure shall consist of welded truss arches with parallel tube chords separated apart by webbing.

2.6.4. Frame to be Hot Dipped Post Fabrication (ASTM A123). Tension: 55 KSI & Yield: 50 KSI

2.6.5. Rafter spacing to be determined by building engineer to comply with local building code.

**2.7.0. Hardware:**

2.7.1. Bolts: Bolts subject to extreme stress and wear shall be structural bolts of Grade 5 and plated/ galvanized that has been upgraded with a corrosion resistant topcoat finish. All bolts shall be installed and securely torque so as the prevent change in tightness. Those subject to removal or adjustment shall not be swaged, peened, staked or otherwise installed.

2.7.2. Membrane Tensioning Hardware: The fabric membrane shall be tensioned with load rated hardware. Hardware shall allow full and free rotation at the foundation connection to avoid fatigue of threaded assemblies.

2.7.3. Membrane Tensioning Webbing: The membrane shall be tensioned with load-tested tie-downs.

2.7.4. Cable Assemblies: Main and wind bracing cable assemblies shall be manufactured to the required length and press swaged with metal sleeves. The cables are manufactured using performed galvanized cables, sized with appropriate safety factors.

3/16" dia.	=	4,200 lbs.
¼" dia.	=	7,000 lbs.
5/16" dia.	=	9,800 lbs.

3/8" dia.	=	14,400 lbs.
1/2" dia.	=	22,800 lbs.

- 2.7.5. Other Fasteners: Non-structural fasteners such as wood screws, Tek screws, etc., shall be standard commercial quality.
- 2.7.6. Exterior Trim: The aluminum alloy used in the extrusion shall meet or exceed 6063-T5.
- 2.7.7. Piece marking and Identification: all individual parts or bundles and packages of identical parts are to be clearly marked for identification. Bolts, nuts, washers and fasteners shall be packaged according to type, size and length. Shipping documentation shall include a list showing the Description, quantity and piece mark of the various parts, components and elements.
- 2.7.8. Material Delivery: The building system materials shall be delivered to the project site during normal working hours on weekdays. (6:30am to 2:30pm). 24 hours advanced notice for delivery is required. Installation contractor will provide adequate workmen and equipment to promptly unload, inspect and accept material delivery.
- 2.7.9. Handling: At no time shall materials be dropped, thrown or dragged over the transport equipment or the ground. Damage to any piece under its own or superimposed weight shall be cause for repair or replacement by the vendor or contractor.
- 2.7.10. Short, damaged or excess materials: Installation contractor shall inspect, count and verify quantities based on the shipping documents.

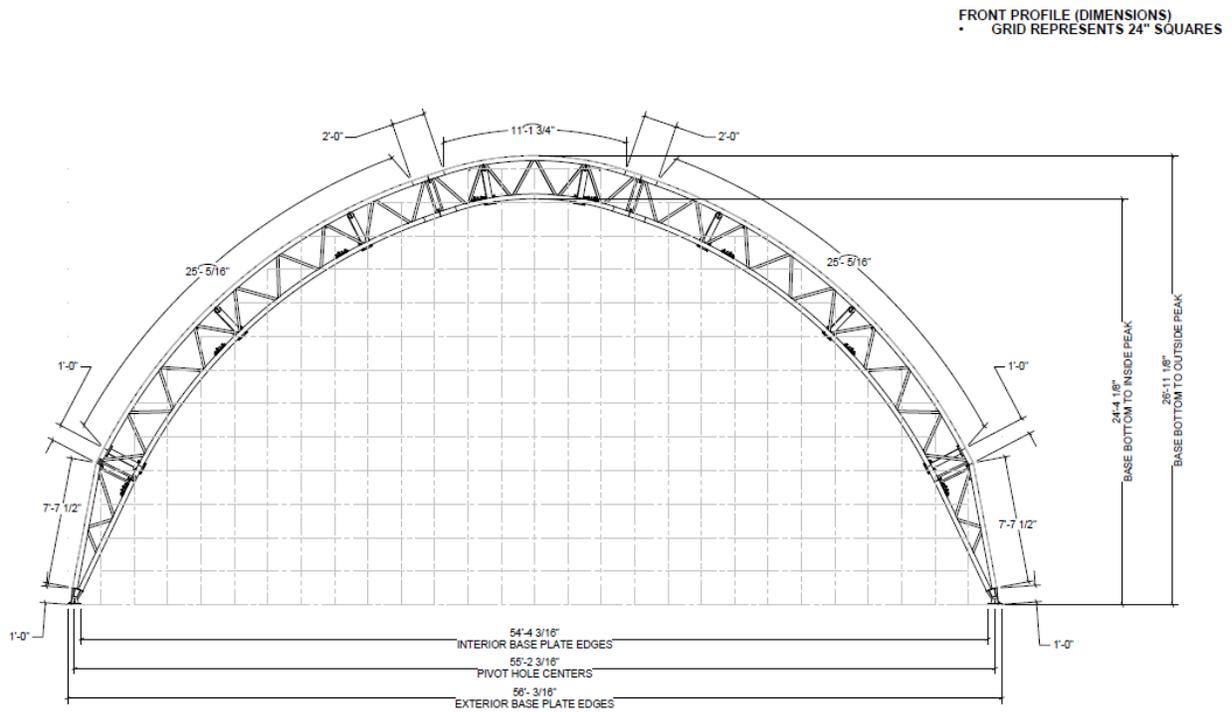
### 3.0.0. REFERENCES AND STANDARDS:

- 3.1.0. The following publications are for the standards listed below but referred to within the document by basic letter designation only. They form a part of this specification to the extent referenced thereto:
- 3.1.1. American Institute of Steel Construction (AISC):
- S326-78 Design, Fabrication and Erection of Structural Steel Buildings  
S329-85 Structural Joints Using ASTM A325 or A490 Bolts
- 3.1.2. American Iron and Steel Institute (AISI):  
SG 503-76 The Design of Fabrication of Cold-Formed Steel Structures
- 3.1.3. American Society for Testing and Materials (ASTM):  
A 36-89 Structural Steel  
A 307-89 Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength  
A 325-89 High-Strength Bolts for Structural Steel Joints
- A 500 A-90 Standard Specification for Cold Formed Welded And Seamless Carbon Steel Structural Tubing in Rounds and Shapes  
A 563 Rev A-89 Carbon and Alloy Steel Nuts  
A 687-89 High-Strength Non-Headed Steel Bolts and Studs

3.1.4. American Society of Civil Engineers (ASCE) Minimum Design Loads for Building and Other Structures. Latest edition as required by State Code.

- ASCE 7-98 American Society of Civil Engineers
- ASCE 7-02 American Society of Civil Engineers
- ASCE 7-05 American Society of Civil Engineers

3.1.5. Canadian Standards Association  
CAN/CSA-S16.1 Limit States Design of Steel Structures



**NovaShield® II with  
ArmorKote™**  
FRU88X-6 4 mil

INTERTAPE POLYMER GROUP  
**TECHNICAL DATA SHEET**

**DESCRIPTION**

Nova-Shield® II FRU88X-6 4 mil is a heavyweight fabric for applications requiring flame retardants and UV stability, such as membrane structures and alternate daily landfill covers. The scrim is produced in a special weaving pattern to enhance thickness, flatness, abrasion resistance, and tear properties. The proprietary coating is used to enhance abrasion resistance, flex resistance, seam strength, UV resistance and longevity.

**FABRIC SPECIFICATIONS**

Weave: Woven HDPE scrim using natural FR/UV tapes  
Coating: 4 mil average each side (95 g/m<sup>2</sup>/side)  
Color: Off-white, green, blue, grey sandstone and other colors available upon request  
Weight: 12 oz/yd<sup>2</sup> (407g/m<sup>2</sup>) +/- 5 %  
Thickness: 23 mil (0.59 mm) ASTM D1777

**ROLL SPECIFICATIONS**

Cores: 4 inch I.D. or 5 inch I.D. available  
Width: Up to 150 inches (-0, +0.5) as ordered  
Length: minimum 250 yds/roll; up to 1000 yds/roll

These values are typical data and are not intended as limiting specifications.



3647 Cortez Road West | Bradenton, FL 34210 | USA  
Customer Service: 800.JPG.8273 | 800.474.8273  
Tape Technical Service: 877.447.4832  
[www.intertapepolymer.com](http://www.intertapepolymer.com) | [info@itape.com](mailto:info@itape.com)

**PERFORMANCE PROPERTIES**

The following data are nominal values based on ASTM standard tests. This data should not be considered specification.

<b>Grab Tensile</b> ASTM D-5034-95	Warp 355 lb, 1578 N / Weft 350 lb, 1555 N
<b>Strip Tensile</b> (N/5cm) ASTM D-5035-95	Warp 270 lb/in (2400)/Weft 250 lb/in (2222)
<b>Tongue Tear</b> ASTM D-2261-96	Warp 115 lb, 510 N / Weft 115 lb, 510 N
<b>Trapezoidal Tear</b> ASTM D-4533-04	Warp 95 lb, 422 N / Weft 90 lb, 401 N
<b>Mullen Burst</b> ASTM D-3786-01	675 psi 4657 kPa
<b>Accelerated UV Weathering<sup>1</sup></b> ASTM G151-00 ASTM G154-04	>90 % strength retention after 2000 hrs exposure @ 0.77 W/m <sup>2</sup> /nm, or 1200 hrs exposure @ 1.35 W/m <sup>2</sup> /nm
<b>Accelerated Natural Weathering</b> ASTM G90-98	>80 % strength retention after 5 Florida Standard Years <sup>2</sup>
<b>Low Temperature Bend</b> ASTM D2136-94	-60°C

<sup>1</sup> Q.U.V [A-340 Lamps]; 8 hrs UV @ 60°C; 4hrs condensation @ 50°C <sup>2</sup> 1333 MJ

While we believe them to be reliable, the statements and information herein are only for general guidance and are not warrants or guarantees for accuracy and completeness. The user must, by test or otherwise, determine suitability for this purpose. There is no warranty of fitness for a particular purpose. Our standard term and conditions of sale apply exclusively to all orders, and all liability for damages of any kind, including consequential, exceeding purchase price is excluded. No one is authorized by us to make oral warranties. We reserve the right to make changes without notice or obligation in our products and publications.

EFFECTIVE: 10/10

**FR PERFORMANCE**

This product meets the requirements of NFPA 701 - 2004 (Method 1 and Method 2), 1989 (large and small scale) and 1996 (tests 1 and 2), CAN/ULC S109-M87 (small and large scale), CAN/ULC S102-03, CAN/ULC S102.2-03, ASTM E84-00a (Class 1), UBC31-1, California Fire Marshal (F-51405).

END OF DOCUMENT