

AIRPORT FUEL FARM DESIGN CONTRACT



**Oxford**  
**ESSELTE**

NO. 753 1/3

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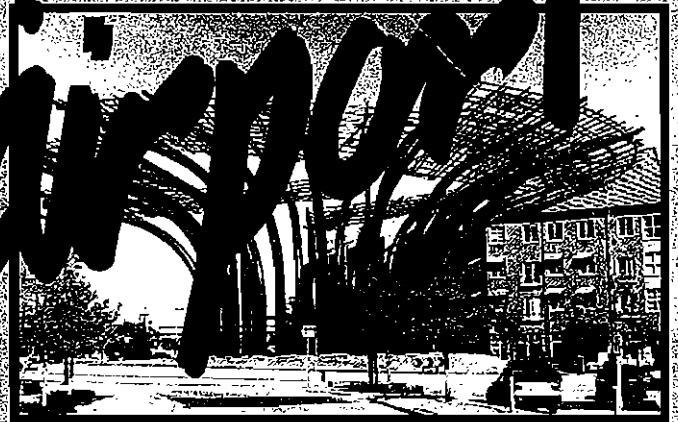
# Preliminary Concept Design and Engineer's Report

## New Bulk Fuel Storage and Dispensing System

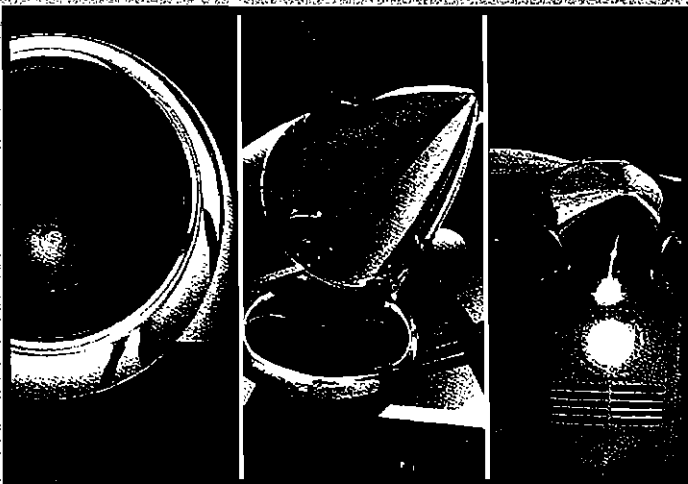
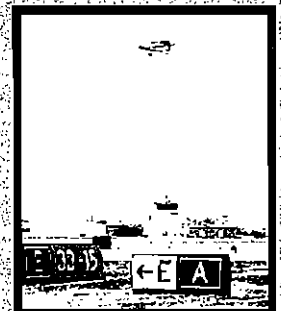
FOR

*Jefferie  
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5-17-04*

# Addison! airport



**16051 Addison Road, Suite 220  
Addison, Texas 75001  
May 6, 2004**



**Washington Group International**  
Integrated Engineering, Construction, and Management Solutions

**Preliminary Concept Design and Engineer's Report**

**New Bulk Fuel Storage and Dispensing System**

**For**

**Addison Airport**

**16051 Addison Road, Suite 220**

**Addison, Texas 75001**

**May 12, 2004**



**Washington Group International**

**Integrated Engineering, Construction, and Management Solutions**

**Preliminary Concept Design and Engineer's Report**  
**New Bulk Fuel Storage and Dispensing System**  
**Addison Airport**

May 12, 2004

1. **Modified Project Scope of Work:**

The centrally located, 15 individual bulk fuel storage tanks, with a central off-load and five Fixed Base Operator (FBO) metered dispensing systems, will be consolidated in one environmentally protected site, including tanks and operating equipment, with suitable architectural considerations to blend into the site. The horizontal mounted cylindrical tanks will have an approximate dimension of ten and one-half feet (10 ½') diameter by forty-three feet (43') in length (25,000 gal), or alternatively, ten and one half feet (10 ½') diameter by twenty-six feet (26') in length (15,000 gal). Fuel storage tanks will be double wall, 2-hour fire rated tanks. Primary products to be dispensed are Low Lead AVGAS and Jet A Fuel; however as a convenience to the FBOs, fuel storage tanks of at least 10,000 gal and dispensing equipment for LL MoGas and Diesel, may be provided for "on-airport" vehicle refueling. For Jet A, the off load system will be capable of off loading a 8000 gallon over the road fuel tanker truck in 20 minutes, at approximately 350 gallons/minute and the dispensing systems into the Airport refueling vehicles will be rated at approximately 300 gallons/minute.

Industry standard filtration systems with automatic shutdown and alarms will be installed on the off-load side of the storage tanks, to protect product in the fuel storage tanks. Overflow protection devices will be installed on all fuel storage tanks and connected to the pump control panel. Pump/dispensing control panel or panels, will be logically sequenced, gauged to fuel storage tanks for fuel level indication, and clearly marked for ease of operations. An oil/water separator will be installed and connected to the secondary containment dike area, using a valve connection and the off-load/dispensing pad to allow for immediate wash-down of any spilled product. The off-load/dispensing pad will be large enough to provide a designated parking spot for any aircraft-refueling vehicle that develops a leak. Fuel storage area will have explosion proof electrical fixtures and control panel. An 1 ½" water line will be required for emergency eye wash unit and a 1" hose and reel unit installed for wash down. The hose must reach all areas of the facility, including the oil/water separator. An emergency telephone/intercom/transmitter device will be installed with direct link to the Fire Station alarm room located at 4798 Airport Parkway, Addison, Texas 75001-3364. Fuel storage tanks will be mounted in an 18" high concrete low wall secondary containment area, connected to the oil/water separator so that any major spill in the containment area can be washed down and pumped out through the oil/water separator. Design will include area lighting, site storm drainage and connection, any required utilities relocation, and site appearance considerations. Access from the outside (airport land side) will be controlled with electrically operated gates and/or a code or key access pad. Paved access will be required from the street and from the airfield areas. Street connection will include driveways, curb and gutter.

## 2. Design Project Reports and Deliverables

- Preliminary Concept Design and Engineer's Report, with Estimate: 5/06/04
- Site and Project approval documents for FAA and other Governmental Agencies
- A site Geotechnical investigation and report: 4/13/04
- Category Exclusion (CATEX) document or Environmental Assessment (EA)
- 35% Preliminary Design for function and budget approval
- 65% Design for Operation, Equipment and Appearance approval
- 95% Design for Final Review, Coordination and Cost Estimate for Construction
- 100% Final Design for Construction, Plans and Specifications Documents

## 3. Preliminary Concept Design

### a) Fuel Storage Tank Requirements

- After meeting with the FBOs and Airport personnel on April 13, 2004, the group consensus on the minimum bulk fuel storage tank requirements for public fuel operations at Addison Airport were established as two 25,000 gal Jet A tanks and one 15,000 gal LL AvGas tank
- Other on Airport operators can specify their fuel storage needs based on either 25,000 gal or 15,000 gal tanks, for standardization of the system equipment
- FBOs requested both MoGas and Diesel Fuel storage and dispensing to support operations of on airport vehicles; however, this would be accomplished by using a two-compartment tank with 15,000 gallons Diesel and 10,000 gallons MoGas capacity. One of the FBOs would operate (order and account) these tanks and dispensing units for the benefit of certain airport users
- Million Air requests two 25,000 gal Jet A tanks and one 15,000 gal LL AvGas tank
- Mercury Air requests two 25,000 gal Jet A tanks and one 15,000 gal LL AvGas tank, and will operate the 15,000 gal Diesel portion of the Diesel/MoGas tank
- Addison Express requests two 25,000 gal Jet A tanks and one 15,000 gal LL AvGas tank and will operate the 10,000 gal MoGas portion of the Diesel/MoGas tank.
- Cherry Air requests two 15,000 gal Jet A tanks (Non-public FBO)
- World Wide Jet requests two 25,000 gal Jet A tanks and one 15,000 gal LL AvGas tank
- Total planned fuel storage tanks are eight (8) 25,000 gal for Jet A, two (2) 15,000 gal for Jet A, four (4) 15,000 gal for LL AvGas, one (1) 25,000 gal baffled tank with a 15,000 gal compartment for Diesel and a 10,000 gal compartment for LL MoGas
- Each Tank will have stand-alone fill and dispense systems, designed as a "package" unit, including Veeder-Root tank gauging system for inter-wall leak detection, local digital or mechanical level indicator, a top "cat walk" grid for safe access to covers and overfill prevention systems.

### b) Pumps and Filters

- All pumps and filters will be standardized for ease of repair/replacement
- One pump will be used for each tank for both off load and dispense

- Pumps and filter/water separator will be sized for 350 gal per minute flow rate for Jet A and 120 gal per minute for LL AvGas.
- Gorman-Rupp RotoPrime are the preferred pump for this application
- Filters/Separators will be Velcon or Facet

c) Off-Load Manifold

- Standard API drybreak type hose coupling from hose rack
- Metering device will be Liquid Controls, or equal

d) Dispensing Equipment

- Metering device will be Positive Displacement Double Case type, or equal
- Standard bayonet type connect hose coupling from hose rack
- Separate Diesel/MoGas Tolkheim Dispensing unit with credit card reader

e) Oil/Water Separator

- 10,000 gallon Coalescer type unit, for underground installation -
- Single wall, coated and cathodic protected unit
- Internal high level sensor and shut off valve
- Pump out port and access covers

4. The Engineer's Report of current design and project status

- a) Site conditions: acceptable location for this industrial type facility, suitable access from airfield, limited space for future expansion; however good access from Addison Road and traffic control or access lanes will not be a problem. Provisions have been made for the widening of Addison Road. All required utilities are readily available. Appearance of this industrial type facility in respect to surrounding businesses and functions is a concern that can be addressed in the design with architectural and landscaping efforts. Drainage, surface and soil conditions are not a problem and can be addressed in the design. Transition for Land Side to Air Side will meet FAA guidance.

b) Code Compliance:

- **International Building Code 2003:**
  - Paragraph 414.6 Outdoor storage, dispensing and use. The outdoor storage, dispensing and use of hazardous materials shall be in accordance with the International Fire Code.
  - Paragraph 415.7.2 Flammable and combustible liquids. The storage, handling processing and transporting of flammable and combustible liquids shall be in accordance with the International Mechanical Code and the International Fire Code.
- **International Fire Code 2003:**
  - Section 1106, Aircraft Fueling, Paragraph 1106.2 Airport fuel systems. Airport fuel systems shall be designed and constructed in accordance with NFPA 407. Paragraph 1106.8 Loading and Unloading. Aircraft-fueling vehicles shall be loaded only at an approved loading rack. Such loading racks shall be in accordance with Section 3406.5.1.12.
  - Section 2202 Definitions: AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY. That portion of property where flammable or combustible liquids or gases used as motor fuels are

stored and dispensed from fixed equipment into fuel tanks of motor vehicles.

- Paragraph 2703.2.4.2 Above-ground tanks. Above-ground stationary tanks used for the storage of hazardous materials shall be located and protected in accordance with the requirements for outdoor storage for the particular material involved.

- Paragraph 2704.13 Weather Protection. Where overhead noncombustible construction is provided for sheltering outdoor hazardous material storage areas, such storage shall not be considered indoor storage when the area is constructed in accordance with the requirements for weather protection as required by the International Building Code.

- Section 3402, Definitions: BULK PLANT OR TERMINAL. That portion of a property where flammable or combustible liquids are received by tank vessel, pipelines, tank car or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, portable tank or container.

- Section 3404, Storage, Paragraph 3404.1 General. The storage of flammable and combustible liquids in containers and tanks shall be in accordance with this section and the applicable sections in Chapter 27. Paragraph 3404.2 Tank Storage. The provisions of this section shall apply to the storage of flammable and combustible liquids in fixed aboveground and underground tanks.

- Section 3406, Special Operations: Paragraph 3406.4 Bulk plants or terminals.

Paragraph 3406.5 Bulk transfer and process transfer operations. Paragraph 3406.5.1.2 Weather Protection Canopies. Where weather protection canopies are provided, they shall be constructed in accordance with Section 2704.13. Weather protection canopies shall not be located within 15 feet of a building or combustible material or within 25 feet of building openings, lot lines, public streets, public alleys or public ways. Paragraph 3406.5.1.12 Loading racks. Where provided, loading racks, stairs or platforms shall be constructed of noncombustible materials. Buildings for pumps or for shelter of loading personnel are allowed to be part of the loading rack.

- Preliminary Code Analysis, by WGI Fire Protection Engineers, dated April 28, 2004 is attachment #7
- Construction of this bulk fuel storage and dispensing facility using ballistic protected, 2 hour fire rated, fuel storage tanks under a fire rated weather protection canopy, with specified safety features, access control and security considerations meets or exceeds all code requirements

c) Propose Fuel Storage Tank Layout

- Tank layout for 15 fuel storage tanks is shown on the Preliminary Site Plan (attachment #2), as submitted for site approval and on the tank layout sketch by Burns & McDonnell (attachment #4).
- The number of tanks and tank size selected by each FBO increases their total usable capacity, simplifies operations and reduces the number of weekly deliveries by the fuel suppliers.
- At current aviation fuel usage, deliveries will occur approximately twice weekly. At projected future fuel usage, deliveries will occur every other day for Jet A fuel. LL AvGas is projected to reduce in total quantity dispensed

d) The proposed Bulk Fuel Storage tanks are protected double wall type tanks, with inter wall sensor to detect leakage from the inner tank; however, secondary containment is required for this application since the total storage at this location exceeds 150,000 gallons. The secondary containment will be cast in place concrete, with drain connection to the 10,000-gallon oil/water separator and a "normal closed" manually operated valve.

e) Driveway and Street access will be from Addison Road, with turn lanes, radius and driveways are deigned to accommodate 8000 gallon, over the road tanker trucks. Unload rack is sloped to inside curb to contain and drain a total of 8000 gallons into the oil/water separator. The dispense side is also sloped and drains into the oil/water separator; however, the maximum size airport refueler truck currently on the airport or projected for the future, is 3000 gallons.

f) Proposed Security Items include:

- Fencing to the public side of this facility will be the FAA standard 7', plus 1' chain link, with inserts. Along Addison Road, an 8' masonry fence is planned, with landscaping along the sidewalk and road.
- Access gates will be electrically controlled, with speaker box and PIN code pad
- Security lighting, at .5 foot candles, will be provided on the facility, in addition to operational lighting for night operations
- A Phone Box with direct dialer to FBOs & police/fire
- Future provisions for CCTV

g) Proposed Safety Items include:

- Internal tank overflow protection
- "dead man" type controls for dispense operations
- Emergency eye-wash station.
- Two wash down hose stations
- Tanks access ladders and over tank catwalk
- Operational lighting for night operations (off-load and dispense)
- Emergency shut off switch at each corner of the facility
- Secondary storage tank containment and loading/dispense rack containment

h) Proposed Fire protection Items include:

- Fire/Heat sensors, direct alarmed to the Fire Department
- 2 Hour fire rated tanks and fire rated canopy
- Portable fire extinguishers on off load and dispense sides
- Emergency call and alarm to Fire Department

i) Utilities:

- Primary High Voltage electrical drop is a pole-mounted transformer. Oncore, the local electrical utility, has been contacted on preference for underground feed, new transformer and connection to main panel.
- 4" water line available for containment wash down and emergency eyewash unit
- 18" storm sewer line is available for outfall connection to the oil water separator
- Telephone line drop is available



j) Proposed weather canopy:

- Standing seam metal roof of acceptable color
- Canopy alternatives for consideration are shown on Attachment X
- The weather canopy will be fire rated for structure and roof panels along with layout and design considerations for fire-fighting access and response.
- The canopy style must be selected from the alternatives for design, to include fire protection of structural members and panels

5. Current System Design Estimate

**Revised Construction Estimate**

**Description:** Bulk fuel storage and dispensing facility with 8- 25,000 gal horizontal Jet A storage tanks, 2-15,000 gal horizontal Jet A storage tanks, 4-15,000 gal horizontal LL AvGas storage tanks and one combo tank with Diesel and MoGas, connected to 6 dispensing units and off-load manifold. Project includes site work, secondary containment, oil/water separator, fire protection, overflow protection, weather protection canopy, electronic controls, meters and alarm systems. Fill stands are connected to the oil/water separator and electric controlled gates provide access control.

Site work, Pavement and Utilities	\$95,000.00
Containment Structure and Pad	\$72,000.00
Storage Tanks and Piping (@\$2.50/gal)	\$800,000.00
Ballistics Rated Storage Tanks	\$136,500.00
Roof Canopy and Structure (\$22.00/sf)	\$295,700.00
Controls and Equipment	\$265,000.00
Landscape & Architectural Items	\$25,000.00
Contingency (10%)	\$168,900.00
<b>Preliminary Construction Estimate Total</b>	<b>\$1,858,100.00</b>
<b>UST Removal, soil remediation &amp; closure*</b>	<b>\$306,500.00</b>
<b>Adjusted Total for New System and UST Removal</b>	<b>\$2,164,600.00</b>

\* UST removal and engineering fees include planning and approval of UST removal and soil mitigation plan, land farming of contaminated soils and lab testing of samples.

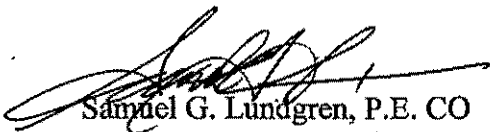
6. Engineer Recommendations:

The bulk fuel storage and dispensing system for Addison Airport as proposed will serve the needs of the airport for many years to come, along with simplifying both operations and maintenance. The site is acceptable for Airport operations and meets FAA guidance. The facility has redundant environmental controls, including overflow protection, automatic pump shutdown leak detection, secondary containment, off-load and dispenser containment and a high level controlled oil/water separator. The facility and planned operations meets or exceeds all current environmental requirements. Considering the location of this proposed fuel storage facility, extra effort has been made to insure the complete safety of the surrounding facilities while making the system invulnerable to common attack. This includes the use of ballistics protected, fire rated, double wall fuel storage tanks, fire sensing, direct alarms and a fire rated weather canopy that prevents sun and weather deterioration of the equipment and piping, limits heat gain of the stored fuel, protects personnel operating the system and screens the tanks from public view for security purposes. Safety concerns are also paramount in the use of "dead man" type controls, installed stairs and catwalks, access ports, overhead protection, lighting, emergency eyewash and system shutoff. The facility as proposed for design meets or exceeds International Building Code (IBC 2003), International Fire Code (IFC 2003), National Fire Protection Association standards (NFPA 407), Environmental Protection Agency (EPA) Regulatory Guidance for petroleum storage, as well as ASME and AIP requirement for aviation

fuel storage and dispensing systems. The use of one pump per tank in a standard modular configuration, simplifies operation and repair, while allowing a higher capacity pump to both off-load and dispense in a shorter period of time. This, plus the use of standard filters, separators, meters, connections and valves will allow current the current fuel system maintenance suppliers to stock key components and standard replacement parts for ease of maintenance, cost effectiveness and rapid response to any component failure. Proposed fuel metering and accounting systems are highly accurate and will provide simple and direct readout of fuel quantity accepted into each tank and exact quantity dispensed into airport refueler vehicles. The proposed MoGas/Diesel motor fuel tank and dispensing system is a convenience for the FBOs for their on-airport vehicle fleet, which will reduce operational costs.

In summary, this by FBO standardized bulk fuel storage and dispensing system will simplify operations, reduce personnel training cost and potential for errors. The system has higher flow rates for both delivery and dispense, which reduces FBO employee standby time. The capacity of the system will meet all aviation fuel demands for the foreseeable future and the system is designed with high quality components, which provide for a plus twenty-year life expectancy. Standardization reduces normal maintenance costs, while enhancing supplier response times. The system is exceptionally safe, with state of the art environmental protection and safety devices, and includes special employee safeguards. The system is exceptionally secure, with fire rated, ballistics protected storage tanks that are also vehicle impact protected and screened from public view or access. Subject to other requirements by regulatory agencies, I recommend the Town of Addison design and construct the Bulk Fuel Storage and Dispensing System as proposed in this Preliminary Concept Design and Engineer's Report.

Respectfully Submitted,

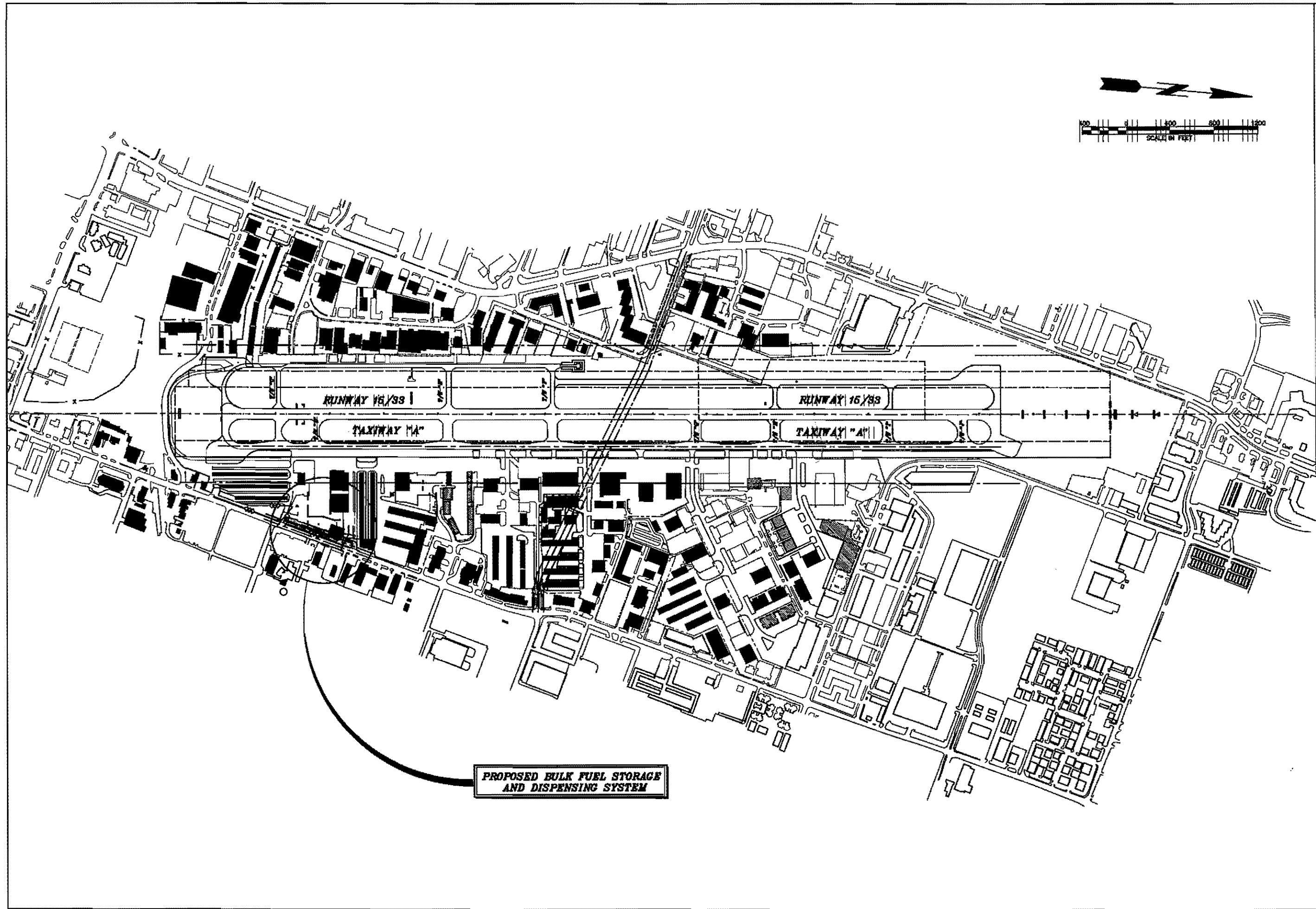


Samuel G. Lundgren, P.E. CO  
Project Manager  
Washington Group International, Inc.

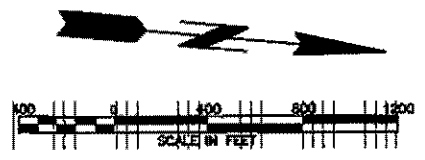
#### Attached Drawings and Sketches

1. Airport Layout Plan
2. Preliminary site plan
3. Canopy sketches
4. Tank Layout diagram
5. Pump flow diagram
6. Meeting Minutes and attendance sheet
7. Preliminary Code Analysis
8. Geotech/Soils report
9. Equipment/Component cut sheets\*

\* Equipment, component and tank fabrication cut sheets are provided for information purposes only. Actual design and specified equipment or component will be listed as the desired item or approved equal that meets operational requirements.



**PROPOSED BULK FUEL STORAGE  
AND DISPENSING SYSTEM**



ADD - FUEL	ADD-ALP-CAD.dwg CAD FILE NO.	PRELIMINARY STAGE OF PLANS
	ALP. PROJ. NO.	
REV.	DATE	DESCRIPTION
		APP.

**BURNS & MCDONNELL**

**Washington Group International**  
Professional Engineering, Construction, and Management Services  
Phone: (940) 386-4444 Fax: (940) 386-4444

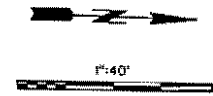
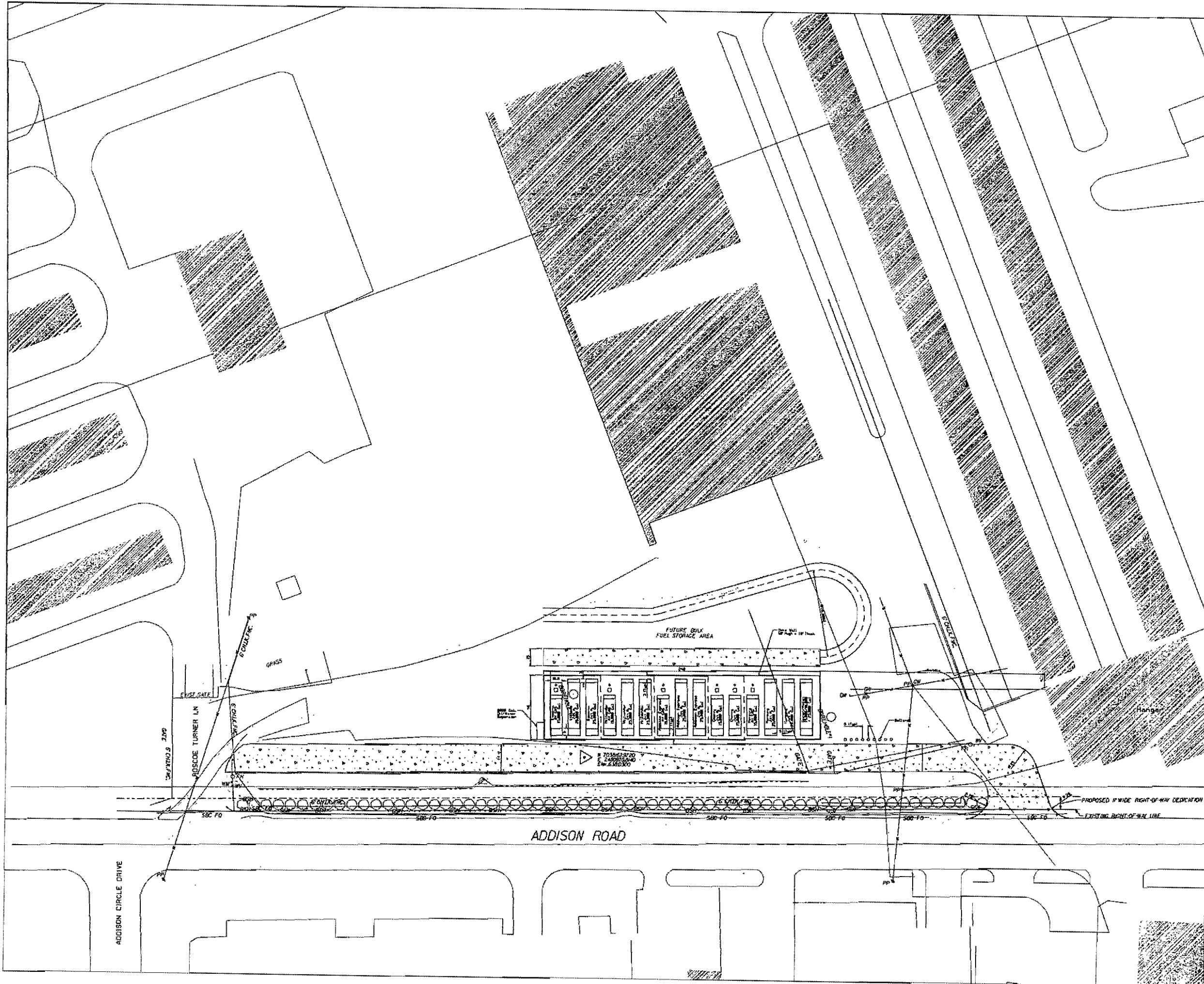
**Addison** ADDISON REGIONAL AIRPORT  
ADDISON, TEXAS

**CONSTRUCTION LAYOUT PLAN**

DESIGNER: \_\_\_\_\_  
 CAD: TESH. \_\_\_\_\_  
 PROJ. LEAD: \_\_\_\_\_  
 CHECKED: \_\_\_\_\_  
 APPROVED: \_\_\_\_\_

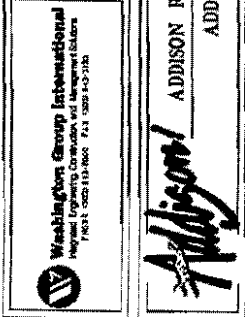
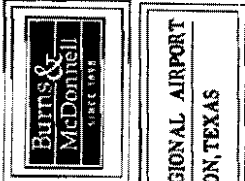
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ATTACHMENT # 1



PRELIMINARY  
STAGE OF PLANS

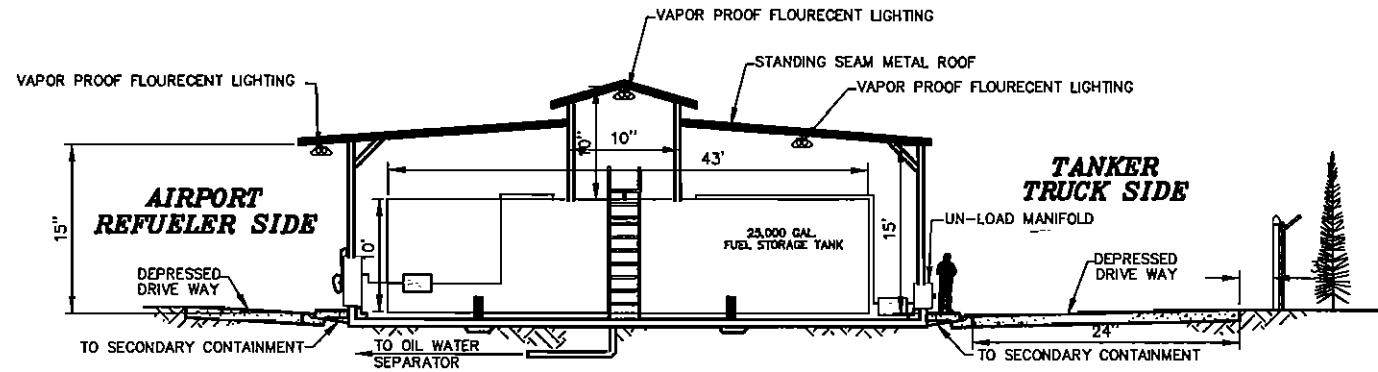
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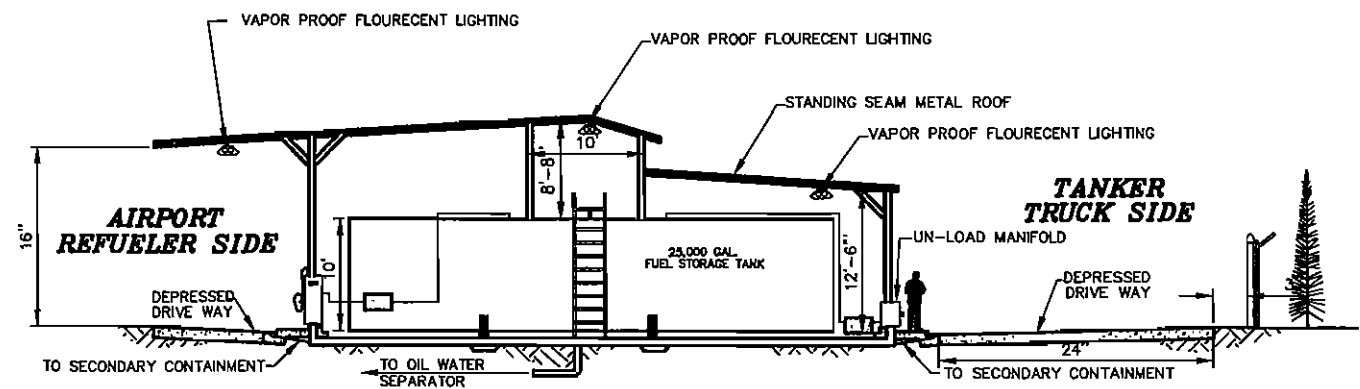
**ADDISON** ADDISON REGIONAL AIRPORT  
ADDISON, TEXAS

DATE: MAY 12 2004  
SHEET 1 OF 1

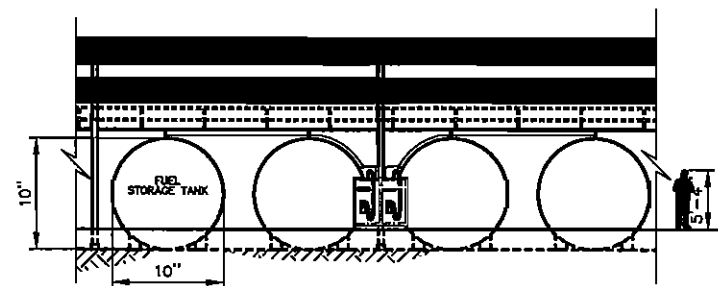
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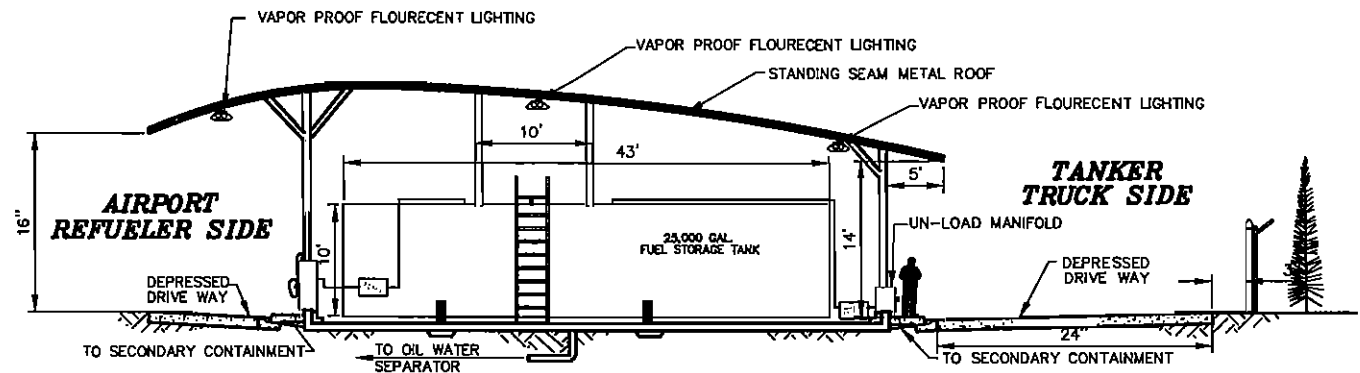
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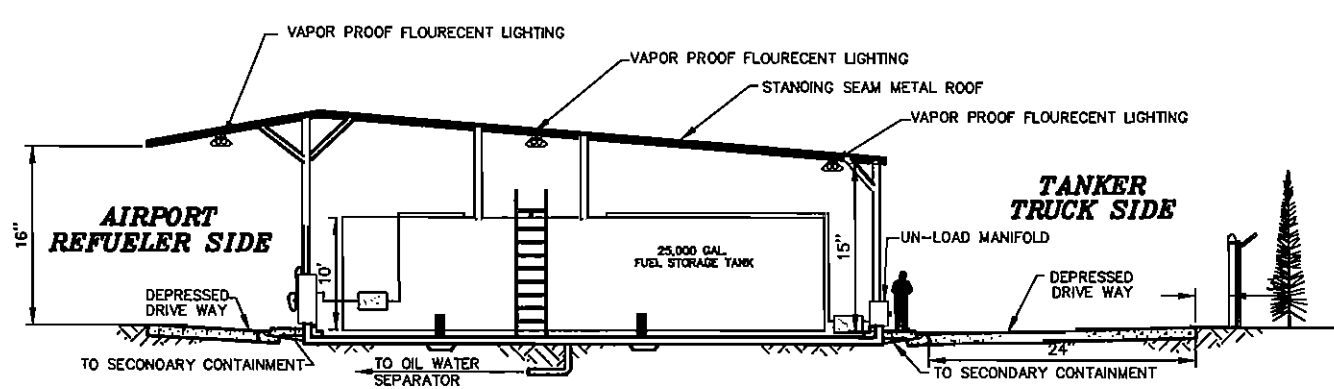
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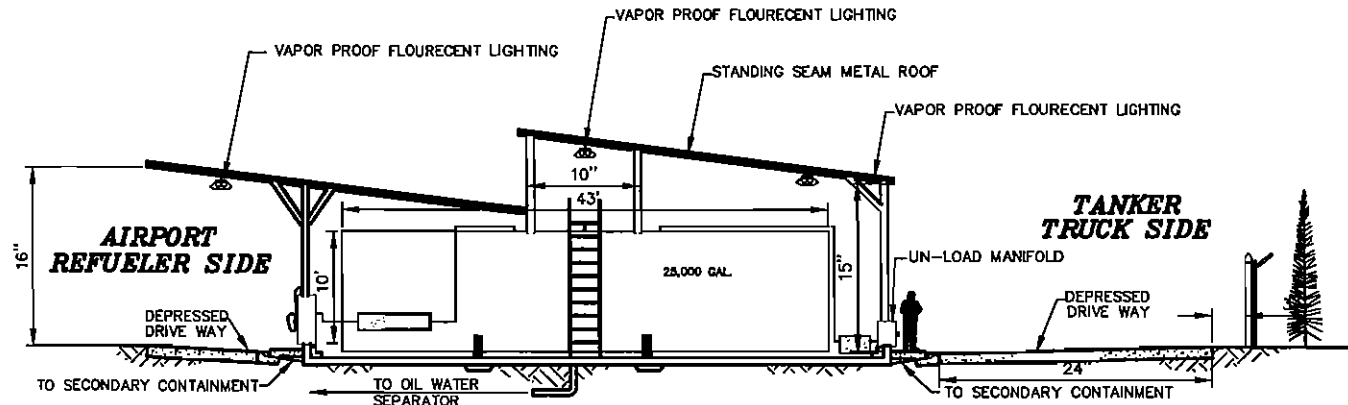
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**ALTERNATIVE "C"**  
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**ALTERNATIVE "D"**  
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**ALTERNATIVE "E"**  
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ADD - FUEL	BLDG-CONCEPTA.dwg	ADD. FILE NO.	A.I.P. PROJ. NO.	REV.	DATE	DESCRIPTION	APP.

**Blutts & McDonnell**  
DESIGNERS

**Washington Group International**  
Regional Planning, Consulting, Construction Administration  
1000 15th Street, Suite 1000, Denver, CO 80202

**ADDISON REGIONAL AIRPORT**  
ADDISON, TEXAS

*Adrian*

**ADDISON FUEL FARM**  
FACILITY CONCEPT

DESIGNER: S.G.L. S.A.M.  
CADD TECH: S.A.M.

PROJ. LEAD: \_\_\_\_\_  
CHECKED: \_\_\_\_\_  
APPROVED: \_\_\_\_\_

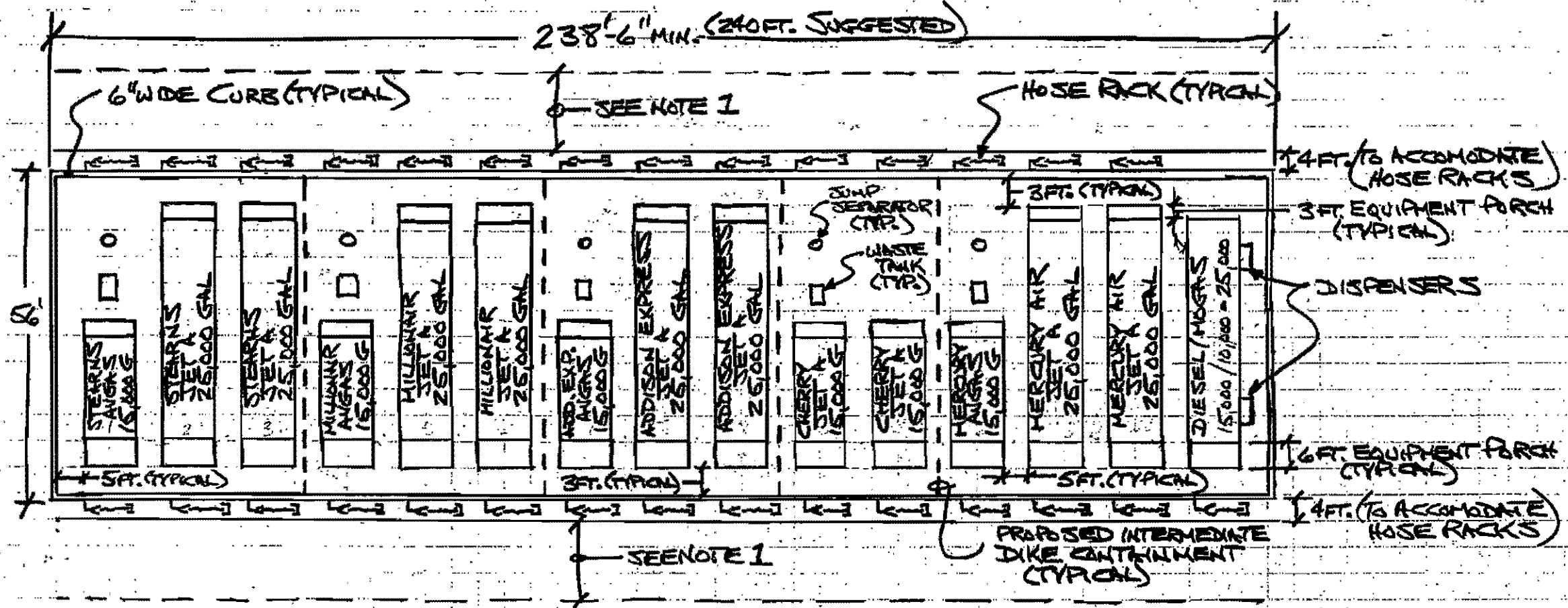
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ATTACHMENT # 3

ADDISON AIRPORT FUEL SYSTEM

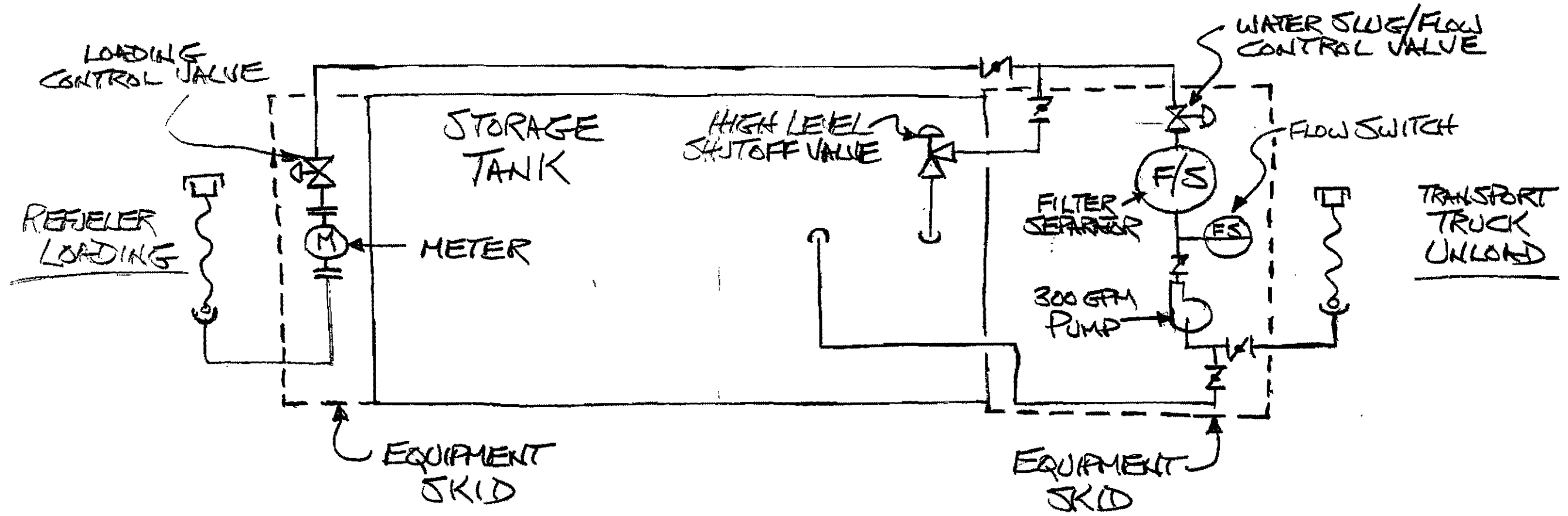
4/27/04

JOHN BASHALL  
BURNS & MCDONNELL



1. RECOMMEND PARKING POSITION ROADWAY BE 15 FT. WIDTH. THIS GIVES ADEQUATE CLEARANCE FOR HOSE HOOK-UP AND SPACE BETWEEN TRUCKS AND FIXED HOSE LOCATIONS.
2. ALL TANKS ARE 10 FT-6 IN (126") DIAMETER. 25,000 GAL TANKS ARE 43 FT. LONG + 6 FT. PORCH + 3 FT. PORCH = 49 FT. OVERALL LENGTH. 15,000 GAL TANKS ARE 26 FT. LONG + 6 FT. PORCH + 3 FT. PORCH = 35 FT. OVERALL LENGTH.
3. MINIMUM SLAB DIMENSIONS ARE 56 FT. X 238'-6" (RECOMMEND 240 FT.). WITH 4 FT. WIDE HOSE RACK CURBS EACH SIDE, RESULTANT WIDTH IS 56 FT.

# TYPICAL TANK/EQUIPMENT ARRANGEMENT



Attachment #6

Trip/Meeting Notes  
April 13, 2004

10:00AM Meeting

Attendees: City of Addison, Washington Group, & Burns & McDonnell  
List attached

Items Discussed:

Type of Tank.

- a. Explained single wall steel vs 2 hr rated double wall steel vs Ballistic Protected 2 Hr rated double wall steel.
- b. Recommend 2 hr rated double wall steel for this application.
- c. City says fire department wants ballistic protected.

Discussed merits & limitations of canopy.

Discussed quantity of storage for each entity.

Discussed need for containment and interim dikeage.

10:45AM Meeting

Attendees: Same except added Deputy Fire Chief.

Gordon Robbins, Deputy Fire Chief indicated that UL 2085 "Fireguard" tanks would be required for this facility due to the proximity of the public. He referenced IFC 2003, Chapter 22, Motor Fuel-dispensing Facilities and Repair Garages as requiring protected tanks. Applicability of Chapter 22 to this Aviation Bulk Fuel Storage and Dispensing Facility was questioned.

The fire department does not like the idea of a canopy over the fuel tanks. They feel the canopy could collapse during a fire event and prevent them from adequately fighting a fire.

11:45 AM Fire Department Visit

Attendees: Washington Group & Burns & McDonnell

Attendees viewed the equipment available for fighting a fire at the new fuel facility. The fire department has a capable P-3 type foam unit found at large aviation facilities. The high foam nozzle is approximately 12ft above grade. The low foam nozzle is about 5ft above grade.

The group met with the fire department staff that would actually be tasked with the fire fighting effort. They reiterated the desire not to have a canopy; quoting concerns for safety and potential collapse during a fire event.



Attachment #6

2:00 PM Meeting with FBO's

Attendees: City, Washington Group, Burns & McDonnell, FBO's, and Bassco  
List attached.

Items discussed:

Tank sizes and quantities were reviewed with the FBOs. Mercury Air, Addison Express, Million Air and World Wide Jet each request 2-25,000 gallon Jet A tanks and 1-15,000 gallon LL Avgas tank. Cherry Air requests 2-15,000 gallon Jet A tanks. Consensus was reached regarding an additional tank for diesel and mogas -- a 25,000 gallon two-compartment tank with 15,000 gallons diesel storage and 10,000 gallons mogas storage.

The planned fueling system equipment design arrangement was discussed by John Bagnall, Burns & McDonnell, with the FBOs. Highlights are as follows:

Each tank will have stand-alone fill and issue systems. Tanks and associated equipment will be manufactured as a package unit with equipment and piping mounted on skids or "porches" attached to the tank structure. This includes pumps, valves, filtration, meters, associated instrumentation and piping. Each tank will have its own fill and issue hose at the unload/load locations respectively. Minimal field pipe installation will be required.

Self-priming centrifugal pumps will be used, Gorman-Rupp RotoPrime or approved equal.

A Veeder-Root tank gauging system will be used and will also provide leak detection monitoring of the double-wall tank interstitial space.

Loading meters will be positive displacement double case type, such as manufactured by Liquid Controls (LC), Brodie or Smith. Dual pulse transmitters will be installed to provide remote data transmission to both the Airport staff and the individual FBOs. Temperature compensation will be provided.

Overfill protection, such as a Scully system was discussed. Current FBO procedure is to visually monitor filling from the refueler tank top manway. The FBOs indicated a desire to maintain this mode of operation.

Driver identification was discussed and the consensus is to utilize magnetic card readers.

## Attachment #6

Also need to have one card reader for each operator to authorize pump start. This requires a reader on the unload side and another on the load side.

Sump separators will be utilized for daily tank and filter sumpings. A 100 or 200 gallon waste tank will be provided for each FBO. Size to be determined following research of cost differences between these two capacities.

The FBOs request to have unloading meters. These meters will be similar to the loading meters to be provided.

Transport unloading operations were discussed and the fact that only two, possibly three trucks could unload at any one time was presented. No exceptions to this were taken.

Valving is to be manual operated where possible. Operator will position valves for either receipt or dispensing of fuel.

One electrical enclosure is planned to be provided for the fuel system controls PLC (programmable logic controller), Veeder-Root tank gauge panel and required electrical switchgear.

EFSO (Emergency Fuel Shut Off) stations will be provided at the four corners of the storage/dispensing area. Activation of any EFSO switch will shutdown all the pumps, close any automated valves and send a remote alarm to the Fire Department and Airport Staff Office.

Tank bottoms will be sloped to one end for drainage either by manufacture of sloping tank support saddles or by sloping the concrete pad.

Telephone will be required at the site for communication and controls.

We are to specify the desired equipment by manufacturer and include an "or approved equal" clause.

Handouts provided:

- Typical Tank/Equipment Arrangement
- Gorman-Rupp – Self Priming Centrifugal Pump
- Veeder-Root – Magnetostrictive Probes
- Veeder-Root – Interstitial Sensor
- Gammon – Sump Separator



Client \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

Project \_\_\_\_\_ Date 4/13/04 Made By \_\_\_\_\_

**ADDISON AIRPORT FUEL** Checked By \_\_\_\_\_

**SYSTEM MEETING** Preliminary \_\_\_\_\_ Final \_\_\_\_\_

122199 Form GCO-28

NAME	REPRESENTING	PHONE #
John BIGNALL	BURNS & McDONNELL	816-822-3524
Mel Schurt	Burns & McDonnell	816-822-3058
SAUL LUNDGREN	WGI	303-843-3596
Miguel Otero-Simenez	W.G.I.-Dallas	972 385 1635 x205
BRUCE HIPP	WGI - DALLAS	972 385 1635 x208
Luis ELIZABAL	Addison Airport	972 392 4850
Bill Dyer	Addison Airport	972 392 4856
Daryl Neuzgi	Addison Airport	972-392-4851
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Jim Pierce	Town of Addison	972-450-2879
LISA Pyles	RDS	972 392-4855
Gordon Robbins	Town of Addison	972-450-7220



Client \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_  
Project \_\_\_\_\_ Date 4/13/04 Made By \_\_\_\_\_  
ADDISON AIRPORT FBO Checked By \_\_\_\_\_  
FUEL SYSTEM MEETING Preliminary \_\_\_\_\_ Final \_\_\_\_\_

122199 Form GCO-28

<u>NAME</u>	<u>REPRESENTING</u>	<u>PHONE #</u>
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**Addison Airport**  
**New Bulk Fuel Storage and Dispensing System**

PRELIMINARY CODE ANALYSIS

Draft Issue A

April 28, 2004

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**SUMMARY**

Based on the International Fire Code (IFC) Chapter 22 definitions for automotive and fleet vehicle fuel-dispensing facilities it is determined that Chapter 22 does apply to this facility. If the diesel fuel and gasoline were removed from this installation then this chapter would not apply since "fueling" is not taking place. Fueling is defined as dispensing into the fuel tanks of motor vehicles. Tanks used to deliver aircraft fuels are not fuel tanks. IFC Chapter 22 – Motor Fuel-Dispensing Facilities, Sections 2201 through 2206 are applicable to this project. In addition, portions of IFC Chapters 11 - Aviation Facilities, 27 - Hazardous Materials, and 34 – Flammable and Combustible Liquids are applicable.

The International Building Code (IBC) Chapter 4, Section 406, §406.5.2 Canopies, indicates that a canopy may be provided and it must be either non-combustible or have a 1-hour fire rating. IBC Section 414.6 for outdoor storage indicates that storage of hazardous materials shall comply with the IFC.

Fire detection or suppression is not required by either the IFC or IBC for this installation. However there are extensive requirements within the IFC that pertain to this installation that have not been reviewed in any detail due to limited available time.

The opportunity for cost savings by eliminating non-required fire protection features or the identification of the minimal set of fire protection requirements would be beneficial to the project.

Cursory review of the IBC and IFC indicate that 2-hour fire rated storage tanks are not required and may be an area of cost savings. Spill control is required for the loading, storage, and unloading areas so double wall tanks do not provide a benefit by eliminating containment. The sizing of the containment planned has not been verified but does not appear to be adequate.

The citations included in the referenced eMail message (see Scope) are all determined to be valid.

**Scope**

Review Email from Mel Sehrt which identifies several IBC and IFC code sections that pertain to the project. Comment on applicability of those comments.

**Design Guidance Documents:**

**Building Code**

International Building Code, 2003 Edition

**Fire Code:**

International Fire Code, 2003 Edition

**National Fire Protection Association (NFPA) Codes and Standards**

NFPA 30 Flammable and Combustible Liquids Code, 2000 edition.

NFPA 407 Standard for Aircraft Fuel Servicing, 2001 Edition



**Facilities**

Facilities Description – based on preliminary sketch (SK-303B2, Rev P5)

**Canopy**

Noncombustible canopy provided over the storage tanks and Airport Refueler Side of tank storage area.

**Jet A Fuel Storage:**

Quantity – 6

Capacity (each) – 25,000 gallons (Approximate Dimensions: 10 ft. diameter, 43 ft. long)

Typical Flash Point: 100 °F (Class II)

Each tank is provided from the manufacturer with a 2-hour fire protection rating and is double walled.

Quantity – 2

Capacity (each) – 15,000 gallons

Each tank is provided from the manufacturer with a 2-hour fire protection rating and is double walled.

**AvGas (Low Lead):**

Quantity – 3

Capacity (each) – 15,000 gallons

Typical Flash Point: (-) 50 °F (Class I)

Each tank is provided from the manufacturer with a 2-hour fire protection rating and is double walled.

**Diesel Fuel:**

Quantity – 1

Capacity (each) – 15,000 gallons

Typical Flash Point: 125 °F (Class II)

Each tank is provided from the manufacturer with a 2-hour fire protection rating and is double walled.

**Gasoline (MoGas):**

Quantity – 1

Typical Flash Point: (-)36 °F (Class I)

Capacity (each) – 10,000 gallons

Each tank is provided from the manufacturer with a 2-hour fire protection rating and is double walled.

**IBC EXCERPTS**

**IBC §202; CANOPY.** An architectural projection that provides weather protection, identity or decoration and is supported by the building to which it is attached and at the outer end by not less than one stanchion. A canopy is comprised of a rigid structure over which a covering is attached.

**IBC §309.1; Mercantile Group M.** Mercantile Group M occupancy includes, among others, buildings and structures or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and accessible to the public. Mercantile occupancies shall include, but not be limited to, the following:

- ✓ Department stores
- ✓ Drug stores
- ✓ Markets
- ✓ Motor fuel-dispensing facilities
- ✓ Retail or wholesale stores
- ✓ Sales rooms

**Application Note:** Section 309.1 is included to document what occupancy classification a commercial motor-fuel dispensing facility is. It is important to note that this project is not "open to the public" nor does it display or sell merchandise. Since this is an outdoor storage and dispensing area it is not classified as an "occupancy".

**406.5 Motor fuel-dispensing facilities.**

**406.5.1 Construction.** Motor fuel-dispensing facilities shall be constructed in accordance with the *International Fire Code* and this section.

**SECTION 406 - MOTOR-VEHICLE-RELATED OCCUPANCIES**

**406.5.2 Canopies.** Canopies under which fuels are dispensed shall have a clear, unobstructed height of not less than 13 feet 6 inches (4115 mm) to the lowest projecting element in the vehicle drive-through area. Canopies and their supports over pumps shall be of noncombustible materials, fire-retardant-treated wood complying with Chapter 23, wood of Type IV sizes or of construction providing 1-hour fire resistance. Combustible materials used in or on a canopy shall comply with one of the following:

1. Shielded from the pumps by a noncombustible element of the canopy, or wood of Type IV sizes;
2. Plastics covered by aluminum facing having a minimum thickness of 0.010 inch (0.30 mm) or corrosion-resistant steel having a minimum base metal thickness of 0.016 inch (0.41 mm). The plastic shall have a flame spread index of 25 or less and a smoke-developed index of 450 or less when tested in the form intended for use in accordance with ASTM E 84 and a self-ignition temperature of 650°F (343°C) or greater when tested in accordance with ASTM D 1929; or
3. Panels constructed of light-transmitting plastic materials shall be permitted to be installed in canopies erected over motor vehicle fuel-dispensing station fuel dispensers, provided the panels are located at least 10 feet (3048 mm) from any building on the same property and face yards or streets not less than 40 feet (12 192 mm) in width on the other sides. The aggregate areas of plastics shall not exceed 1,000 square feet (93 m<sup>2</sup>). The maximum area of any individual panel shall not exceed 100 square feet (9.3m<sup>2</sup>).

**[F] SECTION 414 - HAZARDOUS MATERIALS**

**414.1 General.** The provisions of this section shall apply to buildings and structures occupied for the manufacturing, processing, dispensing, use or storage of hazardous materials.

**414.6 Outdoor storage, dispensing and use.** The outdoor storage, dispensing and use of hazardous materials shall be in accordance with the *International Fire Code*.

**IFC EXCERPTS****IFC SECTION 1101 - GENERAL**

**1101.1 Scope.** Airports, heliports, helistops and aircraft hangars shall be in accordance with this chapter.

**IFC SECTION 1103 - GENERAL PRECAUTIONS**

**1103.5 Dispensing of flammable and combustible liquids.** The dispensing, transferring and storage of flammable and combustible liquids shall be in accordance with this chapter and Chapter 34. Aircraft motor vehicle fuel-dispensing stations shall be in accordance with Chapter 22.

**1106.2 Airport fuel systems.** Airport fuel systems shall be designed and constructed in accordance with NFPA 407.

**IFC SECTION 2202 - DEFINITIONS**

**2202.1 Definitions.** The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

**AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY.**

That portion of property where flammable or combustible liquids or gases used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles.

**FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY.**

That portion of a commercial, industrial, governmental or manufacturing property where liquids used as fuels are stored and dispensed into the fuel tanks of motor vehicles that are used in connection with such businesses, by persons within the employ of such businesses.

**IFC SECTION 2701 - GENERAL**

**2701.1 Scope.** Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter.

This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that when specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

**2704.2.2.4 Outdoor design.** Secondary containment for outdoor storage areas shall be designed to contain a spill from the largest individual vessel. If the area is open to rainfall, secondary containment shall be designed to include the volume of a 24-hour rainfall as determined by a 25-year storm and provisions shall be made to drain accumulations of ground water and rainwater.

**2705.3 Outdoor dispensing and use.** Dispensing and use of hazardous materials outdoors shall be in accordance with Sections 2705.3.1 through 2705.3.9.

**2705.3.3 Location.** Outdoor dispensing and use areas for hazardous materials shall be located as required for outdoor storage in accordance with Section 2704.

**2705.3.4 Spill control for hazardous material liquids in open systems.** Outdoor areas where hazardous material liquids are dispensed in vessels exceeding a 1.3-gallon (5 L) capacity or used in open systems exceeding a 5.3-gallon (20 L) capacity shall be provided with spill control in accordance with Section 2704.2.1.

**2705.3.9 Weather protection.** Where overhead noncombustible construction is provided for sheltering outdoor hazardous material use areas, such use shall not be considered indoor use when the area is constructed in accordance with the requirements for weather protection as required in the *International Building Code*.

**IFC CHAPTER 34 - FLAMMABLE AND COMBUSTIBLE LIQUIDS****SECTION 3401 - GENERAL**

**3401.1 Scope and application.** Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing, mixing and handling of flammable and combustible liquids shall be in accordance with Chapter 27 and this chapter.

**IFC SECTION 3402 - DEFINITIONS**

**3402.1 Definitions.** The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

**BULK PLANT OR TERMINAL.** That portion of a property where flammable or combustible liquids are received by tank vessel, pipelines, tank car or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, portable tank or container.

**BULK TRANSFER.** The loading or unloading of flammable or combustible liquids from or between tank vehicles, tank cars or storage tanks.

**3403.2 Fire protection.** Fire protection for the storage, use, dispensing, mixing, handling and on-site transportation of flammable and combustible liquids shall be in accordance with this chapter and applicable sections of Chapter 9.

**3403.2.1 Portable fire extinguishers and hose lines.** Portable fire extinguishers shall be provided in accordance with Section 906. Hose lines shall be provided in accordance with Section 905.

**3404.2.7 Design, construction and general installation requirements for tanks.** The design, fabrication and construction of tanks shall comply with NFPA 30. Each tank shall bear a permanent nameplate or marking indicating the standard used as the basis of design.

**3404.2.9 Above-ground tanks.** Above-ground storage of flammable and combustible liquids in tanks shall comply with Section 3404.2 and Sections 3404.2.9.1 through 3404.2.9.6.10.

**3404.2.9.1 Fire protection.** Fire protection for above-ground tanks shall comply with Sections 3404.2.9.1.1 through 3404.2.9.1.4.

**3404.2.9.1.1 Required foam fire protection systems.** When required by the fire code official, foam fire protection shall be provided for above-ground tanks, other than pressure tanks operating at or above 1 pound per square inch gauge (psig) (6.89 kPa) when such tank, or group of tanks spaced less than 50 feet (15240 mm) apart measured shell to shell, has a liquid surface area in excess of 1,500 square feet (139 m<sup>2</sup>), and is in accordance with one of the following:

1. Used for the storage of Class I or II liquids.
2. Used for the storage of crude oil.
3. Used for in-process products and is located within 100 feet (30480 mm) of a fired still, heater, related fractioning or processing apparatus or similar device at a processing plant or petroleum refinery as herein defined.
4. Considered by the fire code official as posing an unusual exposure hazard because of topographical conditions; nature of occupancy, proximity on the same or adjoining property, and height and character of liquids to be stored; degree of private fire protection to be provided; and facilities of the fire department to cope with flammable liquid fires.

**3404.2.9.1.2 Foam fire protection system installation.**

Where foam fire protection is required, it shall be installed in accordance with NFPA 11 and NFPA 11A.

**NFPA EXCERPTS**

**NFPA 30 - Flammable and Combustible Liquids Code, 2003 Edition**

**NFPA 30; §7.12 Management of Fire Hazards.**

**7.12.3** The extent of fire prevention and control that is provided shall be determined by means of an engineering evaluation of the operation and application of sound fire protection and process engineering principles. This evaluation shall include, but not be limited to, the following:

- (1) Analysis of the fire and explosion hazards of the operation
- (2) Analysis of emergency relief from process vessels, taking into consideration the properties of the materials used and the fire protection and control measures taken
- (3) Analysis of applicable facility design requirements in Section 7.3 through Section 7.7
- (4) Analysis of applicable requirements for liquid handling, transfer, and use, as covered in Section 7.3 through Section 7.7
- (5) Analysis of local conditions, such as exposure to and from adjacent properties and exposure to floods, earthquakes, and windstorms
- (6) Analysis of the emergency response capabilities of the local emergency services

**NFPA 30; §7.13 Fire Protection and Fire Suppression.****7.13.1 General.**

**7.13.1.1** Section 7.13 shall cover the commonly recognized management control systems and methods used to prevent or minimize the loss from fire or explosion in liquid-processing facilities.

**7.13.1.2** The authority having jurisdiction shall be consulted on specific cases or qualified engineering judgment shall be exercised.

**7.13.2 Portable Fire Control Equipment.**

**7.13.2.1** Listed portable fire extinguishers shall be provided for facilities in such quantities, sizes, and types as could be needed for the special hazards of operation and storage.

**7.13.2.2** When the need is indicated in accordance with 7.12.3, standpipe and hose systems, installed in accordance with NFPA 14, Standard for the Installation of Standpipe and Hose Systems, or hose connections from sprinkler systems using combination spray and straight stream nozzles, installed in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, shall be used.

**7.13.2.3** When the need is indicated in accordance with 7.12.3, mobile foam apparatus shall be provided.

**7.13.2.4** Automotive and trailer-mounted fire apparatus, where determined necessary, shall not be used for any purpose other than fire fighting.

**7.13.3 Fixed Fire Control Equipment.**

**7.13.3.1** A reliable water supply or other suitable fire control agent shall be available in pressure and quantity to meet the fire demands indicated by the special hazards of operation, storage, or exposure.

**7.13.3.2** Permanent connections between the fire water system and any process system shall be prohibited to prevent contamination of fire water with process fluids.

**7.13.3.3** Hydrants, with or without fixed monitor nozzles, shall be provided in accordance with accepted practice. The number and placement shall depend on the hazard of the liquid-processing facility.

**7.13.3.4** Where the need is indicated by the hazards of liquid processing, storage, or exposure as determined by 7.12.3, fixed protection shall be provided by means of approved sprinkler systems, water spray systems, deluge systems, fire-resistive materials, or a combination of these.

**NFPA 407 Standard for Aircraft Fuel Servicing, 2001 Edition****NFPA 407; §1.1 Scope.**

This standard applies to the fuel servicing of all types of aircraft using liquid petroleum fuel.

**NFPA 407; §2.1 General.**

The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

**NFPA 407; §2.1.1 NFPA Publications.**

NFPA 30, Flammable and Combustible Liquids Code, 2000 edition.

**NFPA 407; §4.3.19 Loading.**

**4.3.19.1** No cargo tank or compartment shall be loaded to the point where it is liquid full. The ullage expansion space shall not be less than 1 percent of the volume of the tank compartment. Where local climatic conditions warrant, the ullage expansion space shall be increased to prevent leakage or overflow from expansion of the contents due to a rise in atmospheric temperature or direct exposure to the sun.

**4.3.19.2** A heat-actuated shutoff valve shall be provided in the piping immediately upstream of the loading hose or swing arm connection.

**NFPA 407; §4.3.20 Top Loading.**

**4.3.20.1** Drop tubes used in top loading or overhead loading of tank vehicles shall be designed to minimize turbulence. Drop tubes shall be metallic.

**4.3.20.2** Fixed drop tubes permanently mounted in the vehicle tank shall extend to the bottom of the tank or to the inside of the sump to maintain submerged loading and avoid splashing of the fuel.

**4.3.20.3** Drop tubes attached to loading assemblies extending into the vehicle tank shall extend to the bottom of the tank and shall be maintained in that position until the tank is loaded to provide submerged loading and to avoid splashing or free fall of fuel through the tank atmosphere.

4.3.20.4 Loading arms shall be counterbalanced properly.

4.3.20.5 A deadman control shall be provided and located so that the operator can observe the liquid level in the tank as it fills.

#### 4.4.4 Fuel Storage Tanks.

4.4.4.1 Fuel storage tanks shall conform to the applicable requirements of NFPA 30, Flammable and Combustible Liquids Code.

4.4.4.2 The authority having jurisdiction shall determine the clearances required from runways, taxiways, and other aircraft movement and servicing areas to any aboveground fuel storage structure or fuel transfer equipment with due recognition given to national and international standards establishing clearances from obstructions. Tanks located in designated aircraft movement areas or aircraft servicing areas shall be underground or mounded over with earth. Vents from such tanks shall be constructed in a manner to preclude collision hazards with operating aircraft. Aircraft operators shall be consulted regarding the height and location of such vents to avoid venting flammable vapors in the vicinity of ignition sources, including operating aircraft and automotive equipment permitted in the area.

#### 4.4.5 Emergency Fuel Shutoff Systems.

4.4.5.1 Each fuel system, as required by 4.4.3.3, shall have means for quickly and completely shutting off the flow of fuel in an emergency. This requirement shall be in addition to the requirement in 4.1.7 for deadman control of fuel flow.

4.4.5.2 The method of fuel transfer (gravity, pumping, or use of hydraulic or inert gas pressure) shall be considered in the design of the emergency fuel shutoff system and the location of the emergency fuel shutoff valve.

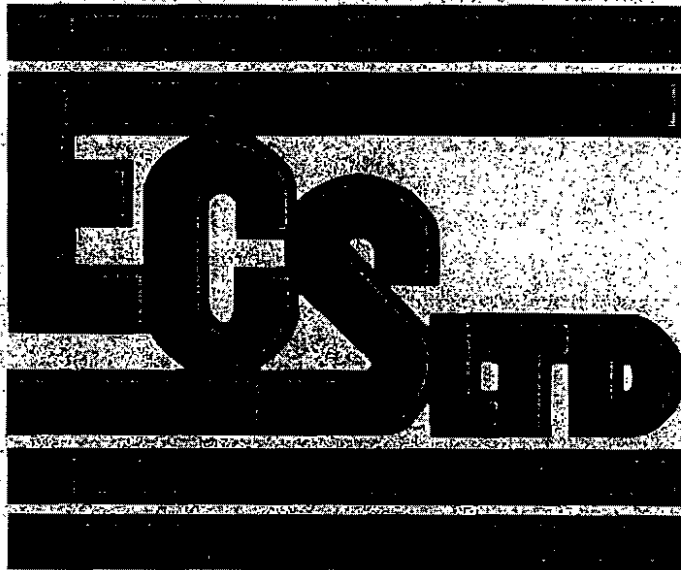
4.4.5.3 The emergency fuel shutoff system shall include shutoff stations located outside of probable spill areas and near the route that normally is used to leave the spill area or to reach the fire extinguishers provided for the protection of the area.

4.4.5.4 At least one emergency shutoff control station shall be conveniently accessible to each fueling position.

4.4.5.5 The emergency fuel shutoff system shall be designed so that operation of a station shuts off fuel flow to all hydrants that have a common exposure.

4.4.5.6 Emergency fuel shutoff systems shall be designed so that they shut off the flow of fuel if the operating power fails.

4.4.5.7 Each emergency fuel shutoff station shall be placarded EMERGENCY FUEL SHUTOFF in letters at least 50 mm (2 in.) high. The method of operation shall be indicated by an arrow or by the word PUSH or PULL, as appropriate. Any action necessary to gain access to the shutoff device (e.g., BREAK GLASS) shall be shown clearly. Lettering shall be of a color contrasting sharply with the placard background for visibility. Placards shall be weather resistant, shall be located at least 2.1 m (7 ft) above grade, and shall be positioned so that they can be seen readily from a distance of at least 7.6 m (25 ft). Valves used to shut off a hydrant for maintenance purposes shall not have placards that could create confusion in an emergency.



**REPORT OF  
SUBSURFACE EXPLORATION SERVICES**

**BULK FUEL STORAGE FACILITY  
ADDISON, TEXAS**

**FOR**

**WASHINGTON GROUP INTERNATIONAL, INC.**

**APRIL 13, 2004**

*ATTACHMENT 8*



**ENGINEERING CONSULTING SERVICES, LTD.**  
Geotechnical • Construction Materials • Environmental

April 13, 2004

Mr. Samuel Lundgren, P.E.  
Washington Group International  
7800 East Union Avenue, Suite 100  
Denver, Colorado 80237

ECS Job No. 19-3846

Reference: Report of Subsurface Exploration and Engineering Services  
Bulk Fuel Storage Facility  
SWC of Addison Road and George Haddaway Street  
Addison, Texas

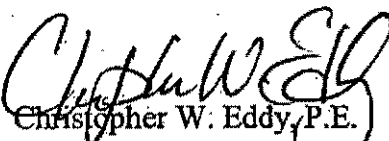
Dear Mr. Lundgren:

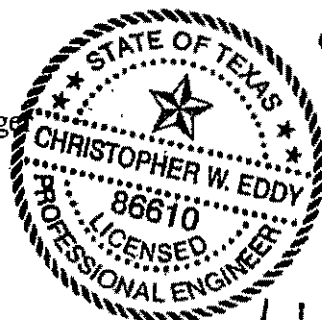
Engineering Consulting Services, Ltd. has completed the subsurface exploration for the proposed bulk fuel storage facility to be located at the referenced site in Addison, Texas. The enclosed report describes the subsurface exploration procedures and laboratory testing, and provides geotechnical recommendations for development of the site. A Boring Location Diagram is included in the Appendix of this report along with the Boring Logs performed for the exploration.

We appreciate this opportunity to be of service to you during the design phase of this project. If you have any questions with regard to the information and recommendations presented in this report, or if we can be of further assistance to you in any way during the planning or construction of this project, please do not hesitate to contact us.

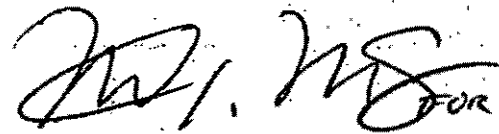
Respectfully,

**ENGINEERING CONSULTING SERVICES, LTD.**

  
Christopher W. Eddy, P.E.  
Geotechnical Department Manager



4/13/4

  
Daniel L. Franklin, Jr., P.E.  
Vice President/Principal Engineer



REPORT

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PROJECT

Subsurface Exploration and Engineering Services  
Bulk Fuel Storage Facility  
SWC of Addison Road and George Haddaway Street  
Addison, Texas

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CLIENT

Washington Group International  
7800 East Union Avenue, Suite 100  
Denver, Colorado 80237

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SUBMITTED BY

Engineering Consulting Services, Ltd.  
4950 Keller Springs Road  
Suite 480  
Addison, Texas 75001

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PROJECT

#19-3846

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DATE

April 13, 2004

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## PROJECT OVERVIEW

### Introduction

This report presents the results of our subsurface exploration and engineering recommendations for the proposed bulk fuel storage to be located at the southwest corner of Addison Road and George Haddaway Street in Addison, Texas. The Boring Location Diagram included in the Appendix of this report shows the approximate location of this project.

### Scope of Work

The conclusions and recommendations contained in this report are based on two soil borings drilled within the proposed location of the fuel storage facility, a bulk soil sample obtained from the site, and associated laboratory testing of selected soil samples obtained from the borings and the bulk soil sample. The borings were drilled to depths of about 20 to 25 feet within the planned location of the fuel storage facility. The results of the soil borings, along with a Boring Location Diagram, are included in the Appendix of this report.

This report presents our recommendations for geotechnical parameters for foundation design for the project. In addition, the report provides construction considerations based upon the results of the soil borings, laboratory tests, and our previous experience.

### Proposed Construction

According to the information provided, the project consists of constructing a bulk fuel storage facility at Addison Airport in Addison, Texas. We understand the fuel storage facility will consist of fourteen fuel tanks (approximately 25,000 gallons) and paved drive lanes.

### Purposes of Exploration

The purposes of this exploration were to explore the soil and groundwater conditions at the site and to develop engineering recommendations to guide design and construction of the project. We accomplished these purposes by:

1. Drilling two borings in the vicinity of the proposed fuel storage facility to depths of about 20 to 25 feet to explore the subsurface soil and groundwater conditions.
2. Performing laboratory tests on selected representative soil samples from the borings and a bulk soil sample to evaluate pertinent engineering properties.

3. Analyzing the field and laboratory data to develop appropriate engineering recommendations.

## EXPLORATION PROCEDURES

### Subsurface Exploration Procedures

The soil borings were located in the field by a representative of ECS, Ltd. based on a site plan provided by Washington Group International, Inc. The boring locations were selected to explore the proposed project area. The soil borings were performed with a truck-mounted rotary-type auger drill rig that utilized continuous-flight augers to advance the boreholes.

Representative samples were obtained using thin-walled tube sampling procedures in general accordance with ASTM Specifications D-1587. In the thin-walled tube sampling procedure, a thin-walled seamless steel tube with a sharp cutting edge is pushed hydraulically into the ground to obtain relatively undisturbed samples of cohesive or moderately cohesive soils. These samples were sealed and returned to the laboratory for testing and classification.

A Texas cone penetrometer test was performed to evaluate the load carrying capacity of the shale encountered. The test was performed in general accordance with test method Tex-132-E in the Texas Department of Transportation (TxDOT) Manual of Testing Procedures. The results of the test are shown on the attached boring log at the depth of occurrence.

A field log of the soils encountered in the boring was maintained by the drill crew. After recovery, each soil sample was removed from the sampler and visually classified. Representative portions of each soil sample were then wrapped in foil and plastic and transported to our laboratory for further visual examination and laboratory testing. After completion of the drilling operations, the borehole was backfilled with auger cuttings to the existing ground surface.

As previously mentioned, a bulk soil sample was obtained at the site. The bulk soil sample was taken from the grassy area to the east of the existing parking lot for CBR testing and lime series testing.

### Laboratory Testing Program

Representative soil samples were selected and tested in our laboratory. The soil samples were tested for moisture content, unconfined compressive strength, Atterberg limits and swell potential. A calibrated hand penetrometer was used to estimate the unconfined compressive strength of several of the soil samples. The calibrated hand penetrometer has been correlated with unconfined compression tests and provides a better estimate of the soil consistency than visual observation alone. These test results are provided on the attached boring log and Swell Test Results sheet in the Appendix.

A lime series test and CBR test were also performed on a bulk soil sample obtained from the project site. The results of these tests are also provided in the Appendix.

An experienced geotechnical engineer classified each soil sample on the basis of texture and plasticity in general accordance with the Unified Soil Classification System. The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring log. A brief explanation of the Unified System is included with this report. The geotechnical engineer grouped the various soil types into the major zones noted on the boring log. The stratification lines designating the interfaces between earth materials on the boring log and profiles are approximate; in situ, the transitions may be gradual.

The soil samples will be retained in our laboratory for a period of 60 days, after which, they will be discarded unless other instructions are received as to their disposition.

## EXPLORATION RESULTS

### Site Conditions

The proposed bulk fuel storage facility will be located at Addison Airport along the west side of Addison Road, south of George Haddaway Street in Addison, Texas. At the time of this investigation, the site was relatively flat and covered with asphalt pavement.

### Subsurface Conditions

The soil conditions encountered at the boring location can be summarized as follows. Approximately 10 inches of asphaltic concrete pavement was present at the ground surface. Tan-brown clayey sandy gravel fill was present beneath the pavement, and extended to the top of native dark brown clay. The clay soil became tan in color with increasing depth in boring B-1. The clay soil extended to the top of tan limestone that was encountered at depth of about 4 feet in the borings. Gray limestone was encountered at depths of about 22 feet and 14 feet in borings B-1 and B-2, respectively, and extended to the termination of these borings at depths of about 25 to 20 feet.

The clay soils encountered in the borings are highly plastic and considered active. Active soils are subject to volume changes with fluctuations in their moisture content. The active clay soils can swell with moisture increases and shrink when they dry. The volume changes can subject foundation (footings, shafts, slabs, etc.) to significant soil pressures and movements with the typical moisture changes that occur beneath a structure after construction.

Moisture fluctuations in the active clays can occur due to several factors that include, but are not limited to, poor drainage, vegetation, seasonal wetting and drying, and trapping of moisture beneath

the floor slab. Subsurface moisture tends to accumulate in the soils directly beneath the slab after construction. The slab traps moisture that normally migrates up through the soil profile and would otherwise evaporate from an exposed ground surface.

### Groundwater Observations

The boring was monitored while drilling and after the completion of drilling for the presence and level of groundwater. Groundwater seepage was not observed while advancing, or at the completion of drilling the borings. Although seepage was not observed in the borings, groundwater seepage can be present in and above the tan limestone, particularly during or following wet periods of the year. Fluctuations of the groundwater level can occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the boring was drilled. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

## ANALYSIS AND RECOMMENDATIONS

The following recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions. If there are any changes to the project characteristics or if different subsurface conditions are encountered during construction, ECS, Ltd. should be consulted so that the recommendations of this report can be reviewed.

### Earthwork Operations

In preparing the site for construction, all loose, poorly compacted existing soils, vegetation, organic soil, pavements or other unsuitable materials should be removed from all proposed construction areas, and any areas receiving new fill. After stripping the site and prior to placing any fill, we recommend proofrolling the area with heavy construction equipment such as a fully loaded scraper or tandem axle dump truck with a minimum axle load of 10 tons. The purpose of the proofrolling is to attempt to locate any soft or compressible soils prior to placing new fill. Unsuitable materials located during proofrolling should be removed to firm ground and replaced with properly compacted fill as described in the following paragraph.

Prior to placement of any new fill, the subgrade should be scarified to a minimum depth of 6 inches, moisture conditioned and compacted to at least 95% of maximum standard Proctor dry density (ASTM D-698). Clay soils should be moisture conditioned to a workable moisture content above optimum value. Soil moisture levels should be preserved (by various methods that can include covering with plastic, watering, etc.) until new fill, pavements or slabs are placed.

Placement and compaction of new fill will depend on soil type and its intended purpose. Clay fills used in the building area and pavement areas should be placed in 9 inch loose lifts and

compacted to at least 95% of maximum standard Proctor dry density (ASTM D-698) at a workable moisture content above optimum value. Fills placed in general landscape areas should be compacted to at least 90% of maximum standard Proctor dry density (ASTM D-698) at a workable moisture content near optimum value. Imported fills for general site grading should be similar to on-site soils, or preferably have a liquid limit less than 50.

Upon completion of the filling operation, care should be taken to maintain the subgrade moisture content prior to construction of slabs and pavements. If the subgrade becomes desiccated, the affected material should be removed and replaced or these materials should be scarified, moisture conditioned and recompacted.

### Foundation Recommendations

The active clay soils encountered at this site can subject shallow foundation systems to differential movements due to moisture-induced volume changes in these soils. Moisture changes in the soil can be the result of seasonal wet/dry periods, vegetation changes, plumbing leaks, etc. We anticipate the risk of active clay soil movements to be minimal due to the presence of concrete pavement around the proposed fuel storage facility and the lack of vegetation. Consideration can be given to supporting the proposed project on a shallow footing foundation system bearing in the tan limestone stratum, straight-sided drilled shafts bearing in the tan limestone, or a mat foundation. Geotechnical design parameters are provided below for each foundation type.

### Shallow Footing Foundations

The proposed construction can be supported on a shallow footing foundation system bearing in the tan limestone that was present at a depth of about 4 feet in the borings. We recommended a net allowable bearing pressure of 8,000 psf be used to proportion shallow foundations bearing at least 8 inches into the tan limestone. The net allowable soil bearing pressure refers to that pressure which may be transmitted to the foundation bearing soils in excess of the final minimum surrounding overburden pressure and includes a factor of safety of at least 3 for a bearing capacity failure. Properly designed and installed footings could be subject to potential settlements on the order of 1/2 inch.

We recommend that continuous footing foundations have a minimum width of 18 inches and that isolated footings have a minimum lateral dimension of 30 inches to reduce the possibility of foundation bearing failure and excessive settlement due to local shear or "punching" failures.

### Construction Considerations - Footings

Excavation of footings and placement of concrete and steel should proceed in a continuous manner, and exposed bearing materials should be protected from excessive wetting or drying before

concrete placement. Concrete in footing excavations should be placed directly against the sides of the cut, with no previous backfill adjacent to the footings below the surface of the rock. Any excessively soft or disturbed materials should be removed from the base of excavations prior to concrete placement. The tan limestone can deteriorate rapidly when exposed, and the base of footing excavations should be protected by a seal slab of footing strength concrete if left open more than 48 hours. We recommend that all footing excavations be observed by qualified geotechnical personnel to verify proper installation.

### Straight-Sided Drilled Shaft Foundation

Straight-sided drilled shafts should bear in the gray or tan limestone.

The shafts will develop their load carrying capacity through a combination of end bearing and skin friction in the limestone. We recommend using an allowable ending bearing pressure of 50,000 pounds per square foot (psf) for drilled shafts bearing at least 2 feet into the gray limestone. An allowable skin friction of 7,500 psf can be used for proportioning drilled shafts bearing in the gray limestone stratum.

Shafts bearing at least 3 feet into the tan limestone can be proportioned using an allowable bearing pressure of 10,000 psf and skin friction of 1,500 psf. The drilled shafts should penetrate any clay layers encountered and bear in competent tan limestone. Skin friction in the tan limestone should only be considered for that portion of the shaft extending below the recommended minimum 3-foot penetration into the tan limestone.

Properly installed and constructed drilled shafts bearing in the tan or gray limestone could be subject to potential settlements on the order of 1/2 inch or less.

Expansion of the near surface clays with moisture increases can subject the shafts to uplift forces. The magnitude of these forces is difficult to estimate and depends on several factors including the in-situ moisture levels at the time of construction and the availability of water. We estimate the magnitude of these forces to be approximately 2,000 psf to a depth of 4 feet, or to the top of tan limestone, if encountered at shallower depths.

Uplift forces must be resisted by the dead load on the shafts and uplift skin friction resistance in the limestone. We recommend using an allowable skin friction resistance of 5,000 psf in the gray limestone. An allowable skin friction resistance of 1,000 psf can be used in the tan limestone below the recommended minimum 3 foot penetration. The shafts should contain sufficient reinforcing steel continuously throughout the shaft depth to resist anticipated tensile forces.

### Construction Considerations - Drilled Shafts

The possibility of encountering groundwater seepage during shaft installation increases during wet periods of the year. Concrete and steel should be placed as soon as possible after shaft excavations



are complete to reduce the potential for seepage problems and deterioration of the bearing surface. During wet periods, seepage in and above the tan limestone could, in some cases, require the use of temporary casing to properly install the shafts. The casing should be seated in the limestone below any seepage. All water should be removed from the cased excavation before beginning the design rock penetration. A sufficient head of concrete must be maintained in the casing during withdrawal. Installation of individual shafts should be completed in one day.

The concrete placed for drilled shafts should have a slump between 5 and 7 inches and should be placed in a manner that prevents it from striking the reinforcing steel and sides of the excavation. We recommend that all drilled shafts be observed by qualified geotechnical personnel, to verify proper shaft installation.

### Mat Foundation

As previously indicated, the clay soils present at this site are considered active. The active clay soils can experience volume changes due to fluctuations in the soil moisture content. These potential volume changes should be taken into account when designing a mat foundation system to support the proposed tanks.

Based on test method TEX-124-E in the Texas Department of Transportation (TxDOT) Manual of Testing Procedures and our experience with similar soils, we estimate soil movements on the order of 1 to 2 inches could occur, depending on the thickness of the clay layer above the tan limestone. These movements are based on dry conditions that can occur prior to construction. The actual movements could be greater if poor drainage, ponded water and/or other unusual sources of moisture are allowed to saturate the soils beneath the structure after construction.

Consideration can be given to reworking the existing soils with proper moisture and density control to the top of tan limestone to reduce the potential active clay soil movements at this site. A minimum thickness of 1-foot of select fill material should be placed above the reworked soil zone to reduce the potential for moisture losses in these soils prior to placement of the mat foundation. Reworking the clay soils to the top of tan limestone (approximately 4 feet) and installation of 1-foot of select fill above the reworked soils should reduce active clay soil movements to less than 1 inch. As an alternative, consideration can be given to removing the active clay soils to the top of tan limestone and replacing these soils with a full depth section of select fill material.

Reworking of the existing clays is performed to increase the moisture of the clays to a level that reduces their ability to absorb additional water that could result in post-construction heave in these soils. The existing clays in the mat foundation area should be excavated to the top of tan limestone. The excavated clays can then be replaced to the base of the planned select fill layer in loose lifts less than 9 inches thick and compacted to between 92% and 97% of standard Proctor maximum dry density at a workable moisture content at least 3% above optimum value. Care should be taken to verify and preserve the specified moisture levels in the reworked clays prior to placement of select fill.

Select fill material (such as clayey sand or very sandy clay that is free of debris and organic matter) should have a liquid limit less than 35 and a plasticity index between 5 and 15. The non-expansive replacement soil should be placed in loose lifts of 9 inches or less and compacted to at least 95% of its standard Proctor dry density at a moisture content ranging from -2% to +3% of its optimum value. Before placing the select fill on a clay subgrade, the subgrade should be scarified to a depth of at least 6 inches, moisture conditioned to at least 3% above the optimum value (at a workable moisture level) and compacted to at least 95% of the maximum standard Proctor dry density.

After completing the filling operations, care should be taken to maintain the subgrade moisture content prior to constructing the foundation slab. If the subgrade becomes desiccated, the affected material should be scarified, moistened and recompactd prior to floor slab placement.

Mat foundations can be designed using a modulus of subgrade reaction of 50 pci.

### Pavement Subgrades

The surficial clays are subject to strength loss with the increases in moisture content that normally occur beneath paving. These soils are generally considered to provide poor subgrade support as indicated by the CBR test results included in the Appendix. The CBR values varied from about 1.4 to 5.9, depending on the soil moisture content.

Treatment of the clay soils with hydrated lime will improve their subgrade characteristics. Based on the result of the lime series tests, we recommend a minimum of 7% hydrated lime be used to modify the clay subgrade soils. The hydrated lime should meet the requirements of Item 264 (Type A) in the TxDOT Standard Specifications for Construction of Highways, Streets and Bridges, and should be thoroughly mixed and blended with the upper 6 inches of the clay subgrade (TxDOT Item 260). This mixture should be uniformly compacted to a minimum of 95% of its maximum Standard Proctor dry density (ASTM D-698) at a moisture content in the range of -2% to +3% of optimum moisture content as determined by that test. Lime treatment should extend at least 1 foot beyond exposed pavement edges to reduce the effects of shrinkage and associated loss of subgrade support.

If lime treatment of the pavement subgrade is not performed, we recommend the pavement subgrades be scarified to a depth of 6 inches, moisture conditioned to above optimum value and compacted to at least 95% of maximum standard proctor dry density.

### Utility/Trench Excavations

All trenches should comply with OSHA and state law requirements for trench safety. It is important that a qualified and experienced contractor be retained to perform the excavation and shoring work. Continuous observations by qualified personnel should be made during excavation, shoring and backfilling operations.

Care should be taken when excavating near and below any existing utility trenches because backfill materials associated with these lines could be loose and/or contain water seepage. Careful observation of these existing trenches is recommended to determine if adjustments in side slopes or shoring is required.

Although groundwater seepage was not encountered in the borings, the possibility of encountering seepage increases during wet periods of the year. Dewatering the area of the planned excavations may be necessary to maintain a safe trench excavation during construction.

### Drainage

Positive drainage should be developed around the facility to minimize any increase in moisture content of the clay soils underlying structures and on-grade slabs/pavements. All adjacent flatwork should be sloped to prevent ponding of water. Water should not be allowed to pond near or adjacent to the structures. Joints between the paving and the structure should be sealed, periodically inspected and resealed to prevent the infiltration of surface water.

### Closing

We recommend that the construction activities be monitored by ECS, Ltd. to provide the necessary overview and to check the suitability of the subgrade soils for supporting the foundations and pavements. We would be most pleased to provide these services.

This report has been prepared in order to aid in the evaluation of this property and to assist the architect and/or engineer in the design of this project. The scope is limited to the specific project and locations described herein and our description of the project represents our understanding of the significant aspects relative to soil and foundation characteristics. In the event that any change in the nature or location of the proposed construction outlined in this report are planned, we should be informed so that the changes can be reviewed and the conclusions of this report modified or approved in writing by the geotechnical engineer. It is recommended that all construction operations dealing with earthwork and foundations be reviewed by an experienced geotechnical engineer to provide information on which to base a decision as to whether the design requirements are fulfilled in the actual construction. If you wish, we would welcome the opportunity to provide field construction services for you during construction.

The analysis and recommendations submitted in this report are based upon the data obtained from the soil borings and tests performed at the locations as indicated on the Boring Location Diagram and other information referenced in this report. This report does not reflect any variations, which may occur between the borings. In the performance of the subsurface exploration, specific information is obtained at specific locations at specific times. However, it is a well-known fact that variations in soil and rock conditions exist on most sites between boring locations and also such situations as groundwater levels vary from time to time. The nature and

extent of variations may not become evident until the course of construction. If variations then appear evident, after performing on-site observations during the construction period and noting characteristics and variations, a reevaluation of the recommendations for this report will be necessary.

APPENDIX

Boring Location Plan

Boring Logs

Unified Soil Classification System

Reference Notes For Boring Logs

Swell Test Results

Summary of CBR Test Results

CBR Curves

Limes Series Test Results

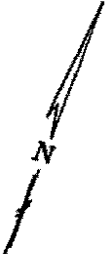
FUTURE BULK FUEL STORAGE AREA

B-1

B-2

ADDISON ROAD

ADDISON CIRCLE DRIVE



NOT TO SCALE



**BORING LOCATION DIAGRAM**  
BULK FUEL STORAGE SYSTEM  
ADDISON ROAD & GEORGE HADDAWAY STREET  
ADDISON, TEXAS

Project No.: 3846  
Date: 04/13/04

CLIENT Washington Group International, Inc.	JOB # 3846	BORING # B-1	SHEET 1 OF 1
PROJECT NAME Bulk Fuel Storage System		ARCHITECT-ENGINEER	



SITE LOCATION  
Addison Rd & George Haddaway St - Addison, Texas

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	RECOVERY (IN)	SPT. N(°) OR TOP BLOWS/IN	DESCRIPTION OF MATERIAL	GRAPHIC PROFILE	MOISTURE CONTENT (%)	HAND PENETROMETER (°) OR UNCONFINED COMPRESSIVE STRENGTH (PSF)	DRY DENSITY (PCF)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	% PASSING #200 SIEVE	RQD (%)
					ENGLISH UNITS									
0					SURFACE ELEVATION									
					Asphalt Depth 10"	0.8								
	1	ST	12		(FILL) Clayey Sandy Gravel, tan-brown	2.0								
	2	ST	12			3.0	30.3	=6000	70	29	41			
	3	TCP	12	100/200	CLAY (CH), dark brown, very stiff	4.0	18.2	=9000+						
5					CLAY (CH), tan, with weathered limestone fragments, hard									
					LIMESTONE, tan, with clay layers, highly weathered									
10	4	TCP	12	100/150										
					- clay layer from 11' to 13'									
15	5	TCP	12	100/150										
20	6	TCP	12	100/125										
					LIMESTONE, gray	22.0								
25	7	TCP	12	100/25										
					END OF BORING @ 25.0'									
30														

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

WATER LEVEL OBSERVATIONS Groundwater seepage was not observed while advancing, or at the completion of drilling the boring.	BORING STARTED	03/30/04	
	BORING COMPLETED	03/30/04	CAVE IN DEPTH ●
	RIG B-61	FOREMAN TD	DRILLING METHOD CFA

CLIENT Washington Group International, Inc.	JOB # 3846	BORING # B-2	SHEET 1 OF 1	<b>ECS</b> <sub>LTD</sub>
PROJECT NAME Bulk Fuel Storage System	ARCHITECT-ENGINEER			

SITE LOCATION Addison Rd & George Haddaway St - Addison, Texas					DESCRIPTION OF MATERIAL	GRAPHIC PROFILE	MOISTURE CONTENT (%)	HAND PENETROMETER (°) OR UNCONFINED COMPRESSIVE STRENGTH (PSF)	DRY DENSITY (PCF)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	% PASSING #200 SIEVE	RQD (%)
DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	RECOVERY (IN)	SPT, N(°) OR TCP BLOWS/IN										
0					Asphalt Depth 10"	0.8								
1	1	ST	12		(FILL) Clayey Sandy GRAVEL, tan-brown	2.0	9.8							
2	2	ST	12			33.5 *7000		69	28	41				
3	3	ST	12			36.4 *5000								
4	4	TCP	12	100/2.75	CLAY (CH), dark brown, trace limestone fragments, very stiff	4.0								
5					LIMESTONE, tan, with clay layers, highly-weathered									
10	5	ST	12		- clay layer		19.5 *9000+							
15	6	TCP	12	100/50	LIMESTONE, gray	14.0								
20	7	TCP	12	100/20	END OF BORING @ 20.0'									

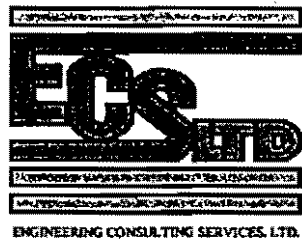
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

WATER LEVEL OBSERVATIONS Groundwater seepage was not observed while advancing, or at the completion of drilling the boring.	BORING STARTED	03/30/04	
	BORING COMPLETED	03/30/04	CAVE IN DEPTH @
	RIG B-61	FOREMAN TD	DRILLING METHOD CFA



## Unified Soil Classification System (ASTM Designation D-2487)

Major Division	Group Symbol	Typical Names	Classification Criteria		
<b>Coarse-grained soils</b> More than 50% retained on No. 200 sieve	<b>Gravels</b> More than 50% of coarse fraction retained on No. 4 sieve	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines GW, GP, SW, SP GM, GC, SM, SC Borderline classification requiring use of dual symbol	$C_u = D_{60}/D_{10}$ Greater than 4 $C_z = (D_{30})^2/(D_{10} \times D_{60})$ Between 1 and 3 Not meeting both criteria for GW Atterberg limits plot below "A" line or plasticity index less than 4 Atterberg limits plot above "A" line and plasticity index greater than 7
		GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		
		GM	Silty gravels, gravel-sand-silt mixtures		
		GC	Clayey gravels, gravel-sand-clay mixtures		
	<b>Sands</b> More than 50% of coarse fraction passes No. 4 sieve	SW	Well-graded sands and gravelly sands, little or no fines	Less than 5% Pass No. 200 sieve More than 12% Pass No. 200 sieve 5% to 12% Pass No. 200 sieve	$C_u = D_{60}/D_{10}$ Greater than 6 $C_z = (D_{30})^2/(D_{10} \times D_{60})$ Between 1 and 3 Not meeting both criteria for SW Atterberg limits plot below "A" line or plasticity index less than 4 Atterberg limits plot above "A" line and plasticity index greater than 7
		SP	Poorly graded sands and gravelly sands, little or no fines		
		SM	Silty sands, sand-silt mixtures		
		SC	Clayey sands, sand-clay mixtures		
<b>Fine-grained soils</b> 50% or more passing No. 200 sieve	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Note: U-line represents approximate upper limit of LL and PI combinations for natural soils (empirically determined). ASTM-D2487.		
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
	OL	Organic silts and organic silty clays of low plasticity			
	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
	CH	Inorganic clays of high plasticity, fat clays			
	OH	Organic clays of medium to high plasticity			
Highly organic soils	Pt	Peat, muck and other highly organic soils	Fibrous organic matter; will char, burn, or glow		



## UNIFIED SOIL CLASSIFICATION SYSTEM

## REFERENCE NOTES FOR BORING LOGS

### I. Drilling and Sampling Symbols:

SS - Split Spoon Sampler	RB - Rock Bit Drilling
ST - Shelby Tube Sampler	BS - Bulk Sample of Cuttings
RC - Rock Core: NX, BX, AX	PA - Power Auger (no sample)
PM - Pressuremeter	HS - Hollow Stem Auger
DC - Dutch Cone Penetrometer	WS - Wash Sample
TC - Texas Cone Penetrometer	

Standard penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2 inch O.D. split spoon sampler, as specified in ASTM D-1586. The blow count is commonly referred to as the N-value.

Texas cone penetrometer (blows/in) refers to the penetration of a 3-inch diameter cone after the cone is driven 100 blows with a 140 lb. hammer falling 30 inches. This is a modification of the Texas Department of Transportation test method TEX-132-E that requires a 170 lb. hammer falling 24 inches.

### II. Correlation of Penetration Resistances to Soil Properties:

#### Relative Density-Sands, Silts

<u>SPT-N</u>	<u>Relative Density</u>
0- 3	Very Loose
4- 9	Loose
10-29	Medium Dense
30-49	Dense
50-80	Very Dense

#### Consistency of Cohesive Soils

<u>Unconfined Compressive</u>	
<u>Strength, <math>Q_u</math>, psf</u>	<u>Consistency</u>
under 500	Very Soft
500-1,000	Soft
1,000-2,000	Firm
2,000-4,000	Stiff
4,000-8,000	Very Stiff
8,000-16,000	Hard
over 16,000	Very Hard

### III. Unified Soil Classification Symbols:

GP - Poorly Graded Gravel	ML - Low Plasticity Silts
GW - Well Graded Gravel	MH - High Plasticity Silts
GM - Silty Gravel	CL - Low Plasticity Clays
GC - Clayey Gravels	CH - High Plasticity Clays
SP - Poorly Graded Sands	OL - Low Plasticity Organics
SW - Well Graded Sands	OH - High Plasticity Organics
SM - Silty Sands	CL-ML - Dual Classification
SC - Clayey Sands	(Typical)

### IV. Water Level Measurement Symbols:

WL - Water Level	BCR - Before Casing Removal
WS - While Sampling	ACR - After Casing Removal
WD - While Drilling	WCI - Wet Cave In
AB - After Boring Completion	DCI - Dry Cave In

The water levels are those water levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clays and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.



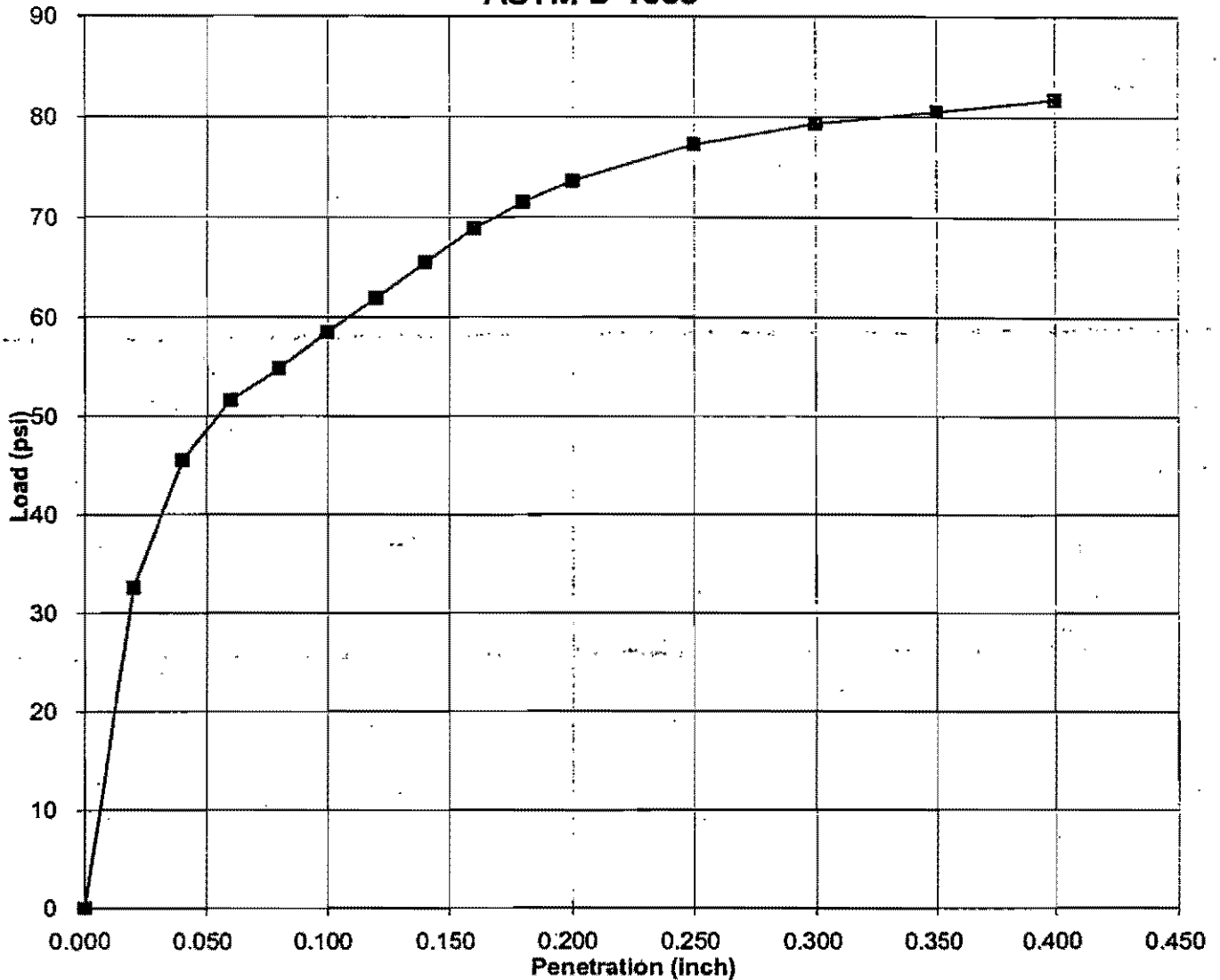
**SWELL TEST RESULTS  
BULK FUEL STORAGE FACILITY  
SWC OF ADDISON ROAD AND GEORGE HADDAWAY STREET  
ADDISON, TEXAS**

**ECS JOB NO. 19-3846**

<b>BORING</b>	<b>SAMPLE</b>	<b>DEPTH (ft)</b>	<b>LIQUID LIMIT</b>	<b>PLASTIC LIMIT</b>	<b>PLASTICITY INDEX</b>	<b>INITIAL MOISTURE (%)</b>	<b>FINAL MOISTURE (%)</b>	<b>LOAD (psf)</b>	<b>% SWELL</b>
B-1	3	2-3	70	29	41	30.3	33.7	310	0.7
B-2	3	2-3	69	28	41	33.5	35.4	310	0.7

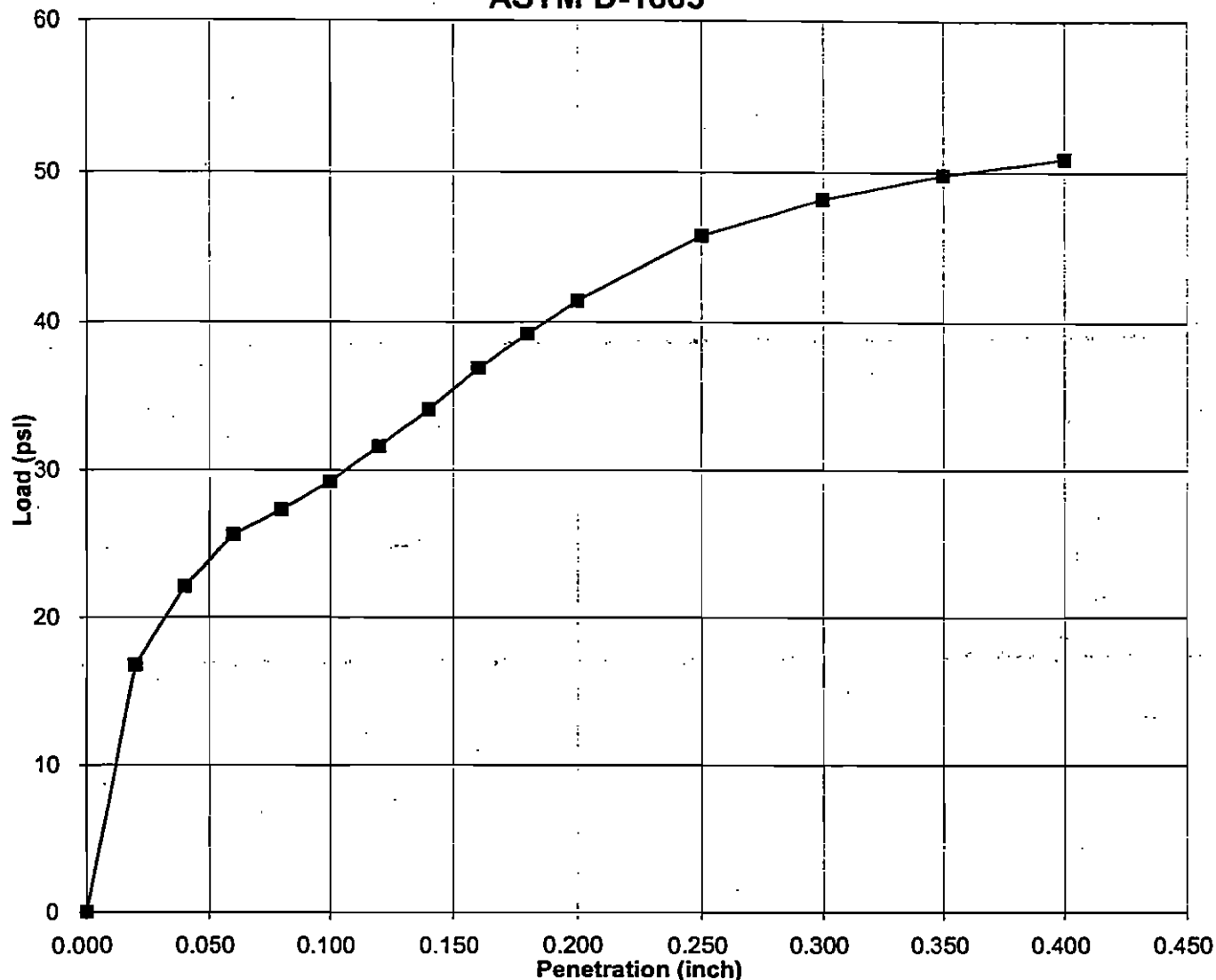


**CBR Penetration  
ASTM D-1883**



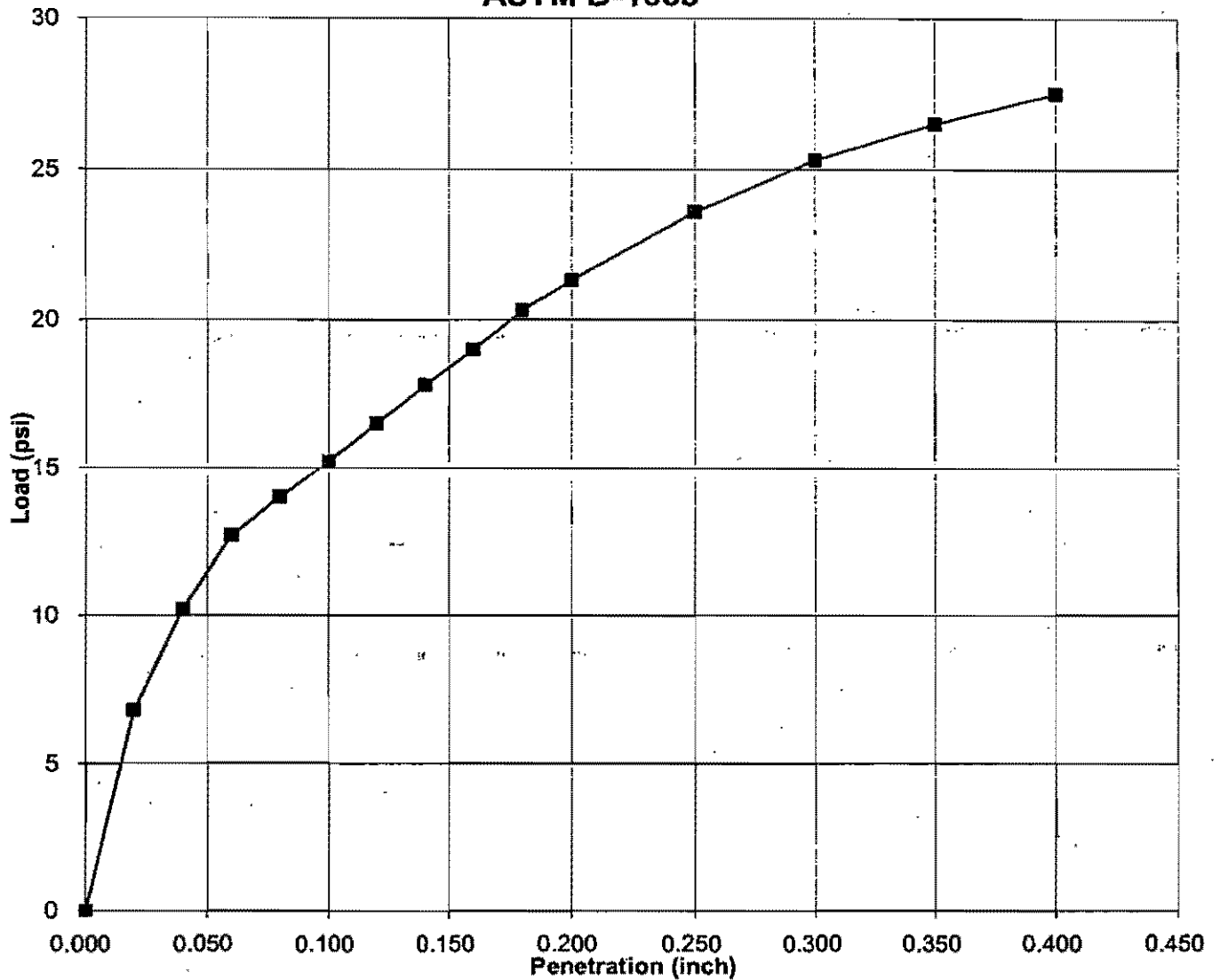
Sample No.: +3%		Street: 0	
Description: Dark Brown Clay		Station No.: 0	
Classification: CH		Remark:	
Maximum Dry Density (pcf)	94.5		CBR 3
Opt. Moisture Content (%)	25.0	Corrected CBR @ 0.1"	5.9
Natural Moisture Content	N/A	Corrected CBR @ 0.2"	4.9
Liquid Limit (LL)	74		
Plastic Limit (PL)	28	Dry Density as Molded	89.9
Plasticity Index (PI)	46	Molded Moisture Content	28.5
Liquidity Index (LI)	N/A	Percent of Maximum Density	95.1
Percent Retained 3/4" Sieve	0.0	Moisture Content +/- Opt	3.5
Percent Retained No. 4 Sieve	0.0	Percent (%) Swell	1.9
Percent Passing No.200 Sieve	N/A		
<b>Project:</b> Bulk Fuel Storage <b>Project No.:</b> 19-3846 <b>Date:</b> 04-06-04		<b>Engineering Consulting Services, Ltd.</b> Dallas, Texas <b>California Bearing Ratio Curves</b>	

**CBR Penetration  
ASTM D-1883**



Sample No.: Optimum Moisture		Street: Street:	
Description: CLAY, dark brown, trace limestone		Station No.: 0	
Classification: CH		Remark:	
Maximum Dry Density (pcf)	94.5		CBR 2
Opt. Moisture Content (%)	25.0	Corrected CBR @ 0.1"	2.9
Natural Moisture Content	N/A	Corrected CBR @ 0.2"	2.8
Liquid Limit (LL)	74		
Plastic Limit (PL)	28	Dry Density as Molded	89.3
Plasticity Index (PI)	46	Molded Moisture Content	25.8
Liquidity Index (LI)	N/A	Percent of Maximum Density	94.5
Percent Retained 3/4" Sieve	0.0	Moisture Content +/- Opt	0.8
Percent Retained No. 4 Sieve	0.0	Percent (%)Swell	4.6
Percent Passing No.200 Sieve	N/A		
<b>Project:</b> Bulk Fuel Storage <b>Project No.:</b> 19-3846 <b>Date:</b> April 06, 2004		<b>Engineering Consulting Services, Ltd.</b> Dallas, Texas <b>California Bearing Ratio Curves</b>	

**CBR Penetration  
ASTM D-1883**



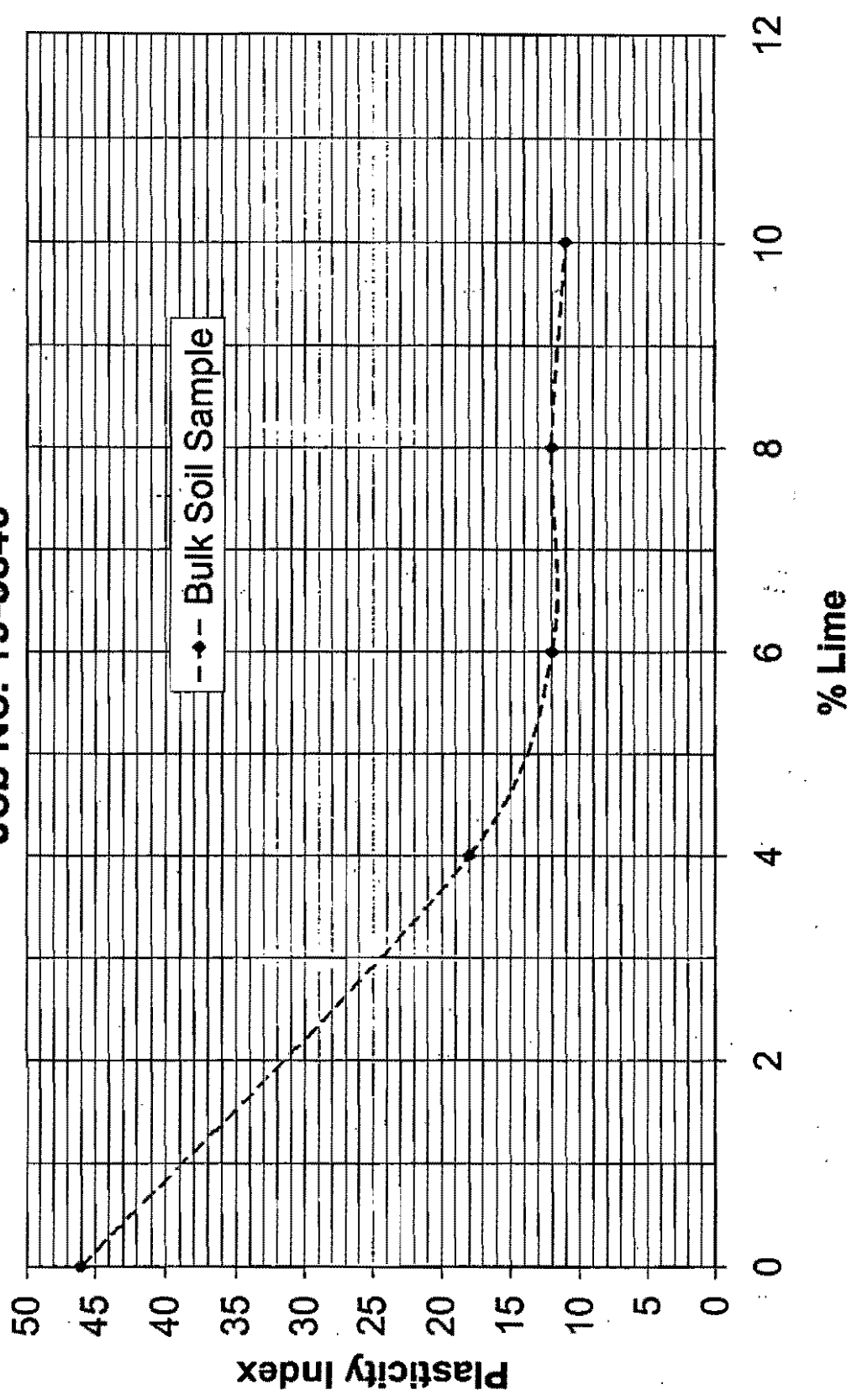
Sample No.: -3.00%		Street:	
Description: CLAY, dark brown		Station No.:	
Classification: CH		Remark: Composite Sample	
Maximum Dry Density (pcf)	94.5		CBR 1
Opt. Moisture Content (%)	25.0	Corrected CBR @ 0.1"	1.5
Natural Moisture Content	N/A	Corrected CBR @ 0.2"	1.4
Liquid Limit (LL)	74		
Plastic Limit (PL)	28	Dry Density as Molded	89.8
Plasticity Index (PI)	46	Molded Moisture Content	22.4
Liquidity Index (LI)	N/A	Percent of Maximum Density	95.0
Percent Retained 3/4" Sieve	0.0	Moisture Content +/- Opt	-2.6
Percent Retained No. 4 Sieve	0.0	Percent (%) Swell	6.1
Percent Passing No.200 Sieve	N/A		

**Project:** Bulk Fuel Storage  
**Project No:** 19-3846  
**Date:** 04/06/04

**Engineering Consulting Services, Ltd.**  
 Dallas, Texas  
 California Bearing Ratio Curves

# LIME SERIES TEST RESULTS

Job No. 19-3846

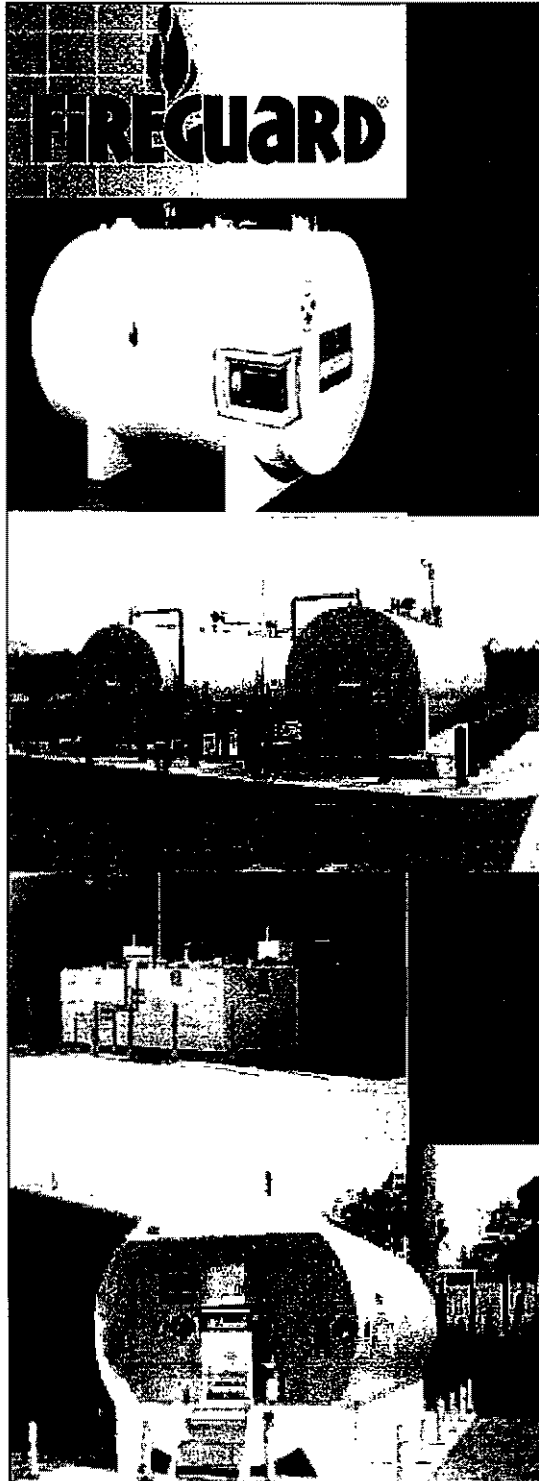




**modern**

*Manufacturers of Custom Fabricated Metal Products Since 1932.*

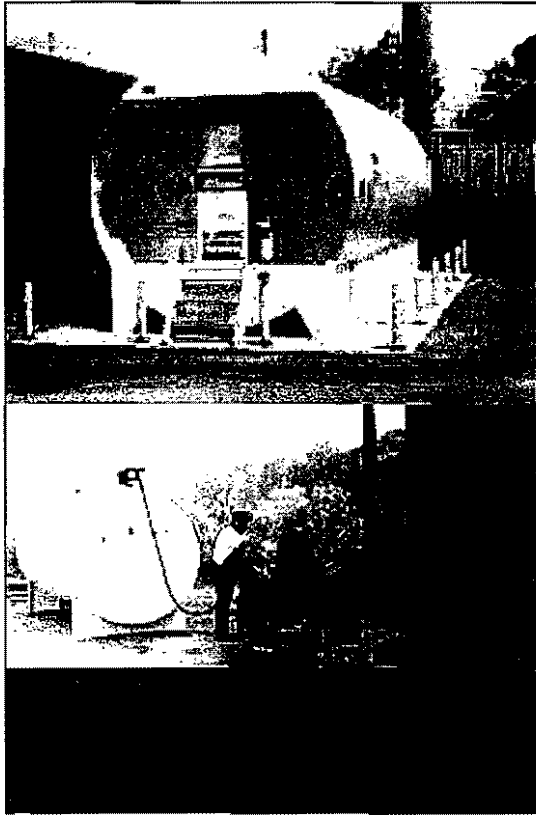
Fire Rated Fireguard Dual Wall Tank



## **Modern's STI – Fireguard™ "Protected" Fire-Rated Aboveground Horizontal Storage Tanks**

- 300 to 50,000 gallon capacity
- Underwriters Laboratories Construction, UL-142 and UL-2085
- Secondly contained, Ballistics and Impact tested
- Also available in rectangular constructions up to 24,000 gallons
- Available with multiple compartments for multiple fuel storage
- Compatible with gasoline, diesel, fuel oil, ethanol, methanol and additives
- Lined internally for special applications, such as jet fuel or potable water storage
- Tanks maybe supported on stationary saddles, or structural skid configurations
- Tanks available with pump platforms and accessories
- Fuel dispensing equipment available
- Material of construction maybe carbon or stainless steel
- Listed in General Services Administration (GSA), Federal Supply Service, FSC Group 54, Part III, SIN Number: 361-20, 361-21, 361-22. Contract number GS-07F-0134K.

**Fireguard™:** A "Protected" Fire Rated Aboveground Storage Tank with projectile, impact resistant and stream hose test ratings. This is a steel double wall aboveground storage tank with interstitial monitoring capabilities and a 2-hour fire rating. It can be built in horizontal and vertical configurations. These tanks may also be built with or without multiple compartments for multiple fuel storage. Each tank contains 3 inches of light-weight insulation material which has 75% less weight than traditional concrete insulations. Fireguard tanks are built to Underwriters Laboratories, UL-142 and UL 2085 specifications. Fireguard tanks also meet the CARB, California Air Resource Board, testing requirements for air emissions.



Fireguard tanks are built in accordance with the Steel Tank Institute's F-941 standard.

Modern Welding Company's Fireguard tanks are listed with the General Services Administration (GSA), Federal Supply Service, FSC Group 54, Part III, SIN Number: 361-20, 361-21, 361-22. Modern Welding Company GSA contract number is: GS-07F-0134K.

**Drawing:** [Cylindrical](#) or [Rectangular](#) (dwg)

**Drawing:** [Cylindrical](#) or [Rectangular](#) (pdf)

**Illustration:** [Fireguard AG](#) (pdf)

**Spec Data:** [Fireguard](#) (rtf)

**UL Certificate of Compliance:** [Fireguard](#) (pdf)

**Brochure:** [Fireguard](#)

**[STI Installation Instructions](#)**

*Corporate Office*

*Corporate Office*

5-19-03

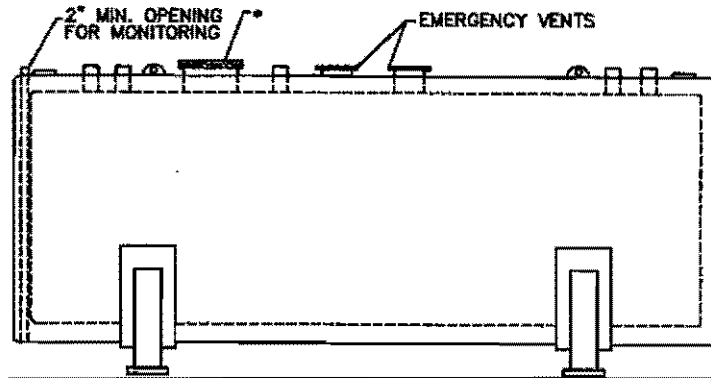
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**FIREGUARD® ABOVEGROUND "PROTECTED TYPE" DOUBLE WALL STORAGE TANKS**



INNER TANK			OUTER TANK	
APPROX. CAP. (GALLONS)	NOM. DIAMETER	NOM. LENGTH	NOM. DIAMETER	NOM. LENGTH
186	36"	3'-6"	48"	4'-6"
300	38"	5'-0"	50"	6'-0"
560	48"	6'-0"	54"	6'-6"
1,000	64"	6'-0"	70"	6'-6"
1,500	64"	9'-0"	70"	9'-6"
2,000	64"	12'-0"	70"	12'-6"
2,500	64"	15'-0"	70"	15'-6"
3,000	64"	18'-0"	70"	18'-6"
4,000	84"	14'-0"	90"	14'-6"
5,000	96"	13'-6"	102"	14'-0"
6,000	90"	18'-2"	96"	18'-8"
6,000	96"	21'-0"	102"	16'-6"
8,000	96"	27'-0"	102"	21'-6"
10,000	96"	26'-10"	102"	27'-6"
12,000	96"	32'-0"	102"	32'-6"
15,000	120"	25'-6"	126"	26'-0"
20,000	120"	34'-0"	126"	34'-6"
25,000	120"	42'-6"	126"	43'-0"
30,000	120"	51'-0"	126"	51'-6"

Tank lengths listed above are based on nominal tank dimensions.  
Overall tank lengths will vary during actual manufacturing.

**STANDARD SPECIFICATIONS**

- Built to the UL 2085 and STI FIREGUARD® standards.
- Tanks will bear UL 2085 label for "Insulated Secondary Containment for Flammable Liquids-Protected Type".
- Inner and outer tank construction and thickness per UL 142.
- Modern's standard opening locations and required lifting lugs.
- Annular space monitoring capabilities
- Support saddles.
- Exterior blasted and finish coated white to Fireguard requirements.
- Check with Modern for type of Emergency Vent Opening supplied.
- Other exterior and interior coating systems may be available upon request.
- Other tank sizes available upon request.

*More Detail*

# FIREGUARD<sup>®</sup> in the New Generation of Fire-rated ANTs, going far beyond those "first generation" tanks which were merely encased in concrete.

• Fire-rated ANTs are now available in sizes up to 100,000 gallons, allowing for maximum protection.

• Fire-rated ANTs are available in a variety of configurations, including: single and double wall, and with or without concrete encasement.

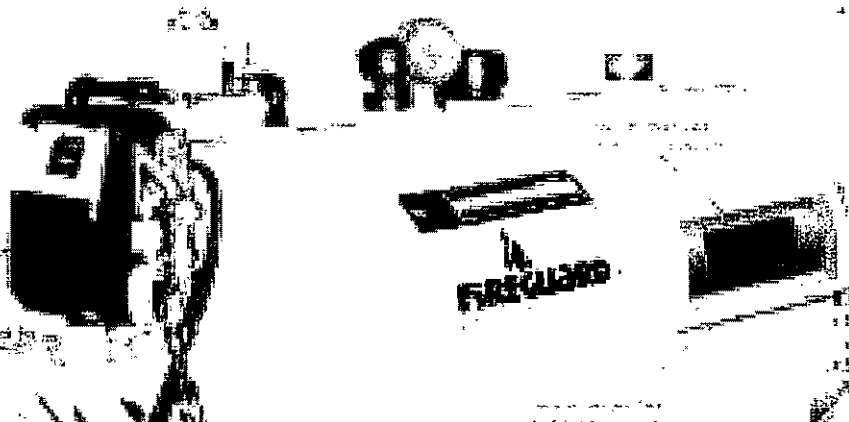
• Fire-rated ANTs are available in a variety of materials, including: steel, aluminum, and stainless steel, allowing for maximum protection.

• Fire-rated ANTs are available in a variety of shapes, including: rectangular, cylindrical, and spherical, allowing for maximum protection.

• Fire-rated ANTs are available in a variety of colors, including: white, tan, and black, allowing for maximum protection.

• Fire-rated ANTs are available in a variety of finishes, including: powder coat, and epoxy, allowing for maximum protection.

**1.0 YEAR WARRANTY** on all fire-rated ANTs. This warranty covers all fire-rated ANTs, including: single and double wall, and with or without concrete encasement.



## 1.0 YEAR WARRANTY

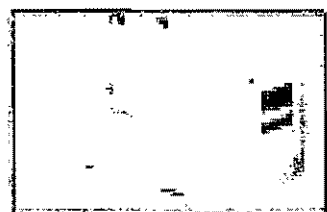
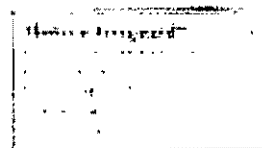
- Fire-rated ANTs are now available in sizes up to 100,000 gallons, allowing for maximum protection.
- Fire-rated ANTs are available in a variety of configurations, including: single and double wall, and with or without concrete encasement.
- Fire-rated ANTs are available in a variety of materials, including: steel, aluminum, and stainless steel, allowing for maximum protection.
- Fire-rated ANTs are available in a variety of shapes, including: rectangular, cylindrical, and spherical, allowing for maximum protection.
- Fire-rated ANTs are available in a variety of colors, including: white, tan, and black, allowing for maximum protection.
- Fire-rated ANTs are available in a variety of finishes, including: powder coat, and epoxy, allowing for maximum protection.

## Lightweight Thermal Protection

- Fire-rated ANTs are now available in sizes up to 100,000 gallons, allowing for maximum protection.
- Fire-rated ANTs are available in a variety of configurations, including: single and double wall, and with or without concrete encasement.
- Fire-rated ANTs are available in a variety of materials, including: steel, aluminum, and stainless steel, allowing for maximum protection.
- Fire-rated ANTs are available in a variety of shapes, including: rectangular, cylindrical, and spherical, allowing for maximum protection.
- Fire-rated ANTs are available in a variety of colors, including: white, tan, and black, allowing for maximum protection.
- Fire-rated ANTs are available in a variety of finishes, including: powder coat, and epoxy, allowing for maximum protection.

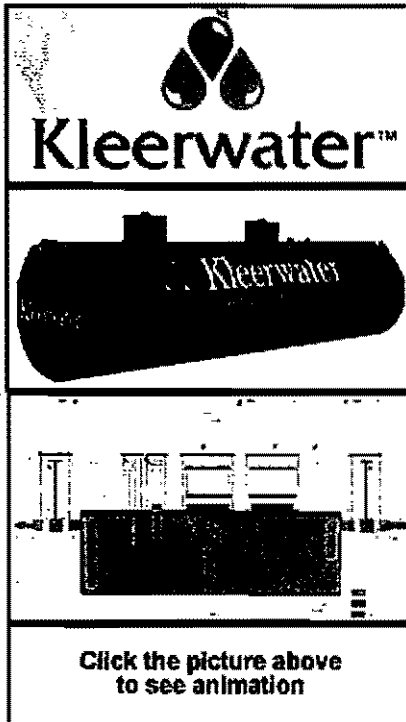
**Technical Specifications**

Model	Capacity (Gallons)	Material	Dimensions (L x W x H)	Weight (Lbs)
FG-1000	1,000	Steel	48" x 48" x 48"	1,200
FG-2000	2,000	Steel	60" x 60" x 60"	2,400
FG-5000	5,000	Steel	72" x 72" x 72"	6,000
FG-10000	10,000	Steel	84" x 84" x 84"	12,000
FG-20000	20,000	Steel	96" x 96" x 96"	24,000
FG-50000	50,000	Steel	120" x 120" x 120"	60,000
FG-100000	100,000	Steel	144" x 144" x 144"	120,000





Manufacturers of Custom Fabricated Metal Products Since 1932.



### Modern's Kleerwater™ High Efficiency Oil Water Separators Patent No. 5,229,015

- Underwriters Laboratories tested and listed per, UL-2
- Designed for no internal or confined space entry when performing routine maintenance. (see note 1 below)
- Kleerwater™ can handle larger influent flows, therefore allowing for smaller separator tanks. With smaller separation tanks, less installation costs.
- Kleerwater™ separator utilizes Stokes Law for defir rates of rise of oil spheres in a liquid medium
- Unique patented oil separation process enhances oil water separation efficiencies
- Separation efficiencies down to 5 ppm & lower. (see r below)
- Electronic audible and visual alarms available for pre level alarm notifications
- Separator material of construction; carbon steel
- Single or double wall steel configurations available
- Handle continuous or intermittent influent flow rates.

#### Kleerwater™ Gravity Displacement Oil Water Separators

Kleerwater™, oil water separators, maybe constructed in sir double wall tank designs. Double wall configurations have ir monitoring capabilities. Tanks are built to Underwriters Labc 58 / UL-1746 construction standards. Kleerwater™ oil water are listed and tested to Underwriters Laboratories, UL-2215 Separators are designed to separator free-floating oils and ( specific gravities between 0.7 and 0.95, from fresh water inf

Kleerwater™ separator design criteria is based on Stokes L defines the rates of rise of oil spheres in a liquid medium. S; coalescence media enhances the separators efficiency to ol unmatched performance, down to 5 ppm.

Kleerwater™ oil water separators can handle larger influent therefore allowing for smaller separator tank utilization. Wil separation tanks, less installation costs are incurred.

Kleerwater™ separators are available with electronic audibl alarms for preset notification of liquid levels in the separator

*Buried — In Rock  
Double wall  
Cathodic Protected?  
Pumped out?*

Kleerwater™ oil water separators are not designed for use in applications where cleaning detergents are involved unless detergents are supplied and furnished by Kleerwater™ LLC technologies.

Solvents or highly dissolved solids, such as untreated sanitizers should not be introduced into Kleerwater™ separators. Kleerwater™ separators will not separate chemical emulsions, dissolved hydrocarbons or volatile organic hydrocarbons.

1 – Maximum 180 day maintenance inspection schedule must be implemented for this claim to be applicable. Follow published maintenance instructions as published by the Kleerwater™ separator manufacturer.

2 – Efficiencies are dependent on influent flow rates, concentration and specific gravity of oil. Any one of these factors can affect Kleerwater™ separator efficiencies of oil and water separation.

### **Sensors and Control Panels**

[Oil Water Interface Sensors](#)

[Oil Water Interface Sensors lengths over 96"](#)

[Annular Space Liquid Sensors](#)

[Control Panels \(1 to 2 Channels\)](#)

[Control Panels \(3 or More Channels\)](#)

[Sensor Lengths Selection Guide](#)

**Engineering Specification:** [Kleerwater](#) (rtf)

**Specification Sheet:** [Kleerwater](#) (rtf)

**General Notes:** [Kleerwater](#) (pdf)

**Separator Sizing:** [Kleerwater](#)

**Installation Instructions** [Kleerwater](#) (pdf)

**Maintenance Instructions** [Kleerwater](#) (pdf)

**Operating and Startup** [Kleerwater](#) (pdf)

**Brochure Literature:** [Kleerwater](#)

**Movie Clip:** [Kleerwater Animation](#) (swf)

**Questionnaire:** [Kleerwater](#) (pdf), [Kleerwater](#) (rtf)

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# Self Priming Centrifugal Pump

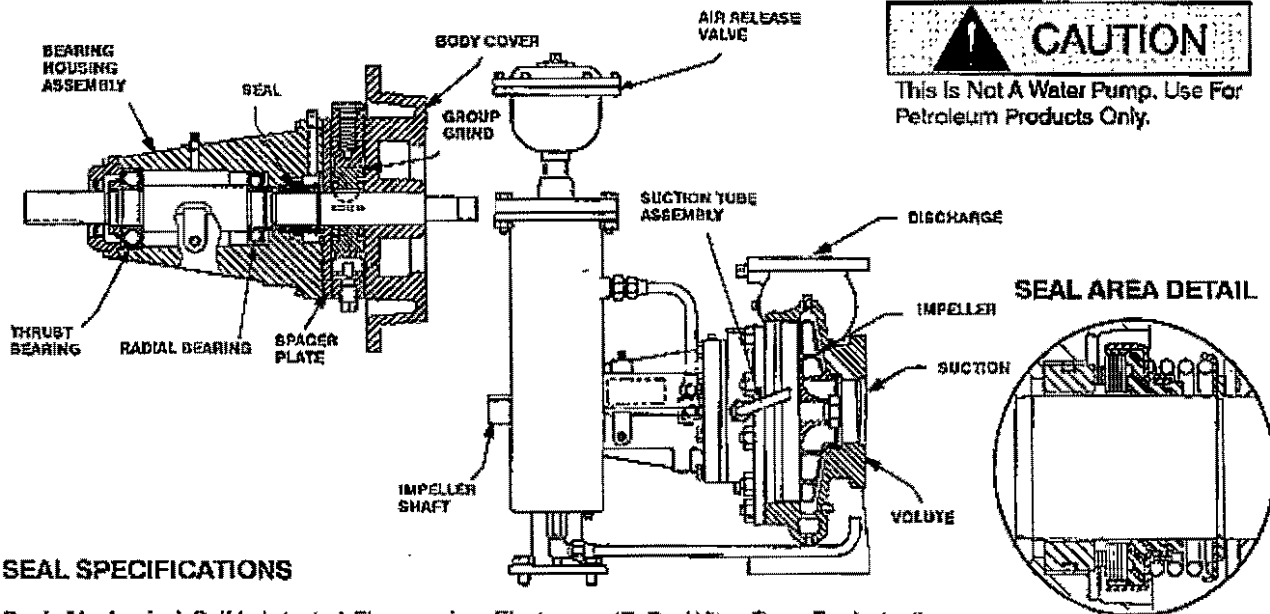
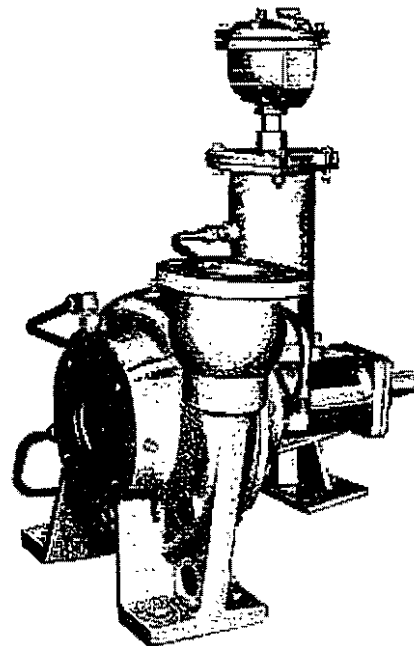
Electric Motor Driven  
Models RD2A31-BAR

Size 3" x 2"

## PUMP SPECIFICATIONS

- Size:** 3" x 2" (76 x 51 mm) Flanged.
- Casing:** Ductile Iron No. 65-45-12.  
Maximum Operating Pressure 150 PSI (10.5 kg/cm<sup>2</sup>).
- Impeller:** Enclosed Type Four Vanes, Aluminum 356-T6.  
Handles 1/4" (6.4 mm) Diameter Spherical Solids.
- Impeller Shaft:** Steel No. 1045.
- Rotor:** Bronze No. B4-8-8-0.
- Wear Ring:** Bronze No. 87-7-7-3.
- Bearing Housing:** Ductile Iron No. 85-45-12.
- Body Cover:** Ductile Iron No. 65-45-12.
- Center/Spacer Plate:** Ductile Iron No. 65-45-12.
- Radial Bearing:** Ball Type.
- Thrust Bearing:** Ball Type.
- Bearing Lubrication:** Grease.
- Gaskets:** Vegetable Fiber, Paper, and Cork.
- Priming:** Rotary Vane Type, with Built-in Spring Loaded Priming Pump Check Valve.

**Optional Equipment:** Suction and Discharge Companion Flange Kit, Cast Steel 70-36; Impeller, Bronze No. 80-10-10; Group Grind with Cast Iron Rotor; Impeller Shaft, Stainless Steel No. 416; Teflon Seal; Oil Filled Bearing Housing Assembly.



**CAUTION**  
This Is Not A Water Pump. Use For Petroleum Products Only.

## SEAL SPECIFICATIONS

Seal: Mechanical; Self-Lubricated. Fluorocarbon Elastomers (DuPont Viton<sup>®</sup> or Equivalent), Rotating Faces are Carbon. Stationary Faces are Ni-Resist. Maximum Temperature of Liquid Pumped is 160°F (71°C).



THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

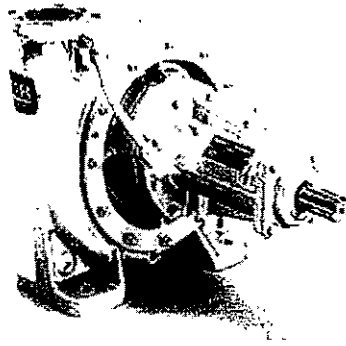
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA  
Specifications Subject to Change Without Notice.

Printed in U.S.A.

## Roto-Prime® Pumps

[Download  
Pump Literature](#)

[Contact Sales](#)



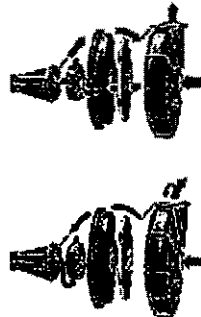
### Pump Specifications

<b>Size</b>	3" x 2", 4" x 3", 6" x 4", 6" x 5" (75 mm x 50 mm, 100 mm x 75 mm, 150 mm x 100 mm, 150 mm x 125 mm)
<b>Max Capacity</b>	1460 gpm (92 lps)
<b>Max Head</b>	390' (119 m)
<b>Seal Elastomer</b>	Viton®, Teflon®
<b>Materials of Construction</b>	Ductile Iron, Cast Steel

### Pump Features

#### Automatic, Positive Pumping

Whenever air or vapor is present at the start of the pumping operation – or when there is a loss of suction because of air or vapor during pumping – the priming pump automatically moves air and vapor from the suction line to the discharge line.



Once the flowing liquid from the centrifugal portion of the pump builds up sufficient pressure in the discharge system, this pressure backs up through a tube to act on the bottom of the priming pump's moveable slide block, placing it in a neutral position. Under these conditions the priming pump no longer evacuates air, but merely circulates a small amount of liquid.

Roto-Prime Pumps are actually two pumps in one. The small, powerful vane-type pump within the main centrifugal housing can prime an absolutely dry 4" (100 mm) line with zero back pressure in approximately two seconds per foot without initial manual priming. And this



priming pump will evacuate suction lines with back pressures up to 8 pounds per square inch.



**Full Priming**

With air or vapor in the lines, pressure of the spring on top of the movable slide holds the priming pump in full pumping position.



**Partial Priming**

As the pump evacuates air and vapor from the lines, liquid pressure builds up on the underside of this slide, moving it upward toward neutral.



**Neutral**

When all air and vapor are removed, liquid pressure equalizes spring pressure and the pump automatically slides into neutral...where it remains until air and vapor again appear in the system.

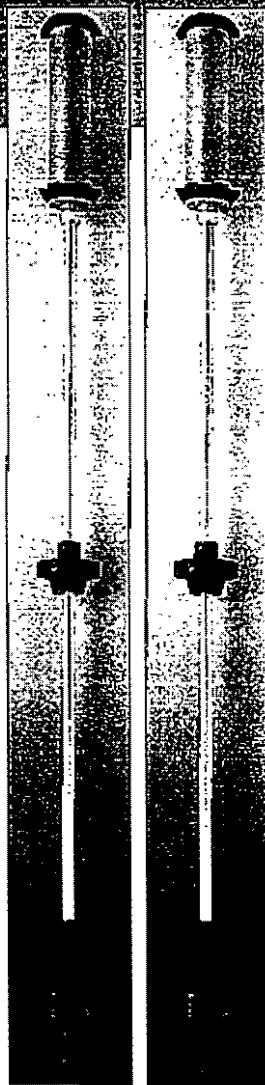
Viton® is a registered trademark of DuPont Dow Elastomers.

Teflon® is a registered trademark of E.I. DuPont de Nemours & Co., Inc.

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# Magnetostrictive Probes for TLS Tank Monitoring Systems

*Certified performance for inventory control and in-tank leak detection in gasolines, diesel and a wide variety of other approved fluids.*



MAG 1

MAG 2

- ▶ *Highly accurate magnetostrictive measurement technology*
- ▶ *Fast, accurate leak tests*
- ▶ *MAG 1 (0.1 GPH) and MAG 2 (0.2 GPH) probes available*
- ▶ *MAG 1 probe third-party certified to exceed U.S. E.P.A. performance standards for 0.1 GPH Volumetric Tank Tightness Testing*
- ▶ *MAG 1 probe compatible with TLS-350 with CSLD for continuous statistical leak detection*
- ▶ *MAG 2 probe third-party certified to exceed U.S. E.P.A. performance standards for 0.2 GPH Automatic Tank Gauging*
- ▶ *Compatible with gasolines, diesel and other approved fluids*
- ▶ *Water measurement capability*

- ▶ *2" and 4" Float Kits available*

## *Series 8473 MAG 1 Probe*

The MAG 1 probe provides highly accurate, trouble-free performance in gasolines, diesel and a wide variety of approved fluids. Its magnetostrictive technology and live-point temperature sensing make it capable of extremely accurate inventory control and in-tank leak testing.

The MAG 1 probe has been third-party tested and certified to perform far better than the U.S. E.P.A. standards for both 0.1 GPH volumetric tank tightness testing and 0.2 GPH automatic tank gauging. See the summary of leak test performance on back or call us for a copy of the complete test results.

## *Series 8473 MAG 2 Probe*

The MAG 2 probe provides the same reliability, inventory control features and fluid compatibility as the MAG 1 probe, but offers 0.2 GPH leak detection at a lower cost. It's ideal for people who want MAG probe performance with 0.2 GPH monthly monitoring capability.

The MAG 2 probe has also been third-party tested and certified to perform far better than the U.S. E.P.A. standards for 0.2 GPH automatic tank gauging. See the summary of leak test performance on back or call us for a copy of the complete test results.

## *MAG 1 Probe and the TLS-350 with CSLD — Leak detection without shutting down your tanks!*

CSLD, Continuous Statistical Leak Detection, is a new, advanced tank testing technology that makes full use of the TLS-350's in-tank monitoring capabilities. CSLD eliminates the need for tank shutdown to perform a leak test — no lost business, no lost operating time!

The TLS-350 with CSLD uses the MAG 1 probe to continuously monitor fuel height and temperature information to detect idle times in the tank. During each idle time, data is collected and combined with information from other idle periods to form a highly accurate leak detection database. Sophisticated statistical analysis techniques in CSLD constantly evaluate the database to discard invalid data and perform leak tests based on only high-quality information in the current database. In fact, a new leak test is performed every time new data from an idle period is added.

It's the next generation in leak detection technology made possible, in part, by the accuracy of the MAG 1 probe!

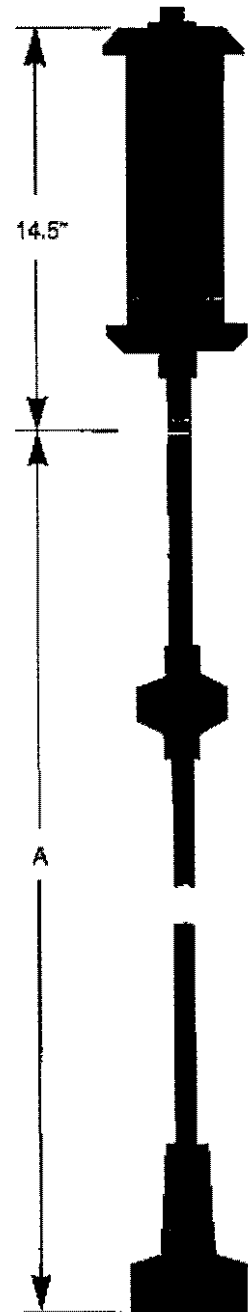
## *Approved for Aboveground Tank Applications*

Veeder-Root Magnetostrictive Probes are approved for use in aboveground storage tanks to monitor fuel inventory. An AST Installation Kit (Form Number 312020-984) is required for these applications and is available from Veeder-Root or your authorized Veeder-Root distributor.

**Standard Models**

MAG 1 PROBE FORM NO.*	TANK I.D.**
847390-101	4'
847390-102	5'
847390-103	5'4"
847390-104	6'
847390-105	7'
847390-106	7'6"
847390-107	8'
847390-108	9'
847390-109	10'
847390-110	10'6"
847390-111	11'
847390-112	2.0M
847390-113	2.5M
847390-114	2.667M
847390-115	3.0M

MAG 2 PROBE FORM NO.*	TANK I.D.**
847390-201	4'
847390-202	5'
847390-203	5'4"
847390-204	6'
847390-205	7'
847390-206	7'6"
847390-207	8'
847390-208	9'
847390-209	10'
847390-210	10'6"
847390-211	11'
847390-212	2.0M
847390-213	2.5M
847390-214	2.667M
847390-215	3.0M



\*Float kits for the specific fuel application must be ordered separately. Kits are available for 4" and 2" floats.  
 See the Veeder-Root Price List for availability  
 \*\* Tank I.D. equals the "A" (Probe Length) dimension on the drawing to right of chart. Probe length (A) must equal Tank I.D.,

**Leak Test Performance — with 4" Floats (Third-Party Certified)**

PROBE	TEST TYPE	P(D)	P(FA)	TEST TIME
MAG 1	0.1 GPH	99%	1%	3 Hours
MAG 1	0.2 GPH	99%	<.1%	2 Hours
MAG 1 w/CSLD	0.2 GPH	99%	<.1%	Continuous
MAG 2	0.2 GPH	99%	<.1%	2 Hours

**Magnetostrictive Probe Console Compatibility**

PROBE	TLS-350 w/CSLD	TLS-350	TLS-300	TLS-300i	TLS-250	TLS-250i
MAG 1	•	•	•	•	•	•
MAG 2		•	•	•	•	•



125 Powder Forest Drive, Post Office Box 2003, Simsbury, CT 06070-2003 TEL: (203) 651-2700, FAX: (203) 651-2719

BRAZIL: Sao Paulo • ENGLAND: Richmond Surrey • FRANCE: Rang's Cedex • GERMANY: Nonnensteiner/Fielder

# Interstitial Sensor for use in Double-Wall Steel Tanks

For TLS-350, ILS-350, TLS-300i, TLS-250i Series and ILS-250



- ▶ Positive alarm indication of any liquid in double-wall steel tanks.
- ▶ System indicators pinpoint alarm location.
- ▶ Simple to install.
- ▶ Two-wire connection to system monitor.
- ▶ Fast action helps prevent serious safety and environmental problems.

The Veeder-Root Interstitial Sensor for use in Steel Tanks detects the presence of liquid in the annulus of a double-wall steel tank. Liquid in the annulus could mean a dangerous leak. When liquid is detected, the sensor sends an alarm signal to a TLS-350, ILS-350, TLS-300i, TLS-250i Series or ILS-250 monitor. The monitor's visual and audible built-in alarm indicators immediately tell you where the problem is, so you can quickly take action to help prevent serious safety and environmental problems.

The TLS-350, ILS-350, TLS-300i, TLS-250i Series and ILS-250 Systems feature internal alarm relays that can also trigger on-site alarms for even greater warning capability. The TLS-350 and TLS-300i alarm signals from the sensor triggers a report showing the time and the location of the alarm

condition. This information is stored in the system's alarm history and can be retrieved through the monitor's integral printer or remotely through its data communications interface.

The Veeder-Root Interstitial Sensor for Steel Tanks can be used in the annulus of steel tanks with a sensor riser pipe of 1.5" I.D or greater. Only two wires are required to connect the sensor to a TLS or ILS system.

#### Detection Capabilities

- ▶ The presence of any liquid in the tank's interstitial space triggers a Fuel Alarm.

#### Operating Capabilities

- ▶ Operating Temperature Range: -20°C to +70°C (Hydrocarbons); 0°C to 70°C (non-freezing Water).
- ▶ Storage Temperature Range: -40°C to +75°C.
- ▶ Cable Length: 25 feet.
- ▶ Dimensions: 2.5" high, 1.50" dia.

#### Standard Components

QTY	DESCRIPTION
1	Interstitial Steel Tank Sensor
2	Watertight Cord Grips

**Standard Models**

FORM NUMBER	DESCRIPTION
794390-420	Interstitial Steel Tank Sensor

**Accessories**

FORM NUMBER	DESCRIPTION
312020-928	Interstitial Sensor Riser Cap and Adaptor Kit - 2"

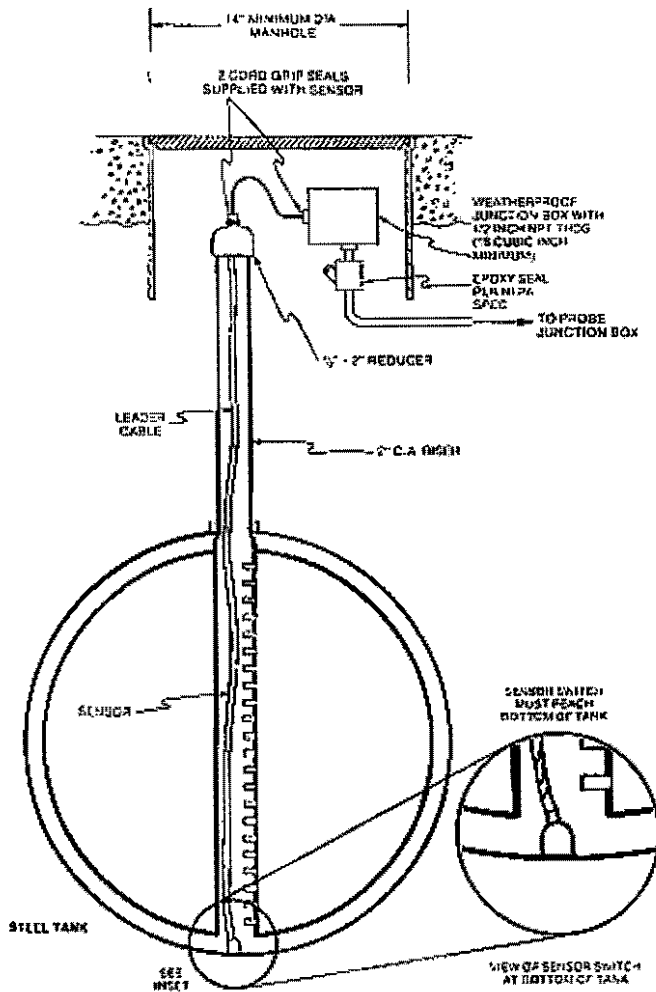
**Interstitial Steel Tank Sensor Console Capability**

The Series 7943 Interstitial Steel Tank Sensor is compatible with the following consoles:

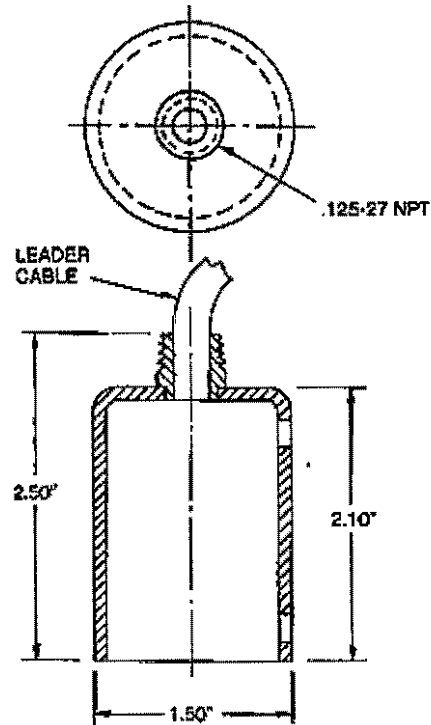
TLS-350*	ILS-350**	TLS-300I	TLS-250I Series	ILS-250
Series 8470	Series 8450	Series 8485	Series 7941	Series 7942

- \* NOTE: An Interstitial Sensor Interface Module is required for use of the Interstitial Fiberglass Tank Sensor with the TLS-350 Console.
- \*\* NOTE: A Two-Wire Module is required for use of the Interstitial Fiberglass Tank Sensor with the ILS-350 Console.

**TYPICAL INSTALLATION**



**SWITCH DIMENSIONS**



*The Leader in Tank Monitoring Technology*

125 Powder Forest Drive, Post Office Box 2003, Simsbury, CT 06070-2003 TEL: (203) 651-2700, FAX: (203) 651-2719

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**GAMMON TECHNICAL PRODUCTS, INC.**  
P.O. BOX 400 - 2300 HWY 34  
MANASQUAN, N.J. 08736

PHONE 732-223-4600  
FAX 732-223-5778  
EMAIL [gammontech@gammontech.com](mailto:gammontech@gammontech.com)

**SUMP  
SEPARATOR FOR  
STORAGE TANKS**

**BULLETIN 22  
(4-99)**

## **SUMP SEPARATOR FOR STORAGE TANKS MODEL GTP-616**

The SUMP SEPARATOR separates water from fuel that is drained from storage tank sumps. Fuel-free water is discharged from one port. Water-free fuel is returned to the storage tank.

The fuel and water mixture from the bottom of a storage tank or from the sump of a filter is discharged to the SUMP SEPARATOR through a nozzle that causes a swirling action to concentrate most of the dirt in the center of the cone-shaped bottom. Water and fuel are allowed to separate by gravity.

- Prevents fuel contamination of ground water
- Pollution control of soil and streams
- Saves valuable fuels
- Minimum Maintenance
- Eliminates need for conventional waste or "slip" tanks
- Epoxy white coated internally (stainless steel available on request)
- Capacity: 50 gallons standard - - up to 300 gallons on special order

### **CLEAN CUT**

Only the Gammon Sump Separator makes possible a **CLEAN CUT**. The operator can easily see when the fuel/water interface has reached the bottom of the cone. When closing the water drain valve, the operator makes a **CLEAN CUT**, preventing any fuel from leaving with the water. Only fuel remains at the bottom of the cone.

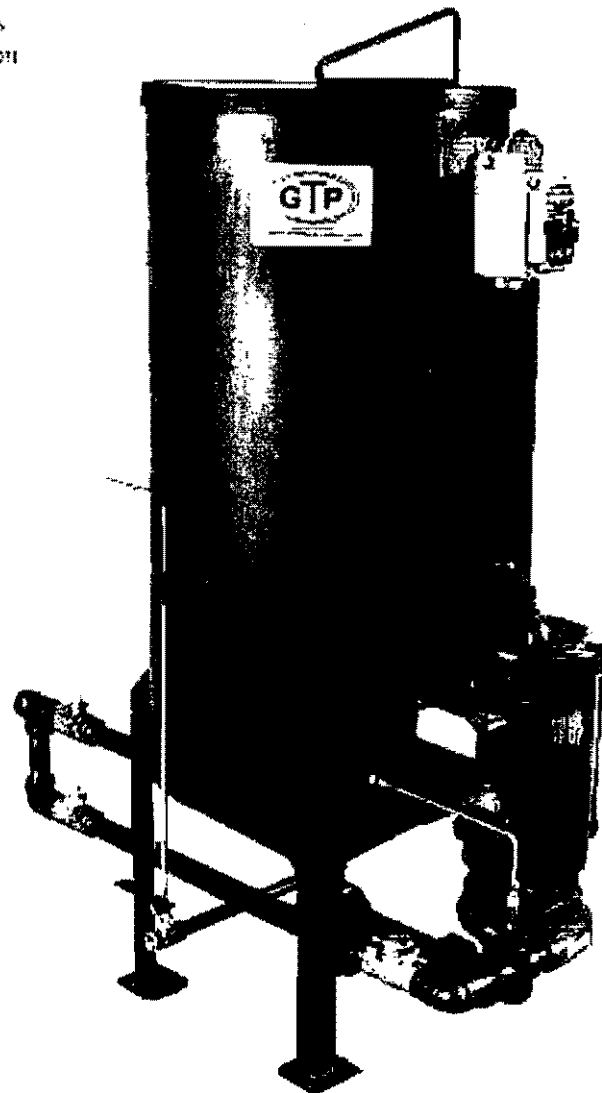
### **VISUAL CERTAINTY**

Direct **VISUAL** observation of the fuel/water interface is achieved by swinging the cover on its davit so that the operator sees through the fuel to the interface. This provides **VISUAL CERTAINTY** to make a **CLEAN CUT**.

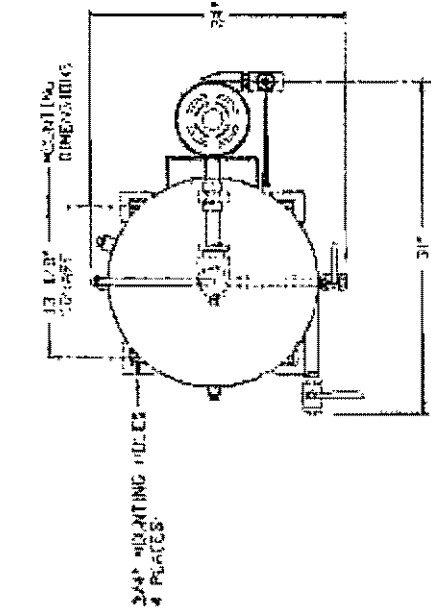
Other sump separator designs on the market rely on a sight glass that the operator observes when draining off the water. Invariably some of the fuel leaves with the water because the level in the sight glass always lags behind the level in the vessel. The operator can overcome this problem by closing the water drain valve ahead of time. The result is that some of the water is then pumped back to the storage tank.

Gammon originated the sump separator in 1965 and has always used a stainless steel foot valve at the bottom of the cone as shown on page 2. All other manufacturers use common pipeline valves that cause some of the settled water to be pumped back to the storage tank.

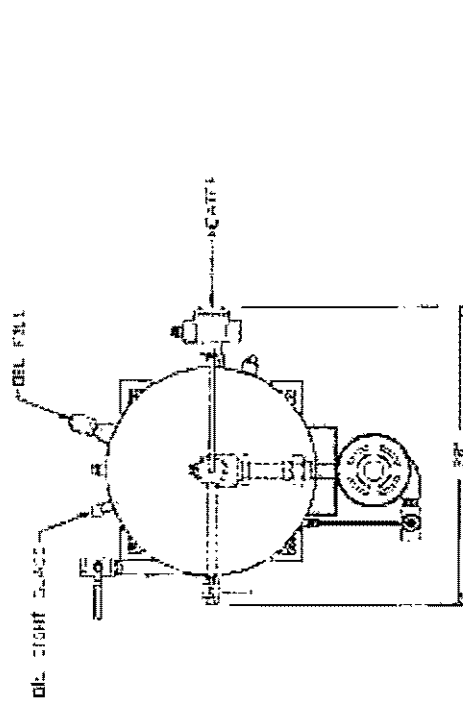
No manufacturer in the world can claim more than 30 years of experience in the sump separator business. In fact - we originated the name, sump separator!



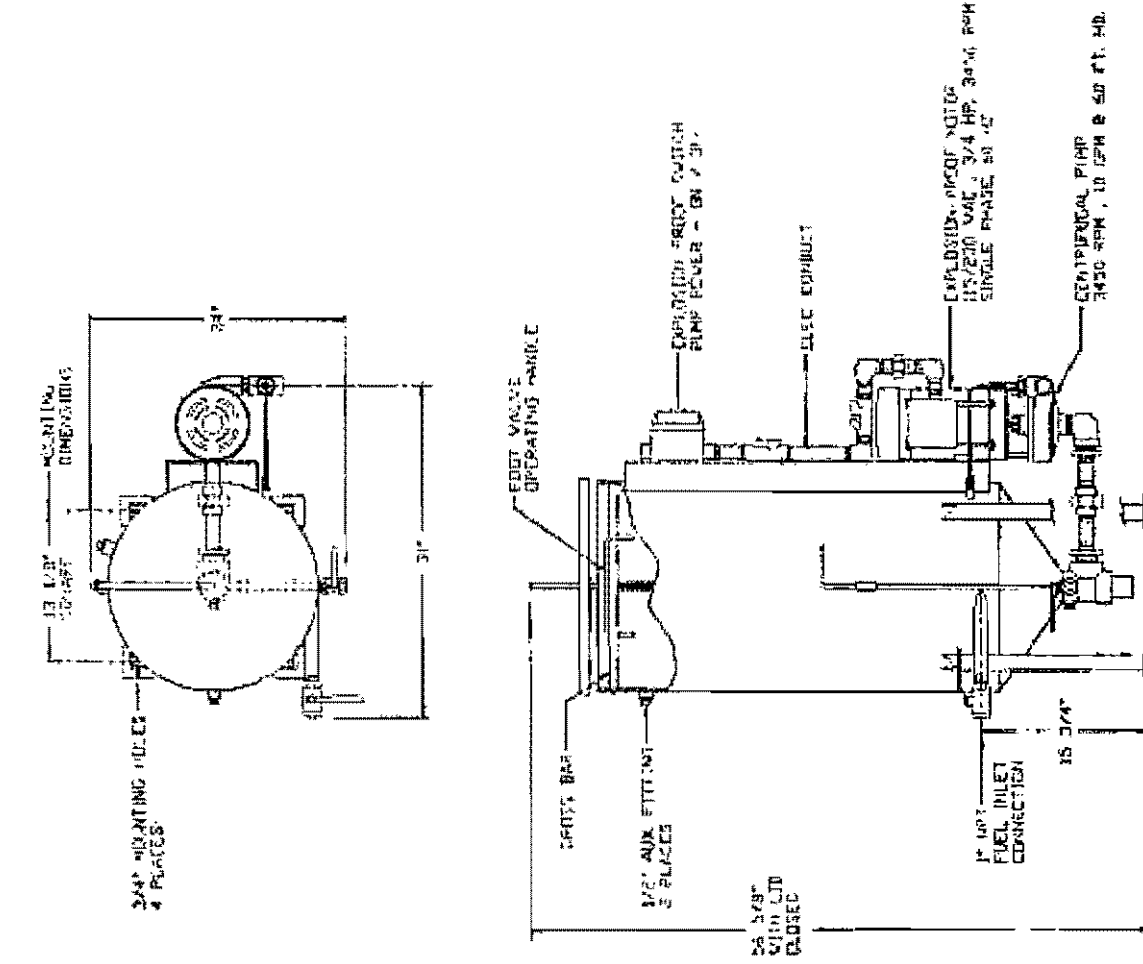
TOP VIEW



TOP VIEW



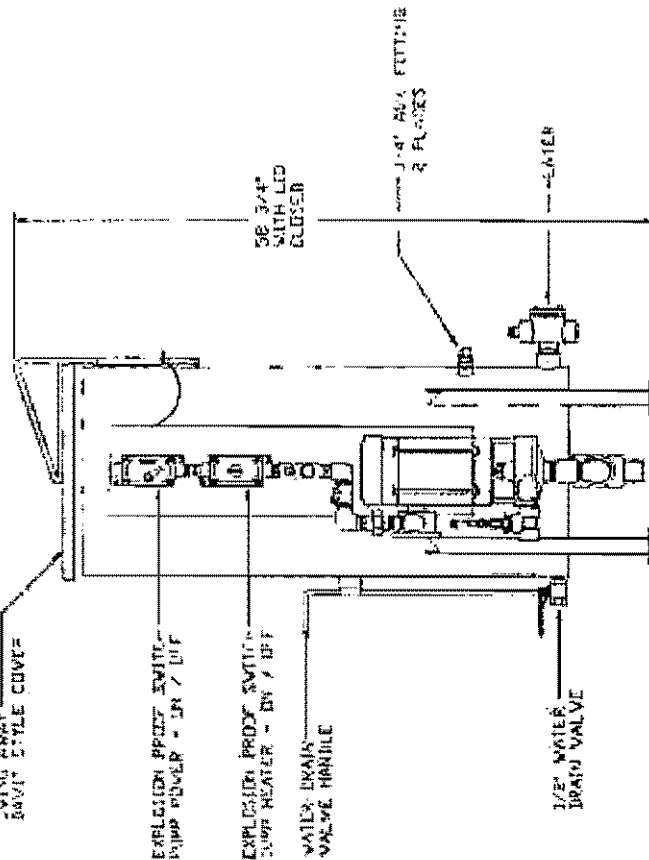
LEFT SIDE VIEW



LEFT SIDE VIEW

616B  
( NO OPTION SHOWN )

FRONT VIEW



FRONT VIEW

616B-7  
( OPTION 7 SHOWN )  
( HEATED SUMP )

*Velcon.*

# Horizontal Filter/Separators

## HV-xxxx200 Series

### Horizontal Filter/Separator Vessels for Fixed Installations at Military Facilities

*meeting*

**USAF Filter/Separator Specifications  
Section 15880**

#### **EASIER CARTRIDGE CHANGE**

The horizontal filter/separator design provides more convenient access to the cartridges than the vertical design.

#### **EFFLUENT CLEANLINESS**

A horizontal filter/separator must be drained to change the elements. This prevents the possibility of getting dirt in the effluent that can occur if the operator does not fully drain a vertical vessel when changing elements. The separator mounting holes on a horizontal vessel are in a vertical plane at the top of the vessel so it is nearly impossible to get dirt in the effluent when cartridges are being changed.

#### **TESTED AND APPROVED\* VESSELS**

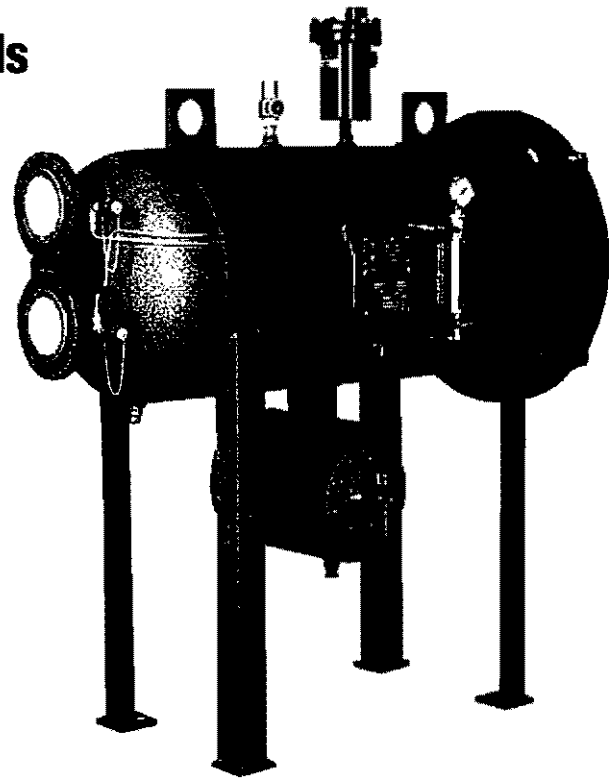
Velcon HV-xxxx200 Series Horizontal Filter/Separators are qualified to USAF Specification 15880. This specification is similar to API Publication 1581, Third Edition, Group II, Class B (fixed installations). These vessels incorporate one piece threaded base coalescer elements for easy, reliable installation and reusable one piece Teflon® coated screen separators.

#### **SPECIFICATIONS**

- 200 psi ASME Code Construction
- RF Flanged Connections
- Swing Bolted Closure
- Buna-N O-Ring Cover Seal
- Mil-C-4556 Epoxy Coated Interior, Primed Exterior

\* Approval letters are available upon request.

Teflon® is a registered trademark of E.I. du Pont de Nemours & Co., Inc.



#### **STANDARD ACCESSORIES**

In compliance with USAF Specification 15880, the following accessories are included for safe, effective operation:

- Automatic Air Vent with Check Valve
- Pressure Relief Valve\*\*
- Direct Reading Differential Pressure Gauge
- Sampling Probes with Ball Valves
- Stainless Steel Ball Valve Manual Drain
- Sight Gauge with Ball Checks and Colored Density Sensitive Ball
- ASME Code Stamp
- API Nameplate

\*\* Does not meet Mil-V-11201

#### **OPTIONAL ACCESSORIES**

- Interface Control
- Water Slug Control Valve

These optional accessories may be supplied directly by the control valve manufacturer, depending on purchase specifications.



# Horizontal Filter/Separator Vessels for Fixed Installations at Military Facilities

## FLOW RATES AND ELEMENTS

Vessel Model No.	Flow Rates <sup>(1)</sup> USGPM	Coalescer Quantity	Element Model No.	Separator Quantity	Element Model No.	Weight with Skid (lbs)	Volume (US gal)
HV-2238200	300	4	I-63885TB	2	SO-430V	1300	66
HV-2838200	600	7	I-63885TB	2	SO-636V	1700	138
HV-3456200	1200	10	I-65685TB	3	SO-648CM	2100	285

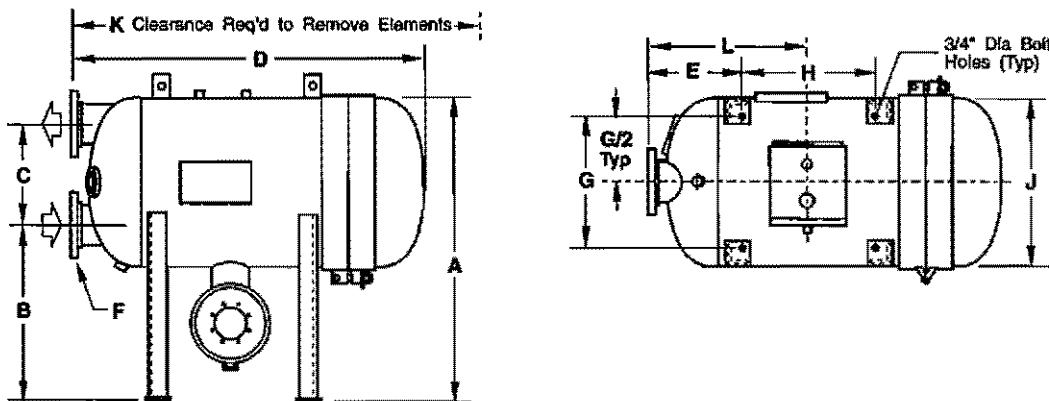
Note: <sup>(1)</sup> For Jet A, Jet A-1, Jet B, JP-4, JP-5, JP-8

## DIMENSIONAL DATA

Vessel <sup>(2)</sup> Model No.	Dimensions (inches)*										
	A	B	C	D	E	F <sup>(3)</sup>	G	H	J	K	L
HV-2238200	53	38 $\frac{1}{2}$	10	54	14 $\frac{1}{2}$	4	16	30	28 $\frac{3}{16}$	90	29
HV-2838200	57	34 $\frac{1}{4}$	16 $\frac{3}{16}$	59 $\frac{1}{2}$	15	6	22	24	29 $\frac{1}{16}$	85	27
HV-3456200	65	38 $\frac{3}{8}$	21	82	18 $\frac{7}{16}$	8	28	38 $\frac{1}{4}$	35	93	37 $\frac{1}{2}$

Notes <sup>(2)</sup> HV-2238200 has a flat cover, while the HV-2838200 and HV-3456200 have domed covers.

<sup>(3)</sup> Flanges are raised face flanges complying with ANSI B16-5, Class 150.



\* Dimensions shown are for estimating purposes only. For exact dimensional detail, obtain copy of vessel drawing.

**Velcon.**

Velcon products are sold and serviced by a world-wide representative network. To order, contact Headquarters or your LOCAL REPRESENTATIVE:

COMPANY HEADQUARTERS:  
Velcon Filters, Inc. 4525 Centennial Blvd.  
Colorado Springs, CO 80919-3350  
Phone: 1.800.531.0180  
Fax: 719.531.5890  
e-mail: [vfsales@velcon.com](mailto:vfsales@velcon.com)  
[www.velcon.com](http://www.velcon.com)

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Sylacauga, Alabama  
Harlingen, Texas

OVERSEAS AFFILIATES:  
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### Distributor Access

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## Positive Displacement Meter - MSAA 275PSI / 1896kPa

#### MSAA-7:

Capacity: 100 GPM (380 L/min.) Supplied with 2" ANSI flanged connections.

#### MSAA-15:

Capacity: 200 GPM (760 L/min.) Supplied with 3" ANSI flanged connections.

#### MSAA-30:

Capacity: 350 GPM (1,325 L/min.) Supplied with 3" ANSI flanged connections.

#### MSAA-40:

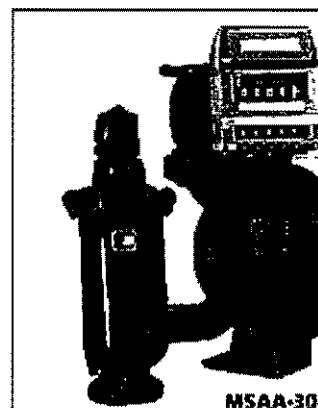
Capacity: 450 GPM (1,700 L/min.) Supplied with 3" ANSI flanged connections.

#### MSAA-75:

Capacity: 700 GPM (2,650 L/min.) Supplied with 4 ANSI flanged connections.

#### MSAA-120:

Capacity: 1,000 GPM (3,785 L/min.) Supplied with 6" ANSI flanged connections.



MSAA-30

IDEX CORPORATION

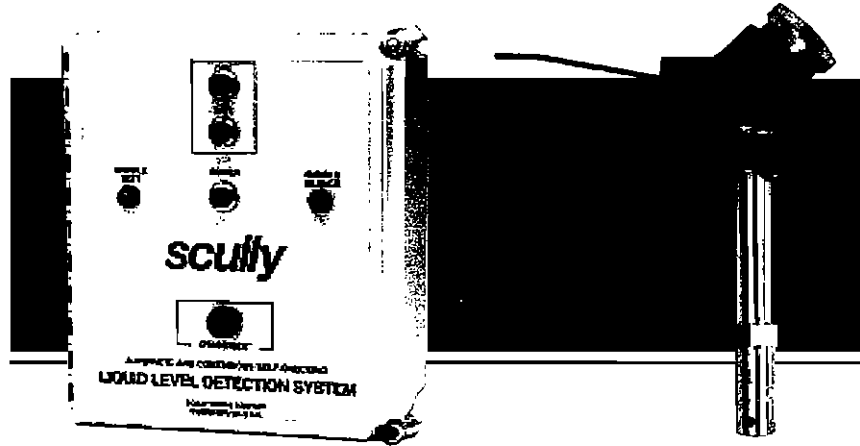
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## Single Point Liquid Level Detection System Model ST-15-LAB

Featuring Dynacheck® - Automatic and Continuous Self-Checking Circuitry



ST-15-LAB

SP-O STYLE PROBE

**The Scully ST-15-LAB Liquid Level Detection System** is a dependable, Faylsafe® system for preventing costly overfills and leaks. The ST-15 controller with SP-O style sensing probes comprises a totally self-checking system, a system you can count on. Don't wait for a costly cleanup, choose Scully. The Scully Single Point Liquid Level Detection System offers all these advantages:

- Dynacheck® - automatic and continuous self-testing circuitry that monitors the tank level or leak status and itself for the maximum in safety through electronic protection.
- Probes are approved as intrinsically safe in hazardous areas.
- Field adjustable sensing level during installation for a variety of tank sizes.
- Probes are solid state, no moving parts.
- Probe available in other materials for a variety of chemical applications.

### Description

The Scully ST-15-LAB Liquid Level Detection System is designed to indicate when product reaches a predetermined high level or a leak occurs.

### Control Unit

The ST-15-LAB control unit incorporates Dynacheck® - automatic and continuous self-testing circuitry. The Dynacheck circuitry monitors the sensor status and its own operation 30 times a second to insure Faylsafe® operation. The wall mounted housing has a green operation indicator, a red wet sensor indicator and an alarm silence switch on the front cover. An internal alarm is also provided. When the alarm is silenced, the red indicator remains on until the probe is dry.

### Probe

The SP-O style probe completes the high level detection or leak detection operation. The Dynacheck continuous and automatic self-testing circuitry sends a signal to the control unit when the sensor becomes wet or an unlikely fault occurs within the sensing circuitry. The factory can supply leak detection probes for double wall tanks and probes made of other materials for a variety of chemical applications. The probe can be field adjusted during installation for a variety of lengths. Refer to the technical information section on the back page for probe temperature ranges.

The ST-15-LAB eliminates the need for manual checks. Its durable construction and Faylsafe® operation provide a system you can depend on. Count on the ST-15-LAB. Choose Scully, the world leader in dynamic liquid level detection systems.

*Setting New Standards In Safety*

67036 Rev.B



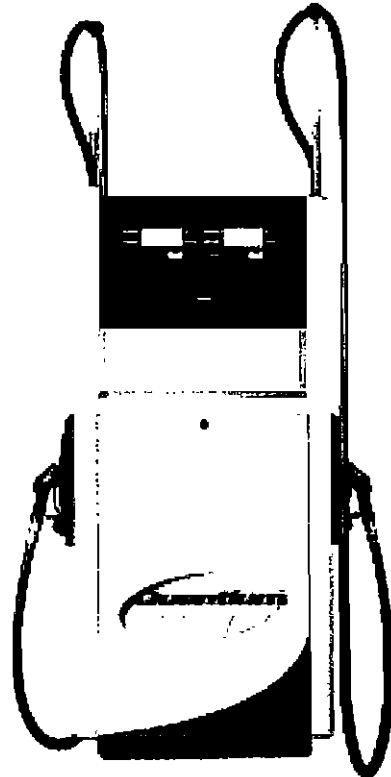
# Quantium 300T



*Used for filling fuel trucks?*

## Quantium 300T

- Optimised ergonomics
- Compact design
- Best-in-industry components



Quantium 300T  
best-in-industry  
components  
for the first really  
global single and  
twin fuel dispenser



In the ever-challenging environment of the retail petroleum industry, the need to improve the efficiency of service stations is a permanent objective. Customer satisfaction and loyalty are the priorities, and outstanding performance and service are the essential key to attaining them.

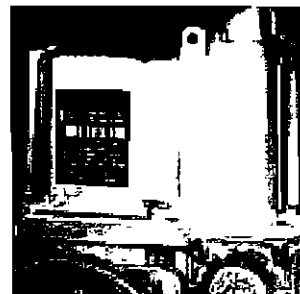
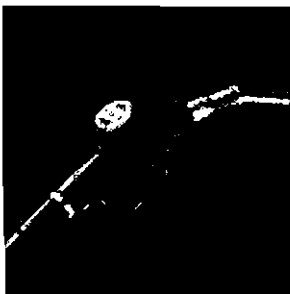
The revolutionary Quantum T family of fuel dispensers has been conceived as the best response yet to this challenge. Through design innovation and the use across the range of a common core of the highest-performance components the industry has to offer we have established a universal platform which we believe will exceed your current and future expectations.

### **Modular design**

The modular basic design of the Quantum 300T dispenser interfaces with a comprehensive set of peripherals to offer levels of flexibility unmatched anywhere in the industry. Future-proof solutions with full plug-in capability for downstream product enhancements mean that we can guarantee our customers best-in-industry technology now and going forward, not to mention the lowest possible ownership costs.

### **Best-in-industry components for unmatched ergonomics**

Built using proven components, the Quantum 300T is an industry reference in terms of ergonomics and performance. The EPZ pump and the MA 26 meter device are twinned with the WWC T1 calculator at the heart of the configuration, making Quantum 300T the most reliable and best performing dispenser in its category.



## EPZ

### The high performance suction pump

This pumping unit has become standard equipment within the Tokheim Group. It has proved its reliability and performance time and again in the toughest conditions and most hostile environments throughout the globe.

The pump operation speed can be modified by simply swapping the motor pulley, enabling the same unit to deliver both standard flows of 40 l/min. or 80 l/min.

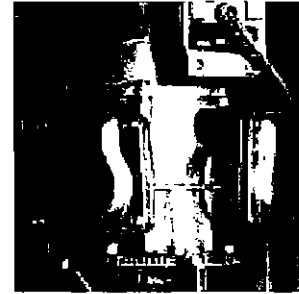
This unit uses a rotary vane pump with carbon blades that produce exceptional suction power even when the pump is dry. Air elimination to extreme tolerances is provided by a patented, fully static device using a vortex effect.

Low electrical power consumption makes this unit a cost-effective solution.

## MA 26

### The high accuracy piston meter

The MA 26 piston meter integrates the MP T1 pulser. It features a four-cylinder sleeved body in which four pistons drive two connecting rods, guaranteeing enhanced reliability.

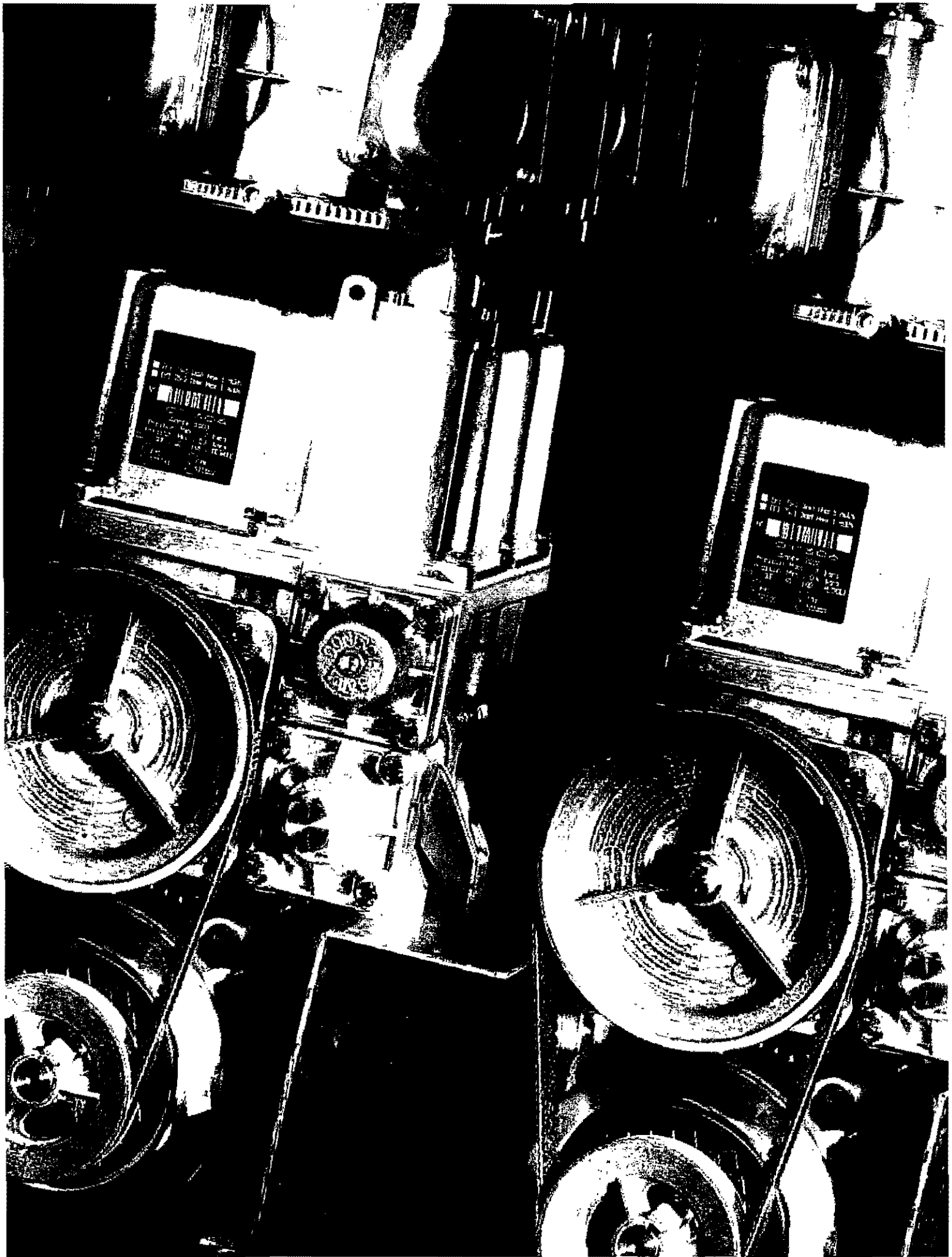


A valve actuated by the crankshaft travels along a linear axis to connect the cylinders successively with the meter inlet and outlet. The valve is mounted between a slide plate built into the meter body and a gasket making a seal with the manifold. The slide plate has four ports, each opening onto one of the four cylinders. The connection between the gasket and the outlet manifold is realised using a teflon diaphragm which prevents any mixing between intake and exhaust.

*10 gal/minute*  
*20 gal/minute?*

Technical specifications		
	40 l/min.	80 l/min.
Pump speed	450 rpm	650 rpm
Max. flow	40 l/min.	80 l/min.
Min. flow	5 l/min.	8 l/min.
Noise level	68 dB	72 dB
Bypass pressure	1.8 bar	2 bar
Power on motor	370 W	550 W
Min. dry suction	400 mbar	500 mbar
Min. wet suction	700 mbar	700 mbar
Air elimination	According to OIML, CEE 77.313 regulation	
Strainer	70 µ	
Bypass pressure adjustment	1.2 bar to 2.5 bar (about 0.1 bar per turn of the by-pass adjustment screw)	

Technical specifications	
Cylinder capacity	0.7 l/rev.
Maximum flow	80 l/min.
Minimum flow	5 l/min.
Accuracy	± 0.3 %
Maximum service pressure	2 bar
Adjusting device action around neutral positions	± 1.1 %





## WWC T1

### The state-of-the-art world-wide calculator

The WWC T1 subsystem is the world-wide electronic heart of the Quantum T dispenser family. Its exceptional levels of reliability and industry-leading flexibility will add genuine value to your fuel retailing operation, while your customer at the pump will enjoy the benefits and comfort of the latest high-visibility display technology.

Designed to incorporate the latest state-of-the-art electronic technology, it allows for more flexibility and maximum efficiency to adapt to all operating requirements in a petroleum retailing environment.

Its adaptable architecture is built around a powerful central microprocessor board controlling a complete set of intelligent peripheral I/O boards with highly dedicated functions to meet your specific needs (e.g. Unit Price Display, Electronic Merchandising, blenders, product indication, preset buttons/keypads, etc.).

Normal data communication between the WWC T1 and forecourt controllers or POS systems already incorporates all major existing proprietary or international standard protocol combinations.

#### Technical specification

- Number of digits:
  - total amount to pay (6),
  - volume (6),
  - unit price (4).
- Data configuration by console or by remote control
- Electronic totalisers provide data on total amount to pay, volume and number of deliveries
- Motor relays and thermal overload protection
- Battery-protected memory for security in the event of power failure
- Optional but fully integrated ECVR solution



### Base models

- Standard speed (40 l/min.), one- and two-product
- Very high speed master (130 l/min.)
- Satellite
- High speed (80 l/min./standard speed (40 l/min.) mono-product twin

- LPG one- and two-hose

### Standard features

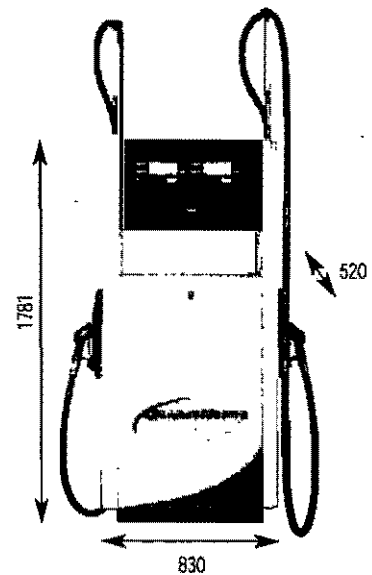
- Lane- or island-oriented, with a flexible mast hose system
- Three phase, 400V/50 Hz motors (same motor for suction pumps and VR vacuum pumps)
- Solenoid control valve (24V) allowing 2-stage (preset application) configurations
- Vapour recovery retrofittable
- Corrosion-resistant chassis and panels with built-in drip tray
- 3/4" ZVA automatic nozzle for standard speed (40 l/min.) & high speed (80 l/min.)
- 1" ZVA nozzle with truck spout for very high speed (130 l/min.) and master/satellite models
- Boesekoop nozzle for LPG
- DN16 hose for standard speed non-VR models (Elaflex or Goodyear)
- Coaxial European vapour recovery hoses for VR (Elaflex or Goodyear)
- DN19 for high speed non-VR models (Elaflex or Goodyear)
- DN21 for very high speed models (Elaflex) or DN25 (Goodyear)

### Optional features

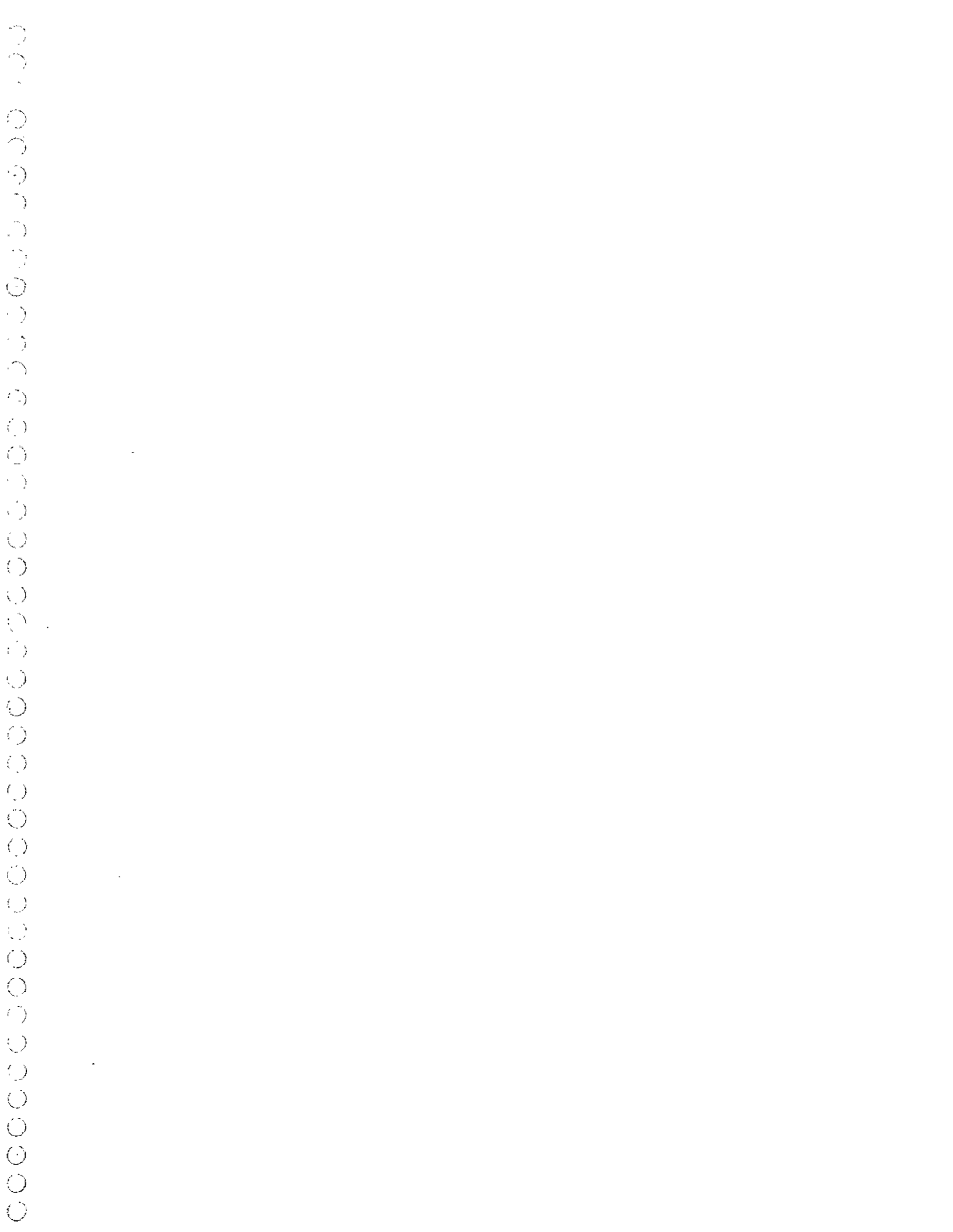
- Vapour recovery (upgradeable to the newly introduced Tokheim ECVR-Self-Calibrating System)
- VR status LED
- Main safety switch
- Programming switch
- Single-phase motor
- Alternate lighted Ferranti-Packard display
- Display on one side only (for island models)
- Preset push buttons
- Preset keypad
- Indication lamps
- Speaker
- IR remote control compatible
- Mechanical totalizers on pulser
- Electromechanical totalizers
- Full range of nozzle options
- Full range of LPG nozzle options (Elaflex, Nettuno, URG)
- Full range of hose options
- 40/80 speed selection
- Air vent
- Hydraulic inlet options
- Pressure feed
- Mouvex air separator
- Ground frame
- Rigid mast for hose: instead of flexible (non-VR models only)
- Ultra low temperature kit (-40°C)
- LPG without nozzle boot (nozzle in fender)

### Environmental conditions

- Ambient temperature: -25°C to +55°C for standard configuration  
-40°C to +40°C with the Ultra Low Temperature kit
- Temperature of fluid: -25°C to +25°C
- Viscosity of fluid: < 10<sup>-4</sup> m<sup>2</sup>/s
- Relative humidity: 5% to 95% non condensing
- Climate: Marine, tropical, industrial and polar
- Altitude: From sea level to 2000m



(in mm)



**WASHINGTON GROUP INTERNATIONAL, INC.**

**\*RENEWAL Certificate of Insurance\***

If the enclosed Certificate requires changes or is no longer necessary, please return a copy of the Certificate with changes noted by mail or fax to the attention of

Mark Fuentes

Fax 847-953-0488

Aon Risk Services, Inc. of Southern California

**Attn: Mark Fuentes**

707 Wilshire Blvd., Suite 6000

Los Angeles, CA 90017

# ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY)  
03/09/2004

<b>PRODUCER</b> Aon Risk Services, Inc., of Southern California 707 Wilshire Blvd., Suite 6000 Los Angeles, CA 90017 Fax: (847) 953-0488      Phone: (213) 630-1345	Serial # 600497	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.
	<b>INSURERS AFFORDING COVERAGE</b>	
<b>INSURED</b> WASHINGTON GROUP INTERNATIONAL, INC. DIVISION: INFRASTRUCTURE 7800 E. UNION AVENUE, SUITE 100 DENVER, CO 80237	INSURER A: ZURICH AMERICAN INSURANCE COMPANY	INSURER B: LLOYDS OF LONDON
	INSURER C:	INSURER D:
	INSURER E:	INSURER F:
	INSURER G:	INSURER H:
	INSURER I:	INSURER J:

## COVERAGES

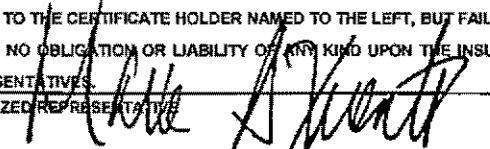
THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
A	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY CLAIMS MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC	GLO3437157-02	4/1/04	4/1/05	EACH OCCURRENCE \$ 2,000,000 FIRE DAMAGE (Any one fire) \$ 2,000,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ 2,000,000 GENERAL AGGREGATE \$ 4,000,000 PRODUCTS - COMP/OP AGG \$ 4,000,000
A	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input checked="" type="checkbox"/> NON-OWNED AUTOS	BAP3437158-02 (AOS) TAP3437160-02 (TX)	4/1/04	4/1/05	COMBINED SINGLE LIMIT (Ea accident) \$ 2,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN EA ACC \$ AUTO ONLY: AGG \$
	EXCESS LIABILITY <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> DEDUCTIBLE <input type="checkbox"/> RETENTION \$				EACH OCCURRENCE \$ AGGREGATE \$ \$ \$ \$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	WC3437161-02	4/1/04	4/1/05	<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$ 2,000,000 E.L. DISEASE - EA EMPLOYEE \$ 2,000,000 E.L. DISEASE - POLICY LIMIT \$ 2,000,000
B	OTHER SEE BELOW &/OR ATTACHED	LE0381527	10/1/03	10/1/04	

### DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

RE: BULK FUEL STORAGE AND DISPENSING SYSTEM  
 ARCHITECTS AND ENGINEERS PROFESSIONAL LIABILITY UP TO \$2,000,000 EACH ACCIDENT CLAIMS MADE INCL. 36-MONTH EXTENDED DISCOVERY PERIOD

INSURED CONTACT: SAM LUNDGREN

<b>CERTIFICATE HOLDER</b> TOWN OF ADDISON ATTN: JIM PIERCE, P.E. 16801 WESTGROVE DRIVE, P.O BOX 9010 ADDISON, TX 75001-9010	<b>ADDITIONAL INSURED; INSURER LETTER:</b>	<b>CANCELLATION</b> SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL <u>30</u> DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE: 
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DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

INSURED: WASHINGTON GROUP INTERNATIONAL, INC.

HOLDER: TOWN OF ADDISON, TEXAS  
16801 WESTGROVE DRIVE  
P.O BOX 9010  
ADDISON, TX 75001-901

RE: BULK FUEL STORAGE & DISPENSING SYSTEM

---

TOWN OF ADDISON, TEXAS AS ADDITIONAL INSURED IN ACCORDANCE WITH THE ATTACHED POLICY ENDORSEMENT LANGUAGE. (GENERAL LIABILITY ONLY)

TOWN OF ADDISON, TEXAS IS INCLUDED AS ADDITIONAL INSURED. (AUTOMOBILE LIABILITY ONLY)

IT IS FURTHER UNDERSTOOD AND AGREED THAT COVERAGE PROVIDED SHALL BE PRIMARY AS TO ANY OTHER VALID AND COLLECTIBLE INSURANCE.

A WAIVER OF SUBROGATION IN FAVOR OF ALL ASSURED IS INCLUDED

**\*\*Companies Affording Coverage Includes Lloyds Of London & Participating Companies\*\***

To be attached to and become a part of the Certificate of Insurance.

#### GENERAL LIABILITY

It is agreed that the definition of Insured is amended to include any person or organization the Named Insured is required by written contract to include as Additional Insured. The "written contract" must be executed prior to the "occurrence" of any loss. Insurance provided by this amendment is limited to the extent of coverage and limits of liability required by the "written contract." and will not increase the limits of the policy or the extend of coverage stated in this policy. The insurance provided by this amendment is limited to only the Legal Liability arising out of the performance of the Named Insured's work under the written contract and shall terminate at the time of completion, or such other time as defined in the written contract.

With respect to the insurance afforded the Additional Insureds, it is further agreed that this insurance does not apply to liability for "Bodily Injury" or "Property Damage" arising out of acts or omissions of the Additional Insured unless this has been agreed to by written contract executed prior to the "occurrence" of any loss.



Addison Contract Agreement No. \_\_\_\_\_ Washington No. \_\_\_\_\_

## TECHNICAL SERVICES CONTRACT AGREEMENT

**THIS CONTRACT AGREEMENT** ("Agreement") is made and entered into this \_\_\_\_ day of January, 2004, by and between the **Town of Addison Texas**, with a business address of 5300 Belt Line Road, Dallas, TX 75254 and a mailing address of P.O. Box 9010, Addison, TX 75001-9010 ("**Owner**"); and **Washington Group International, Inc.**, an Ohio corporation, with a business address at 7800 E. Union Avenue, Suite 100, Denver, Colorado 80237 ("**Engineer**").

### WITNESSETH:

**WHEREAS**, Engineer is engaged in the business of providing professional engineering and design services; and

**WHEREAS**, Owner desires to engage the services of Engineer to perform professional engineering services for the design of a new Bulk Fuel Storage and Dispensing System at Addison Airport (the "**Project**").

**NOW, THEREFORE**, Owner and Engineer agree as follows:

### ARTICLE 1 - SCOPE OF SERVICES

1.1 Engineer agrees to perform for Owner the services described in the Scope of Services at Appendix A attached hereto and incorporated herein.

1.2 Upon execution of this Contract Agreement by both parties, Engineer will proceed with due diligence to perform and complete the services identified in the Scope of Services at Appendix A.

### ARTICLE 2 - MANNER OF PERFORMANCE

2.1 Engineer shall perform the services hereunder and use its professional skill, judgment, and abilities as an independent contractor in accordance with its own methods, this Agreement, and the generally accepted standards of ordinary and reasonable skill and care usually exercised by reputable members of the engineering profession performing the same or similar services at the time and locality Engineer's services are performed. Engineer shall perform all work hereunder in a manner satisfactory and acceptable to Owner in accordance with such standard of care. The Engineer's services consist of those services performed by the Engineer, and its directors, officers, employees, agents, contractors, subcontractors, representatives, and consultants. Nothing in this Agreement is intended nor shall be construed to create an employer-employee relationship, a partnership, or a joint venture or joint enterprise relationship, or to allow the Town to exercise discretion or control over





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the professional manner or method in which the Engineer performs the services which are the subject matter of the Agreement; provided always however that the services to be provided by Engineer shall be provided in a manner consistent with all applicable standards and regulations governing such services and with this Agreement. The employees and agents of, and the methods, equipment and facilities used by, the Engineer shall at all times be under the Engineer's exclusive direction and control.

2.2 Engineer agrees to correct, at its sole expense, any deficiencies resulting from its performance of the services hereunder, which are discovered and reported to Engineer within one year from the date of completion of the services under this Agreement.

2.3 Engineer represents and warrants that it is authorized to practice engineering in the State of Texas and that any necessary licenses, permits or other authorization to practice engineering and to provide the services set forth herein have been heretofore acquired as required by law, rule or regulation. Notwithstanding anything herein to the contrary, the parties hereto agree and acknowledge that Owner is entering into this Agreement in reliance on Engineer's professional abilities with respect to performing the services set forth herein.

2.4 Notwithstanding Owner's approval of any of the work, designs, drawings, specifications, data, documents, and other materials prepared by or for Engineer pursuant to or in connection with this Agreement (together, "Drawings"), Engineer warrants and represents that the same, as the same may be amended or supplemented by Engineer, shall, to the best of Engineer's knowledge, information and belief as an engineer performing the practice of engineering and in accordance with the standards, duties, and obligations set forth herein, be sufficient and adequate for construction of the Project, shall be free from material error, and shall be satisfactory to the Owner. In accordance with the standard of care, Engineer agrees that if it shall recommend unsuitable materials in connection with the Project or if the design of the Project should be defective in any way, Engineer will assume sole responsibility for any damages, loss, claims, or expenses to the extent caused by Engineer's recommendation of unsuitable materials or defective design. Approval by Owner of any of Engineer's Drawings pursuant to this Agreement shall not constitute nor be deemed a release of the responsibility and liability of Engineer, its officers, employees, subcontractors, agents, representatives, and consultants for the accuracy and competency of the same, nor shall such approval be deemed to be an assumption of or an indemnification for such responsibility or liability by Owner for any defect, error or omission in such Drawings or work, it being understood that Owner at all times is ultimately relying on Engineer's skill and knowledge in preparing the Drawings.

### ARTICLE 3 - COMPENSATION AND PAYMENT

3.1 Engineer shall provide the Scope of Services described herein (including, without limitation, Appendix A) for a lump sum amount of One Hundred Twenty Nine Thousand Six Hundred One and



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No/100 Dollars (\$129,601.00). Engineer shall be compensated in proportion to its completion of services performed within each task or phase of service as outlined in this Agreement. Such lump sum amount includes payment of certain Reimbursable Expenses identified and in the amount set forth in Appendix B attached hereto and incorporated herein; no other expenses or costs will be paid or reimbursed to Engineer hereunder.

3.2 In connection with the Project, Owner may request that Engineer perform certain additional services or work not covered by the terms of this Agreement, and Engineer will perform such additional services or work as may be agreed upon by Owner and Engineer. For any such additional services or work, compensation to Engineer shall be computed according to the hourly rates set forth in Appendix B attached hereto and incorporated herein.

3.3 **Manner of Payment** - Engineer shall be compensated in proportion to completion of services performed within each task or phase of service in accordance with the phases set forth below and applicable provisions outlined in this Agreement. During the term of this Agreement, on or as soon as practical after the first day of each month, Engineer shall prepare and submit to Owner an invoice covering the portion of each phase of the work performed during the immediately previous month which is in form and substance satisfactory to Owner. Each such invoice shall include a statement of services rendered and the amount owed in connection therewith, and the sum of all prior payments for the Scope of Services set forth herein. The cumulative amounts of progress payments shall not exceed \$129,601.00, unless mutually agreed upon in writing by Owner and Engineer. Engineer shall not be entitled to any compensation for any services or work not actually performed or for any lost profits as a result of any termination, abandonment or suspension of work by Owner.

Progress payments for such Services shall be paid by each phase of the Project as follows:

Planning and Studies:	\$ 33,947.50 ( 26.20%)
Engineering and Design Phase:	\$ 81,219.50 ( 62.67%)
Construction Management Services Phase:	\$ 14,434.00 ( 11.13%)
Total:	\$129,601.00 (100.00%)

Owner shall pay to Engineer within thirty (30) days after receipt of the invoice the amount shown to be due for work properly performed. If Owner fails to make any payment properly due Engineer for services and expenses within thirty (30) days after receipt of Engineer's invoice therefore, interest on the amounts due Engineer will accrue interest at the rate of 1% per month from and after said thirty (30) days, and in addition Engineer may, after giving seven (7) days written notice to Owner, suspend services under this Agreement until Engineer has been paid in full all amounts properly due for services, expenses and charges. In the event of a disputed or contested billing, only that portion so contested will be withheld from payment. Owner will exercise reasonableness in contesting any bill or portion thereof. No interest will accrue on any contested portion of the billing until mutually resolved. If a suspension of services by Engineer due to Owner's non-payment increases Engineer's





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costs of performance, prior to Engineer's resumption of performance of suspended services, Owner and Engineer will seek to equitably adjust this Agreement to extend Engineer's time for performance of the delayed services or other obligations sufficient to overcome the effects of such delay and/or to increase Engineer's compensation to reflect its increased costs of performance.

3.4 Any provision hereof to the contrary notwithstanding, Owner shall not be obligated to make payment to Engineer hereunder if:

- .1 Engineer is in default of any of its obligations under this Agreement or any documents in connection with the Project (and payment may be withheld to the extent of any such default);
- .2 Any part of such payment is attributable to any services of Engineer which are not performed in accordance with this Agreement;
- .3 Engineer has failed to make payment promptly to consultants or other third parties used by Engineer in connection with Engineer's services hereunder for which the Owner has made payment to Engineer; or
- .4 If the Owner, in its good faith judgment and after consultation with Engineer, determines that the portion of the compensation then remaining unpaid will not be sufficient to complete the services hereunder, no additional payments will be due Engineer hereunder unless and until Engineer performs a sufficient portion of the services so that such portion of the compensation remaining unpaid is determined by Owner to be sufficient to complete the services.

#### **ARTICLE 4 - ACCOUNTING OF COSTS**

During the period of this Agreement, Engineer shall maintain books and accounts of its costs and expenses in accordance with generally accepted accounting principles and practices. Owner shall have access to these books and accounts in the Town of Addison, Texas during normal business hours to the extent required to verify all costs and expenses for a period of one year after completion of Engineer's services.

#### **ARTICLE 5 - LIABILITY AND INDEMNITY**

5.1 Engineer agrees to indemnify and hold harmless the Town of Addison, Texas, its officials, officers, employees, and agents from and against any and all damages, claims, causes of action, liabilities, lawsuits, demands, judgments, penalties, fines, harm, loss, cost or expense claimed by third parties (including, without limitation, employees of both the Engineer and the Owner) for any property damage or destruction and/or bodily injury, including death, to the proportionate extent



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caused by the negligence (including, without limitation, gross negligence) or willful misconduct of Engineer, its agents, directors, officers, employees, contractors, subcontractors, representatives, consultants, or affiliates, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, in connection with or in the performance of the services under this Agreement. The provisions of this paragraph shall survive the expiration or termination of this Agreement.

5.2 To the fullest extent permitted by law, the total liability, in aggregate, of Engineer, its officers, directors, employees, agents, consultants and subcontractors, and any of them, to the Owner and anyone claiming by, through or under the Owner, and any of them, for any and all injuries, claims, losses, expenses or damages whatsoever arising out of or in any way related to Engineer's services under this Agreement from any cause or causes whatsoever, including but not limited to the negligence, errors, omissions, strict liability or breach of contract of Engineer, its officers, directors, employees, agents, consultants and subcontractors, and any of them, shall not, in the aggregate, exceed One Million Five Hundred Thousand and No/100 Dollars (\$1,500,000.00).

5.3 The provisions of this Article 5 takes precedence over any conflicting provision of this Agreement or any incorporated or referenced document.

#### **ARTICLE 6 - RESPONSIBILITIES OF OWNER**

6.1 Owner will designate a representative to review and approve documents submitted by Engineer. The representative shall be empowered to render decisions and provide information in a timely manner that will not delay the orderly progress of the work. Engineer is entitled to rely upon the information, decisions and approvals furnished by Owner's representative.

6.2 Owner will furnish to Engineer the data specified in Appendix A

#### **ARTICLE 7 - CHANGES**

Owner shall have the right to order changes in the Scope of Services. If such changes affect Engineer's costs, performance schedules, warranties or other provisions of this Agreement, Engineer's compensation and other affected provisions shall be equitably adjusted by the mutual agreement of the parties.

#### **ARTICLE 8 - DELAYS**

Neither party hereto shall be considered in default in the performance of its obligations hereunder to the extent that the performance of any such obligation is prevented or delayed by any cause, existing or future, which is beyond the reasonable control of the party obligated to perform and is not avoidable by the exercise of diligence by such party.



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## ARTICLE 9 - OWNERSHIP OF DOCUMENTS

All documents or materials prepared by or for Engineer hereunder in whatever form or format (including, without limitation, in electronic format), including without limitation original drawings, estimates, specifications, field notes and data, shall be delivered to and become the property of Owner. Engineer shall retain a set of reproducible record prints of drawings and copies of other documents for its records as instruments of service. Any reuse for extensions of the Project or for new projects without specific written verification and adaptation by Engineer for the specific purposes intended will be at Owner's sole risk and without liability or legal exposure to Engineer. Any Engineer services for such verification and adaptation will entitle Engineer to further compensation at rates to be agreed upon between Owner and Engineer.

## ARTICLE 10 - INSURANCE

10.1 Engineer shall procure and continuously maintain during the term of this Agreement insurance as follows:

10.1.1 Workers' Compensation insurance at statutory limits, including Employers' Liability coverage at minimum limits of \$1,000,000 each occurrence each accident/\$1,000,000 by disease each occurrence/\$1,000,000 by disease aggregate.

10.1.2 Commercial General Liability at combined single limits of at least \$1,000,000 per occurrence and \$2,000,000 general aggregate for bodily injury and property damage, which coverage shall include products/completed operations (\$1,000,000 products/ completed operations aggregate), and XCU (Explosion, Collapse, Underground) hazards, and contractual liability. Coverage for products/completed operations must be maintained for at least two (2) years after the construction work has been completed. Owner will be named as an additional insured with respect to the Engineer's services performed under this Agreement.

10.1.3 Commercial Automobile Liability insurance at minimum combined single limits of \$1,000,000 per-occurrence for bodily injury and property damage, including coverage for owned, non-owned and hired vehicles.

10.1.4 Professional Liability (Errors & Omission Insurance) with a limit of at least \$2,000,000 per occurrence and annual aggregate on a claims-made basis. This coverage must be maintained for at least two (2) years after the Project is completed. A policy retroactive date equivalent to the inception date of this Agreement (or earlier) must be maintained during the full term of this Agreement.

10.2 With reference to the foregoing insurance requirements, Engineer's insurance policies shall



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comply with the following:

- .1 The Town of Addison, Texas shall be named as an additional insured with respect to all liability policies (except professional liability and workers' compensation).
- .2 All liability policies shall contain no cross liability exclusions or insured versus insured restrictions.
- .3 A waiver of subrogation in favor of the Town of Addison, Texas shall be contained in the workers compensation and all liability policies except for professional liability.
- .4 Such insurance shall be maintained in full force and effect and shall not be cancelled, altered or amended without thirty (30) days prior written notice having first been furnished to the Town of Addison.
- .5 All insurance policies, which name The Town of Addison as an additional insured, shall be primary and non-contributory.
- .6 Required limits may be satisfied by any combination of primary and umbrella liability insurances.
- .7 Engineer may maintain reasonable and customary deductibles, subject to reasonable approval by Owner.
- .8 Insurance must be purchased from insurers that are financially acceptable to Owner.

All insurance must be written on forms filed with and approved by the Texas Department of Insurance. Certificates of Insurance shall be prepared and executed by the insurance company or its authorized agent and shall contain provisions representing and warranting the following: (i) sets forth all endorsements and insurance coverages according to requirements and instructions contained herein, and (ii) shall specifically set forth the notice-of-cancellation or termination provisions to the Town of Addison.

#### **ARTICLE 11 - GOVERNING LAW**

In the event of any action under this agreement and authorization, venue for all causes of action shall be instituted and maintained in Dallas County, Texas. The parties agree that the laws of the State of Texas shall apply to the interpretation, validity and enforcement of this Agreement, and, with respect to any conflict of law provisions, the parties agree that such conflict of law provisions shall not affect the application of the law of Texas (without reference to its conflict of law provisions) to the interpretation, validity and enforcement of this Agreement. This Agreement shall be governed by the



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laws of the State of Texas.

## ARTICLE 12 - NOTICES

12.1 For purposes of this Agreement, notices and all other communications provided for herein shall be in writing, addressed as provided hereinafter to the party to whom the notice or request is given, and shall be either (i) delivered personally, (ii) sent by United States certified mail, postage prepaid, return receipt requested, or (iii) placed in the custody of Federal Express Corporation or other nationally recognized carrier to be delivered overnight. Notice shall be deemed given: when received if delivered personally; forty-eight (48) hours after deposit if sent by mail; and twenty-four (24) hours after deposit if sent overnight by Federal Express or other nationally recognized carrier.

12.2 The address of Owner for all purposes under this Agreement and for all notices hereunder shall be:

Town of Addison  
16801 Westgrove Drive  
P.O. Box 9010  
Addison, Texas 75001-9010

Phone: (972) 450-2879 Fax: (972) 450-2837

Attention: Jim Pierce, P.E., Assistant Director of Public Works

12.3 The address of Engineer for all purposes under this Agreement and for all notices hereunder shall be:

Washington Group International, Inc.  
7800 E. Union Avenue, Suite 100  
Denver, Colorado 80237

Phone: (303) 843-3596 Fax: (303) 843- 3133

Attention: Sam Lundgren, P.E., Project Manager

12.4 From time to time either party may designate another address within the 48 contiguous states of the United States of America for all purposes of this Agreement by giving the other party not less than ten (10) days advance notice of such change of address in accordance with the provisions hereof.

## ARTICLE 13 - NO GUARANTEE OF COST

Owner acknowledges that Engineer has no control over the cost of labor, materials, equipment or services furnished by others, or over methods of determining prices utilized by the contractors



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retained by Owner, or over competitive bidding or market conditions. Engineer shall provide its opinion of probable total Project and construction cost. Engineer's opinions of probable total project and construction cost will be made on the basis of Engineer's experience and qualifications and will represent Engineer's best judgment as an experienced and qualified professional engineer, familiar with the construction industry. However, Engineer cannot and does not guarantee that proposals, bids, or actual total project or construction costs will be the same as those estimated by Engineer.

#### **ARTICLE 14 - DISPUTES**

14.1 Owner and Engineer agree to negotiate in good faith to resolve any disputes or differences arising under this Agreement. Any dispute that cannot be resolved by negotiation may by mutual agreement of the parties be submitted to mediation or such other form of non-binding Alternative Dispute Resolution (ADR) as they may mutually agree upon. If the parties do not agree to submit any such dispute or difference to mediation or other form of non-binding ADR, either party may pursue any available remedy, whether legal or equitable or otherwise.

14.2 If legal proceedings are filed by either party, the forum for any such action relating to this Agreement shall be in the courts located in Dallas, Texas, either state or federal. Owner and Engineer hereby irrevocably consent to the jurisdiction of such courts and waive any defense, whether asserted by motion or pleading, that such courts are an inconvenient or inappropriate venue.

#### **ARTICLE 15 - TERMINATION AND ASSIGNMENT**

15.1 Owner may terminate this Agreement at any time and for any reason whatsoever (with cause or without cause) by giving at least ten (10) days notice to Engineer of such termination. Engineer shall cease all work and labor being performed under this Agreement immediately upon receipt of the notice of termination. In the event of such termination, Owner shall pay Engineer in full for all work previously authorized and properly performed prior to the date of termination.

15.2 Engineer may terminate this Agreement in the event of nonpayment of costs or fees as specified herein and in accordance with this Agreement.

15.3 Upon expiration or termination of this Agreement and payment to Engineer for work properly performed hereunder, Engineer shall deliver to Owner all finished or unfinished documents, data, studies, surveys, drawings, maps, models, reports, photographs or other items prepared by or for Engineer in connection with this Agreement. In the event of termination, the parties shall have their remedies at law, in equity, or otherwise as to any rights and obligations between them.

15.4 All obligations arising prior to the termination or expiration of this Agreement and all provisions of this Agreement allocating responsibility or liability between Engineer and Owner shall survive the cancellation, expiration or termination of this Agreement. Any rights and remedies either





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party may have with respect to the other arising out of the performance of services during the term of this Agreement shall survive the cancellation, expiration or termination of this Agreement.

15.5 This Agreement shall not be assigned, transferred, or otherwise conveyed in whole or in part by either party without prior written approval of the other, except that Engineer may utilize in the performance of this Agreement, without prior approval of Owner, personnel or services of its related entities and affiliated companies as if they were an integral part of Engineer. Any such unauthorized assignment, transfer, or other conveyance shall be cause for immediate termination.

#### **ARTICLE 16 – NO WAIVER**

No failure of either party hereto at any time to give notice of any breach by the other party of, or to require compliance with, any condition or provision of this Agreement shall be deemed a waiver of any provisions or conditions hereof.

#### **ARTICLE 17 - SEVERABILITY**

If any provision of this Agreement is held to be illegal, invalid or unenforceable under present or future laws, such provision shall be fully severable and this Agreement shall be construed and enforced as if such illegal, invalid or unenforceable provision is not a part hereof, and the remaining provisions hereof shall remain in full force and effect. In lieu of any illegal, invalid or unenforceable provision herein, there shall be added automatically as a part of this Agreement a provision as similar in its terms to such illegal, invalid or unenforceable provision as may be possible and be legal, valid and enforceable.

#### **ARTICLE 18– REMEDIES**

In connection with this Agreement, either party shall be entitled to and may, as a remedy for any breach of this Agreement, for any failure by the other party to perform in accordance with the terms and conditions hereof, or to enforce the terms and conditions hereof, seek relief as provided for in Article 14 Disputes of this Agreement. The remedies set forth in this Agreement are Owner's and Engineer's sole and exclusive remedies for any failure of Engineer or Owner, as the case may be, to comply with its obligations.

#### **ARTICLE 19 - ENTIRE AGREEMENT**

19.1 This Agreement (consisting of pages 1 to 11, inclusive) together with the attached Appendix A and Appendix B, sets forth the entire agreement between the parties with respect to the Project and supersedes all prior negotiations, Letters of Intent, preliminary drafts and prior versions of this Agreement, whether signed or unsigned.



Addison Contract Agreement No. \_\_\_\_\_ Washington No. \_\_\_\_\_

19.2 This Agreement and said Appendices A and B may only be amended, supplemented, modified or canceled by a written instrument duly executed by both parties.

**ARTICLE 20 – MISCELLANEOUS**

20.1 This Agreement and each of its provisions are solely for the benefit of the parties hereto and are not intended to create or grant any rights, contractual or otherwise, to any third person or entity.

20.2 The undersigned officers and/or agents of the parties hereto are the properly authorized officials and have the necessary authority to execute this Agreement on behalf of the parties hereto, and each party hereby certifies to the other that any necessary resolutions or other act extending such authority have been duly passed and are now in full force and effect.

**IN WITNESS WHEREOF**, the parties have made and executed this Agreement that is effective as of the date first above written.

**ENGINEER**

**OWNER**

By: *Kurt A. Goddard*  
Name: \* Kurt A. Goddard  
Title: \* Senior Vice President  
Date: 23 Jan 2004

By: *Ron Whitehead*  
Name: \* Ron Whitehead  
Title: \* CITY MANAGER  
Date: JAN 26, 2004

**ATTEST OR WITNESS**

**ATTEST OR WITNESS**

*Richard P. Rusk*

*Mark Acevedo* - MARK ACEVEDO

\*Print or type

## APPENDIX A

### SCOPE OF SERVICES

#### 1. SCOPE

1.1 In accordance with the previous Washington Group International, Airport Services recommendations, the scope of services is to provide comprehensive design services and the production of bid documents for the new Bulk Fuels Storage and Dispensing Facility at Addison Airport. Service will include, among other things:

- .1 developing:
  - .1 an Environmental Assessment (EA) or a Category Exclusion (CATEX) document, as required, and
  - .2 a geotechnical investigation and report for the site of the Project; and
  - .3 a detailed engineers construction estimate; and
- .2 construction acquisition process support; and
- .3 preparation and production of bid documents and bid result review and recommendation of award of bid; and
- .4 providing construction control points staking; and
- .5 construction management and inspection; and
- .6 Project close-out/as-built service.

The centrally located 16 individual bulk fuel storage tanks, with a central off-load and four metered dispensing systems, will be consolidated in one environmentally protected site, including tanks and operating equipment, with suitable architectural considerations to blend into the site. The horizontal mounted cylindrical tanks will have an approximate dimension of eleven feet (11') diameter by thirty-five feet, two inches (35'-2") in length. Products to be dispensed are Low Lead AVGAS and Jet A Fuel. The off load system will be capable of off loading a 8000 gallon over the road fuel tanker truck in 20 minutes, at approximately 400 gallons/minute and the dispensing systems into the Airport refueling vehicles will be rated at approximately 350 gallons/minute.

1.2 Other Considerations - Industry standard filtering systems with automatic shutdown and alarms will be installed on the off-load side of the storage tanks, to protect product in the fuel storage tanks. Overflow protection devices will be installed on all fuel storage tanks and connected to the pump control panel. Pump/dispensing control panel or panels, will be logically sequenced, gauged to fuel storage tanks for fuel level indication, and clearly marked for ease of operations. An oil/water separator will be installed and connected to the secondary containment dike area, using a valve

connection and the off-load/dispensing pad to allow for immediate wash-down of any spilled product. The off-load/dispensing pad will be large enough to provide a designated parking spot for any aircraft-refueling vehicle that develops a leak. Fuel storage area will have explosion proof electrical fixtures and control panel. An 1 1/2" water line will be required for emergency eye wash unit and a 1" hose and reel unit installed for wash down. The hose must reach all areas of the facility, including the oil/water separator. An emergency telephone/intercom/transmitter device will be installed with direct link to the Fire Station alarm room located at 4798 Airport Parkway, Addison, Texas 75001-3364. Use of a concrete low wall would allow a more compact containment dike area, connected to the oil/water separator so that any major spill in the containment area can be washed down and pumped out through the oil/water separator. Design will include area lighting, site storm drainage and connection, any required utilities relocation, and site appearance considerations. Access from the outside (airport land side) will be controlled with electrically operated gates and a code or key access pad. Paved access will be required from the street and from the airfield areas. Street connection will include driveways, curb and gutter. The estimated cost for construction of the Bulk Fuel Storage and Dispensing Facility, as outlined above, is \$1,269,500.

## 2. SCHEDULE FOR PERFORMANCE

During the Planning and Studies Phase and subsequent Design Phase (together, for purposes of this Appendix A, "Design Phase"), the Engineer shall perform the above-listed engineering and design services, producing planning, design and approval documents for a final set of construction plans and specifications documents for competitive bid within 200 calendar days from notice to proceed by the Owner, allowing reasonable review times and periods by the Owner and review agencies. Performance of the Bidding and Construction Phase shall follow the completion of the Design Phase.

*Complete August 16<sup>th</sup> 04*

## 3. REPORTS AND DELIVERABLES

In the Design Phase, the Engineer will produce for Owner's consideration of approval, review with Owner, and make recommendations regarding:

1. A 10% concept design, with at least two options for approval
2. Site and Project approval documents for FAA and other Governmental Agencies
3. A 35% Preliminary Design for function and budget approval
4. A 65% Design for Operation, Equipment and Appearance approval
5. A 95% Design for Final Review, Coordination and Cost Estimate Approval (such cost estimate being Engineer's detailed opinion of probable Project construction cost)
6. The 100% Final Design for Construction, Plans and Specifications Documents (such Final Design plans and documents shall be based on the approved design documents and any further adjustments authorized by Owner in the scope or quality of the Project or in the construction budget, and based upon Engineer's opinion of construction cost; such Final Design plans and documents shall be set forth in detail requirements for the construction of the Project, which shall comply with applicable laws, statutes, ordinances, codes and regulations)

In connection with each stage of design, Engineer shall present and submit to Owner four (4) sets of plans and/or specifications for Owner's review and consideration of approval. Plans shall be 22"X34" and drafted such that they can be reduced to 11"X17" and be readable. At the time that plans and specifications are needed to submit for permits, Engineer shall present and submit to Owner four (4) additional sets of plans and/or specifications. For bidding purposes, the plans, specifications, and all bidding documents will need to be able to be up-loaded to DemandStar, and one (1) copy of the same shall be made available to Owner on a Compact Disk.

During the Design Phase and at any other times requested by Owner, Engineer will assist Owner in consultation with and obtaining approval for the Project from the FAA or such other governmental agencies and authorities as have jurisdiction to review or approve the design of the Project, and assist Owner in consultation with the FAA and such other agencies and authorities.

Reports and deliverables shall consist of drawings, specifications, construction documents, and other information required to fix and describe the size, character, treatment, materials, etc., setting forth in detail requirements for construction of the Project

The Engineer shall advise Owner if it appears that the Project construction cost may exceed the latest approved Project budget and make recommendations for corrective action. For purposes of this Agreement, "construction cost" shall include the cost to construct the Project designed or specified by Engineer (including a reasonable allowance for a contractors' overhead and profit); in addition, a reasonable allowance for contingencies shall be included for market conditions at the time of bidding and for changes in the work during construction. "Construction cost" does not include the compensation of Engineer and its consultants, costs of land, rights-of-way, financing or other non-construction costs.

In the Construction Management Services Phase (referred to in this Appendix A as the "Bidding and Construction Phase"), the Engineer will produce:

1. Bidding documents review and recommendation for award
2. A Storm Sewer Pollution Prevention Plan
3. A Traffic Control Plan
4. Equipment and Fabrication Submittal review and recommendations
5. Major equipment installation and operation verification
6. Project review for complete and usable function and installation
7. As built plans for Project documentation
8. A legal description of the site with facility map

Anticipated Site Visits are as follows:

1. Pre-Design and Concept Approval Meeting
2. 65% Design Review
3. 95% Design Review
4. Pre-Bid Meeting
5. Bid Opening and Review
6. Pre-Construction Meeting
7. Completed Project Review and Operational Check

8. Periodic visits to the site of the Project during construction (at intervals at intervals appropriate to the various stages of construction as Engineer deems necessary or as requested by Owner in order to observe as an experienced and qualified design professional the progress and quality of the various aspects of contractor's work)

In connection with the Bidding and Construction Phase and the Site Visits and for the compensation set forth in this Agreement:

(1) In connection with the bidding of the Project, Engineer will produce for Owner's review and consideration of approval, necessary bidding information, bidding forms, the forms of agreement between Owner and the contractor(s) (including the general and special conditions of the construction contract), and other documents or information in connection with the construction of the Project. Engineer shall assist Owner in issuing bidding documents to bidders and conducting a pre-bid conference with prospective bidders. Engineer shall attend at least one pre-bid meeting in Addison, shall assist in responding to questions from bidders, shall prepare any required addenda to any of the contract documents, Drawings, or information, and shall tabulate and evaluate bids as requested by Owner, and prepare a letter of recommendation for award of the construction contract for the Project.

For purposes of the Bidding and Construction Phase, Engineer shall prepare and deliver to Owner two (2) full size sets and four (4) half size sets of plans, specifications, and other Drawings used in connection with the Project.

(2) Engineer's visits to the site during the construction phase of the Project are to allow Engineer to become generally familiar with and to observe the progress and quality of the construction work, and to determine in general if the work is being performed and is proceeding in a manner indicating that the work, when completed, will be in accordance with the Drawings prepared by or for Engineer hereunder. However, it is understood that the contractor, not Engineer, is solely responsible for the construction of the Project, for safety programs and procedures at the site, and for its own acts or omissions and those of any subcontractor. Engineer shall recommend to Owner that contractor's work be disapproved and rejected while it is in progress if, on the basis of such on-site visits and observations, Engineer believes that such work will not produce a completed Project that conforms generally to the contract documents and Drawings or that it will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated in the contract documents and Drawings.

(3) On the basis of on-site visits and observations, Engineer shall keep the Owner informed of the progress and quality of the construction work, and shall endeavor to guard the Owner against defects and deficiencies in the work and to the extent Engineer observes or is made aware of such defects and deficiencies, Engineer will report any such defects and deficiencies to the Owner. Engineer shall supply Owner with a written report following each on-site visit and observation. Engineer shall require such special inspections or tests of contractor's work as Engineer deems appropriate, and shall receive and review certificates of or other documents regarding inspections, tests and approvals as requested by the Owner and as required by laws, rules, regulations, ordinances, codes, orders or the contract documents and Drawings; Engineer's review of such certificates will be for the purpose of determining that the results certified indicate compliance with the same.

(4) Engineer shall promptly correct any defective Drawings or other information furnished by Engineer at no cost to the Owner. The Owner's approval, acceptance, use of or payment for all or any part of Engineer's services hereunder, including, without limitation, the Drawings or any portion thereof, or of the Project itself, shall in no way alter Engineer's obligations or the Owner's rights hereunder. If requested by Owner, Engineer shall review and take appropriate action on the contractor's submittals and application for payment (including, without limitation, certifying any amounts due the contractor based upon Engineer's visits to and observations at the site, and such certification shall constitute a representation to the Owner, based on Engineer's visits and observations at the site and on the data comprising the Contractor's applications for payment, that, to the best of Engineer's knowledge, information and belief, the work has progressed to the point indicated and the quality of the work is in accordance with the Drawings. Engineer shall furnish to the contractor such additional details, interpretations, and clarifications as are customary during the Construction Phase. All changes, substitutions, and deviations from the Drawings shall be subject to Owner's approval.

(5) Engineer shall review and approve or take other appropriate action upon contractor's submittals such as shop drawings, product data and samples for the purpose of checking such submittals for conformance with, and the design concept expressed in the requirements of the contract documents and Drawings. Engineer's action shall be taken with such reasonable promptness as to cause no delay in the contractor's work on in construction by the Owner's own forces (if any), while allowing sufficient time in Engineer's professional judgment to permit adequate review. Engineer's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by Engineer, of construction means, methods, techniques, sequences or procedures. Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component. When professional certification of performance characteristics of materials, systems or equipment is required by the contract documents and Drawings, Engineer shall be entitled to rely upon such certification to establish that the materials, systems or equipment will meet the performance criteria required by the contract documents and Drawings.

(6) At Owner's request, Engineer shall review or take other appropriate action on construction change orders and construction change directives. Engineer shall also issue necessary clarifications and interpretations (and report the same to Owner) of the contract documents and Drawings as appropriate to the orderly completion of the work. Such clarifications and interpretations will be consistent with the intent of and reasonably inferable from the contract documents and Drawings.

(7) Based on Engineer's observations and on its review of applications for payment and accompanying supporting documentation from the contractor (if Owner has requested such review), Engineer shall, at Owner's request, determine the amounts that Engineer recommends the contractor be paid. Such recommendations of payment (if requested by Owner) will be in writing and will constitute Engineer's representation to Owner, based on such observations and review, that, to the best of Engineer's knowledge, information and belief, (i) the contractor's work has progressed to the point indicated, (ii) such work is generally in accordance with the contract documents and Drawings (subject to an evaluation of the work as a functioning whole upon substantial completion, to the results of any subsequent tests called for in the contract documents and Drawings and to any other qualifications stated in the recommendation), and (iii) the conditions precedent to contractor's being

entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe contractor's work. In the case of unit price work, Engineer's recommendations of payment will include final determinations of quantities and classifications of contractor's work, based on observations and measurements of quantities provided by the contractor with contractor's pay requests.

Engineer shall secure, review, and transmit to Owner all original documents Engineer receives from the contractor, including without limitation any required lien waivers, releases, bonds, affidavits, certificates of inspection, tests and approvals, warranties and similar submittals, and deliver all keys, manuals, record drawings and maintenance books to Owner, as required by the contract documents which are to be assembled by contractor in order to obtain final payment.

(8) Promptly after notice from the contractor that the contractor considers the work ready for its intended use, Engineer, accompanied by Owner and the contractor, shall conduct a visit and observation to determine if the work is substantially complete. If after considering any objections of Owner, Engineer considers the work on the Project substantially complete, Engineer shall notify the Owner and contractor and shall issue a certificate of substantial completion to Owner and the contractor. Simultaneous with Engineer's determination that the Project is substantially complete and the issuance of a certificate of substantial completion, Engineer shall, jointly with the contractor, prepare for Owner a list of incomplete or unsatisfactory items and a schedule for their completion (the "punch list"). If requested by Owner, Engineer shall observe and monitor the correction and final completion of the work. Following issuance of a certificate of substantial completion of the work, if requested by Owner, Engineer shall evaluate the completion of the work of the contractor and make recommendations to Owner when the work is ready for final inspection. Promptly after notice from the contractor that the contractor considers the entire work finally complete and all items on the punch list completed, Engineer, accompanied by Owner and the contractor, shall conduct an inspection of the Project to determine if the work is finally complete.


When the Engineer determines that work of the contractor has been finally completed, is acceptable, and is generally in accordance with the contract documents and Drawings, Engineer will recommend, in writing, final payment to the contractor. Accompanying the recommendation for final payment, Engineer shall also provide a notice that the work meets the intent of Engineer's design, is acceptable, and is generally in accordance with the contract documents and Drawings to the best of Engineer's knowledge, information, and belief and based on the extent of the Services provided by Engineer under this Agreement.

(9) Engineer shall assemble and deliver to the Owner (i) one full size Mylar set, (ii) one half size bond set, and (iii) a CD in AutoCAD format, of reproducible Record Construction Drawings as prepared by Engineer showing changes in the construction work during the construction process, including the final location of all buried utilities, based on marked up prints and drawings and other data furnished by the contractor.

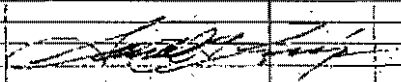
(10) Engineer shall advise and consult with the Owner during construction until final payment to the contractor is made and during any maintenance bond period and warranty by the contractor for the Project.

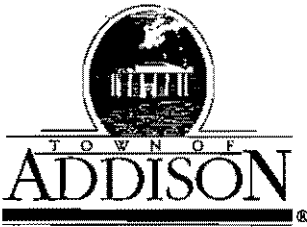


## APPENDIX B – Engineer’s Fee

Title: Replace Bulk Fuel Storage and Dispensing Facility							
Project Number:							
Date: 7/26/2003							
Ref: WGI Fee Proposal							
Estimated Maximum Construction Cost (including design):						\$1,399,101.00	
Washington Group Design Costs							
Description	Hourly Rate	Planning & Studies		Engineering & Design		Constr. Mgmt Svcs	
		Services Hours	Services Cost	Services Hours	Services Cost	Services Hours	Services Cost
<b>CIVIL</b>							
Principal	\$180.00	0	\$0.00	4	\$640.00	0	\$0.00
Project Manager	\$125.00	32	\$4,000.00	52	\$6,500.00	24	\$3,000.00
Senior Engineer/Planner	\$98.00	8	\$720.00	12	\$1,080.00	0	\$0.00
Civil Engineer	\$70.00	0	\$0.00	72	\$5,040.00	38	\$2,680.00
CAD Operator	\$57.00	20	\$1,140.00	86	\$4,802.00	24	\$1,368.00
Estimator	\$59.00	8	\$472.00	16	\$944.00	0	\$0.00
Surveyor, PLS	\$85.00	8	\$680.00	0	\$0.00	0	\$0.00
3 Man Survey Crew	\$170.00	30	\$5,100.00	0	\$0.00	0	\$0.00
2 Man Survey Crew	\$120.00	8	\$960.00	0	\$0.00	0	\$0.00
Clerical	\$52.00	8	\$416.00	32	\$1,664.00	12	\$624.00
<b>SUBTOTAL</b>		<b>106</b>	<b>\$12,526.00</b>	<b>242</b>	<b>\$20,770.00</b>	<b>98</b>	<b>\$7,652.00</b>
<b>GEOTECHNICAL</b>							
Principal	\$125.00	0	\$0.00	0	\$0.00	0	\$0.00
Engineer	\$90.00	12	\$1,080.00	0	\$0.00	0	\$0.00
Project Manager	\$85.00	24	\$2,040.00	8	\$680.00	0	\$0.00
Lab Tech	\$53.00	12	\$636.00	4	\$212.00	0	\$0.00
CAD Operator	\$57.00	4	\$228.00	0	\$0.00	0	\$0.00
Drilling Rig & Crew	\$180.00	8	\$1,440.00	0	\$0.00	0	\$0.00
<b>SUBTOTAL</b>		<b>60</b>	<b>\$5,424.00</b>	<b>12</b>	<b>\$892.00</b>	<b>0</b>	<b>\$0.00</b>
<b>Electrical (Burns &amp; McDonnell Subcontract)</b>							
Principal	\$150.00	2	\$300.00	0	\$0.00	0	\$0.00
Project Manager	\$115.00	8	\$920.00	8	\$924.00	2	\$231.00
Project Engineer	\$112.50	16	\$1,800.00	24	\$2,700.00	16	\$1,800.00
Senior Engineer	\$100.00	24	\$2,400.00	126	\$12,600.00	0	\$0.00
Electrical Engineer	\$89.00	18	\$1,602.00	76	\$6,764.00	0	\$0.00
CAD Operator	\$53.25	20	\$1,065.00	80	\$4,260.00	0	\$0.00
Clerical	\$48.25	8	\$386.00	40	\$1,930.00	8	\$386.00
<b>SUBTOTAL</b>		<b>94</b>	<b>\$8,299.00</b>	<b>354</b>	<b>\$29,178.00</b>	<b>26</b>	<b>\$2,031.00</b>

Description	Hourly Rate	Planning & Studies		Engineering & Design		Constr. Mgmt Svcs	
		Services Hours	Services Cost	Services Hours	Services Cost	Services Hours	Services Cost
<b>Architectural</b>							
Principal	\$180.00	0	\$0.00	0	\$0.00	0	\$0.00
Project Manager	\$125.00	0	\$0.00	0	\$0.00	0	\$0.00
Architect	\$95.00	0	\$0.00	20	\$1,900.00	0	\$0.00
CAD Operator	\$57.00	0	\$0.00	38	\$2,052.00	0	\$0.00
Designer	\$65.00	0	\$0.00	0	\$0.00	0	\$0.00
Clerical (Wordprocessor)	\$52.00	0	\$0.00	18	\$936.00	0	\$0.00
<b>SUBTOTAL</b>		<b>0</b>	<b>\$0.00</b>	<b>74</b>	<b>\$4,888.00</b>	<b>0</b>	<b>\$0.00</b>
<b>Mechanical Engineer (Burns &amp; McDonnell Subcontract)</b>							
Principal	\$150.00	2	\$300.00	0	\$0.00	0	\$0.00
Project Manager	\$115.50	8	\$924.00	12	\$1,386.00	2	\$231.00
Project Engineer	\$112.50	16	\$1,800.00	54	\$6,075.00	16	\$1,800.00
Senior Engineer	\$100.00	10	\$1,000.00	41	\$4,100.00	0	\$0.00
Mechanical Engineer	\$89.00	12	\$1,068.00	48	\$4,272.00	0	\$0.00
Fire Protection Engineer	\$104.00	0	\$0.00	0	\$0.00	0	\$0.00
CAD Operator	\$53.25	16	\$852.00	60	\$3,195.00	0	\$0.00
Clerical	\$48.25	10	\$482.50	42	\$2,026.50	8	\$386.00
<b>SUBTOTAL</b>		<b>74</b>	<b>\$5,426.50</b>	<b>257</b>	<b>\$21,054.50</b>	<b>26</b>	<b>\$2,031.00</b>
<b>Structural</b>							
Principal	\$125.00	0	\$0.00	0	\$0.00	0	\$0.00
Senior Engineer	\$95.00	0	\$0.00	0	\$0.00	0	\$0.00
Structural Engineer	\$75.00	0	\$0.00	16	\$1,200.00	0	\$0.00
CAD Operator	\$57.00	0	\$0.00	21	\$1,197.00	0	\$0.00
<b>SUBTOTAL</b>		<b>0</b>	<b>\$0.00</b>	<b>37</b>	<b>\$2,397.00</b>	<b>0</b>	<b>\$0.00</b>

Description	Planning & Studies		Engineering & Design		Constr. Mgmt Svcs		
	Hourly Rate	Services Hours	Services Cost	Services Hours	Services Cost	Services Hours	Services Cost
<b>Reimbursable Expenses</b>							
3.5" HDDS Cp Disk, ea	\$2.50		\$0.00			0	\$0.00
Bluefile 36" x24", ea	\$2.08		\$0.00			0	\$0.00
Mylar, Sepgs, ea			\$0.00			0	\$0.00
Paper 8 1/2" x 11", ea	\$0.10		\$0.00			0	\$0.00
AirFare (DEN to DFW)	\$500.00	1	\$500.00	3	\$1,500.00	3	\$1,500.00
AirFare (MCI to DFW)	\$500.00	1	\$500.00			1	\$500.00
Mileage rate per mile	\$0.38		\$0.00			0	\$0.00
Car rental per day	\$65.00		\$0.00			0	\$0.00
Support Vehicle per mile			\$0.00			0	\$0.00
Support Vehicle per day	\$35.00		\$0.00		\$0.00		\$0.00
Per Diem Rate per day	\$90.00	3	\$270.00	6	\$540.00	8	\$720.00
Survey Equipment GPS			\$0.00			0	\$0.00
CADD per hour			\$0.00			0	\$0.00
CADD plots per hour			\$0.00			0	\$0.00
<b>SUBTOTAL</b>			<b>\$1,270.00</b>		<b>\$2,040.00</b>		<b>\$2,720.00</b>
<b>Section Totals</b>			<b>\$33,947.50</b>		<b>\$81,219.50</b>		<b>\$14,434.00</b>
<b>Project Design Total</b>					<b>\$129,601.00</b>		
<b>Construction Estimate</b>							
Description: Bulk fuel storage and dispensing facility with 16- 25,000 gal horizontal storage tanks connected to 4 dispensing units and one central off-load manifold. Project includes site work, secondary containment, oil/water separator, fire protection, overflow protection, electronic controls and alarm systems.							
Site work, Pavement and Utilities			\$95,000.00				
Containment Structure and Pad			\$72,000.00				
Storage Tanks and Piping (@\$2.00/gal)			\$800,000.00				
Controls and Equipment			\$265,000.00				
Architectural and Structure			\$25,000.00				
Contingency (10%)			\$12,500.00				
<b>Preliminary Construction Estimate Total</b>			<b>\$1,269,500.00</b>				
Submitted by:							
							
Samuel G. Lundgren, P.E. Project Manager							
Washington Group International							
Off (303) 843-3596, Cell (720) 530-7315							



**Public Works / Engineering**  
 16801 Westgrove • P.O. Box 9010  
 Addison, Texas 75001  
 Telephone: (972) 450-2871 • Fax: (972) 450-2837

# LETTER OF TRANSMITTAL

DATE	10-13-03	JOB NO.	
ATTENTION			
RE: Addison Airport New Fuel Farm Design Contract			

TO Randy Moravec  
Finance

**GENTLEMAN:**

- WE ARE SENDING YOU**
- Attached
  - Under separate cover via \_\_\_\_\_ the following items:
  - Shop Drawings
  - Prints
  - Plans
  - Samples
  - Specifications
  - Copy of letter
  - Change order
  - \_\_\_\_\_

COPIES	DATE	NO.	DESCRIPTION
1			Article 10 - Insurance

**THESE ARE TRANSMITTED as checked below:**

- For approval
- For your use
- As requested
- For review and comment
- FOR BIDS DUE \_\_\_\_\_ 19\_\_\_\_\_
- Approved as submitted
- Approved as noted
- Returned for corrections
- \_\_\_\_\_
- Resubmit \_\_\_\_\_ copies for approval
- Submit \_\_\_\_\_ copies for distribution
- Return \_\_\_\_\_ corrected prints
- PRINTS RETURNED AFTER LOAN TO US

**REMARKS** Randy - This is the insurance portion  
of a proposed design contract with Washington  
Group for the new fuel farm. Red-lined  
by John Hill.  
Please let me know if the insurance  
coverage is OK.  
Thanks,

**COPY TO** \_\_\_\_\_

**SIGNED:** Jim Pierce



# ADDISON

Addison Contract Agreement No. \_\_\_\_\_ Washington No. \_\_\_\_\_

Engineer services for such verification and adaptation will entitle Engineer to further compensation at rates to be agreed upon between Owner and Engineer.

## ARTICLE 10 - INSURANCE

10.1 Engineer shall procure and continuously maintain during the term of this Agreement insurance as follows:

10.1.1 Workers' Compensation insurance at statutory limits, including and Employers' Liability coverage at minimum with limits of Statutory for State and Federal Acts and \$1,000,000 each occurrence each accident/\$1,000,000 by disease each occurrence/\$1,000,000 by disease aggregate Employers' Liability.

10.1.2 Commercial General Liability at combined single with limits of at least \$1,000,000 per combined single limit, bodily injury and property damage, each occurrence and \$2,000,000 eombined single limit, general aggregate for bodily injury and property damage, which coverage shall include products/completed operations (\$1,000,000 products/ completed operations aggregate), and XCU (Explosion, Collapse, Underground) hazards, and contractual liability. Coverage for products/completed operations must be maintained for at least two (2) years after the construction work has been completed. Coverage must be amended to provide for an each-project aggregate limit of insurance. An alternative would be to have separate limits for all lines of General Liability coverage for each project. Owner will be named as an additional insured with respect to the Engineer's services performed under this Agreement.

10.1.3 Commercial Business Automobile Liability insurance at minimum combined single limits of \$1,000,000 per-occurrence for bodily injury and property damage, including coverage for owned, non-owned and hired vehicles for Bodily Injury and Property Damage with a Combined Single Limit of not less than \$1,000,000.

10.1.4 Professional Liability (Errors & Omission Insurance) with a limit of at least \$2,000,000 per occurrence and annual aggregate on a claims-made basis. This coverage must be maintained for at least two (2) years after the project is completed. If coverage is written on a claims-made basis, a policy retroactive date equivalent to the inception date of the contract (or earlier) must be maintained during the full term of the contract.

10.2 With reference to the foregoing insurance requirements, Engineer's insurance policies shall comply with the following:

- 1 The Town of Addison, Texas shall be named as an additional insured with respect to all liability policies (except professional liability).



Addison Contract Agreement No. \_\_\_\_\_ Washington No. \_\_\_\_\_

5.34 The provisions of this Article 5 takes precedence over any conflicting provision of this Agreement or any incorporated or referenced document.

## **ARTICLE 6 - RESPONSIBILITIES OF OWNER**

6.1 Owner will designate a representative to review and approve documents submitted by Engineer. The representative shall be empowered to render decisions and provide information in a timely manner that will not unreasonably delay the orderly progress of the work. Engineer is entitled to rely upon the information, decisions and approvals furnished by Owner's representative.

~~6.2 Owner shall cause any contractor who may have a contract with Owner to perform construction or installation work on the Project, to agree to indemnify Owner and Engineer and hold them harmless from all claims for bodily injury and property damage (other than any property insured by Owner) that may arise from that contractor's operation. In addition, said contractor shall name Owner and Engineer as additional insureds and provide for a waiver of subrogation on that contractor's liability insurance.~~

~~6.3 Owner will furnish to Engineer the data specified in Appendix A.~~

## **ARTICLE 7 - CHANGES**

Owner shall have the right to order changes in the Scope of Services. If such changes affect Engineer's costs, performance schedules, warranties or other provisions of this Agreement, Engineer's compensation and other affected provisions shall be equitably adjusted by the mutual agreement of the parties.

## **ARTICLE 8 - DELAYS**

Neither party hereto shall be considered in default in the performance of its obligations hereunder to the extent that the performance of any such obligation is prevented or delayed by any cause, existing or future, which is beyond the reasonable control of such party.

## **ARTICLE 9 - OWNERSHIP OF DOCUMENTS**

All documents or materials prepared by or for Engineer hereunder in whatever form or format (including, without limitation, in electronic format), including without limitation original drawings, estimates, specifications, field notes and data, shall be delivered to and become the property of Owner. Engineer shall retain a set of reproducible record prints of drawings and copies of other documents for its records as instruments of service. Any reuse for extensions of the Project or for new projects without specific written verification and adaptation by Engineer for the specific purposes intended will be at Owner's sole risk and without liability or legal exposure to Engineer. Any

**Jim Pierce**

---

**From:** Mike Murphy  
**Sent:** Monday, October 13, 2003 1:59 PM  
**To:** Jim Pierce  
**Subject:** FW: Town of Addison, Texas

Jim,  
  
the attached answers my question.....therefore, please look over and get back with John Hill.

Mike  
Michael E. Murphy, PE  
Director of Public Works  
(972) 450-2878 Work  
(214) 215-5280 Mobile  
(972) 450-2837 Fax  
E-Mail: mmurphy@ci.addison.tx.us

-----Original Message-----  
From: HILL, JOHN [mailto:jhill@cowlesthompson.com]  
Sent: Monday, October 13, 2003 1:15 PM  
To: Mike Murphy  
Cc: Mark Acevedo; DIPPEL, KEN  
Subject: FW: Town of Addison, Texas

Mike - I e-mailed Mark Acevedo just a moment ago the below e-mail, and received a note back that Mark was out of the office through tomorrow, 10/14. Since he is gone, I thought I would go ahead and forward this to you. This has to do with the proposed agreement with Washington Group International to design the new fuel farm. I had previously forwarded questions/comments for Mark or for your office, and will forward those to you in a moment. I don't know if your office has been involved with the proposed contract or not; if you all have not seen the contract, please let me know and I will forward it to you (the original contract has been revised). I would appreciate it if someone with your office could review the questions/comments which I will forward to you momentarily and provide a response. Thanks.

John

-----Original Message-----  
From: HILL, JOHN  
Sent: Monday, October 13, 2003 1:03 PM  
To: Mark Acevedo (E-mail)  
Cc: DIPPEL, KEN  
Subject: FW: Town of Addison, Texas

\*\*\*\*\*  
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(214) 672-2000

\*\*\*\*\*

Mark - below is an e-mail I received a short time ago from the Washington Group representative regarding the Technical Services agreement. He has asked if we have any further comments regarding the agreement, and whether or not there is another form that we would like to use. I am not aware of another form, but there may be some additional comments (as I indicated in my e-mail to him) from Staff. I e-mailed you a list of questions last Thursday, and before I respond to him, I would like to see if you or if someone in Public Works would let me know if there are any other comments to the Agreement. Thanks.

John

-----Original Message-----

From: jim.weber@wgint.com [mailto:jim.weber@wgint.com]  
Sent: Monday, October 13, 2003 11:51 AM  
To: HILL JOHN  
Cc: Daniel M Wilson; Sam Lundgren  
Subject: RE: Town of Addison, Texas

John,

We offered our Technical Services Agreement form for use on this effort, as I understand it, because the Town of Addison did not have a contract form. We have used this form with numerous clients who have accepted it with minimal revision, if any at all. Generally, the revisions we have made dealt with one or two issues and contract language was modified just enough to accomplish the agreed to changes. A brief review of the redlined version you sent reveals that roughly 90 percent of the contract has been completely rewritten. Many of the redlines merely restate in different language the same intent of the original contract. There appears to be only a few areas of substantive difference. Since you have indicated there may be a few more changes you want to make, I am wondering if you have a contract form other than Washington Group's that you would prefer to use. It would be easier and less time consuming from my perspective to review/discuss a contract that has one style of language with minor changes to accommodate agreed to differences, than one that has fragmented pieces of the original style surrounded by another.

Jim

James F. Weber  
Sr. Contracts Administrator  
Western Region Legal/Contracts Dept.  
Washington Group International, Inc.  
7800 E. Union Avenue, Suite 100  
Denver, Colorado 80237  
Phone: 303-843-2647  
FAX: 303-843-2266

-----Original Message-----

From: HILL, JOHN [mailto:jhill@cowlesthompson.com]  
Sent: Thursday, October 09, 2003 11:12 AM  
To: 'jim.weber@wgint.com'  
Cc: Mark Acevedo (E-mail); DIPPEL, KEM  
Subject: Town of Addison, Texas

\*\*\*\*\*  
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(214) 672-2000

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<<Technical Services Agreement Sent to WS (Fuel Farm Design).DOC>>

Jim - Thank you for your voice mail message which I received yesterday regarding the Technical Services Contract Agreement between the Town of Addison, Texas and Washington Group International, Inc. I have attached for your review a red-line of the Agreement, the initial draft of which I was given a copy of several weeks ago. I understand from your voice mail message that you will review the attached draft and forward your comments back to me. Please note that there are a few items in the Agreement which I have asked the Town Staff to comment on, and once I receive their comments I will be forwarding some additional comments to you.

Please give me a call if you have any questions or would like to discuss.

John Hill

Cowles & Thompson  
901 Main St.  
Suite 4000  
Dallas, Texas 75202  
(214) 672-2170 (telephone)  
(214) 672-2370 (telecopy)

**Jim Pierce**

---

**From:** Mark Acevedo  
**Sent:** Thursday, October 09, 2003 2:50 PM  
**To:** Jim Pierce  
**Subject:** FW: Technical Services Agreement

Jim,

Can you comment on some or all of these and send back to me. Thanks!

Mark

Mark Acevedo  
Administrator of Facilities & Fleet Services  
Town of Addison  
972-450-2848

-----Original Message-----

**From:** HILL, JOHN [mailto:jhill@cowlesthompson.com]  
**Sent:** Thursday, October 09, 2003 12:02 PM  
**To:** Mark Acevedo  
**Cc:** DIPPEL, KEN  
**Subject:** Technical Services Agreement

\*\*\*\*\*  
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\*\*\*\*\*

Mark - I am getting ready to forward to Jim Weber with W/S the red-line of the Technical Services Contract Agreement which I forwarded to you several weeks ago. In the copy sent to Weber, my comments which were in the draft sent to you will not be included. However, I would appreciate it if you or someone with public works could respond to those comments and to a comment in my 9/11 e-mail, which are:

1. Paragraph 3.1 - Do you want payment based on the number of hours spent times the rate, so that the amount of payment is essentially open ended? (See also comment to paragraph 3.5)
2. Paragraph 3.2 - Do you want to set a "not to exceed" number for reimbursable costs? *yes*
3. Paragraph 3.2.2 - Should "Plans and Specifications" be a capitalized term? *yes*
4. Paragraph 3.5 - The payment amount is only described as an estimate, which is of obvious concern. Do you want the Engineer to provide a firm amount rather than an estimate? *yes*
5. Article 4 (first sentence) - If payment is to be made on the basis

*No. We should have a lump sum based on the scope of work*

of the number of hours spent, the accounting should also include a record of the time spent and work performed by each employee of Engineer who billed time to the project.

*Payment should be based on estimate of % complete as agreed for by Owner*

6. Article 7 (first sentence) - If the scope of services is changed (for example, to add additional services), typically there is a rate structure for such additional services (and a description of what constitutes additional services).

7. Article 10 - The insurance provisions should be submitted to Randy Moravec and Bob Lazarus for review and comment.

*yes  
They look good*

8. Appendix A, Paragraph 1.2 - Should "Off-Load" be capitalized? A capitalized term typically is a term that is a defined term and is used in more than one place. There are a number of capitalized terms (for example, "Storage Tanks" and "Fuel") which perhaps should not be capitalized.

*?*

9. There may be some items which do not need to be included, based on the scope of work (such as the provisions during the construction phase and site inspections which are at the end of Appendix A).

*See Appendix A*

10. One item which has not been included is a provision that if the lowest bid for the construction contract for the Project exceeds the estimated cost, then the Engineer will revised its documents as may be required to reduce or modify the work so that the total construction cost will not exceed the estimate. Such a provision can be added if desired.

*We don't normally do this*

Thanks. I will copy you on the document sent to W/S.

John

**Jim Pierce**

---

**From:** Samuel Lundgren [samuel.lundgren@wgint.com]  
**Sent:** Monday, July 21, 2003 10:08 AM  
**To:** Mark Acevedo  
**Cc:** Jim Pierce  
**Subject:** Technical Services Contract Agreement



Addison Airport  
TSA-Bulk Fuel ...

Mark and Jim,

Please find attached a completed Technical Services Contract Agreement for your consideration. From our last proposal, I have changed one thing. I would like to use Burns and MacDonnell to do the Mechanical & Electrical portion of this design. I obtained proposals from Burns & Mac, Argus and our WGI folks here in Denver; however, I feel most confident in Burns & MacDonnell, and they are comfortable with the 200 days design time, so I have adjusted the proposal according to their fee estimate. If this is a problem, please let me know.

I would propose we start the design process with a kick-off meetings sometime during the week of August 4. I will have a concept site plan for your review and I recommend we meet with the following:

1. Your staff, (including the Airport) for information on the new signalized intersection, curb/gutter standards and appearance desires. If possible, please add the Fire Department to coordinate fire protection design standards and their specifics for the location.

2. The FBOs for their needs, desires and concerns. The FBOs may want to invite representatives from their suppliers.

While in Addison, I will also visit with a couple of tank fabrication firms and fuel handling equipment suppliers. I am concerned on delivery dates for specific equipment.

Thanks again for the opportunity and please call if you have a question.

Respectfully,

Samuel Lundgren, P.E.  
Project Manager, Airport Services  
Washington Group International, Inc.  
7800 E. Union Avenue, Suite 100  
Denver, CO 80237  
Phone (303) 843-3596, Fax (303) 843-3133, Cell (720) 530-7315

1,269,500  
129,600  

---

1,399,100

Passed  
6-24-03

#R18-1

Council Agenda Item: #R18

**SUMMARY:**

Consideration of a Resolution approving and accepting a proposal for professional services in the amount of \$129,600.00 with Washington Group International for the development of a Scope of Work, Design and Construction Management of a new Bulk Fuel Storage and Dispensing Facility (fuel farm) for the Addison Airport.

**FINANCIAL IMPACT:**

Budgeted Amount: \$2,000,000. over three years in the Airport Fund.  
Cost: Estimated total project \$1,469,100. Design cost \$129,600.

**BACKGROUND:**

With the completion of the Phase II Environmental Assessment, discussions with the Airports' Fixed Base Operators and the imminent completion of the Airport Master Plan, Airport management and staff are ready to move forward with the replacement of the Airport's Bulk Fuel Storage and Dispensing Facility (Fuel Farm). It is intended to construct an above ground self-contained facility located immediately to the north of the existing fuel farm. The advantages of this site are: 1) ease of tanker delivery access, 2) existing farm remains operational during construction 3) estimated \$360k savings over constructing on current site.

**RECOMMENDATION:**

Washington Group International has extensive working knowledge with the Addison Airport fuel farm. They performed well in completing the Phase II Environmental Assessment. Staff recommends approval.

Attachments: Washington Group Proposal  
Cost Estimates

**Recommended Scope of Work  
For  
Bulk Fuel Storage and Dispensing Facility  
Addison Airport, Town of Addison, Texas**

**1. Tasking:**

The Town of Addison requested Washington Group International, Airport Services to recommend a scope of work for design of a replacement of the Airports Bulk Fuel Storage and Dispensing Facility.

**2. Scope of work:**

In accordance with the previous Washington Group International, Airport Services recommendations, the scope of work is to provide comprehensive design services and the production of bid documents for the new Bulk Fuels Storage and Dispensing Facility at Addison Airport. Service should include developing an Environmental Assessment (EA) or a Category Exclusion (CATEX) document, as required, a detailed engineers construction estimate, construction acquisition process support, bid result review, and construction management and inspection, and project close-out/as-built service. The centrally located 16 individual bulk fuel storage tanks, with a central off-load and four metered dispensing systems, will be consolidated in one environmentally protected site, including tanks and operating equipment, with suitable architectural considerations to blend into the site and constructed by the Airport, for long term lease to suppliers, operators or FBOs. Products to be dispensed are Low Lead AVGAS and Jet A Fuel. The off load system should capable of off loading a 9000 gallon over the road fuel tanker truck in 20 minutes, at 450 gallons/minute and the dispensing systems into the Airport refueler vehicles should be rated at 400 gallons/minute. The estimate for comprehensive design services as listed above, is \$129,600.

**3. Other Considerations:**

Industry standard filtering systems with automatic shutdown and alarms should be installed on the Off-Load side of the Storage Tanks, to protect product in the fuel storage tanks. Overflow protection devices should be installed on all Fuel storage tanks and connected to the pump control panel. Pump/Dispensing Control panel or panels, should be logically sequenced, gauged to fuel storage tanks for fuel level indication, and clearly marked for ease of operations. An oil/water separator should be installed and connected to the secondary-containment dike area, using a valved connection and the Off-Load/Dispensing pad to allow for immediate wash-down of any spilled product. The Off-Load/Dispensing Pad should be large enough to provide a designated parking spot for any aircraft refueler vehicle that develops a leak. Fuel storage area should have explosion proof electrical fixtures and control panel. An 1 ½" water line will be required for emergency eye wash unit and a 1" hose and reel unit installed for wash down. The hose must reach all areas of the facility, including the oil/water separator. An emergency telephone/intercom/transmitter device should be installed with direct link to the Fire Station alarm room. Use of a concrete low wall would allow a more compact containment dike area, connected to the oil/water separator so that any major spill in the containment area can be washed down and pumped out through the

oil/water separator. Access from the outside (airport land side) should be controlled with electrically operated gates and a code or key access pad. Paved access will be required from the street and from the airfield areas. Street connection should include driveways, curb and gutter. The estimated cost for construction of the Bulk Fuel Storage and Dispensing Facility, as outlined above, is \$1,269,500.



Title:		Replace Bulk Fuel Storage and Dispensing Facility						
Project Number:								
Date:		6/9/2003						
Ref:		WGI Fee Proposal						
Maximum Construction Cost (including design) :		\$1,399,100.00						
<b>Washington Group Design Costs</b>								
		Planning & Studies			Engineering & Design		Constr. Mgmt Svcs	
		Hourly	Services	Services	Services	Services	Services	Services
	<u>Description</u>	Rate	Hours	Cost	Hours	Cost	Hours	Cost
	<b>CIVIL</b>							
	Principal	\$160.00	4	\$640.00	16	\$2,560.00	4	\$640.00
	Project Manager	\$125.00	38	\$4,750.00	68	\$8,500.00	44	\$5,500.00
	Senior Engineer/Planner	\$90.00	8	\$720.00	16	\$1,440.00	0	\$0.00
	Civil Engineer	\$70.00	8	\$560.00	80	\$5,600.00	16	\$1,120.00
	CAD Operator	\$57.00	24	\$1,368.00	86	\$4,902.00	24	\$1,368.00
	Estimator	\$59.00	8	\$472.00	16	\$944.00	8	\$472.00
	Surveyor, PLS	\$85.00	8	\$680.00	0	\$0.00	6	\$510.00
	3 Man Survey Crew	\$170.00	36	\$6,120.00	0	\$0.00	0	\$0.00
	2 Man Survey Crew	\$120.00		\$0.00	0	\$0.00	48	\$5,760.00
	Clerical	\$52.00	12	\$624.00	36	\$1,872.00	12	\$624.00
	<b>SUBTOTAL</b>		<b>134</b>	<b>\$15,934.00</b>	<b>282</b>	<b>\$25,818.00</b>	<b>162</b>	<b>\$15,994.00</b>
	<b>GEOTECHNICAL</b>							
	Principal	\$125.00	0	\$0.00	0	\$0.00	0	\$0.00
	Engineer	\$90.00	16	\$1,440.00	4	\$360.00	0	\$0.00
	Project Manager	\$85.00	24	\$2,040.00	8	\$680.00	36	\$3,060.00
	Lab Tech	\$53.00	12	\$636.00	4	\$212.00	72	\$3,816.00
	CAD Operator	\$57.00	4	\$228.00	0	\$0.00	0	\$0.00
	Drilling Rig & Crew	\$180.00	8	\$1,440.00	0	\$0.00	0	\$0.00
	<b>SUBTOTAL</b>		<b>64</b>	<b>\$5,784.00</b>	<b>16</b>	<b>\$1,252.00</b>	<b>108</b>	<b>\$6,876.00</b>
	<b>Electrical</b>							
	Principal	\$125.00	0	\$0.00	6	\$750.00	0	\$0.00
	Senior Engineer	\$95.00	4	\$380.00	68	\$6,460.00	8	\$760.00
	Electrical Engineer	\$75.00	12	\$900.00	72	\$5,400.00	24	\$1,800.00
	<b>SUBTOTAL</b>		<b>16</b>	<b>\$1,280.00</b>	<b>146</b>	<b>\$12,610.00</b>	<b>0</b>	<b>\$2,560.00</b>

#R18-3



Description	Hourly Rate	Planning & Studies		Engineering & Design		Constr. Mgmt Svcs	
		Services	Services	Services	Services	Services	Services
		Hours	Cost	Hours	Cost	Hours	Cost
<b>Architectural</b>							
Principal	\$160.00	0	\$0.00	0	\$0.00	0	\$0.00
Project Manager	\$125.00	0	\$0.00	0	\$0.00	0	\$0.00
Architect	\$95.00	8	\$760.00	36	\$3,420.00	12	\$1,140.00
CAD Operator	\$57.00	4	\$228.00	46	\$2,622.00	8	\$456.00
Designer	\$65.00	0	\$0.00	12	\$780.00	0	\$0.00
Clerical (Wordprocessor)	\$52.00	0	\$0.00	18	\$936.00	0	\$0.00
SUBTOTAL		12	\$988.00	112	\$7,758.00	20	\$1,596.00
<b>Mechanical</b>							
Principal	\$125.00	0	\$0.00	6	\$750.00	0	\$0.00
Senior Engineer	\$95.00	8	\$760.00	22	\$2,090.00	12	\$1,140.00
Mechanical Engineer	\$75.00	12	\$900.00	96	\$7,200.00	36	\$2,700.00
Fire Protection Engineer	\$104.00	4	\$416.00	36	\$3,744.00	12	\$1,248.00
SUBTOTAL		24	\$2,076.00	160	\$13,784.00	60	\$5,088.00
<b>Structural</b>							
Principal	\$125.00	0	\$0.00	0	\$0.00	0	\$0.00
Senior Engineer	\$95.00	0	\$0.00	0	\$0.00	0	\$0.00
Structural Engineer	\$75.00	12	\$900.00	28	\$2,100.00	8	\$600.00
CAD Operator	\$57.00	4	\$228.00	16	\$912.00	16	\$912.00
SUBTOTAL		16	\$1,128.00	44	\$3,012.00	24	\$1,512.00
<b>Reimbursable Expenses</b>							
3.5" HDDS Cp Disk, ea			\$0.00			0	\$0.00
BlueLine 36" x24", ea			\$0.00			0	\$0.00
Mylar, Sepias, ea			\$0.00			0	\$0.00
Paper 8 1/2" x 11", ea			\$0.00			0	\$0.00
Mileage rate per mile	\$0.32		\$0.00			0	\$0.00
Support Vehicle per mile			\$0.00			0	\$0.00
Support Vehicle per day	\$35.00	15	\$525.00	8	\$280.00	12	\$420.00
Per Diem Rate per day	\$95.00	15	\$1,425.00	8	\$760.00	12	\$1,140.00
Survey Equipment GPS			\$0.00			0	\$0.00



**Recommended Scope of Work  
For  
Bulk Fuel Storage and Dispensing Facility  
Addison Airport, Town of Addison, Texas**

*Demolition  
Site Drainage  
Utilities  
Landscape & Irrig  
Startup/Training  
Site Lighting*

**1. Tasking:**

The Town of Addison requested Washington Group International, Airport Services to recommend a scope of work for design of a replacement of the Airports Bulk Fuel Storage and Dispensing Facility.

**2. Scope of work:**

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oil/water separator. Access from the outside (airport land side) should be controlled with electrically operated gates and a code or key access pad. Paved access will be required from the street and from the airfield areas. Street connection should include driveways, curb and gutter. The estimated cost for construction of the Bulk Fuel Storage and Dispensing Facility, as outlined above, is \$1,269,500.