

STATE OF TEXAS           §  
   §  
 COUNTY OF FORT BEND    §

**AGREEMENT FOR BLAST FILM WINDOW PROTECTION  
RFP 13-027**

THIS AGREEMENT is made and entered into by and between Fort Bend County, (hereinafter "County"), a body corporate and politic under the laws of the State of Texas, and Enpro Contracting (hereinafter "Contractor"), a company authorized to conduct business in the State of Texas.

**WITNESSETH**

WHEREAS, County desires that Contractor provide and install blast film window protection at the Jane Long Annex (hereinafter "Services") pursuant to RFP 13-027; and

WHEREAS, Contractor represents that it is qualified and desires to perform such services.

NOW, THEREFORE, in consideration of the mutual covenants and conditions set forth below, the parties agree as follows:

**AGREEMENT**

**Article I. Scope of Services**

Contractor shall render Services to County as defined in Scenario 1 in the Scope of Services (attached hereto as Exhibit A).

**Article II. Personnel**

2.1 Contractor represents that it presently has, or is able to obtain, adequate qualified personnel in its employment for the timely performance of the Scope of Services required under this Agreement and that Contractor shall furnish and maintain, at its own expense, adequate and sufficient personnel, in the opinion of County, to perform the Scope of Services when and as required and without delays.

2.2 All employees of Contractor shall have such knowledge and experience as will enable them to perform the duties assigned to them. Any employee of Contractor who, in the opinion of County, is incompetent or by his conduct becomes detrimental to the project shall, upon request of County, immediately be removed from association with the project.

### **Article III. Compensation and Payment**

3.1 Contractor's fees shall be calculated at the rates set forth in the attached Exhibit A. The Maximum Compensation for the performance of Services within the Scope of Services described in Exhibit A is thirty-three thousand four hundred and ninety-three dollars and no/100 (\$33,493). In no case shall the amount paid by County under this Agreement exceed the Maximum Compensation without an approved change order.

3.2 All performance of the Scope of Services by Contractor including any changes in the Scope of Services and revision of work satisfactorily performed will be performed only when approved in advance and authorized by County.

3.3 County will pay Contractor based on the following procedures: Upon completion of the tasks identified in the Scope of Services, Contractor shall submit to County two (2) original copies of invoices showing the amounts due for services performed in a form acceptable to County. County shall review such invoices and approve them within 30 calendar days with such modifications as are consistent with this Agreement and forward same to the Auditor for processing. County shall pay each such approved invoice within thirty (30) calendar days. County reserves the right to withhold payment pending verification of satisfactory work performed.

### **Article IV. Limit of Appropriation**

4.1 Contractor clearly understands and agrees, such understanding and agreement being of the absolute essence of this Agreement, that County shall have available the total maximum sum of thirty-three thousand four hundred and ninety-three dollars and no/100 (\$33,493), specifically allocated to fully discharge any and all liabilities County may incur.

4.2 Contractor does further understand and agree, said understanding and agreement also being of the absolute essence of this Agreement, that the total maximum compensation that Contractor may become entitled to and the total maximum sum that County may become liable to pay to Contractor shall not under any conditions, circumstances, or interpretations thereof exceed thirty-three thousand four hundred and ninety-three dollars and no/100 (\$33,493).

### **Article V. Time of Performance**

Time for performance of the Scope of Services under this Agreement shall begin with receipt of the Notice to Proceed and end no later than sixty (60) days thereafter. Contractor shall complete the tasks described in the Scope of Services within this time or within such additional time as may be extended by the County.

### **Article VI. Modifications and Waivers**

6.1 The parties may not amend or waive this Agreement, except by a written agreement executed by both parties.

6.2 No failure or delay in exercising any right or remedy or requiring the satisfaction of any condition under this Agreement, and no course of dealing between the parties, operates as a waiver or estoppel of any right, remedy, or condition.

6.3 The rights and remedies of the parties set forth in this Agreement are not exclusive of, but are cumulative to, any rights or remedies now or subsequently existing at law, in equity, or by statute.

## **Article VII. Termination**

### **7.1 Termination for Convenience**

7.1.1 County may terminate this Agreement at any time upon thirty (30) days written notice.

### **7.2 Termination for Default**

7.2.1 County may terminate the whole or any part of this Agreement for cause in the following circumstances:

7.2.1.1 If Contractor fails to perform services within the time specified in the Scope of Services or any extension thereof granted by the County in writing;

7.2.1.2 If Contractor materially breaches any of the covenants or terms and conditions set forth in this Agreement or fails to perform any of the other provisions of this Agreement or so fails to make progress as to endanger performance of this Agreement in accordance with its terms, and in any of these circumstances does not cure such breach or failure to County's reasonable satisfaction within a period of ten (10) calendar days after receipt of notice from County specifying such breach or failure.

7.2.2 If, after termination, it is determined for any reason whatsoever that Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the County in accordance with Section 7.1 above.

7.3 Upon termination of this Agreement, County shall compensate Contractor in accordance with Section 3, above, for those services which were provided under this Agreement prior to its termination and which have not been previously invoiced to County. Contractor's final invoice for said services will be presented to and paid by County in the same manner set forth in Section 3 above.

7.4 If County terminates this Agreement as provided in this Section, no fees of any type, other than fees due and payable at the Termination Date, shall thereafter be paid to Contractor.

#### **Article VIII. Ownership and Reuse of Documents**

All documents, data, reports, research, graphic presentation materials, etc., developed by Contractor as a part of its work under this Agreement, shall become the property of County upon completion of this Agreement, or in the event of termination or cancellation thereof, at the time of payment under Section 3 for work performed. Contractor shall promptly furnish all such data and material to County on request.

#### **Article IX. Inspection of Books and Records**

Contractor will permit County, or any duly authorized agent of County, to inspect and examine the books and records of Contractor for the purpose of verifying the amount of work performed under the Scope of Services. County's right to inspect survives the termination of this Agreement for a period of four years.

#### **Article X. Insurance**

10.1 Prior to commencement of the Services, Contractor shall furnish County with properly executed certificates of insurance which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days' prior written notice to County. Contractor shall provide certified copies of insurance endorsements and/or policies if requested by County. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form from such companies having Bests rating of A/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:

10.1.1 Workers' Compensation insurance in accordance with the laws of the State of Texas. Substitutes to genuine Workers' Compensation Insurance will not be allowed. Employers' Liability insurance with limits of not less than \$1,000,000 per injury by accident, \$1,000,000 per injury by disease, and \$1,000,000 per bodily injury by disease.

10.1.2 Commercial general liability insurance with a limit of not less than \$1,000,000 each occurrence and \$2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.

10.1.3 Business Automobile Liability insurance with a combined Bodily Injury/Property Damage limit of not less than \$1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.

10.1.4 Professional Liability insurance with limits not less than \$1,000,000.

10.2 County and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation. All Liability policies including Workers' Compensation written on behalf of Contractor shall contain a waiver of subrogation in favor of County and members of Commissioners Court.

10.3 If required coverage is written on a claims-made basis, Contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of 2 years beginning from the time that work under the Agreement is completed.

#### **Article XI. Performance and Payment Bonds**

Contractor shall provide to the Office of the County Purchasing Agent a performance bond and a payment bond, each in the amount of one hundred percent of the Maximum Compensation within ten (10) calendar days of execution of this Agreement. Such bonds shall be executed by a corporate surety duly authorized and admitted to do business in the State of Texas and licensed in the State of Texas to issue surety bonds with a Best Rating of "A" or better. County reserves the right to accept or reject any surety company proposed by Contractor. In the event County rejects the proposed surety company, Contractor will be afforded five (5) additional days to submit the required bonds issued by a surety company acceptable to County.

#### **Article XII. Indemnity**

**CONTRACTOR SHALL INDEMNIFY AND DEFEND COUNTY AGAINST ALL LOSSES, LIABILITIES, CLAIMS, CAUSES OF ACTION, AND OTHER EXPENSES, INCLUDING REASONABLE ATTORNEYS FEES, ARISING FROM ACTIVITIES OF CONTRACTOR, ITS AGENTS, SERVANTS OR EMPLOYEES, PERFORMED UNDER THIS AGREEMENT THAT RESULT FROM THE NEGLIGENT ACT, ERROR, OR OMISSION OF CONTRACTOR OR ANY OF CONTRACTOR'S AGENTS, SERVANTS OR EMPLOYEES.**

#### **Article XIII. Confidential and Proprietary Information**

13.1 Contractor acknowledges that it and its employees or agents may, in the course of performing their responsibilities under this Agreement, be exposed to or acquire information that is confidential to County. Any and all information of any form obtained by Contractor or its employees or agents from County in the performance of this Agreement shall be deemed to be confidential information of County ("Confidential Information"). Any reports or other documents or items (including software) that result from the use of the Confidential Information by Contractor shall be treated with respect to confidentiality in the same manner as the Confidential Information. Confidential Information shall be deemed not to include information that (a) is or becomes (other than by disclosure by Contractor) publicly known or is contained in a publicly available document; (b) is rightfully in Contractor's possession without the obligation of nondisclosure prior to the time of its

disclosure under this Agreement; or (c) is independently developed by employees or agents of Contractor who can be shown to have had no access to the Confidential Information.

13.2 Contractor agrees to hold Confidential Information in strict confidence, using at least the same degree of care that Contractor uses in maintaining the confidentiality of its own confidential information, and not to copy, reproduce, sell, assign, license, market, transfer or otherwise dispose of, give, or disclose Confidential Information to third parties or use Confidential Information for any purposes whatsoever other than the provision of Services to County hereunder, and to advise each of its employees and agents of their obligations to keep Confidential Information confidential. Contractor shall use its best efforts to assist County in identifying and preventing any unauthorized use or disclosure of any Confidential Information. Without limitation of the foregoing, Contractor shall advise County immediately in the event Contractor learns or has reason to believe that any person who has had access to Confidential Information has violated or intends to violate the terms of this Agreement and Contractor will at its expense cooperate with County in seeking injunctive or other equitable relief in the name of County or Contractor against any such person. Contractor agrees that, except as directed by County, Contractor will not at any time during or after the term of this Agreement disclose, directly or indirectly, any Confidential Information to any person, and that upon termination of this Agreement or at County's request, Contractor will promptly turn over to County all documents, papers, and other matter in Contractor's possession which embody Confidential Information.

13.3 Contractor acknowledges that a breach of this Section, including disclosure of any Confidential Information, or disclosure of other information that, at law or in equity, ought to remain confidential, will give rise to irreparable injury to County that is inadequately compensable in damages. Accordingly, County may seek and obtain injunctive relief against the breach or threatened breach of the foregoing undertakings, in addition to any other legal remedies that may be available. Contractor acknowledges and agrees that the covenants contained herein are necessary for the protection of the legitimate business interest of County and are reasonable in scope and content.

13.4 Contractor in providing all services hereunder agrees to abide by the provisions of any applicable Federal or State Data Privacy Act.

13.5 Contractor expressly acknowledges that County is subject to the Texas Public Information Act, TEX. GOV'T CODE ANN. §§ 552.001 *et seq.*, as amended, and notwithstanding any provision in the Agreement to the contrary, County will make any information related to the Agreement, or otherwise, available to third parties in accordance with the Texas Public Information Act. Any proprietary or confidential information marked as such provided to County by Consultant shall not be disclosed to any third party, except as directed by the Texas Attorney General in response to a request for such under the Texas Public Information Act, which provides for notice to the owner of such marked information and the opportunity for the owner of such information to notify the Attorney General of the reasons why such information should not be disclosed.

**Article XIV. Independent Contractor**

14.1 In the performance of work or services hereunder, Contractor shall be deemed an independent contractor, and any of its agents, employees, officers, or volunteers performing work required hereunder shall be deemed solely as employees of contractor or, where permitted, of its subcontractors.

14.2 Contractor and its agents, employees, officers, or volunteers shall not, by performing work pursuant to this Agreement, be deemed to be employees, agents, or servants of County and shall not be entitled to any of the privileges or benefits of County employment.

**Article XV. Notices**

15.1 Each party giving any notice or making any request, demand, or other communication (each, a "Notice") pursuant to this Agreement shall do so in writing and shall use one of the following methods of delivery, each of which, for purposes of this Agreement, is a writing: personal delivery, registered or certified mail (in each case, return receipt requested and postage prepaid), or nationally recognized overnight courier (with all fees prepaid).

15.2 Each party giving a Notice shall address the Notice to the receiving party at the address listed below or to another address designated by a party in a Notice pursuant to this Section:

County: Fort Bend County Office of Emergency Management  
307 Fort Street  
Richmond, Texas 77469

With a copy to: Fort Bend County  
Attn: County Judge  
301 Jackson Street, Suite 719  
Richmond, Texas 77469

Contractor: Enpro Contracting  
1401 Brittmoore Road  
Houston, Texas 77043

15.3 A Notice is effective only if the party giving or making the Notice has complied with subsections 15.1 and 15.2 and if the addressee has received the Notice. A Notice is deemed received as follows:

15.3.1 If the Notice is delivered in person, or sent by registered or certified mail or a nationally recognized overnight courier, upon receipt as indicated by the date on the signed receipt.

15.3.2 If the addressee rejects or otherwise refuses to accept the Notice, or if the Notice cannot be delivered because of a change in address for which no Notice was given, then upon the rejection, refusal, or inability to deliver.

**Article XVI. Compliance with Laws**

Contractor shall comply with all federal, state, and local laws, statutes, ordinances, rules and regulations, and the orders and decrees of any courts or administrative bodies or tribunals in any matter affecting the performance of this Agreement, including, without limitation, Worker's Compensation laws, minimum and maximum salary and wage statutes and regulations, licensing laws and regulations. When required by County, Contractor shall furnish County with certification of compliance with said laws, statutes, ordinances, rules, regulations, orders, and decrees above specified.

**Article XVII. Performance Warranty**

17.1 Contractor warrants to County that Contractor has the skill and knowledge ordinarily possessed by well-informed members of its trade or profession practicing in the greater Houston metropolitan area and Contractor will apply that skill and knowledge with care and diligence to ensure that the Services provided hereunder will be performed and delivered in accordance with the highest professional standards.

17.2 Contractor warrants to County that the Services will be free from material errors and will materially conform to all requirements and specifications contained in the attached Exhibit A.

**Article XVIII. Assignment**

18.1 Neither party may assign any of its rights under this Agreement, except with the prior written consent of the other party. That party shall not unreasonably withhold its consent. All assignments of rights are prohibited under this subsection, whether they are voluntarily or involuntarily, by merger, consolidation, dissolution, operation of law, or any other manner.

18.2 Neither party may delegate any performance under this Agreement.

18.3 Any purported assignment of rights or delegation of performance in violation of this Section is void.

**Article XIX. Applicable Law**

The laws of the State of Texas govern all disputes arising out of or relating to this Agreement. The parties hereto acknowledge that venue is proper in Fort Bend County, Texas, for all legal actions or proceedings arising out of or relating to this Agreement and waive the right to sue or be sued elsewhere. Nothing in the Agreement shall be construed to waive the County's sovereign immunity.



**Article XX. Successors and Assigns**

County and Contractor bind themselves and their successors, executors, administrators and assigns to the other party of this Agreement and to the successors, executors, administrators and assigns of the other party, in respect to all covenants of this Agreement.

**Article XXI. Third Party Beneficiaries**

This Agreement does not confer any enforceable rights or remedies upon any person other than the parties.

**Article XXII. Severability**

If any provision of this Agreement is determined to be invalid, illegal, or unenforceable, the remaining provisions remain in full force, if the essential terms and conditions of this Agreement for each party remain valid, binding, and enforceable.

**Article XXIII. Publicity**

Contact with citizens of Fort Bend County, media outlets, or governmental agencies shall be the sole responsibility of County. Under no circumstances whatsoever, shall Contractor release any material or information developed or received in the performance of the Services hereunder without the express written permission of County, except where required to do so by law.

**Article XXIV. Captions**

The section captions used in this Agreement are for convenience of reference only and do not affect the interpretation or construction of this Agreement.

**Article XXV. Conflict**

In the event there is a conflict between this Agreement and the attached exhibit, this Agreement controls.

IN WITNESS WHEREOF, the parties hereto have signed or have caused their respective names to be signed to multiple counterparts to be effective on the 2 day of April, 2013.

FORT BEND COUNTY



Robert E. Hebert, County Judge

ENPRO CONTRACTING

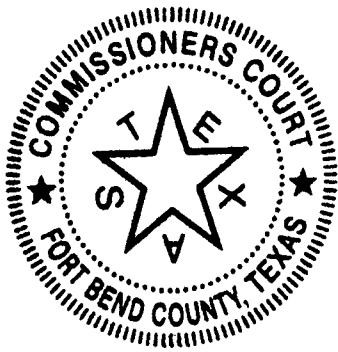
  
Authorized Agent- Signature

GARY NEUMANN  
Authorized Agent- Printed Name

ATTEST:

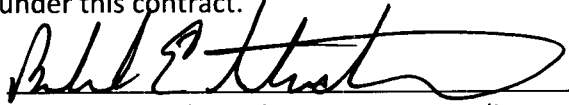
*Dianne Wilson*  
Dianne Wilson, County Clerk

VP FINANCE  
Title  
3-22-13  
Date



**AUDITOR'S CERTIFICATE**

I hereby certify that funds are available in the amount of \$ 33,497.<sup>00</sup> to accomplish and pay the obligation of Fort Bend County under this contract.

A handwritten signature in black ink, appearing to read "Robert E. Sturdivant", is written over a horizontal line.

Robert Edward Sturdivant, County Auditor

# EXHIBIT A

## Jane Long Annex, Ft Bend County Window Mitigation Project RFP 13-027

### Scope of Work: Provide and install blast film on all exterior windows:

The Jane Long Annex was surveyed by Kent LeMonte on February 5, 2013 while meeting with Doug Barnes, Senior Planning Coordinator for Fort Bend County. During discussions with Mr. Barnes it was pointed out that the operational integrity of this structure is critical to Fort Bend County and that both blast pressures and hurricane force winds were considered risks which could affect operations and should be addressed as part of the mitigation plan. A single product solution to both risks is desired.

The objective of this project is to meet or exceed building safety requirements established by FEMA (hurricane protection) and DHS (blast mitigation) and ultimately reach the GSA Safety Condition "2" for windows in a blast event. GSA Safety Condition "2" states that in a blast event the window glass may crack but must remain in place, and no significant glass particles can leave the frame and enter the structure (see table 1). Blast pressures used in the GSA model for category "C" buildings (open to public) are 4.0psi with a duration of 28 msec. It is important to note here that a safety condition of "2" is NOT required by GSA, but a condition "3B" is required under their new code requirements established in 2005. ISC Standards allow up to safety condition "4". The importance of these facts will be summarized later in this document.

**Table 1. GSA Criteria for Test Specimen Performance Conditions**

Performance Condition	Description	Glass Fragments		Hazard Level	Protection Level
		Exterior to Structure	Interior to Structure		
1	Glass not cracked, fully survived and/or fully retained by frame and no glass fragments either inside or outside structure.	None	None	NA	Very High
2	Glass may be cracked but is retained by the frame.	Yes	No significant fragments. Dusting or very small fragments near sill or on floor acceptable.	Very Low	Very High
3a	Glass failed and not fully retained in frame.	Yes	Yes - land on floor no more than 40 inches from window	Low	High
3b	Glass failed and not fully retained in frame.	Yes	Yes - land on floor no more than 10 ft from window.	Low	High
4	Glass failed and not fully retained in frame.	Yes	Yes - Land on floor more than 10 ft from window and impact a vertical surface located not more than 10 ft behind the window no higher than 2 ft above floor level.	Medium	Medium
5	Glass fails catastrophically.	Yes	Yes - land on floor more than 10 ft from window and impact a vertical surface not more than 10 ft behind window above a height of 2 ft.	High	Low

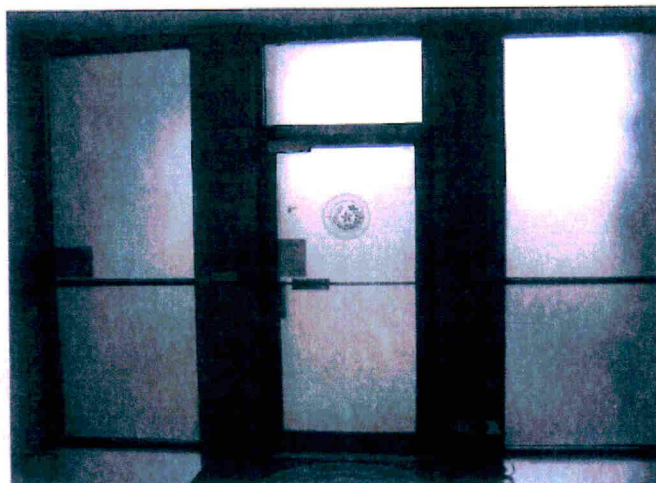


**FEMA Standards for Hurricane Protection:** The Jane Long Building is located in wind-zone 2, greater than 1 mile from any coastline. Typically FEMA requirements mirror those established by ASTM E 1996 and E 1886, which identifies the test protocol for missile impact and wind cycle testing. Test standards for Richmond, Texas must prevent penetration of a 4.5lb 2x4 traveling at 27mph and hold up during the wind cycle testing phase. Wind zone 2 means that expected winds are less than 130mph.

The wind pressure dynamic is explained and determined by ASCE 7-10 which just recently went into effect in 2012. ASCE 7-10 has increased wind loads up to 140mph as opposed to the <130mph defined in ASCE 7-05. This has caused some confusion in that not all areas have adopted the new criteria. Wind-loads, while not being close to the pressures created in a blast, last much longer and create constant positive and negative forces on window systems. Because of this it is critical to hold the glass in the frame (attachment) so that if it breaks it cannot be dislodged from the frame creating a large hole in the structure for wind driven rain to penetrate.

Again the objective of this scope of work is to prevent the glass from leaving the frame in a hurricane event. As with blast protection there is a point where the amount of force can overcome the protective system installed. Therefore, it is critically important to understand the limits of any protection system. This can only be done through full comprehension of both the current system in place (existing windows) and the resulting window system with protection measures in place. The recommended solution must be tested and documented to show how it performs in accordance with both the test protocol and the actual structure and current window system. With this information in hand it is easy to determine at what point the proposed system will fail. Enpro considers it our first priority to make sure that the limits of each system we provide are clearly defined so that actual risk can be measured and understood.

**Survey Observations:** The building is a two-story brick-and-glass structure built prior to 1973. The building is not open to the public and remains locked at all times. Permission to access must be acquired by contact through a voice transmitter at the main (south) entrance.





The windows in this structure are ¼" annealed single-pane tinted glass. The windows are fixed in aluminum frames with rubber compression gaskets. The windows are non-typical in that they reach from floor to ceiling throughout the building. No safety bars are in place on these windows. All windows face either north or south. There are no windows or doors facing west and only a single door with side-lite and transom facing east. All doors have ¼" tempered single-pane glass. The north entrance of the building has white opaque film in place on the door and surrounding panes of glass. This film will need to be removed before the blast-resistant film and attachment system is installed. After installation, new opaque film will be reinstalled to match the current appearance.

All windows and the north and south entrances are deeply recessed inside brick columns which provide adequate shading for solar control and some level of protection against flying debris during a windstorm event. The recessed entries also afford an assailant protection from view and observation. Forced entry to buildings usually takes place by breaching the entry door or adjacent windows.

The building is located very close to a main street in Richmond, Texas and there is an active rail line within a few blocks to the north of the structure. The building is vulnerable to a terrorist threat or an accidental explosion from a rail car. The windows are vulnerable to high wind loads due to their size and type. Work stations exist throughout the building and generally less than ten-feet away from the glass. Many of the work stations observed during the survey (2<sup>nd</sup> floor north) are within five feet of the window.

The age of this building is important in that construction codes and requirements, which exist today relative to types of glass used in window systems within 18" of the floor and adjacent to entry doors, were not in effect when this building was constructed. All windows are either floor to ceiling or directly adjacent to entry doors and, as identified above, the windows are annealed "plate" glass. Today's building codes require that all of these windows be impact resistant safety glass (either tempered or laminated) and meet the impact test standards of 16 CFR CPSC 1201 Category II and equivalent to ANSI Z97.1 unlimited 400-Ft Lbs Impact criteria. None of the existing glass in the Jane Long Annex currently meets these standards except for the doors. Fortunately, our manufacturer, Madico Window Films, has tested its clear 7-mil and 8-mil films to meet these standards when applied to the interior surface of ¼" annealed glass and provides the required impact standards which must be met when performing any building upgrades.

The significance of having annealed glass as opposed to tempered glass is also shown in the performance of the blast protection system installed and illustrated by the GSA Wingard blast modeling software. Annealed glass under performs when compared to tempered glass in all blast scenarios.

In response to our questions it is understood that a professional blast consultant has not been engaged to provide an analysis of building's window system and the results of a potential blast. Enpro is not a blast engineering company and cannot be held responsible for the actual effects of a blast event taking place. Regardless of the material presented in this or any RFP, we recommend that Fort Bend County contact a blast consultant to confirm the recommended solutions stated herein so that risk can be fully understood. We work with a blast consultant located in Texas who is also responsible for all testing of the products identified in this RFP. At the very least we would recommend a review of the existing window system and a response to the recommended solutions contained in this document with an



opinion of the expected safety condition that is possible. The cost for completing this task is relatively low, below \$1000.

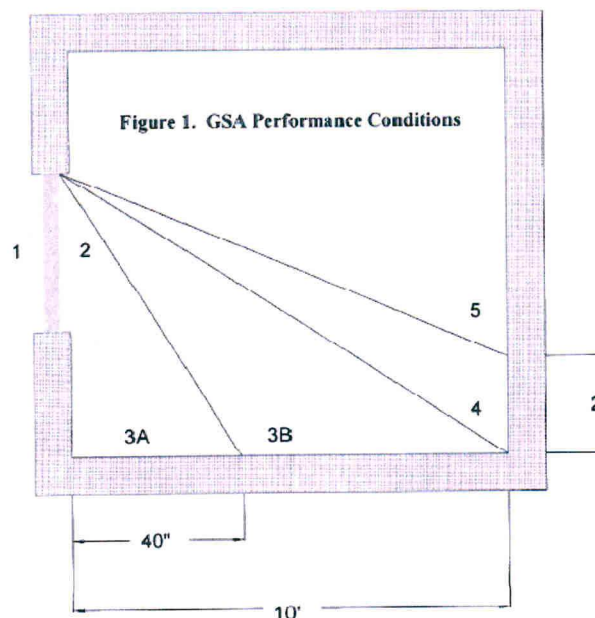
**Blast Modeling:** Enpro uses Wingard LE V.2.0 Conceptual Design Software to estimate the effect that blast pressures have on different types of glass. This software was created for the GSA to help them determine what government buildings require in additional protection for windows and glass entries against the threat of terrorist bombs.

Enpro's film manufacturer, Madico, also has worked for many years with blast specialists to conduct testing and gain further knowledge of the results of blast pressures on glass and the best methods for mitigation. The systems designed by Madico for blast protection are measured and graded by how well they perform under different blast pressures and different types of windows and glass. The Wingard software helps to quantify the results by allowing the user to establish the actual type of window and vary the level of blast pressure to see when the system reaches its limit. Blast pressures are not standardized except for the blast pressure of 4.0psi at 28 msec duration to be used as the standard for comparison. The threat against any structure can vary greatly. Our job in this RFP is to show you how well our products will perform at different levels of pressure and at what point they will fail.

#### GSA Criteria

Government agencies have recognized the potential risk reduction offered by safety film and have sponsored testing of the effectiveness in a retrofit situation. GSA has been a leader in development of criteria related to glass fragment mitigation, including establishment of design loads and required levels of protection in their Draft Security Criteria. The Interagency Security Committee (ISC) also developed security criteria which, based largely on the GSA criteria, establishes requirements for federal office buildings. GSA has also developed a test method: "Standard Test Method for Glazing and Glazing Systems", which is a modification of ASTM F1642-96.

A graphical depiction of the performance conditions contained in the criteria are shown in Figure 1. A description of the performance conditions and hazard levels were outlined in Table 1 above.





**Recommendations and Solutions:**

Enpro Contracting's recommended solutions involve the same products for both blast and hurricane protection. The system includes an 8-mil (8/1000") clear, polyester, optical grade, laminated film with a high-bond acrylic adhesive system and a scratch-resistant interior coating for high-quality performance and durability. The film is designed to hold glass together, even when broken by pressure or impact.

When dealing with high wind or blast pressure loads on commercial windows, the glass must be physically attached to the window frame to prevent the glass from leaving the frame and entering the office. This can be done in several ways. Structural silicone adhesives (WetGlaze) have been tested and proven to be an economical solution, when installed correctly. Mechanical attachment systems employ an extruded frame of aluminum that attaches the filmed glass to the existing window frame. Enpro has been requested to offer both WetGlaze and Mechanical attachment systems for this RFP. In our pricing we will show both alternatives for comparison.

To meet the objectives set forth in this RFP both film and attachment systems are required. Even with these systems the existing windows are such that the ultimate goals for protection are not achievable under all circumstances. This is further explained below under "System Performance".

**The Products:**

Enpro works with Madico Window Films as our exclusive supplier for all security film products and attachment systems. Madico is the most tested of all manufacturers and all test data is certified accurate by Professional Engineering and in accordance with ASTM standards. All installers working on blast projects have been certified by Madico as professionals in the applications of all solutions recommended. This is not a rubber stamp certification. Every installer certified has completed a study course and performed complex installations observed by Madico to qualify for each system. Our installers have an average of 15 years of experience working with Madico products and Enpro in safety/security film and attachment systems applications.

**Safety Film:** Madico SS 800 clear safety film is the best product for consideration in this RFP. SS 800 is a clear laminated 8-mil product specifically designed for blast mitigation and extensively used throughout the world in government buildings, embassies, military installations, and the petro-chemical industry. The product is continuously being tested, has a 10-year manufacturer's warranty and an expected life of over 25 years. The product is clear and distortion free and, when installed by our experienced team, is virtually invisible on the glass.

**Attachment Systems:** Enpro recommends either the Dow 995 structural silicone adhesive attachment or Madico's "FrameGard" mechanical attachment system. There is a significant difference in cost between the two systems; however, the Wingard modeling software identifies performance as being equal. Madico's testing of these products proves that the FrameGard system out-performs WetGlaze by a significant margin. (Test results are available in the Appendix of this RFP). Here again, only a qualified blast engineer should offer an opinion on which system would be the best investment for the Jane Long Annex. Below is a complete description of both attachment systems.



### Description of the FrameGARD™ System

Figure 4.11 shows the various components of the FrameGARD™ system. The Madico safety window film is labeled "a". There are various kinds of film that can be used in the FrameGARD™ system. In addition, films of different thickness can be used depending on the level of protection necessary for the application. Extensive testing has been done on the FrameGARD™ system with several different Madico window films.

The FrameGARD™ itself is labeled "b" in figure 4.11. It is an aluminum "L"-shaped bracket that has been specially reinforced and pre-drilled with holes every three inches. There is a gasket on the window face of the bracket so that no sharp edges come in contact with the film and tear it, causing premature failure. In addition, the bottom of the bracket has been made with small ridges, or teeth, to grab the film and help keep it in place. The finished and installed frame dimension, with cap, is 1½" in width by 5/8" in height with the 5/8" rubber gasket extending above the frame ¼".

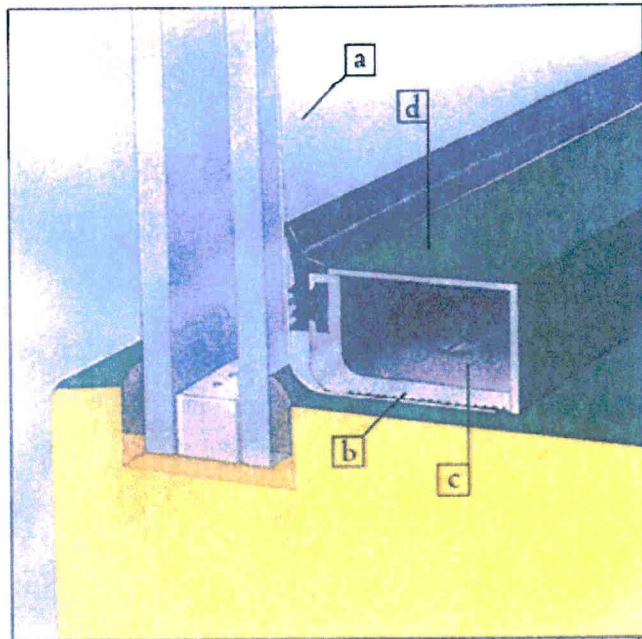


Figure 4.11 – Schematic diagram of the FrameGARD™ system.

The FrameGARD™ system comes with buttress screws labeled "c" in figure 4.11, specially chosen for their superior thread and holding ability under strenuous conditions. These screws have lasted as many as 5 bomb-blast tests before having to be replaced. Therefore, it is extremely important that *no other screws* be used in the FrameGARD™ system. It is possible to get a specially made Phillips head buttress screw for use in the US; however, these screws may not be used internationally.

Finally, "d" in figure 4.11 is the only optional piece of the FrameGARD™ system, a cap. They come in a wide variety of colors to match the décor of the window frame. These caps are not a functional component of the system. That is, the cap will not change the performance of the FrameGARD™ system. They are merely a decorative piece.

### Installing the FrameGARD™ System

The most important thing to remember about the FrameGARD™ system is that trained professionals *must* do the installation. Performance of the system depends on this. A site survey must be completed by competent personnel to determine the feasibility of using FrameGard and how it will be installed.

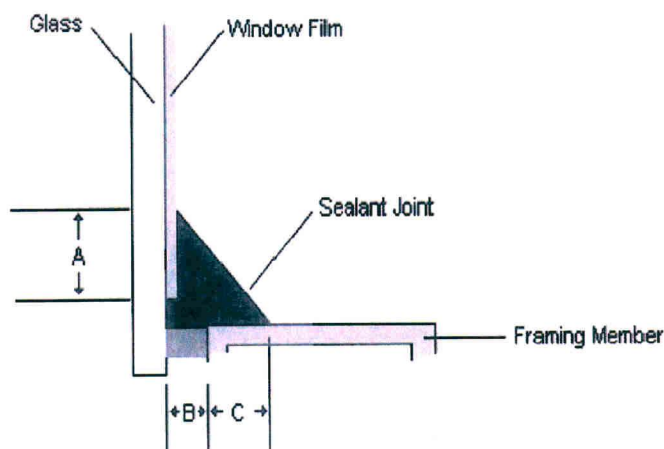
There are some things about the installation that will be helpful to know. In general the installation is as follows:

- Window film is applied to the inside of the glass. It is cut two inches oversize on every side of the window that will use the FrameGARD™.
- FrameGARD™ is fitted around the frame, over the window film.

- FrameGARD™ is fixed to the film using Hi-Bond double-back tape.
- FrameGARD™ is screwed in place through the base profile into the window frame. Its grip surface clamps the edges of the window film.
- The optional cap may be fitted to the base section.

The FrameGARD™ may be applied to one, two or four sides of the window frame, depending on the level of protection necessary. It may also be screwed into the frame in a variety of ways to take full advantage of the “buffering” and “shock absorbing” aspects of the system. Those technical experts who are surveying the job will determine the specifics of the installation. The surveyors will also take into consideration surrounding buildings, standoff distances and a variety of collateral issues in order to determine the level of protection necessary.

**Dow 995 Structural Silicone Adhesive:** “WetGlaze” systems designed using structural silicone sealant to anchor an applied polyester film onto a supporting frame have proven to be effective techniques for protecting people from the hazards of glass when evaluated for blast, high winds or impact resistance. The sealant attachment systems that have proven to be economically viable are built around a triangular joint connecting the film onto the supporting framing member. To achieve acceptable performance a very high performance sealant must be used.



A: The sealant bite onto the attached film. To assure sealant adhesion, a minimum sealant bite of ¼ inch is required for any sealant cap beading application. Many high performance applications designed to withstand an applied force are built around a sealant bite of 3/8" to ½", which has proven to perform well in a wide variety of application tests.

Note: there is generally a slight gap (less than 1/8") between the edge of the film and the glazing channel to allow for proper installation of the film.

B: Gasket or glazing channel interior thickness. This is the distance between the inside of the glass to the framing member. Generally this distance is approximately ¼", depending upon the type of glazing



system. This space could contain a material such as a structural silicone sealant or a firmly anchored gasket that Dow 995 will adhere well to; or, this space could contain a material such as a backer rod with little strength that silicone will not adhere to.

C: Sealant bite onto the framing member. To assure sealant adhesion a minimum sealant bite of  $\frac{1}{4}$ " is required for any sealant cap beading application. Many high-performance applications (blast resistance, hurricane resistance, etc.) designed to withstand an applied force are built around a sealant bite of up to  $\frac{1}{2}$ " which has proven to perform well in a wide variety of application tests.

D. Cautions: WetGlaze systems are only effective if installed properly. Total mass is the critical component which is achieved by insuring that the triangle of product is sufficient to hold the filmed glass to the frame. Improper beads of silicone are ineffective and can fail at much lower pressures than the manufacturer's defined bead. For the Jane Long Annex windows a proper bead will have a flat angled exterior surface (not concave) that extends  $\frac{3}{4}$ " up onto the glass and  $\frac{3}{4}$ " out onto the frame. As a physical measure the bead will require 20 fluid ounces (standard commercial sausage/tube) of Dow 995 silicone per 11 feet of frame surface.

A complete specification is provided in the Appendix as part of this proposal.

**The Installation Process:** The Jane Long Annex project is relatively straight forward in terms of installation requirements. The main windows on both the north and south face of the building all have vertical blinds in place which will be removed by our installing team prior to applying the film and attachment system chosen. The windows are then cleaned four separate times, including the window frames, to remove dust, dirt and any debris that may be stuck to the glass such as tape, paint or heavy dirt.

Once clean, the film is pre-cut to fit the glass on a special slitting machine which is set up in a central location. Film is applied to the visible edge of the glass when using the WetGlaze attachment system. Film is applied out onto the window frame on all four sides when using the FrameGard attachment system.

If WetGlaze is the chosen attachment system, the film must be allowed to set and dry for a minimum of 24 hours before the silicone can be applied to be sure that the frame and gasket joint are completely dry. The frame is prepared with alcohol or a special adhesive enhancer depending on the type of frame. Adhesion of silicone is pretested at the beginning of each project. When ready and properly prepared the window and frame are then taped to provide for the correct size of bead and to insure that the final appearance will be smooth, clean and consistent. The silicone is applied and troweled to a smooth flat surface, never concave.

If FrameGard is chosen, the film is applied and the extrusions are immediately installed using #14 screws every 3" along the entire frame. After all four sides of frame are in place, the architectural color matching caps are installed to give a clean and professional appearance.

Enpro's installers will perform all aspects of the installation including removal and replacement of the vertical blinds. The county is responsible for providing a minimum of two feet of clear area in front of each window as a work space. In some parts of the building work stations, desks or files may be pushed up to the window frames. In some cases computer wires and phone lines are integrated into these work stations. Our crews cannot be responsible for moving these types of systems and IT specialists may be required to protect the wiring from damage.



The entire installation process can be completed in approximately two weeks or less. Our crews work after hours and weekends when necessary; however, it appeared that this would not be necessary as our total time required per window is less than one hour. Our installation team is quite adept in working around your staff's schedule to minimize any interruption of their work.

Entry doors require a different approach because the door frame is not conducive to attachment systems. To maximize the strength of door glass, Enpro removes the glass from the frame and installs 8-mil film on the interior surface and a special exterior 7-mil film on the outside surface of the glass. When reinstalling the glass into the door frame, structural silicone is used inside the framing/glazing caps to glue the glass into the door frame. This system proves to be as strong as any single application on a standard window with attachment. This approach also maximizes the time required for an assailant armed with a crowbar or bat to break through a door glass giving occupants the necessary time to react to the threat.

**System Performance:** No matter how strong the defensive measures, every system can be overwhelmed by sufficient force. Therefore it is imperative that the limitations of our proposed systems be well understood by Fort Bend County so that the best and most cost-effective system can be provided based on the level of threat anticipated. Blast pressures are easy to define and model using the Wingard system. The chart below shows the results of a modeled event on the windows at the Jane Long Annex using the existing windows with no protection as a base line and the GSA Safety Condition as the comparative guide. It is important to note here that both WetGlaze and Mechanical Attachment systems are identified as equal in the Wingard program. We do not agree with this assessment; however, only an engineer can confirm this.

The information that follows is based on the typical second floor window which is 40" x 95" 1/4" single-pane annealed glass. We have identified the existing window without any upgrades. At the point of failure, we add just 8-mil film. We then show the same window with both film and attachment.

### Wingard Computer Modeling Results

Window System	Blast Pressure	Safety Condition
Existing Window No Protection	1.0psi, 28msec	3B
	1.5psi, 28msec	4
	2.0psi, 28msec	5
Window with 8-mil film only	2.0psi, 28msec	4
Window with 8-mil film and attachment	2.0psi, 28msec	2
	3.0psi, 28msec	3B
	3.5psi, 28msec	4
	4.0psi, 28msec	5

This summary shows that the window size and type (annealed glass) has a limiting effect on total protection. As a comparison, if these windows were tempered glass with the same film and attachment system, at 4.0psi, the safety condition would still be 5, but at 3.0psi the safety condition would improve to 2. The question that remains is, "To what level of threat (pressure) do you want to protect the windows?"

challenges. Our team's experience with these issues and similar circumstances, identified in the previous projects shown below, gave Enpro the experience to work within these parameters and overcome the obstacles. This project is still underway with an expected completion date of July 2013.

**MD Anderson Hospital - FEMA Grant Project**

1515 Holcombe Blvd.

Houston, Texas 77030

Phase 1: \$124,950

Phase 2: \$ 32,080

Phase 3: \$740,000 - Bonded

Phase 1: October 2011 - February 2012 - Completed

Phase 2: July 2012 - Completed

Phase 3: October 2012 - Completed

Contact: Stephen Pearson

713-745-1704

[scpearson@mdanderson.org](mailto:scpearson@mdanderson.org)

**Vaughn Construction**

125 Carrie Street

Houston, Texas 77047

Contact: Mr. Phillip Johnson

713-589-7400

[pjohnson@vaughnconstruction.com](mailto:pjohnson@vaughnconstruction.com)

**Architect/Engineer:** Chi Chung Chang, URS Corporation, 713-914-6699

**Products:** Madico 8-mil and 15-mil clear and semi-reflective security film for hurricane protection.

FrameGard, GullWing and Dow 995 WetGlaze attachment systems for bonding filmed glass to frames.

**Job Size:** Total Project 67,000 square feet of film and 57,000 lineal feet of frame attachment

**Project Overview:** MD Anderson received a grant for improving the safety and sustainability of operations for their hospital patient rooms and common areas, transit corridors, and waiting rooms. This is a very large facility with multiple buildings covering a several city blocks and 24 stories in height.



Buildings ranged in age from plus 30-years to brand new. Single solutions were not possible as each area had unique window systems.

**Challenges Overcome:**

MD Anderson's FEMA grant for hurricane protection required a tight timeline for completion, so scheduling and patient room access were paramount. It is understood and expected that there will be challenges when performing work in large hospital environments. In most cases the client prefers installations to take place while patient rooms are unoccupied. Due to the occupancy level of this hospital, many of the patient rooms required retrofit while occupied. For this reason they required a system that produced no odor and minimal noise. Through our partnership with Madico, Enpro has perfected the installation of many internal window protection systems, including a product called GullWing, which incorporates a hinged PVC attachment system using high-bond tape to hold the filmed



**Pricing:**

The costs for installed product at the Jane Long Annex is based on application of 8-mil clear safety film, by Madico, with a 10-year manufacturer's warranty to every existing window and door glass in the structure (102 panes). The pricing below includes the labor to remove and replace the vertical blinds. The pricing also includes the cost to remove and replace the opaque film currently applied to the north entry windows. The pricing excludes sales tax as this is not anticipated for a county building.

We have broken down the pricing to show separately the film and both attachment systems. The double installation on all door glass using Dow 995 attachment would be the same for each alternative.

The cost of bonding for this project would be approximately 3.5% of the total installed cost and added to the final total.

**Scenario #1 Daylight applied film with Dow 995 silicone attachment system.**

Daylight Installation of 8-mil film to all window and door glass of the Jane Long Annex	\$19,946.00
Installation of Dow 995 ¾" bead of Silicone to all four sides of each window	\$11,597.00
Cost of mobilization, bonding, etc.	\$ 1,950.00
<b>Total Installed Cost Scenario #1</b>	<b>\$33,493.00</b>

**Scenario #2 4-sided FrameGard Attachment of 8-mil film for all windows**

Frame overlapping installation of 8-mil film to all windows,	\$20,289.00
Installation of 4-sided FrameGard mechanical attachment on all windows	\$32,133.00
Cost of mobilization, bonding, etc.	\$ 2,835.00
<b>Total Installed Cost Scenario #2</b>	<b>\$55,257.00</b>

**End of Section**