August 24, 2017

GARY DONALDSON
ARCHITECTURE
FACILITIES PLANNING

Addendum No. 1
To Plans and Specifications

New Fire Station #4
For San Angelo Fire Department
San Angelo, Texas
RFB No. FD-03-17

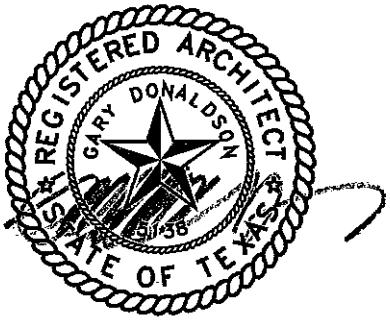
This Addendum shall become part of the Plans and Specifications to the full extent as though it were originally included therein, and shall supersede related items contained which it might conflict. Acknowledgement of receipt of this Addendum will be required on the Bid Proposal Form included in the Contract Documents.

This Addendum includes:

- This cover sheet
- COSA Specifications, Request for Bids under Invitation to Bid & Instructions to Venders
- Architectural Specifications, Summary of Work
- Architectural Specifications Section 0125
- Architectural Specifications Section 0201, Refer to the attached document
- M.P.E. Specification Section 16720
- M.P.E. Drawing Sheet M-2

(31 total pages including this cover & exhibits)

By: Gary Donaldson, AIA NCARB



8/24/17

August 24, 2017
Addendum No. 1 - F.S. 4

Request for Bids COSA Specification, Invitation to Bid as listed under Copies:
All documents listed are required at the bid opening, however (1) one copy in .PDF format on USB flash drive can be submitted within 24 hours of the bid date.

Request for Bids COSA Specification, Instructions to Venders under 1.37 Taxes & Permits:
City of San Angelo is tax exempt & cannot make any Vendor a purchasing agent.

On-Site Prebid Meeting:
No on-site prebid meeting will be scheduled. Note that the project's property is vacant & relatively clear. Interested parties can visit the site at their convenience.

Project Cost/Budget Estimate (CIP):
Total project cost estimate is 3.1 million as released thru. Capital Improvement Program (CIP).

Index of Drawings, Notes for Clarity:
There is no drawing sheet M-5 as noted in index and there is a drawing sheet P-3.2 which was left out of the index.

Subsurface Investigation, refer to Specification Section 0201:
Subsurface data was scheduled to be included in Spec. Section 0201, but failed to get inserted prior to posting, refer to the attached file "Exhibit A" (twenty five 8.5" x 11" pages) for the complete report.

Fire Alarm, refer to Specification Section 16720 & Security System:
City of San Angelo will use their representative to furnish and install the fire alarm system equipment as per specification section 16720 and the security system equipment (not included in project specifications). General Contractor will be responsible to schedule & coordinate both these installations. Electrical Contractor will be responsible to install the infrastructure and rough-ins for these two systems.

AirVac Recirculation System Bid Alternate No. 4, refer Drawing Sheet M-2:
Refer to the attached "Exhibit B" (three 8.5" x 11" pages) for the complete AirVac 911 Engine Exhaust Removal System specification complete with component/equipment quantities.

Substitutions as listed under Samples & Shop Drawings, refer to Specification Section 0125:

The below list consists of products that have been submitted for substitution as per date of this addendum:

Product	Acceptable Substitution
1. OSDI Groves, Inc. Red Rack/Turn-out Lockers (Spec. Section 1051)	Yes
2. Clean Air Concepts, AirHawk 2000 System (Bid Alternate No. 4, Drawing Sheet M-2)	Yes
3. A-Lert Roofing Systems, KR panels (Spec. Section 0753-3, roof panels only)	Yes
4. StonePly Co. Natural Stone Panels (Drawing Sheet A-5)	No
5. MultiDrain, EconoDrain PT-2 (Drawing Sheet P-1)	Yes

Note that it will be the responsibility of the successful Bidder to verify that each product deemed acceptable in this listing shall be equal in engineering, manufacturing, quantity, warranty and quality. Shop drawings and submittals shall be stamped with "approved" by Contractor prior to submission to Architect/Engineer.

ADDENDUM NO. 1 - "EXHIBIT A"

October 2, 2015

Mr. David Knapp
City of San Angelo
402 S. Chadbourne, Ste. 202
San Angelo, Texas 76903

Re: Geotechnical Investigation
Fire Station #4
NWC S. Chadbourne & Edgewood
San Angelo, Texas

Dear Mr. Knapp:

In accordance with your instructions, we have conducted a Geotechnical Investigation for the above referenced project. The conclusions and recommendations of this investigation are to be found in the attached report.

We trust that this will provide the information you have requested. We are also available for the geotechnical and materials testing services recommended in the Report during construction. If there are any further questions, please do not hesitate to call.

Sincerely,

Enprotec / Hibbs & Todd, Inc.

2 OCT 15

STATE OF TEXAS
GARY SCOTT YUNGBLUT
85640
LICENSED
PROFESSIONAL ENGINEER

G. Scott Yungblut, P.E.
Geotechnical Engineer

Enclosure
15-6371

GEOTECHNICAL INVESTIGATION
FIRE STATION #4
NWC S. CHADBOURNE & EDGEWOOD
TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION
FIRE STATION #4
NWC S. CHADBOURNE & EDGEWOOD
SAN ANGELO, TEXAS

EXECUTIVE SUMMARY

The following is a summarized outline of the report recommendations. This summary should be read in complete context with the attached report.

SITE PREPARATION:

- Initial site clearing will require the removal of the moderately organic topsoil present across the site at the time of the subsurface exploration.
- Some difficulties may be encountered while excavating the shallow weathered limestones.
- Protect the moisture sensitive subgrade from excessive moisture changes through proper drainage and runoff during construction and throughout the life of the center.

PAD PREPARATION (CONVENTIONAL SLAB-ON-GRADE):

- The expansive clayey soils should be removed a minimum 2½ feet below existing grade at least 5 feet beyond the proposed building footprint and replaced with select fill.

BUILDING FOUNDATION AND FLOOR SLAB:

- A straight shaft drilled pier foundation founded in the weathered limestone.
- A shallow foundation founded in the existing sandy clays or select fill used to raise site grades.
- Floor slab underlain by a minimum 2½ feet of select fill to reduce the PVR to less than 1 inch.

PAVEMENTS:

- Options for asphaltic concrete and Portland cement concrete pavements have been included.

INTRODUCTION

GENERAL: This investigation was authorized in September 2015 by Mr. David Knapp, Construction Manager for the City of San Angelo, Texas. The purpose of this investigation is to provide foundation, floor slab, and pavement design information along with construction recommendations for the proposed Fire Station #4 in San Angelo, Texas.

The project includes the Fire Station structure and associated pavements. Anticipated construction of the structure is steel framing with a masonry veneer exterior. Detailed structural loading was not provided, however for this analysis it has been assumed that maximum column loads will be about 60 kips per column and maximum wall loads will be less than 2.0 kips per linear foot of wall, based on dead load plus design live load. Detailed site grading has also not been provided, although it has been assumed that the floor slab for the structure will be constructed at or near existing grades and a maximum of 1 to 2 feet of fill will be required to achieve final grade, exclusive of the recommendations contained herein. No basement or below grade construction is expected.

SCOPE: The scope of the exploration and analysis to be performed by Enprotec/Hibbs & Todd, Inc. (eHT) included a site reconnaissance, the subsurface exploration, field and laboratory testing, and an engineering analysis and evaluation to provide design recommendations for the foundation, floor slab, and pavements along with construction recommendations for the proposed Fire Station. Details and results of the investigation are discussed in the following sections of this report.

LIMITATIONS: The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made after being prepared in accordance with generally accepted professional engineering practice in the fields of foundation engineering, soil mechanics, and engineering geology. No other warranties are implied or expressed.

SITE DESCRIPTION

SITE LOCATION & TOPOGRAPHY: The proposed site is generally located in the northwest quadrant formed by the intersection of S. Chadbourne and Edgewood in San Angelo, Texas. At the time of the subsurface exploration the site was covered with sparse short grasses and small mesquite trees/bushes. The site appears to be relatively flat in the proposed building area, but slopes slightly from the south down to the north with an estimated 1 to 2 feet of elevation difference across the building area.

DESCRIPTION OF WORK

FIELD INVESTIGATION: Drilling and soil sampling activities were performed at select locations of the subject site on September 15, 2015. Three test borings were drilled to depths ranging from 15 to 20 feet below the existing ground surface elevation at the locations shown on Figure 1 in Appendix A. The boring locations were identified on the site plan provided by Mr. Knapp.

The test borings were drilled utilizing a truck-mounted Failing rotary drilling rig. The test borings were advanced utilizing dry sampling methods and/or rotary air drilling techniques which allow for accurate groundwater observations. Drilling and sampling activities were performed in general accordance with referenced ASTM and/or TxDOT procedures or other accepted methods.

Soil formations were sampled using a 3-inch diameter Shelby-type steel tube sampler (ASTM D 1587) and/or a 2-inch split barrel sampler (ASTM D 1586). Undisturbed soil samples were subjected to calibrated pocket penetrometer tests (Qp) to assist in evaluating the shear strength of the cohesive soils. Quantitative estimates of the foundation strata bearing capacity were also obtained from interpretation of the Standard Penetration Test (SPT) results and widely published empirical correlations. The reports of the field tests are reported on the Logs of Borings in Appendix C.

The borings were visually logged in the field, and all recovered samples were placed in core boxes for delivery to the laboratory. Push-tube samples and split barrel samples were placed in polyethylene plastic bags to minimize moisture changes. Samples will be retained for 30 days from the date of this report. The samples will then be discarded unless notified in writing by the client requesting that the samples be retained.

The borings were observed for groundwater at each test location, during and following the completion of the boring. These observations are shown on the Logs of Borings and discussed in a later section of this report. The borings were backfilled with on-site materials upon completion of the fieldwork. Logs of Borings were subsequently prepared, along with a legend titled EXPLANATION OF SYMBOLS AND TERMS USED ON BORING LOGS and GENERAL NOTES. The legend and general notes show typical soil and rock classifications, drilling symbols, weathering descriptions, and soil structure characteristics.

LABORATORY TESTING: Select materials recovered in the borings were tested in the laboratory and classified based on the laboratory test results. Laboratory testing was conducted in general accordance with ASTM procedures and standards. Atterberg Limits (ASTM D 4318) and Minus 200-Mesh Sieve Tests (ASTM D 1140) were performed on selected soil samples in order to classify and establish index properties and grain size characteristics of the soils. Appendix B summarizes the results of these classification tests. The soil classifications are based on the Unified Soil Classification System (USCS).

ENGINEERING ANALYSIS: The engineering analysis was conducted on the information obtained from the field and laboratory investigations and from information provided by Mr. Knapp. If revisions to the plans for the proposed project, or if deviations from the subsurface conditions presented in this report are encountered during construction, we should be notified to determine if changes in our recommendations are required.

SUBSURFACE MATERIALS AND CONDITIONS

SITE GEOLOGY: As shown on the San Angelo Sheet of the *Geologic Atlas of Texas* the site is located in an area where Recent Holocene and Pleistocene Age Deposits are present at or near the surface which generally consist of caliche and gravels near the surface.

SITE STRATIGRAPHY: A detailed description of the site stratigraphy is provided on the Logs of Borings. Generally the subsurface conditions at the site may be characterized as follows:

Stiff to hard comparative consistency sandy clays with calcareous deposits were present from the surface to depths ranging from 4 to 6 feet. The clays were underlain by highly weathered to sound limestones which extended to a depth of at least 20 feet, the termination depth of the deeper test boring.

GROUNDWATER: Groundwater was not encountered within the test borings during or at completion of drilling activities. Groundwater may typically be found within the alluvial soils and particularly in contact with the highly weathered limestones. An accurate depiction of the groundwater depth would require leaving the test borings open for an extended period of time due to the moderately impermeable soils. Based upon the soil moisture contents the groundwater table was considered to exist at depths greater than 20 feet below current grades at the time of the subsurface exploration, although shallower perched water may be encountered across the site. The water table may fluctuate seasonally and during periods of heavy rainfall.

LABORATORY RESULTS: The results of the Atterberg Limits Testing indicate that the tested soils possess Liquid Limits (LL) ranging from 37 to 44 with corresponding Plasticity Indices (PI) of 22 to 27. Soil Classification Tests indicate that the soils exhibit a moderate to high expansive potential with a moderate degree of plasticity. The soils are classified as CL materials according to the Unified Soil Classification System (USCS). Refer to Appendix B for the laboratory test results of the materials tested.

FOUNDATION DESIGN RECOMMENDATIONS

GENERAL: The proposed site is underlain by moderate strength, moderate to highly expansive sandy clays further underlain by highly weathered limestones. Based upon the expansive nature of the surficial soils encountered at the site, a conventional slab-on-grade is not recommended without the recommended site preparation as described herein. The Potential Vertical Rise (PVR) has been estimated using the *State of Texas Highway Department Materials and Testing Division Test Method TEX-124-E "Methods of Determining the Potential Rise"* for the existing soils. For this site, the PVR estimation was based on a plasticity index (PI) ranging from 22 to 27. The estimation assumed average seasonal minimum moisture corresponding to the "dry line" of the test method. The PVR for this site was estimated to be 1¼ to 1¾ inches. A differential movement of half of the PVR can be assumed. However, differential movement can be equal to or even double the PVR in extreme conditions such as soils exposed to moisture and swelling in one area and drying and shrinkage in another.

SHALLOW FOUNDATION: Following proper site preparation, the structure may be supported by a shallow foundation system. Continuous wall footings for load bearing walls and spread footings for building columns may be designed for maximum allowable bearing pressures of 2.0 and 2.5 kips per square foot (ksf), respectively, based upon dead load plus design live load considerations. A subgrade modulus of 120 psi/in may be used for foundation design within the existing soils or select fill material. The bottoms of the exterior footings should bear a minimum 30 inches below adjacent surface grades along the perimeter to reduce seasonal effects on the supporting soils and should also be in accordance with local building code requirements. The grade beams should have a minimum width of 16 inches and the pads should have a minimum width of 24 inches even if the actual bearing pressure is less than the design value. Any shallow or near ground supported foundation should be designed by a structural engineer experienced in design of shallow foundations.

DRILLED PIER FOUNDATION: A deep foundation consisting of straight shaft drilled piers may be utilized for the proposed Fire Station and would be considered the least risk option. The limestones encountered at a depth of about 10 feet below existing grade are expected to provide a suitable bearing stratum for the drilled piers.

Design pier depths shown in the construction documents should ensure that the piers reach the minimum depth indicated above. The proper depth must be reached in order to ensure adequate bearing capacity. Piers founded in the limestone should be sized assuming a maximum net allowable end bearing pressure of 30 ksf, based on a dead load plus design live load considerations which will allow for nominal settlement (1 inch or less). An allowable skin friction value of 1.5 ksf may be used below a depth of 5 feet. Note that pier settlements of 2 to 3 percent of the shaft diameter will occur to fully develop the skin friction. The allowable capacity is based on published correlations for STP field test data. The value includes a safety factor of at least 3 against shear failure in the supporting soils.

The piers should have a minimum diameter of 18 inches for good quality construction and inspection. Minimum on-center pier spacing should be 3 times the pier diameter at the bearing surface to eliminate an overlapping stress influence. The piers should be reinforced for their full depth to within 6 inches of the bottom of the pier to resist potential tensile forces which may develop due to swelling of the site soils and due to structural loads. It is recommended that each pier be reinforced with a minimum 0.5 percent reinforcing steel (based on the cross-sectional area of the pier shaft). The steel may be considered part of the reinforcement required by axial compressive loads, lateral load considerations, or the minimal reinforcement required by the codes.

Minimum 4-inch void spaces should be provided beneath all structural elements connected to the pier, such as grade beams, to prevent transfer of soil uplift forces onto the pier. A positive void between the subgrade and the grade beam should be provided utilizing a trapezoidal cardboard carton form or equivalent to prevent soil from falling into (and eventually filling) the void spaces.

Although not anticipated at this site, temporary casing must be used where necessary to stabilize pier holes if groundwater or caving soils are encountered during construction. Any accumulated water must be removed prior to the placement of concrete. If the pier hole has been cased, sufficient concrete should remain in the casing as the casing is withdrawn to prevent any discontinuities from forming within the concrete section. Additionally, concrete placed in drilled piers should not be placed at slumps less than 5 inches unless it is consolidated full depth with a vibrator or by other means. Concrete placed in piers at a slump less than 5 inches increases the potential for honeycombing.

FLOOR SLAB: A soil supported floor slab may be used in conjunction with the shallow foundation. The slab-on-grade should be supported on a minimum 2½ feet of select fill material to provide a PVR of less than1 inch. Based upon the assumed floor slab live loads a minimum 5-inch thick concrete slab reinforced with at least #4 rebar 18 inches on center, each way, placed mid-height within the office/living area floor slab is recommended due to the underlying expansive soils. Floor slabs in the garage area should be similar to the thicknesses recommended in the pavement section of this report. However, the structural engineer should provide the actual floor slab design.

PERIMETER MOISTURE CONTROL: Proper design of a foundation in expansive soils must include perimeter surface moisture control. Basically soils experience volume changes when allowed to dry or when allowed access to moisture. Thus, if the soil moisture content remains constant, soil volume changes will be minimal. In reality, it is difficult to prevent seasonal soil-moisture fluctuations, but these moisture changes can be limited.

Proper grading and drainage around the foundation to prevent ponding of water is essential from construction through the life of the structure. Outlets for gutter systems must empty either into storm drains or onto paved surfaces to allow for quick discharge of water away from the area. Paving and sidewalk surfaces should extend to the building line where possible to serve as a barrier to soil moisture evaporation and infiltration. This report is being prepared assuming that conscientious watering will occur and any landscape areas near the foundation will not be continuously saturated. Trees should be kept away from the foundation edge a distance at least equal to their expected mature height. Metal or concrete edging around flower beds is not recommended near the building. Flowerbed edging will trap and pool water near the foundation and potentially cause excess swelling of the soils. If edging is installed there should be areas in the edging to allow water to quickly drain out of the flowerbed and away from the building.

FOUNDATION CONSTRUCTION RECOMMENDATIONS

SITE CLEARING/STRIPPING: Initial site preparation will require the removal of the 4 to 6 inches of moderately organic topsoil present across the site. Deeper organic removal will be necessary in areas of the site due to the removal of the mesquite trees and bushes. The rootballs should be completely removed and replaced with properly compacted select fill. There is a potential for the rootballs to decay and leave a void beneath the foundation if the rootballs are not properly removed. Removal depths should be verified in the field by a representative of the geotechnical engineer at the time of site grading based upon the subgrade soils and the subgrade stability.

PROOFROLLING: Following site clearing and site cutting, the subgrade for the slab-on-grade should be proofrolled with a loaded tandem axle truck in the presence of and approved by a qualified geotechnical engineer to locate any soft or unstable areas. If present, these soft or loose soils should be removed to a stable subgrade and replaced with select fill material. Following proofrolling, the subgrade should be scarified to a depth of 6 to 8 inches; moisture conditioned to above optimum moisture content; and recompacted between 95 and 100 percent dry density of Standard Proctor (ASTM D 698).

Over-compaction of the clayey subgrade should be avoided to prevent aggravating potentially swelling soil problems such as differential heave of any fill. Extreme care must be exercised to prevent excessive drying of the expansive soil subgrade since a subsequent increase in moisture content can cause swell. It is also recommended that the moisture in the building pad be maintained at or above the specified moisture content until concrete placement has been performed.

BUILDING PAD PREPARATION: If select fill is planned to be utilized to reduce the PVR at the site, the soils throughout the proposed building area and extending at least 5 feet beyond the exterior building perimeter are recommended to be removed to provide a minimum 2½ feet of select fill beneath the slab-on-grade. A minimum 2 feet of the highly expansive surficial soils should be removed even if select fill thicknesses greater than 2½ feet are required to bring the pad to grade. Specific recommendations for the select fill are presented in the following section of this report. Extreme care must be exercised to prevent excessive drying of the expansive soil subgrade since a subsequent increase in moisture content can cause swell.

SELECT FILL: Select fill should consist of soil materials with sufficient plastic fines to minimize water transmission. The soils should be free of organics and other deleterious materials and should have a maximum liquid limit of 30, a plasticity index no less than 5 and no greater than 12, and have a maximum particle size of 2 inches. The select fill should also meet the USCS classification of SC, GC or CL. The structural fill should be compacted to a minimum 95 percent Standard Proctor at above optimum moisture content. Compacted lift thicknesses should not exceed 6 inches.

VAPOR BARRIER: A vapor barrier such as polyethylene sheeting should be placed below the floor slab in moisture sensitive areas and where the floor will be covered with moisture sensitive materials. If the subgrade underlying the vapor barrier contains sharp or angled particles, a layer of cushion sand (approximately 1 to 2 inches thick) could be placed in contact with the sheet to provide protection against puncture.

FOUNDATION EXCAVATION: Excavations should be observed by the geotechnical consultant to make sure that the proper bearing material has been reached in accordance with the recommendations given herein. The excavations should be checked for size and observed to make sure that all loose material has been removed prior to concrete placement. Prompt placement of the concrete following building pad preparation is strongly recommended.

UTILITIES: Prior to construction all underground utilities should be located and, if present in the construction area, permanently capped and removed at the property line or rerouted around the proposed structure to preserve their function. Special attention should be performed in evaluating the backfill of utilities that will remain which may not be suitable for support of the proposed structure. The soils should be removed and recompacted as described herein if found unsuitable. A representative of the geotechnical engineer should make this determination during construction.

Granular material or "buckshot" should not be used to backfill new utility lines entering or beneath the building. If utilized, the granular material could provide a conduit for water to travel beneath the building and cause the underlying soils to swell and potentially heave the slab. A utility trench "plug" should be provided for all utility trenches entering the building footprint including electrical, gas, water and sewer, etc. The plug should extend a minimum 2 feet beyond the footing, each way, and from the bottom of the trench to the surface. The plug should be constructed of low permeable higher plasticity clays or a lean concrete. Utility excavations through the select fill pad beneath the structure shall be backfilled with select fill and compacted as specified for the building pad.

FOUNDATION CONSTRUCTION CONSIDERATIONS

WET WEATHER: If construction is performed during wet weather, disking or windrowing of the top 6 inches of wet unsuitable soils beneath structural areas may be necessary in order to dry out the soil. Following soils removal to a stable subgrade the excavated soils could be air-dried and reused. Mechanical stabilization through the use of a crushed limestone flex-base material "working mat" could also be considered. The actual depths and stabilization methods should be confirmed through continuous testing under the observation of a representative of the geotechnical engineer.

EXCAVATION SAFETY: All excavations should be in accordance with local and federal (OSHA) regulations and the trench safety plan. If instability problems occur, stability within the excavations should be maintained by flattening or widening slope sidewalls. In addition, the on-site soils are susceptible to erosion and disturbance by flowing water and construction traffic. If these soils are disturbed by construction traffic and excessive moisture they may become unstable. The site should therefore be graded to prevent water from ponding near the new foundation and running into excavations.

EXCAVATION DIFFICULTIES: Limestone was observed near the surface. It is anticipated that some excavation in the area may require specialized excavation equipment. Pre-bid test pits are recommended in the area. Furthermore, excavation bank stability problems may also be encountered. In this event, shallow excavations may be sloped or widened in the anticipation of bank stability problems, with deeper excavations possibly requiring more elaborate external support means for stability. All excavations should be performed in accordance with OSHA requirements, which will be the responsibility of the project contractor.

GENERAL: Many problems can be avoided or solved in the field if proper inspection and testing services are provided. eHT should be retained to perform testing and construction observation services sufficient to verify compliance with our recommendations. It is recommended that the site preparation, foundation, floor slab, and pavement construction be monitored by the geotechnical engineer or his representative. The following are recommended minimum sampling and testing frequencies.

EARTHWORK: During the earthwork phase of the project at least one Proctor test, Atterberg limits test, and minus 200 sieve test should be performed per soil type for subgrade, backfill, and fill materials. In the building area, at least 1 density and moisture content test per 2,500 square feet should be performed on the subgrade soils, and at least 1 density and moisture content test per 2,500 square feet should be performed for each compacted 6-inch thickness of fill. In pavement areas, at least 1 density and moisture content test per 5,000 square feet should be performed on the subgrade soils, and at least 1 density and moisture content test per 5,000 square feet of fill and base material should be performed. Testing of backfilled trenches should be at least 1 density and moisture content test per 100 linear feet of trench per 6 inch compacted lift thickness.

CONCRETE: At least 1 slump, air content (if required) and temperature test, and at least 1 set of 3 concrete cylinders should be molded for each type of concrete per 100 cubic yards or fraction thereof placed in a day. Each set of cylinders should be tested for compressive strength with 1 of the cylinders tested at 7 days and 2 of the cylinders tested at 28 days.

DRILLED PIER OBSERVATION: Detailed inspection of pier construction should be performed by a representative of the geotechnical engineer to verify that the piers are vertical and founded in the proper bearing stratum, and to verify that all loose materials have been removed prior to concrete placement.

PAVEMENT DESIGN RECOMMENDATIONS

GENERAL: The pavement thickness required is a function of the subgrade soil support characteristics, traffic volume and type, and quality of available construction materials. All pavement designs for long life include routine maintenance for both flexible and rigid pavements. All pavements should be observed for repair or maintenance needs at least one time per calendar year.

SUBGRADE CHARACTERISTICS: The test borings indicate that the upper portion of the soils exhibit moderate to high expansive characteristics. The soils are sandy clays with moderate plasticity and liquid limits. Depending on the site grading, the primary subgrade in the pavement areas will be moderate to highly expansive material.

FLEXIBLE PAVEMENT DESIGN: The following table shows flexible pavement thickness alternatives, which may be considered for the support of the anticipated traffic at this site.

Traffic Type	HMAC*	Flexible Base Course	Total Thickness
Light (Auto)	2.0"	10.0"	12.0"
* HMAC - Hot-mix asphaltic concrete ** The subgrade should be compacted to a minimum 98 percent of maximum Standard proctor density at not less than optimum moisture.			

RIGID PAVEMENT DESIGN: The following table shows thickness alternatives for concrete pavements. These values reflect a design life of 20 years with routine maintenance.

Traffic Type	PCC*	Flexible Base Course	Total Thickness
Heavy (Fire Engines)	8.0"	6.0"	14.0"
Light (Auto)	5.0"	5.0"	11.0"
Dumpster Pad	8.0"	6.0"	14.0"
* PCC - Portland cement concrete ** The subgrade should be compacted to a minimum 98 percent of maximum Standard proctor density at optimum moisture or above.			

Portland Cement Concrete is recommended in the truck routes of the site, especially where tight turning may be required.

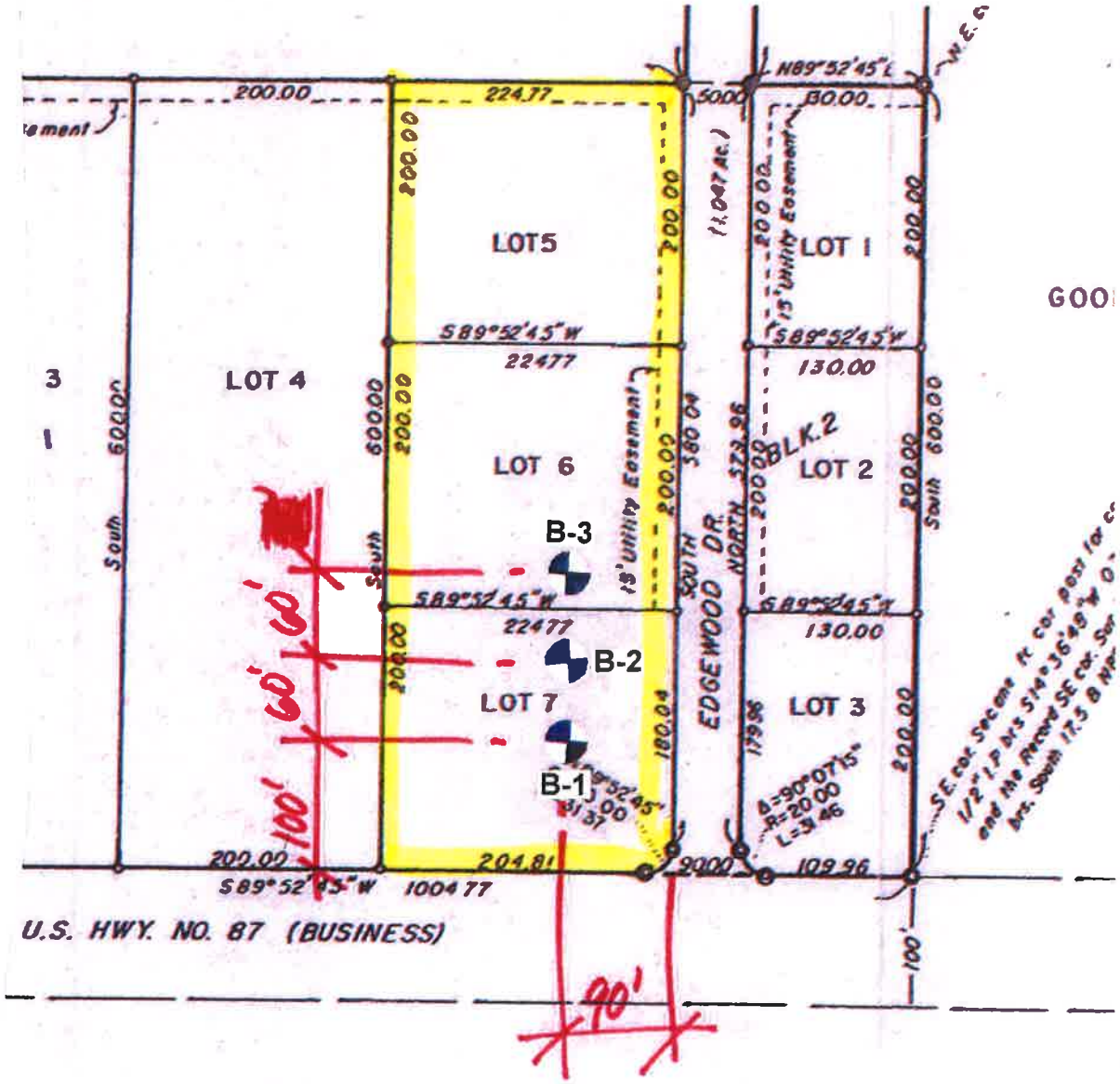
MATERIAL SPECIFICATIONS: The pavements should be specified, constructed, and tested to meet the following minimum standards:

1. Hot-Mix Asphaltic Concrete - Texas Department of Transportation (TxDOT) Item 340, Type "D". Construction methods and testing should be consistent with those required in this specification.

2. Portland Cement Concrete - TxDOT Item 360. Specify a minimum concrete compressive strength of 3,000 psi at 28 days. Reinforcement for temperature and crack control should not be less than #4 bars on 18 inch spacing for light (auto) traffic areas and #4 bars on 12 inch spacing for heavy (truck) traffic areas. For load transfer at construction and expansion joints, smooth dowel bars should be specified to be at least 14 inches in length and ⅝ inch diameter for the light duty pavement section and 14 inches in length and ⅞ inch diameter for the heavy duty pavement section. These bars should be spaced at 12 inches for light traffic joints and heavy traffic joints. Joint types, joint spacing, and other details for the pavement should be consistent with those such as the American Concrete Institute. Detailing of the concrete pavement may have an impact on the above mentioned reinforcement recommendations. Please contact our office if additional information is required. Construction materials and procedures should be consistent with the above-mentioned specification.

3. Flexible Base Course - TxDOT Item 247, Type A, Grade 2 or better. The base layer should be constructed to a minimum 98 percent of maximum dry density at ±2 percent of optimum moisture content as determined by ASTM D 1557. Construction procedures should be consistent with this specification.

APPENDIX A



NOT TO SCALE

BORING LOCATION PLAN

FIGURE 1

FIRE STATION #4
NWC S. CHADBOURNE & EDGEWOOD
SAN ANGELO, TEXAS

Project No.: 15-6371 Date: September 2015

APPENDIX B

FIREHOUSE #4
NWC S. CHADBOURNE & EDGEWOOD
SAN ANGELO, TEXAS
SUMMARY OF CLASSIFICATION TESTS

Boring No.	Depth (ft)	Liquid Limit %	Plasticity Index	% Passing #200 Mesh Sieve	Water Content %	USCS	Description
B-1	0-2'	44	27	84	8.2	CL	Brown Fine Sandy Clay with trace calcareous nodules
B-2	2-3½'	37	22	80	8.1	CL	Brown Fine Sandy Clay with calcareous nodules
B-3	0-1'	38	22	77	7.3	CL	Brown Fine Sandy Clay with trace calcareous nodules

APPENDIX C

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street, Abilene, Texas 79601
(325) 698-5560, Firm Registration No 1151

LOG OF BORING

Project: **FIRE STATION #4** Date: SEPTEMBER 14, 2015

Location: **NWC S. CHADBOURNE & EDGEWOOD SAN ANGELO, TEXAS** Type: AIR ROTARY Boring No.: **B-1**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN FINE SANDY CLAY WITH TRACE CALCAREOUS NODULES				4.5+	
		ST					4.5+	
		SS	BROWN SANDY CLAY WITH CALCAREOUS NODULES	28				
5		ST					4.5+	
		AU	LIGHT GRAY HIGHLY WEATHERED LIMESTONE					
		SS	LIGHT GRAY WEATHERED LIMESTONE	50 / 1"				
10								
		SS	LIGHT GRAY AND TAN LIMESTONE	50 / 1"				
15								
		SS		50 / 0"				
20			TOTAL DEPTH OF BORING 20 FEET					

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

15-6371

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **FIRE STATION #4** Date: SEPTEMBER 14, 2015

Location: **NWC S. CHADBOURNE & EDGEWOOD SAN ANGELO, TEXAS** Type: AIR ROTARY Boring No.: **B-2**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN FINE SANDY CLAY WITH TRACE CALCAREOUS NODULES				4.5+	
		ST	BROWN SANDY CLAY WITH CALCAREOUS NODULES				4.5+	
		SS		43				
5		AU	LIGHT GRAY HIGHLY WEATHERED LIMESTONE					
		SS	LIGHT GRAY WEATHERED LIMESTONE	50 / 0"				
10			LIGHT GRAY AND TAN LIMESTONE					
		SS		50 / 1"				
15			TOTAL DEPTH OF BORING 15 FEET					

NOTE

NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

15-6371

ENPROTEC/HIBBS & TODD, INC.
ENVIRONMENTAL AND CIVIL ENGINEERING
402 Cedar Street
(325) 698-5560
Abilene, Texas 79601
Firm Registration No. 1151

LOG OF BORING

Project: **FIRE STATION #4** Date: SEPTEMBER 14, 2015

Location: **NWC S. CHADBOURNE & EDGEWOOD SAN ANGELO, TEXAS** Type: AIR ROTARY Boring No.: **B-3**

DEPTH IN FEET	SYMBOL	SAMPLE	MATERIAL DESCRIPTION	N-BLOWS PER FOOT	TEXAS CONE PENETROMETER 1st 6"	TEXAS CONE PENETROMETER 2nd 6"	Qp (tsf)	DEPTH SCALE
		ST	BROWN FINE SANDY CLAY WITH TRACE CALCAREOUS NODULES				4.5+	
		AU	TAN SANDY CLAY WITH CALCAREOUS NODULES AND GRAVEL					
			BROWN SANDY CLAY WITH CALCAREOUS NODULES					
		SS		50 / 5"	*			
5			LIGHT GRAY HIGHLY WEATHERED LIMESTONE					
		SS	LIGHT GRAY WEATHERED LIMESTONE	50 / 1"				
10			LIGHT GRAY AND TAN LIMESTONE					
		SS		50 / 3"				
15			TOTAL DEPTH OF BORING 15 FEET					

NOTE

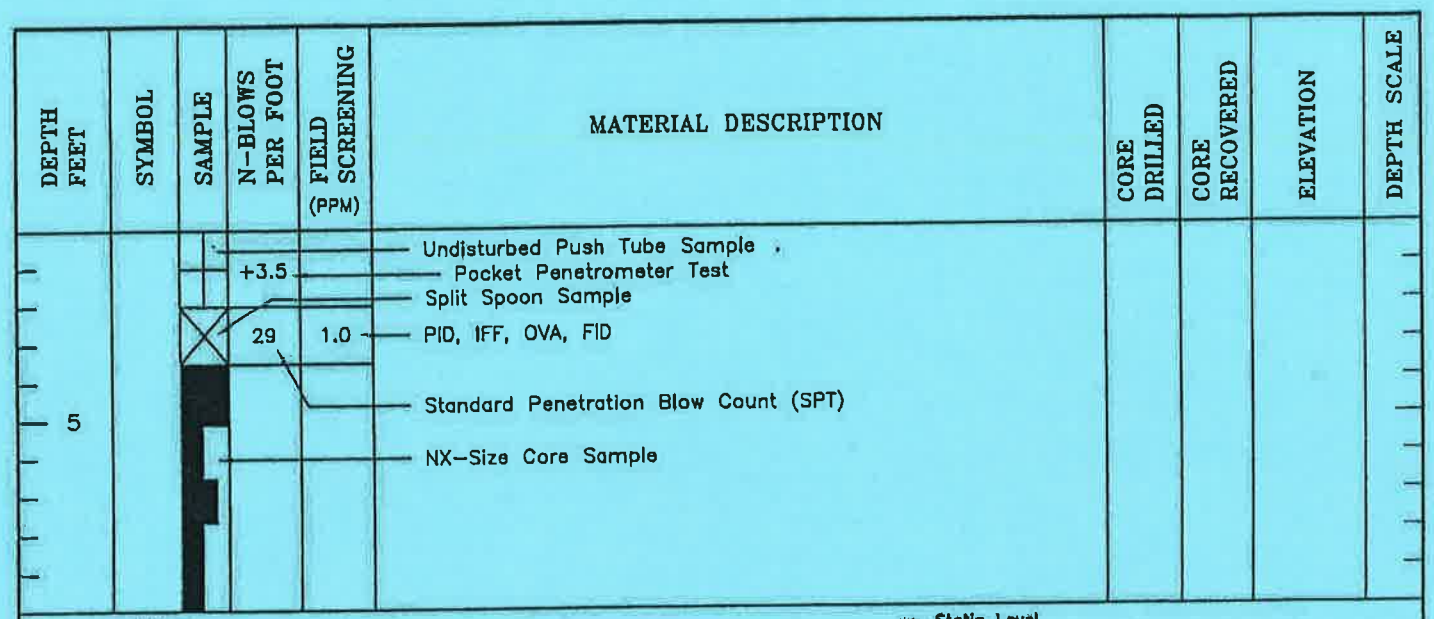
NO GROUNDWATER WAS PRESENT DURING OR AT COMPLETION OF DRILLING ACTIVITIES.

* WITH 6" SEAT

15-6371

ENPROTEC, INC.

EXPLANATION OF SYMBOLS AND TERMS USED ON BORING LOGS



Water Encountered — Water Level Encountered During Drilling

Static Level (date) — Stabilized Water Level

UNIFIED SOIL CLASSIFICATION
DESCRIPTION OF SYMBOLS AND DIVISIONS

- Well-Graded Gravels, Gravel Sand Mixtures (GW)
- Poorly-Graded Gravels, Gravel Sand Mixtures (GP)
- Silty Gravel, Gravel Sand-Silt Mixtures (GM)
- Clayey Gravels, Gravel-Sand-Clay Mixtures (GC)
- Well-Graded Sands, Gravelly Sands (SW)
- Poorly-Graded Sands, Gravelly Sands (SP)
- Silty Sands, Poorly-Graded, Sand-Silt Mixtures (SM)
- Clayey Sands, Poorly-Graded, Sand-Clay Mixtures (SC)
- Inorganic Silts and Very Fine Sands, Silty or Clayey Fine Sands (ML)
- Inorganic Clays of Low to Medium Plasticity Gravelly, Sandy or Silty Clays, Lean Clays (CL)
- Organic Silts and Organic Silty Clays of Low Plasticity (OL)
- Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils (MH)
- Inorganic Clays of High Plasticity, Fat Clays (CH)
- Organic Clays of Medium to High Plasticity, Organic Silts (OH)
- Caliche and Other Impervious Layer (HP)

BEDROCK SYMBOLS

- Conglomerate (CGL)
- Sandstone (SS)
- Limestone (LS)
- Shale (Sh)
- Weathered Shale (WS)
- Sandy Shale (SSh)
- Shaley Limestone (Sh LS)
- Dolomite (DOL)

MISCELLANEOUS SYMBOLS

- Asphaltic Concrete (HMAC)
- Cement Grout (CMT)
- Bentonite (BENT)

The LOG of BORING is a representation of the subsurface material at specific boring location and within the depth explored. The transition between strata may be gradual and variations in material types and depths between borings can be expected. Water level observations represent those conditions at the time of exploration and may vary with time and location of site.

SOIL COLOR CLASSIFICATION
Determined by
MUNSELL SOIL COLOR CHARTS
1990 EDITION REVISED

GENERAL NOTES

SAMPLE IDENTIFICATION

Soil Samples are visually classified in general accordance with the Unified Soil Classification System (ASTM D2487 or D 2488)

DRILLING AND SAMPLING SYMBOLS

ST:	Shelby Tube - 3" O.D., except where noted
SS:	Split-Spoon
THD:	THD Cone Penetrometer
AU:	Auger Sample
DB:	Diamond Bit
CB:	Carbide Bit
WS:	Wash Sample

SOIL PROPERTY SYMBOLS

N:	Standard "N" penetration: Blows per foot, or fraction thereof, of a 140 pound hammer 30 inches on a split-spoon
Qp:	Calibrated Penetrometer Resistence, TSF
Qu:	Unconfined Compression Strength, TSF
LL:	Liquid Limit, %
PI:	Plasticity Index

SOIL STRENGTH CHARACTERISTICS

NON-COHESIVE (GRANULAR) SOILS

RELATIVE DENSITY	BLOWS PER FOOT(N)
Very Loose	0-4
Loose	5-10
Firm	11-30
Dense	31-50
Very Dense	51 +

COHESIVE (CLAYEY) SOILS

COMPARATIVE CONSISTENCY	BLOWS PER FOOT(N)	UNCONFINED COMPRESSIVE STRENGTH (Qu)
Very Soft	0-2	0 - 0.25
Soft	3-4	0.25 - 0.50
Medium Stiff	5-8	0.50 - 1.00
Stiff	9-15	1.00 - 2.00
Very Stiff	16-30	2.00 - 4.00
Hard	31 +	4.00 +

SOIL CHARACTERISTICS

PARTICLE SIZE

Boulders	8 in. +	Coarse Sand	5mm-0.6 mm	Silt	0.074mm-.005mm
Cobbles	8 in.-3 in.	Medium Sand	0.6mm-0.2mm	Clay	-0.005mm
Gravel	3 in.-5mm	Fine Sand	0.2mm-0.074 mm		

DEGREE OF EXPANSIVE POTENTIAL	PI
Low	0-15
Moderate	15-25
High	25 +

DEGREE OF PLASTICITY	PI
None to Slight	0-4
Slight	5-10
Moderate	11-30
High	31 +

AIRVAC
air vacuum corporation

The World Leader In Engine Exhaust Removal Systems for the Fire and EMS Industry

ADDENDUM NO. 1 - EXHIBIT "B"

April 12, 2017

Engineer Paul Wilkerson
San Angelo Fire Department #4
San Angelo, TX

No Hoses

RE: QUOTATION FOR AIRVAC 911® ENGINE EXHAUST REMOVAL SYSTEM.

Dear Paul:

Thank you for sending us the request forms for your FREE quotation on our, AIRVAC 911® ***Engine Exhaust Removal System,*** the fire industry's most effective, hassle free and complete exhaust removal system on the market today. I have enclosed the requested proposal with more information about our superior system.

Please feel free to call me TOLL FREE with any questions or if you require more information at (800)540-7264. Again, thank you for your inquiry and we look forward to helping you and your Fire Department/EMS facility solve its engine exhaust problem.

Sincerely,

Sara Scialo
Air Vacuum Corporation
Email: sales@airvacuumcorporation.com

GSA Contract Holder

GS-07F-0437M

Made in USA

NFPA MEMBER

GO GREEN

MEETS 2013 EDITION NFPA 1500 9-1.5, OSHA, NIOSH, FEMA & MORE

John Koris
P.O. Box 517 • Dover, NH 03821-0517 • Toll Free 800-540-7264 • Tel 603-743-4332 • Fax 603-743-3111 • www.airvac911.com

The World Leader In Engine Exhaust Removal Systems for the Fire and EMS Industry

AIRVAC 911® SPECIFICATIONS

MODEL: AIRVAC 911®, VERTICAL AIR FLOW DESIGN, CEILING HUNG, RE-CIRCULATING AIR FILTRATION SYSTEM. MANUFACTURED BY: AIR VACUUM CORPORATION, 6 FARADAY DRIVE, DOVER, NH 03820.

FILTRATION: "4-STAGE" FILTER PACK. ALL FILTERS ARE INDUSTRY STANDARD SIZED, UL TESTED & CERTIFIED.

PRE-FILTER (STAGE 1): 24" X 24" X 1". 3-PLY POLYESTER CONSTRUCTION. TWO LAYERS OF 16/40 DUAL DENIER POLY FIBERS WITH A FINAL DUST CATCHING ADHESIVE LAYER. SELF-SEALING FILTER WITH PRE-INSTALLED INTERNAL HEAVY GAGE WIRE FRAME. PERFORMANCE BASED ON A.S.H.R.A.E. 52.1-1992 TEST METHOD. CLASSIFIED AS A UL CLASS 2 FILTER, ACCORDING TO UL STANDARD 900 AND CAN 4-S111.

MAIN MEDIA FILTER (STAGE 2): 24" X 24" X 6". "**HEPA MAX 3000**" HIGH EFFICIENCY PARTICULATE AIR FILTER. DOP TESTED WITH 0.3 MICROMETER SIZED PARTICLES TO HAVE A **MINIMUM EFFICIENCY OF UP TO 95% AND EXCEEDS THE MAXIMUM EFFICIENCY OF 98% ASHRAE 52.1 TESTED FILTERS**. CONSISTS OF A PLEATED MEDIA PACK ENCLOSED WITHIN A GALVANIZED STEEL FRAME ASSEMBLY. ULTRA-FINE FIBERGLASS MEDIA FORMED IN A SERIES OF PLEATS SEPERATED BY CORRUGATED ALUMINUN DIVIDERS TO MAINTAIN UNIFORM SPACING BETWEEN EACH PLEAT FOR OPTIMAL AIRFLOW. CLASSIFFIED CLASS 2 ACCORDING TO U.L. STANDARD 900 AND IS CLASSIFIED MERV 16 IN ACCORDANCE WITH ASHRAE STANDARD 52.2. FOR INSTALLATION SAFETY, TOTAL WEIGHT NOT TO EXCEED 16 LBS.

GAS-PHASE EXTRACTOR (STAGES 3&4): ONE 24" X 24" X 4", **"MULTISORB 3000"** BLENDED GAS PHASE EXTRACTOR. 50/50 RESPIRATOR GRADE ACTIVATED CARBON GRANUALS EFFECT FOR REMOVAL OF HIGH WEIGHT MOLECULAR GASES WITHIN DIESEL EXHAUST (VOC'S, HYDROCARBONS, BENZENE, OCTANE, METHANOL AND MORE) AND POTASSIUM PERMANGANATE FOR REMOVAL OF LIGHT WEIGHT MOLECULAR GASES (*SULFUR DIOXIDE, NITROGEN DIOXIDE, FORMALDEHYDE AND MORE*). EACH FILTER IS CONSTRUCTED WITHIN A 24ga METAL FRAME WITH INTERNAL "HONEYCOMB" CONTAINMENT STRUCTURE. 50/50 BLEND EQUATES TO 14 LBS EACH. FOR INSTALLATION SAFETY, TOTAL WEIGHT NOT TO EXCEED 28 LBS.

CABINET CONSTRUCTION: 18 & 16 GAUGE, ALL WELDED STEEL CONSTRUCTION. 25" X 26" X 28" CUSTOM GRAY POWDER COAT PAINT FINISH. TWO HINGED ACCESS PANELS: ONE, TO THE FILTER BANK AND THE OTHER TO THE MOTOR/BLOWER UNIT. A "DWYER" MAGNEHELIC STATIC PRESSURE GAGE, ALLOWS USER TO VISUALLY CHECK ON THE STATUS OF THE FILTER BANK. **FOUR HORIZONTAL & ADJUSTABLE AIRFLOW GRILLS**. "QUICK LATCH" FILTER COMPARTMENT WHICH IS CAPABLE OF HOLDING UP TO 15" OF FILTRATION!

ELECTRICAL: 3/4 H.P., 1725 RPM, 115 VOLT SINGLE PHASE ELECTRIC MOTOR, 13.6 F.L. AMP., RESILIENT MOUNT, AUTOMATIC THERMAL PROTECTION. ELECTRIC MOTOR, RESILIENT MOUNT. ALL MOTORS ARE UL APPROVED. *OPTIONS:* UNITS AVAILABLE AT 230 VOLT, SINGLE PHASE, 6.8 F.L. AMP, ADD $52 EA. UNIT, 230 VOLT (SINGLE PHASE) MOTOR USABLE AT 208 VOLT. 7.0 F.L. AMP. ADD $95 EA UNIT, THREE PHASE 208-230 VOLT, 3.6 F.L. AMP, ADD $195 EA. UNIT; TO BASE QUOTE.

BLOWER: CONTINENTAL CENTRIFUGAL IMPELLER AND FUNNEL CONE. NON-METAL & CHEMICALLY RESISTANT.

AVEC CONTROL PANEL: UL 508 CERTIFIED CUSTOM "AUTOMATIC VEHICLE EXHAUST CONTROL", MULTI-CIRCUIT AUTOMATIC RESET TIMER CONTROL. TWO CIRCUIT CONFIGURATIONS RATED AT 20 AMPS PER. TIMING RANGE OF .1 TO 120 MIN. ENCLOSED WITHIN A NEMA-4 RATED ENCLOSURE, NECESSARY FOR APPLICATIONS WHERE WATER IS PRESENT (WASHING OF VEHICLES). MANUAL THREE POSITION SWITCH FOR: AUTO MODE, SYSTEM OFF & SYSTEM RUN OVERRIDE. LED "OPERATING" LIGHT.

AUTOMATIC ACTIVATION SWITCHES: (SEE ENCLOSURES) PHOTO ELECTRIC EYES ACTIVATE SYSTEM UPON VEHICLE MOVEMENT (OUTDOOR RANGES OF UP TO 200') AND MAGNETIC DOOR SWITCHES (ONE PER OVERHEAD DOOR).

INSTALLATION: (IF APPLICABLE) ~~"TURN KEY" AN ADDITIONAL CHARGE MAY APPLY IF THE LOCATION OF INSTALLATION DOES NOT HAVE SUFFICIENT ELECTRICAL CAPACITY TO INSTALL THE AIRVAC 911®, SYSTEM. (E.G. 1 OPEN 20 AMP BREAKER PER UNIT + 1 FOR THE CONTROL PANEL). DUE TO THE FLUCTUATION OF REQUIREMENTS BOTH LOCALLY AND WITHIN EACH STATE, THE ABOVE PRICING DOES NOT INCLUDE: SEISMIC OR VIBRATION MOUNTING HARDWARE, LOW VOLTAGE WIRING WITHIN CONDUIT, PAINTING OF CONDUIT ETC. OR THE COST OF ANY PERMITS THAT MAY BE REQUIRED UPON INSTALLATION. PLEASE REFERENCE OUR "STANDARD INSTALLATION DESCRIPTION" FOR DETAILS. NON GSA SCHEDULE ITEM.~~

The World Leader In Engine Exhaust Removal Systems for the Fire and EMS Industry

PROPOSAL – AIRVAC 911® ENGINE EXHAUST REMOVAL SYSTEM

THE SALE OF "**AIR VAC-911**"®, ENGINE EXHAUST AIR FILTRATION SYSTEM, BY AIR VACUUM CORPORATION OF DOVER N.H., FOR REMOVAL OF HAZARDOUS EMISSIONS FROM FIRE, RESCUE, TRUCKING, AND OTHER HEAVY EQUIPMENT FLOOR AREAS.

April 12, 2017

Engineer Paul Wilkerson
San Angelo Fire Department #4
San Angelo, TX
325/659-2235

DESCRIPTION	QUANTITY
AIR VAC-911 EXHAUST REMOVAL SYSTEM - Single Ph. 115V	5
AIR VAC-911 FILTER PACK (4-Stage Filter Pack, "Main Filters")	5
AIR VAC-911 FILTER GAUGE (Min. one per building section)	1
UL 508A CERTIFIED CONTROL PANEL - AVEC-6C/T2	1
ACTIVATION PACKAGE - PB30TK 200' PHOTO EYE (set) &	2
N505AUTM/STX01 TRACK MOUNTED DOOR SWITCH	3
N505AUTM BI-FOLD DOOR SWITCH	3
PREFILTERS (12 Per Box/Case)	12
*ESTIMATED SHIPPING AND HANDLING	5
*"Non-Schedule Item"	

The AIRVAC 911® system is provided with a FIVE YEAR WARRANTY on ALL components (excluding consumable filters)

♦ *FREIGHT: FOB Origin,* ♦ **TERMS: 1/2 Payment with the order & final payment prior to release..** ♦ ***Lead-Time 8 to 10 weeks.*** ♦ Buyer is responsible for all permits, permit fees, State/local licensing fees and applicable taxes related to the purchase of product, shipping and installation or must provide all necessary tax-exempt certificates; state, local and/or county to Air Vacuum Corporation. ♦ Please contact your sales rep for installation information and pricing. ♦ Governmental Purchases please consult your sales rep for GSA price list. Pricing valid for 90 days

GSA Contract Holder

GS-07F-0437M

Made in USA

NFPA MEMBER

GO GREEN

MEETS 2013 EDITION NFPA 1500 9-1.5, OSHA, NIOSH, FEMA & MORE