REMEDIAL ACTION ENGINEERING WORK PLAN
FOR
INSTALLATION OF REMEDIAL ACTION SYSTEM
AT
NAVAL AIR STATION JOINT RESERVE BASE
WILLOW GROVE, HORSHAM TOWNSHIP, PENNSYLVANIA

Contract No. N62472-92-D-1296
Contract Task Order No. 0074

Prepared for:
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DRAFT
EA Project No. 296.0074.4300
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NASJRB Willow Grove; Navy Fuel Farm

Remedial Action Engineering Work Plan
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1. INTRODUCTION

1.1 SCOPE OF WORK


1.2 ORGANIZATION OF THE REPORT

This Remedial Action Engineering Work Plan for the LNAPL recovery system expansion shall act as the governing document for the system installation and will be considered the “design” document. This report is divided into six chapters. Chapter 1 is the introduction and includes the scope of work. Chapter 2 discusses construction techniques, installation support and specifications. Chapter 3 contains quality control procedures to be implemented during construction activities and Chapter 4 contains sampling and analysis to be performed. Environmental protection and permitting discussion is included in Chapter 5 and Chapter 6 contains waste management procedures. A proposed schedule for the construction activities is presented in Chapter 7.

A total of six design drawing sheets and five attachments accompany this report. The drawings detail the site plan and system design and the attachments provide resumes of project personnel, design calculations, manufacturers information for the system components, design specifications, and the current air discharge permit.

1.3 SITE LOCATION

The Navy Fuel Farm is located along the north side of Privet Road and immediately south of the Pennsylvania Air National Guard (PAANG) portion of the Air Reserve Facility (ARF) at NASJRB Willow Grove. A site location map and site plan is presented on the Title Sheet. The Navy Fuel Farm and a portion of the adjoining property to the north, occupied by PAANG (Buildings 345 and 340), constitute the area requiring remedial efforts and include the area within which the LNAPL recovery system will be installed.

The Navy Fuel Farm is bordered on all sides by NASJRB grounds. Located to the north of the Navy Fuel Farm are ARF Buildings 330, 340, and 345. Several other base facilities exist...
within 1,000 ft of the site. The Navy Fuel Farm is approximately 2 acres in area and consists of three aboveground storage tanks (ASTs), associated aboveground piping, and building Nos. 119 and 81.

The topography of the Navy Fuel Farm area is characterized as flat and gently sloping to the north-northwest. There is a slight downgrade at the north end of the facility which encourages runoff to flow northeast into the catchment basin or the adjacent drainage ditch.

1.4 OBJECTIVES

The objectives of this CTO are twofold: firstly, the distribution of non-petroleum volatile organic compounds (VOC) at the site will be evaluated through soil and ground-water sampling. The evaluation of non-petroleum VOC will be addressed in a separate document, Sampling and Analysis Plan for Remedial Action at the Navy Fuel Farm. The second objective, which is described herein, is to design and install a full scale LNAPL recovery system and operate it for a period of one year. The remedial system will consist of water table depression and vacuum enhanced LNAPL recovery at three recovery wells. The construction activities will consist of expanding (retrofitting) the existing pilot remedial system to meet the new system specifications.

Based on the results of the pilot study, a LNAPL recovery system using water table depression and vacuum-enhancement was chosen as the remedial alternative of choice for the Navy Fuel Farm (EA, 1996).

The following items were recommendations of the pilot study and are incorporated into the design of the full scale remedial system.

- Expand the vacuum-enhanced recovery system to include existing wells NFFW-2R, NFFW-14 and NFFW-16. Install dual pumping systems in each well that are amenable to vacuum-enhanced operation within the range of ground-water table elevation fluctuations observed during the pilot study.

- Install submersible ground-water pumps with variable speed drives and pressure transducers on each pump to compensate for ground-water table fluctuations.

- Install individual underground lines (LNAPL, ground-water and SVE) to each recovery well along with underground electrical service.
Upgrade the ground-water treatment system to accommodate a flow rate of up to 45 gpm. Based on results of the pilot study, ground-water treatment using granular activated carbon (GAC) is both efficient and cost effective.

Upgrade the water discharge line to 4-in diameter PVC pipe and install below ground.

Install telemetry to allow for remote monitoring of the entire system.
2. REMEDIAL SYSTEM INSTALLATION

2.1 CONSTRUCTION TECHNIQUES

The construction activities will consist of four major tasks including: 1) excavation, 2) installation of ground-water and LNAPL recovery equipment, 3) building installation, and 4) electrical and control installation. Each task is discussed in detail in the following sections.

2.1.1 Excavation

Installation of the remedial system will consist of trenching from the treatment system to the three recovery wells (NFFW-2R, NFFW-14 and NFFW-16) and from the treatment system to the existing man hole located in close proximity to NFFW-8. The subsurface conduits and process lines will be installed in common trenches between the treatment system and the recovery wells. The equipment utilized to perform these tasks will include a backhoe and a Bobcat.

Trenching of the recovery lines to NFFW-16 and the installation of the discharge line will require excavation across roads that are currently used for Navy Fuel Farm operations. The Navy will be notified 2 weeks prior to impacting these roads and efforts will be made to minimize impacts to fuel farm operations.

Prior to the excavation activities Navy personnel will be requested to mark utility locations. The utilities will be marked out by Navy personnel and it is assumed that areas requiring excavation will not require relocation of existing utilities. The Navy will receive at least 2 weeks notice prior to initiation of trenching activities to perform the utility mark-out.

Areas disturbed during the trenching activities will be re-graded and re-seeded. Roads that are disturbed during excavation will be replaced with similar material and asphalt areas will be also be patched with asphalt.

2.1.2 Installation of Ground-Water, Soil Vapor and LNAPL Recovery Equipment

New submersible ground-water pumps will be installed in each of the recovery wells. The ground-water pumps will be equipped with variable speed drives which will be integrated with submersible pressure transducers to regulate the water level in the well. Additional pressure sensors will be installed in each well to compensate for the applied vacuum.
Upgrading of the SVE system will not be required during system installation as the existing soil vapor extraction system will be utilized and will remain in the existing building. Offgas will be treated using the existing thermal oxidizer.

New LNAPL recovery pumps will be installed and recovered LNAPL will be stored in the existing above ground storage tank. The existing LNAPL storage tank will remain in place, between the SVE building and the ground-water treatment building.

Each recovery wellhead will be enclosed in a prefabricated enclosure which will allow for the application of vacuum to the entire wellhead. Each well will be finished with a concrete pad and protective steel posts to protect it from possible vehicle damage.

Equipment utilized for the installation of the wellheads will consist primarily of hand tools. The use of heavy equipment will not be required.

2.1.3 Building Installation

The upgraded ground-water treatment system will be installed in a new prefabricated 12ft x 12ft building that will be constructed next to the existing building that was constructed as part of the pilot system. The new building will be placed on a 13ft x 13ft concrete pad and will contain two 1,000 lb GAC vessels and electrical controls for the ground-water and LNAPL recovery systems. The building will be prefabricated and erected onsite.

2.1.4 Electrical and Control Installation

The existing 3-phase 208 Volt electrical service will be utilized for the expanded remedial system. The existing service will provide sufficient power for the two additional ground-water and LNAPL pumps. Electric will be supplied to the new ground-water treatment building through the existing load center that is located on the exterior of the SVE building. The new control panels installed in the ground-water treatment building will be integrated with the controls of the existing SVE building.

The expanded system will be equipped with a Supervisory Control and Data Acquisition (SCADA) system that will require the installation of a phone line to the treatment system. The phone line will be installed by the local phone company and will be coordinated by EA and NASJRB Willow Grove Public Works.

2.2 UTILITY SUPPORT REQUIRED
Support from NASJRB Willow Grove Public Works personnel will be minimal for the construction tasks and will consist primarily of utility location prior to trenching and interfacing with Fuel Farm operations. Existing electrical service will be utilized and EA will perform the discharge connection to the sanitary sewer system. A new phone line will be installed to the expanded treatment system and will be coordinated by EA.

Public works personnel will be updated daily to construction operations and scheduling. It is anticipated that fuel farm operations will be minimally impacted during construction activities. Public works personnel will be notified prior to possible impacts and construction activities will be scheduled to minimize impacts to fuel farm operations.

Names of vendors and subcontractors will be provided to the Public Works department prior to construction activities to allow for entry to NASJRB Willow Grove. Necessary equipment and materials used during construction activities will be staged in the common area of the existing pilot treatment system.

2.3 TREATMENT SYSTEM DRAWINGS

A total of six design drawing sheets accompany this report and include pertinent details, site plans, process equipment and control logic. The sheets include the following:

- Title Sheet- Vicinity Map and Site Location Map
- Sheet 1- Site Map and Partial Plan
- Sheet 2- Details of Concrete Slab, Treatment Building Plan, and Building Elevations
- Sheet 3- Recovery Well Detail, Discharge Piping/Trench Detail, Recovery Piping/Trench Detail, and Discharge Pipe at Manhole Connection Detail
- Sheet 4- Process Flow Diagram and Process and Instrumentation Diagram I
- Sheet 5- Process and Instrumentation Diagram II

Calculations used for the design are presented in Attachment B. A summary of equipment specifications and control logic is presented in Table 2-1 and manufactures data sheets for specified equipment presented in Attachment C. Appropriate marked-up sections of Navy SPECSINTACT consistent with a design build approach are presented in Attachment D.
# Table 2-1 Equipment Specifications and Control

## Vacuum-Enhanced LNAPL Recovery System

**Navy Fuel Farm**

**NASJRB Willow Grove, Pennsylvania**

<table>
<thead>
<tr>
<th>Item</th>
<th>Manufacturer/Model</th>
<th>Specification</th>
<th>Control Logic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P&amp;ID Series 100 - LNAPL Recovery System</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-101 through P-103 LNAPL recovery pump/probe</td>
<td>Clean Earth Technology/ Product Terminator</td>
<td>12 VDC Rodar Vane (metal/nylon composite) 26 gal/hr @ 25 psi</td>
<td>LAH 301 will shut down pumps P-101 through P-103 LNAPL/water sensor integral to pump/probe mechanism will control LNAPL pumping intervals</td>
</tr>
<tr>
<td>ME-101 through ME-103</td>
<td>Clean Earth Technology/ Product Terminator</td>
<td>Automatic Level Seeker 50 ft (max.) range</td>
<td>Will process input signal from LNAPL pump/probe and raise/lower the system to pump LNAPL</td>
</tr>
<tr>
<td><strong>P&amp;ID Series 200 - Ground-Water Recovery Pumps</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-201 through P-203 Ground-water recovery pumps</td>
<td>Grundfos Redflo 4/16E-4</td>
<td>2 HP Stainless Steel Electric Submersible with Variable Speed Drive 15 gpm @ 86 ft total head</td>
<td>LAH 301 and PDAH 501 will shut down P-201 through P-203 Pressure transducers (PE 201-203 and LE 201-203) will provide input to variable speed drives for P-201 through P-203 to depress and maintain the ground-water-table at the optimum level for LNAPL recovery</td>
</tr>
<tr>
<td><strong>P&amp;ID Series 300 - LNAPL Storage Tank</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-301 Existing LNAPL Storage Tank</td>
<td>Highland Tank/Skid Tank</td>
<td>Double Wall Steel 500 gallon</td>
<td>LAH 301 will shut down P-101 through P-103 and P-201 through P-203</td>
</tr>
<tr>
<td><strong>P&amp;ID Series 400 - SVE System</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>T-401 Existing Moisture Separator</td>
<td>Rietschle T-130</td>
<td>Steel</td>
<td>LAH 401 will shut down P-401</td>
</tr>
<tr>
<td>P-401 Existing SVE Pump</td>
<td>Rietschle/VFT-40</td>
<td>Dry Rotary Vane 5-in Hg @ 28 scfm</td>
<td>LAH 201, 202, 203, 401; TOA 401 P-401 will shut down if water levels in the recovery wells reach a high level (indicating pump failure), if T-401 reaches a high level, and if ME-401 reaches any alarm condition (shuts down)</td>
</tr>
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### TABLE 2-1 (Continued)

<table>
<thead>
<tr>
<th>Item</th>
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<th>Specification</th>
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<tr>
<td>ME-401 Existing Thermal Oxidizer</td>
<td>Thermitech/VAC-25</td>
<td>Thermal Oxidation System 250 scfm (max)</td>
<td>TOA 401 All Thermal Oxidizer (ME-401) alarms will shut down P-401</td>
</tr>
<tr>
<td>T-402 Existing Propane Tank</td>
<td>Anigas/Skid Tank</td>
<td>Steel 500 gallon</td>
<td>NA</td>
</tr>
</tbody>
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**P&ID Series 500 - Liquid-Phase Carbon Adsorption System**

| T-501 and T-502 Liquid-Phase Carbon Units | CETCO./M36         | Epoxy Coated Steel 50 gpm @ 75 psi 42-in diameter | FDAH 501 High pressure across the carbon vessels will shut down P-201 through P-203 |

**Note:**
1) Appropriate personnel will be notified of any and all alarm conditions via an autodialer.
2) Design calculations are included in Appendix 2-1 and manufacturer's data sheets for items listed in table are included in Appendix 2-2. Data sheet for T-402 (Propane Tank) is not available. This tank is a standard steel tank provided by the propane supplier.
3. QUALITY CONTROL

3.1 CORPORATE STATEMENT

EA's work ethic is built around the concept of providing safe, high-quality, responsive, cost effective services. During project execution, particular attention is given to providing professional quality in reports and designs, ensuring quality workmanship and performance of installed equipment, and controlling cost and schedule.

3.2 PROJECT ORGANIZATION

EA has established a proven management structure, designed specifically to successfully execute the remedial action at the NASJRB, Willow Grove, Pennsylvania. The organization chart for the NASJRB project is shown in Table 3-1. The project management structure is based on clear and simple reporting lines among all levels of the project team, as well as among specialty subcontractors. This structure also establishes clear organization interaction between EA team personnel and the Northern Division. Resumes of EA project personnel are presented in Attachment A.

3.3 QUALITY CONTROL ACTIVITIES

To ensure total quality of the project, field construction activities will be executed under the supervision of the Site Superintendent/Project Engineer. The Site Superintendent/Project Engineer will be responsible for ensuring that construction activities are completed in accordance with the Work Plan specifications and the Health and Safety Plan.

Specific Quality Control activities include:

- Management of the performance of the on-site construction and inspection activities
- Materials inspection to ensure conformance with design specifications
- Management of the documentation of daily activities

At the end of each work day, a Daily Report will be prepared summarizing the activities conducted on that day, materials delivered to the project site, and the results of materials inspection. Additionally, the Daily Report will log the personnel and equipment present on site that day as well as the hours of utilization. Health and safety issues will also be addressed in the report if necessary. A copy of the Daily Report is provided in Figure 3-2.
Inspections will be conducted to assess the aspects of the scope of work, to monitor performance and progress of construction activities, and to ensure compliance with Work Plan specifications. Areas covered for this Work Plan include the following:

- Excavation limits have been defined, mapped and marked
- Excavation permits have been obtained and signed by the appropriate NASJRB personnel
- Utility clearances have been completed
- Examination of the stability of excavations
- Stormwater management controls are in place to avoid water from entering the excavation, and water is handled in accordance with appropriate Erosion and Sediment Control Procedures
- Equipment and materials inspection
- Pipes are secured/stabilized prior to backfilling
- Traffic control devices such as barriers, cones, etc. are in place
- Storage of equipment and materials
- Lock-out/tag-out during electrical work
- Site restoration activities
Figure 3-1. Organization Chart.
4. SYSTEM MONITORING

4.1 OPERATION AND MAINTENANCE

Following system installation and start-up, one year of operation and maintenance (O&M) will be performed. The operation and maintenance will consist of bi-monthly (twice per month) site visits. During these bi-monthly visits system performance will be monitored and routine maintenance of the process equipment will be performed. The operating data to be recorded on a field data sheet (Figure 4-1) and include ground-water flow (instantaneous and cumulative), extraction air flow rate, extraction pressure, vapor concentrations, and thermal oxidizer operating parameters. Routine maintenance will be performed according to factory specifications and will be detailed in the Operation and Maintenance Manual to be submitted as a separate report. Analytical sample collection will also be performed as part of the operation and maintenance visits.

4.2 SAMPLING AND ANALYSIS

Sampling and analysis of air and ground water will be performed during the operation and maintenance of the remedial system to assess system performance.

4.2.1 Ground-Water Sampling

Ground-water samples will be collected monthly from before, between, and after the GAC units to monitor performance of the GAC vessels and analyzed for benzene, toluene, ethylbenzene, xylene (BTEX) and naphthalene to determine carbon change-out requirements. Numbers of samples to be analyzed, analysis methods, and QA/QC requirements are presented in Table 4-1. Duplicate samples and trip blanks will not be collected as part of the system performance monitoring because the data is used solely for system performance monitoring and is not required as part of the discharge specifications to the NASJRB Willow Grove wastewater treatment plant.

4.2.2 Monitoring Well Sampling

Upon conclusion of one year of system operation, all (19) of the monitoring wells will be sampled for BTEX and naphthalene as presented in Table 4-1. Ground-water samples will be analyzed by EA Laboratories in Sparks, MD on a standard turn-around basis. EA laboratories is a Pennsylvania Department of Environmental Protection (PADEP) and Navy certified laboratory. These sample results will be used to assess system performance and to determine what remedial operations are necessary at the Navy Fuel Farm. Analytical data reported as part of these monitoring activities will not require validation.
Samples will be collected from monitoring wells in accordance with slow pumping methodology using variable speed submersible ground-water pumps with dedicated lengths of Teflon-lined polyethylene tubing for each well. The following methodology will be used for sample collection and sample management.

4.2.2.1 Purging and Sampling

Field equipment to be employed at the site will include a Grant YSI 3800 water quality meter, or similar, with a flow-through-cell (which includes probes for measurement of pH, eH, dissolved oxygen, thermometer, conductivity, and turbidity). Additional equipment will include an organic vapor analyzer with a PID. Each piece of equipment will be checked by EA to be in proper working order before its use and calibrated as required. Prior to each use, field analytical equipment probe(s) will be decontaminated in accordance with Section 4.2.2.4. After each use, the instrument will be checked and stored in an area shielded from weather conditions.

Instruments will be calibrated before sampling each day and on an as-needed basis in accordance with the manufacturer's instructions.

The low flow sampling protocol will be as follows:

a. Measure Water Level

Using a properly cleaned oil/water interface probe, determine the water level in each well and the total well depth. If a LNAPL is present, the LNAPL will be bailed off prior to sampling and placed in the LNAPL storage tank located on-site.

b. Purge Well

Purge each well with a submersible pump and a dedicated length of Teflon-lined polyethylene tubing dedicated to each well until the pH, specific conductance, dissolved oxygen (DO), eH, turbidity (5 NTU goal) and temperature have stabilized (less than ± 0.2 pH units and less than a 10 percent change for the other parameters between three consecutive readings at 5 minute intervals), as follows:

- Place the Teflon-lined polyethylene tubing with attached submersible pump so that the pump intake is at the approximate middle of the screened interval of the well or within 5 feet of the well bottom, if this zone is screened. For well screens which breach the water table, the pump intake will be placed at the approximate middle of the water column in the well. To minimize sediment/silt
mobilization (turbidity) from the bottom of the well, the pump intake should be kept a minimum of 2-3 feet above the bottom of the well.

- Connect the Teflon-lined polyethylene tubing (in the well) to the cleaned flow-through-cell of the water quality meter (Grant / YSI 3800 or equivalent).

- Care will be taken to keep the Teflon-lined polyethylene tubing and the flow-through cell full of water in that portion of the tubing above the top of the well during purging and sampling (i.e. to mitigate the presence of air pockets).

- Using the variable speed submersible pump, purge the monitoring well.

Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Once water reaches the well cap / flow-through-cell, decrease the flow rate and check the water level. Adjust pump speed until water level drawdown stabilizes (ideally less than 2 feet). Continue purging until indicator field parameters stabilize. For wells with low recharge rates with screened intervals that are totally below the water table (or potentiometric surface), do not draw the water level in the well down below the top of the screened interval. Stop the pump when the water level is just above the top of the screened interval, allow time for recharge, and then resume pumping. Repeat this as necessary until the water quality parameters have stabilized as stated above. For wells with minimal recharge rates (less than 50 % recovery within 30 minutes), where the well is essentially dewatered during purging, the well will be pumped down two times and then sampled as soon as sufficient volume has recharged into the well bore for sampling purposes. Then notify the EA Project Manager and record that information in the sampling form.

Every 3-4 liters of water removed, measure and record the depth to water (below the top of the well casing), the pumping rate (in milliliters/minute), pH, turbidity, specific conductance, salinity, temperature, eH, and dissolved oxygen.

Stabilization of the water level in the well must be achieved and is defined as no more than 0.2 ft drawdown between the 5-minute measuring intervals. The pumping rate should be adjusted (decreased) to mitigate drawdown of the water level to within the specified target range. (Ideally at the pumping rate of 100-300 ml/min, there would be no drawdown of the water level). If no more than 2 ft of drawdown occurs, the drawdown is considered negligible and sampling can begin after achieving stabilization of the field measured water quality parameters.
If more than 2 ft of drawdown occurs during the purging process, then at a minimum, the volume of water discharged to that point must again be removed from the well, e.g., if 0.5 gals of water was purged from the well prior to stabilization of the water level, then an additional 0.5 gals must be purged whether or not the field measured water quality parameters have stabilized. The final purge volume must be greater than the stabilized drawdown volume plus pump/tubing volume.

If the stabilization of the water level or water quality parameters or the recharge rate requires more than 2 hours of purging time for the well, call the EA Project Manager for discussion and decision as to how to proceed. Purged water will be containerized and staged in accordance with Section 4.2.2.5.

c. Collect Sample

After stabilization of the water level and field measured water quality of the well, disconnect the Teflon lined tubing from the flow-through-cell of the water quality meter and collect the discharging water in the laboratory prepared and preserved sample bottles. Fill all sample containers by allowing the pump discharge to flow down the inside wall of the sample container, minimizing turbulence. A sample of ground water will be collected and tested for residual chlorine prior to sample collection. Should residual chlorine be present in the ground water, ascorbic acid will be added to sample containers as a preservative where appropriate.

Ground-water sampling will continue directly after completion of purging using the same pump and Teflon-lined polyethylene tubing. The short length of tubing connecting the well cap with the flow-through-cell will be disconnected from the cell and ground-water samples will then be taken. VOC samples will be collected first directly into the pre-cleaned, pre-preserved sample containers provided and designated by the laboratory. A test VOC sample container will be checked with pH paper to confirm adequate preservation. Additional HCL will be added to the VOC vials if necessary. VOC vials will be completely filled without headspace above the liquid portion (to minimize volatilization). Check that a Teflon-lined silicone septum is correctly placed in the cap and secure the cap tightly. After the cap is sealed, vials should be inverted, lightly tapped and checked for bubbles. If bubbles are present, they will be eliminated by adding additional sample water before the vial is resealed. As each sample is obtained any observations made will be recorded on the Field Sampling Form and the field notebook.
Sample container handling, chain-of-custody and shipping to EA Labs will be performed in accordance with Section 4.2.2.2.

One trip blank will be included per shipping cooler containing water samples to be analyzed for TCL VOC. Field duplicate ground-water samples will be collected at the rate of 1 per every 10 ground-water samples and will be collected from monitoring wells expected to have the highest concentrations. The field duplicate samples will be analyzed for the same parameters as the other ground-water samples. Field blanks will be collected each day samples are collected. The field blank will consist of pumping DI through the sampling pump and into the sampling container. One sample will also be collected from the tap water source used for equipment decontamination.

4.2.2.2 Sample Designation, Handling, Custody, and Shipping

Sample Designation and Labeling

Once the sample is collected, label the sample bottle with the appropriate sample tag and provide the following data: sample identification number, project number, date, time, sampler's signature, analysis requested, and preservative(s) added.

EA will employ the following coding (sample designation) system:

I. Ground-water Samples
   Example: NFFW-7
   > NFFW = Monitoring well from Navy Fuel Farm Well
   > 7 - Ground-water sample obtained from monitoring well 7

II. QC
   Example: NFFW-DUP-1
   > NFFW - Well sample from Navy Fuel Farm Well
   > DUP 1 - First duplicate sample from a monitoring well. The actual well number from which the sample is collected will be recorded in the field notebook.

Handling, Custody, and Shipping

Seal the sample containers with custody tape (for VOC vials, seal the vials in a quart plastic bag and attach the custody seal around the bag). Complete the Chain of Custody (COC) document entries and record the sampling event in the bound field notebook in indelible ink.

The properly labeled and sealed containers will be placed in a plastic "Ziplock" type bag and sealed. Approximately 1-3 in. of inert cushioning and absorbing material (i.e., bubble wrap)
will be placed in the bottom of the cooler. The sample will be packed in ice which has been double bagged with heavy duty polyethylene bags, prior to placement into the cooler. Samples will be packed so as to maintain a temperature between 0° C and 4° C.

The COC form will be sealed in a Ziploc-type bag and taped to the inside of the cooler lid. The lid of the cooler will be sealed with packing, fiber, or duct tape. Samples will be shipped to the laboratory via overnight courier or delivered by the field personnel. The laboratory will be notified by phone of the sample shipment at least 24 hours before arrival and 48 hours before arrival if the arrival is to occur on a Saturday.

A Cooler Receipt Form must also accompany the Chain-of-Custody form. Upon receipt of the cooler at EA Laboratories, the receiver will open the cooler, remove the Chain-of-Custody form and Cooler Receipt Form, and complete the Preliminary Examination Phase portion of the Cooler Receipt Form. After the samples have been logged in, the Log-In Phase of the Cooler Receipt Form will be completed. The Cooler Receipt Form must accompany and be part of the Chain-of-Custody form.

4.2.2.3 Sample Documentation

The documentation necessary for this investigation includes the following:

- Field Notebook
- Chain-of-Custody form
- Cooler Receipt Form
- Field Sampling form

Field Notebook

The field notebook is a bound daily log maintained by the Site Field Manager and contains the record of sampling activities for the days of field work. At a minimum, this document should include:

- Arrival and departure times of workers and visitors to the Site
- General description of work performed (i.e., samples collected, sampling times, sampling personnel names, and deviation from plans).
- Field data collected (i.e., pH, conductivity, location of sampling points, well depth, and calibration records).

Chain-of-Custody and Cooler Receipt Forms
A completed Chain-of-Custody (COC) form will accompany the samples shipped to the laboratory and will contain the following information:

- Project name and EA project number
- Name of person collecting samples
- Date and time samples were collected
- Type of sampling conducted (composite/grab)
- Parameters and method for analysis
- Location of sampling station
- Field filtration/preservation methods
- Number and type of containers used
- Signature of EA field personnel relinquishing sample
- Date and time of custody transfer to overnight courier
- Sample shipper (UPS, Federal Express, etc.)

Samples suspected to contain elevated concentrations of the parameters specified, based on field screening and monitoring results, will be noted on the chain of custody.

**Field Sampling Form**

This document is used by the person sampling to record the physical measurements of the sample information and also as a reference.

**4.2.2.4 Decontamination Procedures**

The primary objective of the decontamination process is to prevent the accidental introduction of potential contaminants to non-contaminated areas and/or samples. This section describes the methods associated with decontamination of field equipment.

The sampling equipment will be cleaned prior to use in the field. Wherever possible, sampling equipment will be dedicated to a single location to minimize potential for cross-contamination. Non-dedicated sampling equipment will be decontaminated as described below.

**Stainless Steel or Teflon**

This includes stainless steel equipment used for soil sampling activities:

1. Wash thoroughly (at each well location) using a brush and Alconox, or similar detergent.
2. Rinse equipment thoroughly with DI water.
3. Rinse with isopropyl alcohol by spray bottle and allow to air dry.
4. Flush with DI water to remove isopropyl alcohol.

5. Air dry and store on plastic poly sheeting, or if not being used shortly, in plastic garbage bags to prevent contamination during storage and/or transport to the field.

**Submersible Pumps**

1. Steam clean pump.
2. Rinse equipment thoroughly with DI water.
3. Rinse with isopropyl alcohol by spray bottle and allow to air dry.
4. Flush with DI water to remove isopropyl alcohol.
5. Air dry and store on plastic poly sheeting, or if not being used shortly, in plastic garbage bags to prevent contamination during storage and/or transport to the field.

**Interface Probes**

1. Rinse with Alconox or similar detergent and DI water solution.
2. Rinse with DI water.
3. Rinse with isopropyl alcohol and allow to air dry.
4. Rinse with DI water.
5. Store equipment in polyethylene bag during transport or storage.

4.2.2.5 Investigative Derived Waste

This section addresses the procedures for collection, storage, testing, and disposition of investigative derived waste (IDW).

**Purge Water**

Water removed from monitoring wells for sampling purposes will be containerized, treated using the granular activated carbon, and discharged to the sanitary sewer.
Decontamination Fluids

Liquid generated as a result of decontamination activities will be included with the purge water.

Other Decontamination Waste

Other wastes generated during decontamination activities, including discarded personal protective equipment (PPE), aluminum foil, and other debris, will be double bagged and disposed of as general refuse.

4.2.3 Air Sampling

Air sampling of the SVE component of the treatment system will be performed using field instruments to assess thermal oxidizer efficiency and hydrocarbon removal rates. The field instruments will consist of a flame ionization detector (FID) or a photoionization detector (PID). All field instruments will be calibrated according to manufacturer specifications.

Air samples will be analyzed from each individual recovery well prior to the thermal oxidizer to assess vapor phase hydrocarbon removal rates. Additional air samples will be collected from before and after the thermal oxidizer to assess thermal oxidizer performance.

Laboratory analysis of air samples is not required under the air permit that was acquired for the pilot remedial system. Air permit requirements include maintaining a thermal oxidizer internal temperature of 1,400°C and a discharge concentration of 300 ppm as monitored using field instruments. Frequency of analysis is not specified in the air permit. Locations and frequency of analysis are presented in Table 4-1.

4.3 REPORTING

Monthly system performance reports shall be prepared to summarize the operation and performance of the remedial system for each monthly period. Information to be contained in this report shall include monitoring data collected as part of the bi-monthly O&M visits.

A final system performance report shall be submitted in draft and final form to summarize one year of system operation. Information to be contained in this report includes monitoring and gauging data collected during the first year of the extended monitoring period. A comparison of ground-water analytical results from before and after system operation will be presented along with recommendations for improving system performance. Anticipated annual costs for the maintenance of the existing system will also be presented.

Reports will be submitted to Northern Division, the Resident Officer in Charge of Construction Office, and to the NASJRB Willow Grove Public Works Environmental Department.
# Table 4-1: Summary of Analysis to Be Performed

<table>
<thead>
<tr>
<th>Analysis and Description</th>
<th>Method</th>
<th>Matrix</th>
<th>Sampling Frequency</th>
<th>Number of Samples</th>
<th>Trip Blank</th>
<th>Field Blank</th>
<th>Duplicate</th>
<th>Equipment Blank</th>
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<td>BTEX and Naphthalene</td>
<td>SW-846 8020</td>
<td>Water</td>
<td>Monthly</td>
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<td>0</td>
<td>0</td>
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<td>36</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BTEX and Naphthalene</td>
<td>SW-846 8020</td>
<td>Water</td>
<td>After one year of system operation</td>
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<td>3</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>30</td>
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<td>(Well Sampling)</td>
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<td>Total Volatile Hydrocarbons</td>
<td>Field Instruments (FID or PID)</td>
<td>Air</td>
<td>Bi-Monthly</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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**Notes:**
- TB - Trip Blanks - 1 per day of VOC shipment
- FB - Field Blanks - 1 sample each of DI water and decon source water per event
- DUP - Duplicates - 5 percent of samples
- Equipment Blank - Equipment Rinses - one per sampling technique per day
- MS/MSD - Matrix Spike/Matrix Spike Duplicates - 5 percent of samples
- NA - Not Applicable
REMEDIAL SYSTEM INSPECTION LOG  
NAVY FUEL FARM, NASJRB WILLOW GROVE, PENNSYLVANIA

Date: __________ Time:__________ Project Number 2960074 Task 7200
Outside Temperature: __________ Personnel: ________________

GROUN-D WATER SYSTEM

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<td></td>
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<td>Depth to Water</td>
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<tr>
<td>Depth to Product</td>
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GAC Influent Pressure (psi): ____________________________
GAC Between Carbon Pressure (psi): ______________________
GAC Effluent Pressure (psi): ___________________________

LNAPL RECOVERY SYSTEM

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<tr>
<td>Total Gallons Recovered</td>
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<tr>
<td>Pump Cycle Time (min)</td>
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SVE SYSTEM

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</tr>
</thead>
<tbody>
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<td>Extraction Flow Rate (cfm)</td>
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</tr>
<tr>
<td>Extraction Pressure (in. Hg)</td>
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<tr>
<td>Vapor Concentration (ppm)</td>
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Thermal Oxidizer Temp: ________________________________
Thermal Oxidizer Offgas Concentration (ppm)           ________________________________

Comments: _______________________________________
_________________________________________________
_________________________________________________

Figure 4-1
5. ENVIRONMENTAL PROTECTION

5.1 EROSION CONTROLS

The construction activities will be performed in a manner to have minimal impacts on the surrounding environment. It is anticipated that excavations will be backfilled at the end of each working day to minimize erosion. Soil that is not used as backfill will be staged and covered with plastic until the excavations are completely backfilled. Upon conclusion of the construction activities remaining soil will be spread in a designated area and seeded and covered with straw.

5.2 DISCHARGE PERMITS

An air discharge permit was obtained for the pilot study that was conducted at the Navy Fuel Farm. A copy of the existing discharge permit is presented in Attachment E. The existing air permit will be modified for the addition of two additional vapor recovery wells to the existing system.

Treated ground water currently discharged to the NASJRB Willow Grove sanitary sewer system and a discharge permit is not required. Treated ground water from the new remedial system will be discharged to the sanitary sewer by way of a new below-ground discharge line that will be installed during the construction activities. The additional discharge flow rate that will be obtained as part of this new system configuration will not require an additional discharge permit. The Public Works Department has been notified of the increase in discharge flow rate and have approved the modification.

5.3 BUILDING AND CONSTRUCTION PERMITS

Building and/or construction permits are not required for this expansion to an existing pilot remedial system. The construction of a concrete pad, the erection of a temporary building, and electrical connections to an existing electrical service will require coordination with NASJRB Willow Grove Public Works and/or the office of the Resident Officer in Charge of Construction. System schematics, site plans, and equipment specifications will be provided to the appropriate NASJRB Willow Grove personnel to facilitate the field construction activities. In the event of conflicting schedules with other onsite construction projects, EA will take direction from Northern Division and the Resident Officer in Charge of Construction office.
6. WASTE MANAGEMENT

6.1 WASTE DISPOSITION

Waste materials to be generated as a result of remedial action activities include POL, granular activated carbon, asphalt, and soil. Handling, transportation and disposal of waste materials will be conducted in accordance with applicable federal and state laws, as well NASJRB policies and procedures. Materials transported off site will be manifested on the appropriate Bill of Lading to document the type of material, quantity, and final destination and disposition of the waste.

POL product will be collected in a storage tank. When sufficient quantity of product has accumulated in the tank, it will be transferred to a tanker for offsite disposal.

Granular activated carbon (GAC) units are used in the treatment of the recovered ground water. GAC will be removed from the units and transported off-site for regeneration.

Waste asphalt will be generated as a result of trenching and excavation activities. A staging area consisting of a roll-off container will be established on site. Waste asphalt will be stockpiled in the roll-off container prior to off-site transportation and disposal.

Soil will be generated from trenching and well retrofitting activities. Excavated soil will be disposed on-site by spreading the soil in designated areas. As soil is excavated, it will be staged adjacent to the location from which it was excavated. Soil which can be used as backfill will be placed back into the trench. Excess soil or soil not meeting specifications for backfill will be spread in the designated on site areas.

6.2 TRANSPORTATION AND DISPOSAL SUBCONTRACTORS

The following provides information on the subcontractors to be utilized for the off-site transportation and disposal of waste materials. Each of the subcontractors listed below has been providing services to NASJRB.

POL Product:

<table>
<thead>
<tr>
<th>Company</th>
<th>Contact Name</th>
<th>Phone</th>
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</thead>
<tbody>
<tr>
<td>ABC Tank Company</td>
<td>Boyd Campbell</td>
<td>(609) 881-3843</td>
</tr>
<tr>
<td>1025 North Clayton, New Jersey 08312</td>
<td></td>
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</table>
Granular Activated Carbon:
CETCO Industrial Services
1350 West Shure Drive
Arlington Heights, Illinois 60004
Contact Name: Tracy Toppert
Contact Phone: (800) 527-9948

Asphalt:
Enviro/Consultants Group, Ltd.
262 Chapman Road
Suite 103A
Newark Delaware 19702
Contact Name: Enemute Oduran
Contact Phone: (302) 292-8995
7. PROJECT SCHEDULE

Figure 7-1 presents the schedule for the installation of the remedial system at the Navy Fuel Farm. The schedule includes tasks up to the completion of the reports associated with this work effort. The schedule assumes a construction mobilization start date of 22 July 1997 which is contingent upon Navy approval of the system design and review comments received by 26 May 1997. The schedule does not account, however, for delays which are not possible to project, i.e., weather.

Every attempt will be made to adhere to the schedule presented. Unexpected delays shall be documented and reported to the Navy in a timely fashion. In the event that the schedule needs to be modified, EA will contact the Navy for approval of the updated schedule.
### FIGURE 7-1. PROPOSED SCHEDULE FOR REMEDIAL SYSTEM CONSTRUCTION

<table>
<thead>
<tr>
<th>Act ID</th>
<th>Description</th>
<th>Crig Dur</th>
<th>Rem Cur</th>
<th>Early Start</th>
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#### Operation and Maintenance (7200)

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REFERENCES

ATTACHMENT A

RESUMES OF EA PROJECT PERSONNEL
David S. Santoro, P.E., L.S.
CTO Senior Technical Review

Education: B.S.; Ohio State University; Agricultural Engineering; 1964

Training: EA Expert Witness Training; 1990
EA Project Manager Training; 1990
Regularly conducts Quality Management Training

Certifications: Registered Professional Engineer (P.E.)—DE, GA, IL, IN, KY, MD, NC, NJ, NY, OH, PA, SC, TN, TX, VA, WV
Registered Licensed Surveyor (L.S.)—OH

Mr. Santoro is Chief Engineer and Director of Quality Control and as senior registered professional engineer is responsible for ensuring the professional quality of feasibility studies and design, coordination with public and regulatory agencies, construction oversight/Title II Services/inspection, design build and other engineering services. He authorizes contracts or other official agreements, and hiring of key staff; approves assignments of staff to projects; and reviews and approves project proposals, plans, reports, and budgets. Mr. Santoro leads EA's Quality Review program, including approval of senior technical reviewers. He provides senior technical review/guidance for EA major programs/contracts such as U.S. Air Force Center for Environmental Excellence (AFCEE), Armstrong Laboratory, Base Realignment and Closure (BRAC'), Corps of Engineers and U.S. Coast Guard. He performs the principal-in-charge role on major full service projects. The magnitude of project sizes vary from $50,000 to over $20 million.

Remedial Engineering—Provides total technical direction for design through construction and start-up/proof-out and operations of facilities. Projects range from simple pump and treat to major treatment removal actions. Select examples include slurry and barrier wall, RCRA-CAP projects, treatability studies for biological and physical treatment, PCB removal action, biological treatment of burn pit waste, 330,000 gallon dual walled buried fuel oil replacement, fuel oil tank upgrades for in excess of 200 tanks, aquifer air sparging pilot study, design/build/operate pump and treatment facility, other design/build/operate facilities, pilot/demonstration projects, removal action, drummed and contaminated materials, and lead shot removal action.

Water Treatment, Supply, Distribution, and Management—Developed conceptual and final designs for water treatment facilities of both ground and surface supplies. Evaluated treatment alternatives for new facilities and for modifications to existing supplies. Implemented numerous hydraulic and distribution projects from inception through construction implementation. Provided technical direction and management to water company for all aspects of water supply, treatment, distribution, and storage, and all financial aspects.

RI/FS/RD/RA—Directed implementation of project/work plans for CERCLA sites in numerous states. Involvement has been from a senior review or principal engineer perspective. Projects have investigated numerous technologies for ground-water treatment (aquifer air sparging/air stripping/vacuum vaporizer well [UVB] technologies), treatment and/or removal of contaminated soils/sediment, (polychlorinated biphenyls [PCBs], lead, lead shot, polycyclic aromatic hydrocarbon [PAH], etc.), capping systems, leachate collection and treatment, slurry and barrier walls. Soil/sediment treatment include technologies such as stabilization, dredging with mechanical separation, biological treatment, and excavation for offsite disposal.

Permitting and Regulatory Liaison—Developed numerous successful state permit applications for solid hazardous waste sites and federal permits for PCB (TSCA) disposal permits, and provided technical assistance, including Part B, to RCRA permit applicants. In addition, successful permitting of water treatment and sewage treatment facilities, remedial treatment facilities and numerous other projects in many states.
Sam Morekas
EA Program Management Officer

Education: B.S.; The Johns Hopkins University; Engineering; 1955

Training: 40-hour OSHA Hazardous Waste Health and Safety Training
8-hour Hazardous Waste Supervisors Training
Various Short Courses on Technical Writing, Management, and Administration

Bronze Medal for Commendable Service, U.S. Environmental Protection Agency, 1975
Sustained Superior Performance, National Institutes of Health, 1967

Mr. Morekas has more than 40 years experience in the direction and management of multidisciplinary projects in engineering and related fields. Since 1972, he has been involved in all facets of developing and implementing federal and state legislation, regulations, and programs to control hazardous wastes. He has held management positions with EPA and with the State of Maryland. He has managed and directed professional, technical, and administrative personnel, including engineers and scientists, engaged in a wide variety of environmental and engineering programs.

Uncontrolled Hazardous Waste Sites—Mr. Morekas has more than 24 years experience in all aspects of programs and projects to manage hazardous wastes. He has managed programs related to hazardous waste control at the federal (U.S. EPA) and state (Maryland) level and is an experienced negotiator with federal and state regulatory and contracting agencies. He has directed and supervised preparation of draft and final regulations and guidance for implementing various sections of RCRA/CERCLA/SARA. For the past 8 years, he has worked extensively in support of U.S. Department of Defense (DOD) agency projects related to general environmental compliance, including hazardous waste compliance and site remediation. As a Branch Chief in EPA’s Division of Hazardous Site Control, he developed, planned, and executed a program for providing guidance, support, and oversight to states participating in Superfund remedial projects. Organized, directed, and supervised the preparation and dissemination of the 2-volume document “State Participation in the Superfund Program.” Served as principal advisor to EPA upper management on matters related to state issues and performed liaison functions with the Association of State and Territorial Solid Waste Management Officials (ASTSWMO) and other interest groups.

Project Management—Managed and directed a project to evaluate a proposal for disposal of stored chemical munitions and to assist a Citizens’ Steering Committee in understanding the potential health and environmental implications of disposal/transportation of these munitions. Directed a team of in-house and subcontractor staff in developing requirements for obtaining proposals/bids for the operation and maintenance of site and leachate control systems at the Operating Industries Landfill, and of wastewater and water treatment plants at the Stringfellow and San Gabriel (Area 1) Superfund sites in California. Managed and directed several task orders related to the operation and maintenance of an industrial wastewater treatment plant; prepared RCRA Part B permit applications for two hazardous waste storage facilities; and updated maps of all NPDES outfalls at the Norfolk Naval Shipyard, Portsmouth, Virginia.

U.S. And State Hazardous Waste Management Programs—Directed a program designed to document fundamental data regarding types, characteristics, quantities, sources, and distribution of hazardous waste in the U.S. Developed program plans and developed and administered contract studies totaling $1.5 million. Organized and directed the preparation of a comprehensive report, submitted to Congress, on disposal of hazardous wastes in the U.S. Served as Workgroup Leader to develop regulations and guidance documents for implementing various sections of the Resource Conservation and Recovery Act. Planned and executed a survey of industrial plants generating hazardous wastes for the State of Maryland, Department of Health and Mental Hygiene. Directed the preparation of a report to the Maryland General Assembly documenting the results and recommending legislation to establish a state-wide hazardous waste management program.
Mr. Reitenbach is an environmental engineer with over 10 years of experience on projects involving petroleum hydrocarbons and other hazardous wastes. Projects completed by Mr. Reitenbach include design, installation, and operation of ground water and in-situ source area remediation systems including free product recovery, site assessments, feasibility studies, risk assessments, corrective action planning, and permit applications. Mr. Reitenbach currently oversees the operations, maintenance, and regulatory compliance of remediation activities at several facilities for both public and private sector clients.

Remedial Action Project Management—Mr. Reitenbach manages several remediation projects at sites ranging from retail gasoline stations to manufacturing facilities and petroleum marketing terminals. Mr. Reitenbach coordinates all aspects of projects from initial investigation through remedial system installation and operation. He has conducted and assessed vacuum enhanced product recovery tests, ground-water pumping tests, and soil vent and air sparge tests. He has also successfully bioremediated approximately 6,000 cubic yards of soil in biopiles and through landfarming. Mr. Reitenbach has written numerous corrective action workplans and has designed remediation systems comprising ground-water air stripping and free-phase product recovery. He has submitted several regulatory permit applications for NPDES discharge and atmospheric discharge. Mr. Reitenbach's clients have included major oil corporations, food processors, the U.S. Navy, the U.S. Army, the U.S. Air Force, and the U.S. Coast Guard.

Remedial Investigations/Feasibility Studies—Mr. Reitenbach has participated in a number of RI/FS at sites impacted by petroleum releases at several Department of Defense Installation Restoration Program sites, as well as private and public sector sites. He served as Task Manager supervising an interdisciplinary staff to complete the RI/FS. Sites included a fuel farm, fire training area, and waste oil storage tank. RI activities included groundwater monitoring well installations, surface and subsurface soil sampling and analyses, and groundwater sampling and analyses. Feasibility studies assessed the technical administrative and economic aspects of remedial alternatives.

Ground Water Modeling—Mr. Reitenbach has conducted computer modeling of ground water flow and solute transport for use in evaluating remedial action at various sites with petroleum releases. Mr. Reitenbach has experience with MOC, MODFLOW, BIOPLUME, RESSQ, and AT123D. Modeling results have been used in risk assessments and to justify "no action" remedial alternatives.

Underground Storage Tank Systems—Mr. Reitenbach has designed the removal and replacement of several UST systems to comply with federal and state regulations for vapor recovery, leak detection and secondary containment. In addition, he has coordinated and submitted documentation for numerous UST excavation assessments and he has managed UST site closures.

Environmental Health—As an Environmental Sanitarian for the Talbot County (Maryland) Health Department, Mr. Reitenbach performed numerous inspections and soil evaluations to determine compliance with the Maryland Health and Environmental Laws and Regulations. Gained experience in many areas of environmental health including soil evaluation, percolation testing, wastewater disposal, water supplies, well permitting, and asbestos sampling.
Mr. Stempowski has over five years experience as a Project Engineer involved in designing, permitting, constructing, and operating ground water and soil remediation systems. He also has experience installing monitoring and recovery wells, conducting aquifer and feasibility tests, and performing remedial focused site assessments and characterizations.

**Remedial Investigation and Remedial Action**— As project engineer and hydrogeologist conducted investigations and assessments at more than 45 above ground storage tank (AST) and underground storage tank (UST) sites in DC, MD, PA, and VA for government and private sector clients. Designed and installed over 15 ground water and soil remediation systems and conducted operation and maintenance activities on approximately 35 different systems. Systems include ground water pump and treat, free product recovery, air sparging, and soil vapor extraction systems utilizing granular activated carbon adsorption, air stripping, and thermal and catalytic oxidation treatment technologies. Also performed system operation and maintenance activities and prepared client and regulatory reports. Provided on-site consultation, instruction, and documentation; collected soil, sludge, and liquid samples, and prepared detailed tank closure reports for underground storage tank removals at over 25 sites. Advised client on required actions and related options regarding potential remedial action and negotiated with State inspectors. Also coordinated tank and soil disposal and prepared all associated cost estimates and proposals.

**Geotechnical Experience**— Designed, installed, and developed over 50 monitoring, recovery, soil vapor extraction, and air sparging wells utilizing hollow stem auger and air rotary drilling techniques. Prepared geologic boring logs and cross sections, and conducted aquifer slug and pump tests. Also installed and classified many soil borings and collected discrete soil and aquifer material samples for geotechnical and hydrogeological analyses. Construction experience includes grading, sub-base compaction testing, and roadway binding and wearing course installation and inspection.

**Emergency Response**— Member of several initial and follow-up emergency spill/leak response teams generally associated with the release of petroleum products. Instituted emergency spill containment and hazard abatement procedures, coordinated response actions, developed and employed emergency control methods including the installation of interceptor trenches, recovery sumps and wells, and vapor extraction systems. Coordinated activities with local Fire and Health Departments and state and local environmental agencies.

**Cost Estimating/Proposal/Bid Development**— Developed annual operation and maintenance budgets for ground water monitoring and remediation sites and assisted in the preparation of bid documents and specifications for both Federal and private contracts. Prepared monitoring, sampling, and remediation system construction, operation, and maintenance cost estimates. Also prepared site assessment, characterization, remedial investigation, and feasibility study proposals.

**Project Management**— Effectively managed several ground water and soil remediation system construction projects including subcontractor contracting and coordination. Also managed annual operation and maintenance activities at up to 20 petroleum remediation sites. Experienced in cost estimating, proposal preparation, budget tracking, and invoicing.
Education:  B.S.; Randolph-Macon College; Biology; 1989

Certifications:  OSHA 40-Hour Hazardous Waste Operations and Emergency Response Training
SCUBA Certified
8-Hour Hazardous Waste Supervisors Training
First Aid and CPR Certified

Mr. Dobson is an environmental scientist with 7 years experience in environmental field investigations and the operation and maintenance of remedial systems. He has extensive experience in the geotechnical area including well installation, soil borings, ground water sampling, and aquifer testing. He also possesses extensive experience in conducting subsurface investigations using mobile gas chromatograph techniques to analyze air, soil, and water samples.

Remedial Action—Performs operation and maintenance of various pump and treat, and soil venting sites. Familiar with various total fluid and dual phase pumps, separators, and stripping towers. Has conducted several soil vapor extraction and air sparging pilot and feasibility tests. Under contract to the U.S. Army Corps of Engineers, Omaha District, he installed and operated a soil vapor extraction/aquifer air sparging system at Dover Air Force Base. Following installation, he conducted weekly monitoring and operation and maintenance to optimize system performance. He installed and maintained two mobile product recovery systems at Fort Drum New York. Both systems used ground water depression to induce product into the wells, where it was skimmed using separate product pumps. Ground water was treated using granular activated carbon for one system; the second system used sodium hydroxide and potassium permanganate for iron removal prior to an air stripper. The project also included conducting soil vapor extraction (SVE) and aquifer air sparging (AAS) pilot studies to determine the feasibility of these remedial alternatives. Mr. Dobson installed and maintained several ground water pump and treat and soil vapor extraction systems for Exxon throughout the mid-Atlantic area. Duties included operation and maintenance checks of several different brands of water pumps, product pumps, air strippers, soil vapor extraction systems, and various forms of off-gas treatment including thermal and catalytic oxidizers.

Remedial Investigations/Feasibility Studies—Performs soil, vadose zone, ground water, surface water, biological, and leachate sampling following strict sampling and analytical protocols for various sanitary and hazardous waste landfills, DOD, and industrial sites. Mr. Dobson served as site manager for an investigation at Aberdeen Proving Ground. His responsibilities included the collection of ground water samples from over 100 monitoring wells following strict USACE and APG sampling protocols. Samples were collected using the micropurge technology. He served as site manager for the field investigation at a site in the Bayou, which involved investigation activities in support of the Feasibility Study. He coordinate the collection of over 1,000 soil and sediment samples. He was involved in designing innovative methods for the collection of the samples in the adverse conditions of a swamp environment.

Health and Safety Monitoring—Evaluated employee exposure to contaminants during excavation and removal of underground storage tanks. Analyzed air using portable direct reading instruments and gas chromatographs. Mr. Dobson has been responsible for overseeing proper implementation of health and safety protocols for numerous investigation and remediation projects.
ATTACHMENT B

DESIGN CALCULATIONS
1) **Ground-Water Extraction Pump Sizing (P-201 through P-203)**

The ground-water extraction pumps were sized based on maximum headloss as calculated from the recovery well (NFW-16) located the greatest distance from the proposed location of the new ground-water treatment system (as shown on Drawing C-1).

**Design flow rate:** 15 gpm / well (45 gpm total)

**Selected piping:**
- 1-in Polyethylene (pump discharge to surface)
  - Headloss / Velocity @ 15 gpm = 12.77 ft per 100 ft / 5.79 ft / s
- 2-in Sch. 40 PVC (process)
  - Headloss / Velocity @ 15 gpm = 0.45 ft per 100 ft / 1.46 ft / s
  - Headloss / Velocity @ 45 gpm = 3.43 ft per 100 ft / 3.49 ft / s

Note: Velocity at maximum design flow (3.49 ft/s) is within manufacturer recommended maximum PVC flow velocity of 5 ft/s.

**Headloss (H<sub>i</sub>)**

<table>
<thead>
<tr>
<th>Elevation Head (Z):</th>
<th>40 ft (depth) + 6.5 ft (GAC height)</th>
<th>46.5 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>H&lt;sub&gt;i&lt;/sub&gt; @ 15 gpm (1-in):</td>
<td>45 ft x (12.77 ft / 100 ft)</td>
<td>5.75 ft</td>
</tr>
<tr>
<td>H&lt;sub&gt;i&lt;/sub&gt; @ 15 gpm (2-in):</td>
<td>200 ft x (0.45 ft / 100 ft)</td>
<td>1.0 ft</td>
</tr>
<tr>
<td>H&lt;sub&gt;i&lt;/sub&gt; @ 45 gpm (2-in):</td>
<td>20 ft x 3.43 ft / 100 ft</td>
<td>0.67 ft</td>
</tr>
<tr>
<td>H&lt;sub&gt;i&lt;/sub&gt; @ 45 gpm (GACs):</td>
<td>2 GAC units x 1.86 ft / unit</td>
<td>3.72 ft</td>
</tr>
<tr>
<td>Minor losses @ 25%:</td>
<td>0.25 x (46.5 ft + 5.75 ft + 1.0 ft + 0.67 ft + 3.72 ft)</td>
<td>14.41 ft</td>
</tr>
</tbody>
</table>

Total H<sub>i</sub> 72.05 ft

Design H<sub>i</sub> [Total H<sub>i</sub> x 0.15 (S.F.)] + Total H<sub>i</sub> 82.85 ft

**Pump Selection**

**Criteria:** 15 gpm @ 82.85 ft total head

**Selection:** Grundfos Redi Flo 4, Model 16E 4 (15 gpm @ 86 ft)
2) **Soil Vapor Extraction System Pump Sizing Check (P-401 existing)**

Design criteria: 8 scfm per well (24 scfm total) @ 5 in-Hg

Selected piping: 2-in Sch. 40 PVC

- Headloss @ 8 scfm = 0.0010 in-H$_2$O / ft
- Headloss @ 24 scfm = 0.011 in-H$_2$O / ft

Note: Headloss in 2-in Sch. 40 PVC is minimal. Piping lengths indicated below reflect individual lines to each well that manifold together in the existing treatment building (as shown on Drawing P-2)

**Headloss (H$_i$)**

- H$_i$ @ 8 scfm (2-in): 
  \[
  \frac{[20 \text{ ft (NFFW-2R)} + 165 \text{ ft (NFFW-14)} + 150 \text{ ft (NFFW-16)} + 30 \text{ ft (at building)}]}{\times 0.0010 \text{ in-H}_2\text{O / ft}} = 0.365 \text{ in-H}_2\text{O}
  \]
- H$_i$ @ 24 scfm (2-in): 
  \[
  20 \text{ ft} \times 0.011 \text{ in-H}_2\text{O / ft} = 0.22 \text{ in-H}_2\text{O}
  \]
- H$_i$ @ 24 scfm (T-401): Negligible 
  \[
  0 \text{ in-H}_2\text{O}
  \]
- Minor losses @ 25%: 
  \[
  [0.365 \text{ in-H}_2\text{O} + 0.22 \text{ in-H}_2\text{O} + 0 \text{ in-H}_2\text{O}] \times 0.25 = 0.146 \text{ in-H}_2\text{O}
  \]
- Total $H_i$ 
  \[
  0.731 \text{ in-H}_2\text{O}
  \]
- Design $H_i$ 
  \[
  [\text{Total } H_i \times 0.15 \text{ (S.F.)}] + \text{Total } H_i = 0.84 \text{ in-H}_2\text{O (0.06 in-Hg)}
  \]

**Comparison to Existing Equipment Specification**

Criteria: 24 scfm @ 5 in-Hg

Existing: Rietsehle VFT-40 (25 scfm @ 10 in-Hg and 28 scfm @ 5 in-Hg)
Existing is acceptable.

Notes: 1) Design vacuum is based upon the results of the pilot study. During the pilot study applied vacuum typically ranged from 2 to 5 in-Hg.
3) **Liquid-Phase Carbon Adsorption Unit Sizing (T-501 and T-502)**

**Design flow rate:** 45 gpm

**Design loading:** 5 gpm / ft²

**Minimum unit φ:**

\[
\phi = \frac{45 \text{ gpm} \times 1 \text{ ft}^2}{5 \text{ gpm}} = 9 \text{ ft}^2
\]

\[
\text{Area} = \pi r^2
\]

\[
r = \sqrt{9 \text{ ft}^2 / \pi}
\]

\[
r = 1.69 \text{ ft}
\]

\[
\phi = 2r = 3.38 \text{ ft} = 40.56 \text{ in}
\]

**Unit Selection**

**Criteria:** 45 gpm @ minimum unit φ of 3.38 ft

**Selection:** CETCO LM-36, 3.5 ft (42 in) φ

Rated for 75 psi @ 50 gpm (max)
4) **DISCHARGE PIPE SIZING**

Design flow rate (Q): 45 gpm

Design slope (S): 1 ft / 100 ft (0.01)

**Maximum flow through 4-in φ PVC (assumes pipe flowing full):**

\[ V = 1.49/n \times (R_n^{2/3}) \times (S^{1/2}) \]

Substitute:

\[ V = Q/A \]
\[ R_n = A/P \]
\[ A = \pi r^2 \]
\[ P = 2 \pi r \]
\[ n = 0.010 \text{ (for smooth pipe)} \]

\[ Q/A = 1.49/n \times (A/\pi^{2/3}) \times (S^{1/2}) \]
\[ Q = 1.49 \pi r^2/0.010 \times (\pi r^2/2 \pi r)2/3 \times (0.01^{1/2}) \]
\[ Q = (468.097r^2) \times (r/2)^{2/3} \times 0.10 \]
\[ Q = 29.49r^{2/3} \]
\[ Q(\text{cfs}) = 29.49r^{0.67} \]
\[ Q = 29.29 \times 0.167 \]
\[ Q = 0.246 \text{ cfs} \]
\[ Q = 110.4 \text{ gpm} \]

**Pipe Selection Basis**

The design flow of 45 gpm is within the maximum flow for 4-in φ PVC. As a result, 4-in φ PVC is acceptable.
ATTACHMENT C

MANUFACTURER’S DATA SHEETS FOR SPECIFIED EQUIPMENT
PRODUCT
TERMINATOR
PRODUCT RECOVERY SYSTEM

OPERATIONS MANUAL
Standard Equipment:

NEMA 4 weatherproof main Control Box (NON-Explosion proof)
Auto Seeker System with 25 foot power cable
Product Probe with 50 foot probe product tube
Product Tank Inlet Fitting
100 foot product discharge tube
Product Tank Override Probe with bung and 25 foot cable
25 foot Probe power cable extension
Well head bracket and PVC adaptors
Operations Manual
TYPICAL CABLE CONFIGURATION FOR **STANDARD** PRODUCT TERMINATOR SYSTEM (See chart, pg. 51)
8.0 System Specifications

System Specifications

**Complete Product Terminator™ System includes:** Product Terminator™ Control Box, Product Terminator™ Probe with 50' cable, Auto Seeker with 25' cable, and Product Tank Shutoff Probe with 25' cable, and 100 ft product discharge tubing.

**Input Power:** 115vac or 230vac, 100 watts max. or 12vdc, 75 watts max. with optional battery cable and 12v deep discharge battery. 24vdc cabling available for higher performance. 10 amp main breaker on System Power switch.

**Operating Temperature Range:** ambient air temperature of -40°F to +140°F (-40°C to 60°C)

**Pumping Rate:** up to 50 gal/hr (190 liter/hr) @ 0 psi (zero depth & no discharge back pressure), or up to 26 gal/hr (100 liter/hr) @ 25 psi discharge back pressure.) [See Pump Performance Curve, next page.]

**Product Viscosity:** Products with viscosity of less than 10 Cp at 70 degrees F.

**Well Diameter:** 2 inch minimum for product recovery only

**Standard Well Depth:** 50 ft. max

**Minimum Well Head Clearance for AUTO SEEKER:** 24"x24"x22" Deep (61cm x 61cm x 56.4cm deep).

**Probe Dimensions:** 1.8" (4.6cm) dia. x 16" (41cm) long [cable dia. including the discharge tube is 0.5"(1.3cm)]. Standard Probe cable length is 50 ft. (15.2m)

**Control Box Dimensions:** 14" (36cm) wide x 23" (59cm) high x 6" (15.4cm) deep. An additional 10" is required below for cable exit and an additional 14" is required in front and to the left for door swing.

**Standard cable length:** 25 ft. (7.6m) from Control Box to well head.

**Product Tank Probe:** threads into a standard 2" barrel bung. Standard cable length is 25 ft. (7.6m)

**Total System Weight:** 68 Lbs. (31kg)
8.0 System Specifications

Product Terminator Pump Performance Curve

NOTES: 1.) 85 ft. Probe Product Tube
2.) Pump speed NORMAL
Dimensions

<table>
<thead>
<tr>
<th>PUMP MODEL</th>
<th>MOTOR HP</th>
<th>OVERALL A</th>
<th>MOTOR LENGTH B</th>
<th>PUMP END LENGTH C</th>
<th>MAX. DIA. D</th>
<th>INLET E</th>
<th>DISCH. PIPE SIZE F</th>
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NOTE: Dimensions are for single phase motors. Specifications subject to change without notice.

Performance

![Performance Graph](image-url)
Materials and Components

1. Stainless Steel Discharge (304 SS) – light, yet durable construction is corrosion resistant with built-in stratifiers to create a smooth transition from pump to discharge connection.

2. Stainless Steel Check Valve (304 SS) – will not stick, slam, or jam. Self-cleaning.

3. Stainless Steel Safety Cable Connector (304 SS) – Non-fray loop design attaches to discharge head.

4. Stainless Steel Check Valve Retainer (304 SS) – ensures positive seating of check valve, reduces water turbulence, and eliminates vortexing at pump discharge.

5. Teflon® Check Valve Seat – provides for positive seating of check valve.


7. Teflon® Impeller Seal Ring – provides internal seals for maximum sample integrity.

8. Stainless Steel Chambers and Guide Vanes (304 SS) designed to reduce upthrust, resist corrosion, and eliminate clogging.

9. Teflon® Intermediate Bearings – placed at each stage to ensure positive shaft alignment, eliminate vibration, and maintain pump efficiency.

10. Stainless Steel Splined Shaft (304 SS) – prevents slippage of impellers on the shaft while allowing easy service and disassembly of the pump for cleaning.

11. Stainless Steel Priming Inducer (304 SS) – prevents dry running, lubricates the bearings and permits long low-flow operation.

12. Stainless Steel Slotted Inlet Screen (304 SS) – non-corrosive with slot size matched to impeller size to prevent clogging.

13. Stainless Steel Straps (304 SS) – durable and strong design allows pump end to be easily serviced.

14. Stainless Steel Motor Cable Guard (304 SS) – protects cable.

15. Teflon® Motor Cable – corrosion resistant Teflon® coated wire reduces the risk of sample bias.

16. Stainless Steel Suction Interconnector (304 SS) – rugged, NEMA design with large flow openings. Provides positive pump and motor alignment.

17. Stainless Steel Shaft Coupling (329/420/431 SS) – heavy-duty, corrosion resistant design.

18. Sealed Stainless Steel Motor – constructed of stainless steel, Teflon®, and Viton® and designed to meet the strict specifications required in environmental applications.
**SKID TANK**

**Light Duty Skid Tank**

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**Heavy Duty Skid Tank**

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Gravity discharge fitting furnished only when specified by customer.
Highland Skid Tanks are painted with red primer.
All tanks over 1,000 gallons receive U.L. 142 Label.
Pipe skids, beam supports vary in size and number according to tank capacity. Skid design may vary.
Call for special requirements.

**Highland Tank and Manufacturing Company**
P.O. Box 338, St. Marys, PA 15530-0338
Phone (814) 893-5701
Fax (814) 893-5701
99 West Elizabethtown Road, Manheim, PA 17545-9410
Phone (717) 665-6877
Fax (717) 665-6877
958 Nineteenth Street, Watervilet, NY 12189-1752
Phone (518) 272-0391
Fax (518) 272-0391
To meet the stricter requirements of environmental control, the market is increasingly requiring oil-free operating vacuum pumps. This is especially true in the food and candy industries, as well as on paper handling machinery. In the laboratories and assembly lines which are part of these industries it is important to avoid odor emission and contaminates which is never totally possible with oil lubricated pumps. Working in a clean air environment is today's requirement.

Our VFT range meets this requirement completely.

There are ten model sizes available i.e. 25, 40, 60, 80, 100, 140, 180, 250, 340 and 500; 15 to 353 cfm.

In standard construction the VFT vacuum pumps will reach an ultimate vacuum of 150 mbar absolute, but they can be modified for special applications to reach an ultimate of 100 mbar absolute.

The VFT vacuum pumps are air cooled by a built in fan. There are two versions. On the standard version (pictures 1 and 2) the warmed cooling air is exhausted radially over the whole circumference of the fan housing. On the optional construction (picture 3) the fan is surrounded by a spiral housing which exhausts the air in a particular direction, either upwards, downwards, or sideward. This latter version is especially suitable where the pump will be mounted in a confined space, inside a machine or sound enclosure. Then the warmed air can be ducted away, hence not raising the temperature of the cooling air.

The VFT pumps operate on the rotary vane principle but differ from other multi-cell systems by using exhaust valves which mean that only 4 vanes are necessary.

PA 157  2.10.90
This reduces the sliding friction. The sensitive exhaust valves permit exhaust from the cells only when the internal pressure exceeds the external pressure hence preventing backflow or over compression.

Our new design results in lower temperatures and reduced energy requirements.

Prolonged tests with this system have proven that the lifetime of the carbon graphite vanes is improved considerably by the reduced load.

These improvements result from research we did on a vacuum system for use in a space station and which we can now apply to general technology.

Standard Features:
- Inlet filter (microline filter)
- Exhaust silencer

Special Versions:
All sizes are available with special voltages and frequencies.

Accessories:
- Vacuum regulation valve
- Non-return valve
- Vacuum tight inlet filter (as additional filter)
- Motor starter
- Unloading valve for Star/Delta starting (generally recommended for VFT 340 and VFT 500)

Please consult our data sheets DU 157 and DU 167 for further details.
THERMTech, Inc.

SAFE • SIMPLE • ECONOMICAL

VAPOR CHECK

MODEL: VAC 25

**GENERAL DATA**

* SCFM rating: 250 SCFM (7.1 m³/min)
* burners maximum output capability: 1,000,000 BTU/hr
* burner turndown ratio: 20 to 1
* combustion blower motor size: 1 HP (.75 KW)
* combustion chamber I.D: 27" x 27" x 60" (68.6cm x 68.6cm x 152.4cm)
* stack I.D: 12" x 12" (30.5cm x 30.5cm)
* skid size: 39" x 120" (99cm x 304.8cm)
* velocity through process inlet:
  @ 125 SCFM (3.5 m³/min) from process stream: 23.8 ft/sec (7.25 m/sec)
  @ 250 SCFM (7.1 m³/min) from process stream: 47.5 ft/sec (14.48 m/sec)

**THERMAL DATA**

* SCFM added by combustion blower when fired on ratio: 96 SCFM (2.7 m³/min)
* total ACFM @ 1400°F (760°C): 1219 ACFM (34.5 m³/min)
* burner chamber volume required for 0.5 seconds retention time @ 1400°F (760°C): 10.2 ft³ (.289 m³)
* burner chamber volume required for 1.0 seconds retention time @ 1500°F (815°C): 21.4 ft³ (.606 m³)
* stack velocity:
  @ 125 SCFM (3.5 m³/min) from process stream: 10.2 ft/sec (3.11 m/sec)
  @ 250 SCFM (7.1 m³/min) from process stream: 20.3 ft/sec (6.19 m/sec)
* estimated weight, thermal unit only: 1550 lbs (703 Kg)

**CATALYTIC DATA**

* SCFM added by combustion blower when fired on ratio: 29 SCFM (.82 m³/min)
* total ACFM @ 600°F (315°C): 560 ACFM (15.6 m³/min)
* catalyst volume for 90% plus destructive efficiency: 1/2 ft³ (14,159 cm³)
* inlet temperature: 600°F (315°C)
* maximum concentrations: 25 % of the LEL
* stack velocity:
  @ 125 SCFM (3.5 m³/min) from process stream: 4.7 ft/sec (1.43 ft/sec)
  @ 250 SCFM (7.1 m³/min) from process stream: 9.3 ft/sec (2.84 ft/sec)
* estimated weight, thermal unit plus catalytic module: 1770 lbs (803 Kg)

* The above data is intended to be used as general, guide line type information. For specific application proposal, please contact the manufacturer.
CETCO Industrial Services Group offers a complete line of modular liquid phase adsorbers. The Aquatec LM-Series is designed as a low cost pressure adsorber that is portable and can be easily put into service. The Aquatec LM-Series adsorbers are capable of operating pressures up to 75 psi and are designed to hold from 500 to 2000 lbs of carbon.

Important Features

- Durable carbon steel construction.
- Hydrottested to 90 psi for a maximum operating pressure of 75 psi.
- Lifting lugs and forklift guides to facilitate moving.
- Lower PVC collection hub and laterals positioned for maximum carbon utilization.
- Upper PVC distribution hub and laterals allow for backwashing and/or upflow operation.
- Threaded influent/effluent connections.
- 12"x16" elliptical manway for easy access.
- Low profile design.
- Heavy duty high build glass flake chemical resistant internal lining.
- Rust-inhibitive epoxy primer and acrylic polyurethane top coat exterior.
- Can be filled with any of CETCO's virgin or reactivated granular carbons.
- Shipped with carbon and ready for service.
- All models available for lease.

For More Information and Pricing
Call
1-800-527-9948
and Talk to One of Our
Knowledgeable Technical
Support Personnel

Carbon volume and weight based on bituminous carbon @ 28 lbs/ft³
Estimated pressure drop based on virgin 8x30 carbon.
Design and specifications subject to change without notice.
Available Options:

- FDA Approved & Industrial Use Plasite Linings
- Custom Linings
- Custom Colors
- Stainless Steel Construction
- Stainless Steel Internals
- Drain Assembly
- Flanged Inlet/Outlets
- PRVs
- Vacuum Breakers
- Air Release Valves
- Prepiped Automatic Systems
- Multi Vessel Systems
- Call for your custom configuration

**CETCO**
Industrial Services Group
1-800-527-9948

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PARKLINE DELAWARE VALLEY, INC.

"Small Building Specialists"
P.O. Box 11
LINCOLN UNIVERSITY, PA 19352
(610) 274-8742  FAX (610) 274-8762

QUOTE NUMBER
EAMD05.WPS

PROPOSAL SUBMITTED TO
Mr. Swanson / E.A. ENGINEERING

PHONE 1-410-771-4950  DATE 3/19/97

STREET
15 Loverton Circle

JOB NAME
Equip. Building

CITY, STATE and ZIP CODE
Sparks., MD. 21552

JOB LOCATION
Willow Grove, PA

ARCHITECT

DATE OF PLANS

JOB PHONE
fax:1-410-771-4204

We hereby submit specifications and estimate for:

DESCRIPTION:

1- 12'0" wide x 12'0" long x 10'0" high low eave, PARKLINE Type AL Building, designed BOCA Codes, Live-Load: 30# SF., Wind Load: 20# SF.

Roof Color: 24 gauge galvalume with 3" interlocking rib.

Trim Color: Arctic White or Roman Bronze.

Wall Color: Customer to select from seven factory colors, Siliconized Polyester Finish.

1- 3'8" wide x 7'0" high x 1-3/4" thick Walk Door pre-assembled in frame with Mortise Lockset, RHSO, Solid-Leaf, Threshold and Weather stripping. Frame and Leaf—factory painted with one coat of baked on primer.

1- 300# SF. 3" thick 1.5# density fiberglass Roll In Wall Insulation, faced with white metalized polypropylene scrimkraft facing with white PVC hat clips for panel ribs.

200# SF. 3" thick x 48" wide .60-density fiberglass Blanket Roof Insulation, faced with white metalized polypropylene scrimkraft facing with mechanical clips.

1- 16" wide x 24" high Adj. Wall Louver, frame shall be minimum 14 gauge formed aluminum, blades shall be minimum 12 gauge extruded aluminum mill finish, pull bar operating handle and mesh insect screen.

Freight F.O.B. Winfield, WV, estimated weight 2,161 #.

ALTERNATE ADD-

for Estimated freight to Willow Grove, PA (LTL Rate)

ALTERNATE ADD-

for 3 Sets of PA FE Sealed Erection Drawings

We Propose hereby to furnish material -- complete in accordance with above specifications, for the sum of:

$ --

Signature

Note: This proposal may be withdrawn by us if not accepted within 30 days.

Acceptance of Proposal — The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Date of Acceptance:

Signature

We hereby agree:

We will furnish labour, materials, and equipment for the above named project, as per specifications above.

Signature

We hereby agree:

We will furnish labour, materials, and equipment for the above named project, as per specifications above.

Signature

Invoicing extra costs will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon states, accidents or defects beyond our control. Owner to carry fire, theft, transit and other necessary insurance. Our workers are fully covered by Workmans Compensation Insurance.

Note: This proposal may be withdrawn by us if not accepted within 30 days.

Acceptance of Proposal — The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

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Signature

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Note: This proposal may be withdrawn by us if not accepted within 30 days.

Acceptance of Proposal — The above prices, specifications and conditions are satisfactory and are hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Date of Acceptance:

Signature
Specifications

Quote # EAMD05.WPS

ALTERNATE ADD: for Open Shop Labor to assemble the bldg.

ALTERNATE ADD: for One (1) Insulated Steel Roll-up door 6'8" x 6'-8" h w/ an interior lock.

ALLOW 2 - 3 Weeks for approval drawings.
ALLOW 4 - 6 Weeks for delivery of building after approval.

PRICE DOES NOT INCLUDE ANY PA STATE SALES TAX IF APPLICABLE.
PRICE DOES NOT INCLUDE ANY PERMITS, LICENSING OR BUILDING FEES
PRICE DOES NOT INCLUDE UNLOADING OF BUILDING (If assembled by others)

PARKLINE DELAWARE VALLEY, INC.
"The Small Building Specialists"

Submitted by: [Signature] Date: 1/9/97

[space for acceptance details]
# STANDARD BUILDING TYPES

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**STANDARD HEIGHTS**

8’, 10’, 12’, 14’, 16’ *

**STANDARD LENGTHS**

TYPE S & LT BUILDING LENGTHS = 16” MULTIPLES
TYPE AL BUILDING LENGTHS = 4’-0” MULTIPLES

### BUILDING SPECIFICATIONS

#### DRAWINGS AND DESIGN DATA

**General**

The buildings covered by these specifications shall be of self-framing design utilizing the roof and wall panels as the primary structural supporting members.

Each building shall be supplied with all necessary component parts, including foundation anchors, to form a complete building system. All parts shall be new and free from any defects or imperfections.

The building width and length shall be measured from the outside of the building wall panels and the height of the building shall be the distance measured from the bottom surface of the base channel to the exterior juncture of the roof and sidewall panels.

The building supplier shall furnish a complete set of building erection drawings illustrating the step by step sequence for the erection of the building. The erection drawings shall be prepared specifically for the building covered by these specifications showing the exact location of all roof and wall accessories and the exact anchor bolt locations required for each accessory.

**Design Criteria**

All buildings shall be designed in accordance with the applicable sections of the latest edition of the AISC “Specifications for Structural Steel Buildings” and the AISI “Specifications for the Design of Cold Formed Steel Structural Members”.

Each building shall be designed for the following loads, in addition to the stationary weight (dead load) of the building. Reduction of loads due to tributary loaded areas will not be permitted.

1. The vertical Live Load of the building shall be not less than (*) pounds per square foot applied on the horizontal projection of the roof.
2. The horizontal Wind Load of the building shall be not less than (*) miles per hour and shall be distributed and applied in accordance with the applicable edition of the Metal Building Manufacturers Association (MBMA) publication titled “Low Rise Building Systems Manual”.

*Select one from above.*
All combining and distributing of auxiliary equipment loads imposed on the building system shall be done in accordance with the applicable section of the MBMA publication titled "Low Rise Building Systems Manual". **NOTE:** The building designer is responsible for advising the building supplier of any auxiliary loads intended to be imposed on any building covered by these specifications.

All standard buildings listed in this manual have been designed in accordance with the current addition of the Metal Building Manufacturers Association (MBMA) publication titled "Low Rise Building Systems Manual".

However, it should be pointed out that many areas of the country require the use of state or local building codes which may be different from the MBMA. Buildings covered such as the "National Building Code", the "Standard Building Code", and the "Uniform Building Code" are markedly different from one another and are often revised at the local level.

Therefore it is the responsibility of the specifier to notify Parkline of any building code(s) in effect for any particular building or provide Parkline with the telephone number of the building inspector with jurisdiction over the building site.

**ROOF AND EXTERIOR WALL PANELS**

**Roof Panel Design**

Roof panels shall be supplied in a single continuous length from eave line to ridge line and shall be designed to tightly interlock so that no fasteners are required at intermediate points along the panel side laps.

Roof panels shall be a maximum of 16” wide with a flat surface between the interlocking side ribs. The interlocking ribs shall be a minimum 3” high, and shall be turned upward. All roof panels shall be factory punched for connection at the eave line of the building.

Roof panels shall be minimum 24 gauge steel coated on both sides with a coating of corrosion resistant aluminum-zinc alloy applied by a continuous hot dipping process. Coating weight shall be a minimum of 0.32 oz. of aluminum-zinc alloy per square foot of coated sheet (both sides)—equivalent to approximately 0.80 mil thickness on each side. Minimum yield strength of panel material shall be 50,000 PSI.

**(Optional) Roof Panel Material-Painted**

Roof panels shall be minimum 24 gauge galvanized steel conforming to ASTM A 525 specifications with the galvanized coating conforming to G90 (1 ¼ oz.) standards. Minimum yield strength of panel materials shall be 50,000 PSI.

All exterior surfaces of the galvanized steel roof panels shall receive two factory, roller applied, paint coats having a combined coating thickness of .8 to 1.2 mils of dry film thickness. The finish coat for roof panels shall be a white siliconized polyester formulation.

**Wall Panel Design**

Exterior wall panels of the building shall be a single continuous length from the base channel to the roof line of the building at the sidewalls and endwalls of the building except where interrupted by wall openings.

Wall panels shall be maximum 16” wide with a 3” deep inward turned interlocking side rib. Wall panels shall contain two ¾” deep by 3 ¼” wide fluted recesses, each starting 2-7/16” from each panel edge.

Wall panels shall be fastened internally to the base channel and eave cap of the building with ¾” diameter electrogalvanized machine bolts placed within the panel interlock. The fastening system shall be designed so that no wall fasteners are exposed on the exterior surfaces of the walls.

Wall panels shall be minimum 24 gauge galvanized steel conforming to ASTM A 525 Specifications with the galvanized coating conforming G90 (1 ¼ oz.) standards. Minimum yield strength of panel material shall be 40,000 PSI. Panel material shall be embossed with a random pattern pebble embossure of approximately .007-.008 depth.

The bases of the wall panels shall be closed off with polyethylene closures conforming to the panel profile.

**Color Coatings**

All exterior surfaces of the galvanized steel wall panels and exterior trim shall receive two factory, roller applied, paint coats having a combined coating thickness of .8 to 1.2 mils of dry film thickness. The finish coat for wall panels shall be a siliconized polyester formulation of one of the following Parkline colors: Twilight Blue, Desert Tan, Laurel Green, Arctic White, Harvest Gold, Roman Bronze or Shell Gray.

Exterior color coatings shall meet the following performance standards after 10 years continuous exposure in normal* vertical atmospheric conditions.

- **a. Panels shall show no evidence of blistering, peeling, or chipping.**

- **b. Panels shall not show surface chalking in excess of the No. 8 rating D 659-80 as established by the American Society for Testing and Materials (ASTM).**

- **c. Panels, after cleaning, shall not show color change in excess of five (5) NBS units when measured in accordance with the ASTM D 2244-85 standards.**

The above performance standards shall not apply where panels have been damaged by fire, radiation or other physical damage.

* "Normal" atmospheric conditions exclude exposure to corrosives such as chemical fumes or salt spray.
D. (Optional). The eaves of the building shall have a gutter and downspout system of 26 gauge factory painted gutters of the same configuration as the building rake trim and 2"x3" box type galvanized steel downspouts. Gutter and downspouts shall be the same color as the building rake trim and shall be complete with all required outlet drops, elbows and connecting hardware.

Structural Framing

Angle or channel bracing components shall be placed across the building width to allow transmission of horizontal wind loads. All wind bracing components shall be of minimum 14 gauge galvanized steel. Where required for proper transmission of lateral wind loads, structural frame wind bents shall be installed. Wind bents shall consist of a bolted column and rafter assembly of steel conforming to ASTM A 36 specifications.
HOLLOW METAL DOORS

DOOR SPECIFICATIONS

All doors shall be 1 3/4" thick flush construction. Door leaves shall be minimum 20 gauge galvanized steel, reinforced by lamination to a small cell honeycomb core and manufactured in accordance with ANSI/SDI-100, Grade I, Model 1 (STC rating 30 and U value .41). The hinge reinforcement shall be minimum 7 gauge and the lock reinforcement shall be minimum 16 gauge. Door frames shall be 4 3/4" deep, double rabbeted type, of minimum 16 gauge galvanized steel. All leaves and frames shall be factory painted with one coat of baked on primer.

Optional: Permanent or removable transoms.

DOOR LEAVES — Shall be of types indicated below.

a. Solid Panel (Type S)
b. Narrow lite, top with 5" x 30", 1/4" acrylic glazing pre-glazed, solid bottom. (Type NL)
c. Half glass, top open for glazing, solid bottom. (Type HG)

DOOR ASSEMBLY

All doors shall be provided 'assembled' in their frames with all hardware, except door levers or knobs, installed on door leaf. 6'0" x 7'0" double swing doors require some field assembly.

DOOR HARDWARE

STANDARD DOOR HARDWARE:

a. (3) 4-1/2" x 4-1/2" steel hinges per ANSI #A8132 (Old Govt. Spec. FFH116C Type T2127) US26D (626) Satin Chrome Finish with non removable pins.
b. 3 11/16" wide 5/8" high extruded aluminum threshold.
c. 3/16" x 1/2" polyurethane and vinyl weatherstripping.
d. Mortise cylinder lockset per ANSI A156.13, Series 100, Grade 1, Function F13, (Old Govt. Spec. 86B) US26D (626) Satin Chrome Finish.

OPTIONAL DOOR HARDWARE:

a. Cylindrical key in knob lockset per ANSI A156.2, Series 4000, Grade 2, Function F81. (Old Govt. Spec. 160A) US26D (625).
b. Rim type "Cross Bar" panic device per ANSI A156.3, Type 1, Grade 1, Function 05, (Old Govt. Spec. 810HT) with US27 Brushed Aluminum Finish.
c. Rim type "Push Pad" panic device built to ANSI A156.3, Type 1, Grade 1, Function 08 certification Aluminum Lacquer Finish.
e. Door closer is certified to conform to ANSI 156.4 Grade 1 and meets exterior barrier free codes in Aluminum Lacquer Finish.
f. 23" wide x 20" high adjustable blade louver with mesh insect screen.
g. ADA (The Americans With Disabilities Act) Package.
FRAMED OPENINGS FOR OVERHEAD DOORS
Framed openings shall be constructed from minimum 12 gauge galvanized steel. The jambs and head shall provide a minimum 2 1/2" wide inside surface for field mounting of overhead door track and hardware. Head and jamb covers to be 24 gauge, embossed, painted wall color.

NOTE: Allow a minimum of 1'-6" clear head room above eave line for overhead-type doors and 2'-0" minimum head room for roll up-type doors.

UTILITY SLIDING DOORS
Sliding doors shall consist of a minimum 16 gauge galvanized steel channel framing system and embossed 24 gauge pre-painted arctic white ribbed covering. The doors shall be top hung design with a continuous bottom guide rail.

OPTION: Door covers painted same color as wall color.

Door leaves available in widths of 4'-0" *, 8'-0" *, 10'-8" and 12'-0".

* SINGLE SLIDING DOOR
(Double Door Uses Two Identical Leaves)

NOTE: Refer to framed opening for section details.

REMOVABLE WALL SECTIONS
A removable wall section shall consist of a framed opening capable of supporting roof and wall loads when the wall section is removed. The removable section shall consist of the same materials as the permanent wall. Section shall be removable by unbolting from inside the building.

NOTE: Refer to framed opening details for size availability.
SPECIAL WALL OPENINGS
All necessary framing and connectors to structurally replace the panels removed by any wall opening. All trim and flashings required to make the unit placed in any opening weathertight shall be provided by the supplier of the unit being installed.

GABLE LOUVERS (TYPE AL BUILDINGS ONLY)
Gable louvers shall be fixed type with blades set on a 45 degree slope. Blades and frames shall be minimum 14 gauge extruded aluminum with natural mill finish. Louver shall include #18–14 aluminum mesh insect screens.

<table>
<thead>
<tr>
<th>BUILDING WIDTH</th>
<th>SIZE</th>
<th>FREE AREA</th>
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<tbody>
<tr>
<td>4-1/2&quot; X 4&quot;</td>
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<td>9.9 SQ. IN.</td>
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<tr>
<td>6&quot; X 6&quot;</td>
<td></td>
<td>15.6 SQ. IN.</td>
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<tr>
<td>6&quot; X 9&quot;</td>
<td></td>
<td>48 SQ. IN.</td>
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<tr>
<td>12&quot; X 12&quot;</td>
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<td>198 SQ. IN.</td>
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</table>

ADJUSTABLE WALL LOUVERS
Adjustable louvers shall be of self framing design. The louver frame shall be of minimum 14 gauge formed aluminum and the louver blades shall be minimum 12 gauge extruded aluminum. Finish shall be natural mill finish and shall not require field painting.
Blades shall be pivoted on 1/2" diameter aluminum pivot pins through nylon flanged bearings and operated by means of a pull bar operating handle. All louvers shall be complete with an exterior mounted 18-14 aluminum mesh insect screen.

NOTE: Designer must specify louver sill height. Minimum sill or head height is 6".

FIXED UTILITY LOUVERS
Fixed louvers shall be general purpose type of self framing design. Finish shall be bright galvanized. All louvers shall be complete with #8 insect screening.
INTERIOR FINISHES

ROLL-IN INSULATION

The interior of the building shall be insulated with 3" thick fiberglass faced on its exposed side with a white metalized polypropylene scrimkraft facing. The insulation shall be retained between the interlocking panel ribs with a white PVC hat clip over the panel ribs.

Note: C = Calculated
T = Tested

<table>
<thead>
<tr>
<th>INSULATION VALUES</th>
<th>U</th>
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</thead>
<tbody>
<tr>
<td>3' THICK</td>
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LOCK-IN WALL LINER

The interior of the building shall be lined with a factory assembled insulated metal liner having no exposed fasteners except at the matching base, ceiling and accessory trim.

Liner panels shall be 16" wide and shall be minimum 26 gauge embossed galvanized steel, prepainted arctic white. Insulation shall be non combustible, nominal 1" thick, 2# minimum density fiberglass laminated to the liner panel.

Option: the void between the exterior wall panel and the lock-in liner shall be insulated with 3" thick unfaced fiberglass insulation.

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<th>INSULATION VALUES</th>
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</table>

LOCK-IN WALL LINER PLUS

The interior of the building shall be lined with a factory assembled insulated metal liner having no exposed fasteners except at the matching base, ceiling and accessory trim.

The wall liner system shall have a concealed insulating board of 1 1/2" thick polyisocyanurate foam impaled on rib clips.

Liner panels shall be 16" wide and shall be minimum 26 gauge embossed galvanized steel, prepainted arctic white. Insulation shall be non combustible, nominal 1" thick, 2# density fiberglass laminated to the liner panel.

The void between the exterior wall panel and the lock-in plus liner shall be insulated with 3" thick unfaced fiberglass insulation.

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<tbody>
<tr>
<td>3' THICK</td>
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BLANKET ROOF INSULATION

Roof insulation shall consist of 48" wide, 3" thick, .6# density fiberglass faced on its exposed side with a white metalized polypropylene scrimkraft facing. The faced insulation material shall have a UL Flame Spread Rating of 25 when tested in accordance with UL 723 ASTM E 84 procedures.

Insulation shall be supported at the roof line by means of mechanical clips spaced on maximum 4" centers and shall be sealed by means of 2" side laps on the facing.

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<tr>
<td>4&quot; THICK</td>
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THERMA ROOF

Roof insulation shall consist of 48" wide x 8' and 12' long polyisocyanurate foam board faced with a white embossed coated foil on the exposed interior surface.

Insulation shall have a maximum UL flame spread rating of 25, fuel contributed rating of 10 and smoke developed rating of 155-190 when tested in accordance with UL723 testing methods and shall meet the requirements of the Underwriters Laboratories "Wall-Ceiling" Construction Classification.

The roof insulation system shall include metal supporting tees on 4" centers and all trim required for a finished interior appearance. No metal-to-metal contact between the insulation system and exterior roof or wall covering will be permitted.

Insulation thickness shall be (2" or 3")*.  

*Select one.

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ATTACHMENT D

SPECSINTACT
PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1.1.1 Project Description

The work includes [ ] and incidental related work. [ ]

1.1.2 Location

The work shall be located at the [ ] approximately as indicated. The exact location will be shown by the Contracting Officer.

1.2 EXISTING WORK

In addition to "FAR 52.236-9, Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements":

a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.

b. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Contracting Officer. At the completion of operations, existing work shall be in a condition equal to or better than that which existed before new work started.

1.3 LOCATION OF UNDERGROUND FACILITIES

Obtain digging permits prior to start of excavation. [ ] Scan the construction site with electromagnetic or sonic equipment, and mark the surface of the ground where existing underground utilities are discovered. [ ] Verify the elevations of existing piping, utilities, and any type of underground obstruction not indicated or specified to be removed but indicated for discovered during scanning in locations to be traversed by piping, ducts, and other work to be installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made. [ ] Perform toning where indicated or shown by the Contracting Officer.

1.3.1 Notification Prior to Excavation

Notify the Contracting Officer at least 48 hours prior to starting excavation work.

1.4 GOVERNMENT-FURNISHED MATERIAL AND EQUIPMENT

Pursuant to Contract Clause ["FAR 52.245-2, Government Property (Fixed Price Contracts)""] ["FAR 52-245-2, Government-Furnished Property (Short Form)"], the Government will furnish the following materials and equipment for installation by the Contractor:
1.4.1 Delivery Schedule

Notify the Contracting Officer in writing at least \( \frac{1}{2} \) calendar days in advance of the date on which the materials and equipment are required. Pick up materials and equipment no later than 30 calendar days after the required date. When materials and equipment are not picked up by the 10th day, the Contractor will be charged for storage at the rate of [_____] per 100 [pounds] [cubic feet] per month or fraction thereof.

[MATERIALS AND EQUIPMENT WILL BE AVAILABLE ON OR AFTER [_____] CALENDAR-DAYS AFTER THE AWARD-OF-CONTRACT.]

1.4.2 Delivery Location

The materials and equipment [are located at [_____] [are located within [_____] miles of the jobsite] [will be delivered to [_____]].]

1.5 [GOVERNMENT-INSTALLED WORK [______].]

1.6 SPECIFICATION COVER SHEET
PART 2    PRODUCTS

Not used.

PART 3    EXECUTION

Not used.

-- End of Section --
SECTION 01140
WORK RESTRICTIONS
09/96

PART 1 GENERAL

1.1 [SUBMITTALS]

Submit the following in accordance with Section titled, "Submittal
Procedures."

1.1.1 SD-18, Records

a. Visit Request for Pearl harbor Naval Shipyard Form (PHNSY
   14ND-SYD-5512/28) G

b. Completed Special Access Determination (NAUSEA 5510/15) G

c. Pier parking authorization G

d. Government guard services G

e. MSRB G

f. Dining and lodging requirements G

g. Housing plan G

h. Medical plan G

i. Contractor regulations G

j. Transportation of personnel, materials, and equipment G

k. Purchase orders G

1.2 [SPECIAL SCHEDULING REQUIREMENTS]

a. [_____] shall be ready for operation as approved by Contracting
   Office before work is started on [_____] which would interfere
   with normal operation.

b. Have materials, equipment, and personnel required to perform the
   work at the site prior to the commencement of the work. Specific
   items of work to which this requirement applies include:

   (1) [_____]

   (2) [_____]


1.3 CONTRACTOR ACCESS AND USE OF PREMISES
1.3.1 Station Regulations

Ensure that Contractor personnel employed on the Station become familiar with and obey Station regulations. Keep within the limits of the work and avenues of ingress and egress as directed. Do not enter restricted areas unless required to do so and until cleared for such entry. Permission to interrupt any station roads, railroads, or utility services shall be requested in writing minimum of _______ calendar days prior to the desired date of interruption. The Contractor's equipment shall be conspicuously marked for identification.

1.3.2 Working Hours

Regular working hours shall consist of an eight and one-half hour period established by the Contracting Officer, Monday through Friday, excluding Government holidays.

1.3.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Provide written request at least _______ calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress. During periods of darkness, the different parts of the work shall be lighted in a manner approved by the Contracting Officer.

1.3.3.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations. Keep within the limits of the work and avenues of ingress and egress. Ingress and egress of Contractor vehicles at the Activity is limited to the H-3 gate. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. The Contractor's equipment shall be conspicuously marked for identification. [For information, city and county of Honolulu Traffic Code Section 15-21.11(a) states, "No person shall drive any truck in either direction over Kaneohe Bay Drive, Mikiola Drive and the junction with Kalaeo Avenue, when such truck with load weighs in excess of seven tons.

1.3.3.2 Working Hours

Regular working hours shall consist of an eight and one-half hour period between 7 a.m. and 3:30 p.m., Monday through Friday, and 7 a.m. to 11 p.m. on Saturday, excluding Government holidays.

1.3.3.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application _______ calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods of darkness, the different parts of the work shall be lighted in a manner approved by the Contracting Officer. Make utility cutovers after normal working hours or on Saturdays, Sundays, and Government holidays unless directed otherwise.
Utility cutovers, if required, shall be made after normal working hours or on Saturdays, Sundays, and Government holidays.

1.3.3.4 [Occupied Building[s]

The Contractor shall be working [in an existing building] [around existing buildings] which [is][are] occupied. [Do not enter the building[s] without prior approval of the Contracting Officer.] [Relocate movable furniture [approximately [_____] feet away from the Contractor's working area] [as required to perform the work]. Protect the furniture, and relocate the furniture in [its] [their] original location[s] upon completion of the work.] Leave attached equipment in place, and protect [it] [them] against damage, or temporarily disconnect, relocate, protect, and reinstall [it] [them] at the completion of the work. [The Government will remove [and relocate] other Government property in the areas of the building scheduled to receive work.]]

1.3.4 Utility Cutovers and Interruptions

a. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in the paragraph "Work Outside Regular Hours."

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. Interruption to water, sanitary sewer, storm sewer, telephone service, electric service, air conditioning, heating, fire alarm, compressed air, and [_____] shall be considered utility cutovers pursuant to the paragraph entitled "Work Outside Regular Hours." [Such interruption shall be further limited to [_____] hours.] This time limit includes time for deactivation and reactivation.

d. Operation of Station Utilities: The Contractor shall not operate nor disturb the setting of control devices in the station utilities system, including water, sewer, electrical, and steam services. The Government will operate the control devices as required for normal conduct of the work. The Contractor shall notify the Contracting Officer giving reasonable advance notice when such operation is required.

1.4 [OCCUPIED AND EXISTING BUILDINGS]

The Contractor shall be working [in] [around] existing buildings. Do not enter buildings without prior approval from Contracting Officer.

1.5 [SPECIAL SCHEDULING FOR OCCUPIED BUILDINGS]

The work under this contract requires special attention to the scheduling and conduct of the work in connection with existing operations. Identify on the construction schedule each factor which constitutes a potential interruption to operations.

The following conditions apply:

(1) [_____]

(2) [_____]

SECTION 01140 Page 3
[The existing buildings and their contents shall be kept secure at all times. Provide temporary closures as required to maintain security as directed by the Contracting Officer.]

[Provide dust covers or protective enclosures to protect existing work that remains and Government material located in the [_____] during the construction period.]

[Relocate movable furniture [approximately 6 feet][_____] away from the Contractor's working area [as required to perform the work], protect the furniture, and replace the furniture in [its] [their] original location[s] upon completion of the work.] Leave attached equipment in place, and protect [it] [them] against damage, or temporarily disconnect, relocate, protect, and reinstall [it] [them] at the completion of the work.]

[The Government will remove [and relocate] other Government property in the areas of the building[s] scheduled to receive work.]

1.6 [SECURITY REQUIREMENTS]

Contract Clause "FAR 52.204-2, Security Requirements and Alternate II."
"FAC 5252.236-9301, Special Working Conditions and Entry to Work Area." and the following apply:

[_____]}

1.6.1 [NOBSY, Washington, DC, Quarters "A"

Provide full name, date of birth, and social security number of all employees and representatives of the Contractor who need access to the Quarters "A" compound to the Contracting Officer at least 7 days in advance of the date on which access is desired. The Contractor will be advised should any of the proposed employees not meet security requirements for access to the Quarters "A" compound. For individual cases, access to the Quarters "A" compound can occasionally be obtained with a 4-hour advance notice; however, the Contracting Officer reserves the right to utilize the full 7 days should he determine it necessary.]

a. [Personal identification: Before entering the Quarters "A" compound, all persons shall furnish personal identification and receive a badge furnished by the Government. Badges shall be worn so they are clearly visible at all times. Return badges to the issuing office when leaving the Quarters "A" compound.]

b. [Security processing: Allow for a processing period of [15] [_____] minutes as employees enter the Quarters "A" compound at the beginning of each workday. All materials entering or in the Quarters "A" compound will be subject to search.]

1.6.2 [NSWC, Dahlgren, VA]

A copy of the security regulations may be obtained from the security office of the station.]

1.6.3 [Naval Surface Warfare Center (NSWC), Indian Head, MD]

No employee or representative of the Contractor will be admitted to the work site unless he furnishes satisfactory proof that he is a citizen of the United States or is specifically authorized admittance by the OICC.
Identification Badges - A list of all employees to be engaged in the performance of work shall be furnished to the Security Department. In the event employees are hired or discharged, a corrected list of employees shall be furnished reflecting the change in personnel. Identification badges for the Contractor and his employees shall be furnished by the Security Department, Indian Head Division, Naval Surface Warfare Center, Indian Head, MD. Immediately report instances of lost or stolen badges to the Contracting Officer. Upon completion of the contract and/or termination of the service of any employee, the Contractor shall return the badges to the Security Pass Office. Compliance with this requirement is mandatory and certification thereof to the Contracting Officer is required prior to submitting final invoices. Failure to return badges will hold up Contractor's final payment.

Vehicles and Equipment - In addition to other conditions and requirements set forth hereinbefore, attention is invited to the fact that vehicles and equipment admitted to the Indian Head Division, Naval Surface Warfare Center, Indian Head, MD will be required to meet standards established by the Station Safety Department. The vehicular and/or equipment conditions shall satisfactorily meet the following provisions:

1. Steering mechanism must be satisfactory and safe condition.
2. Horns and warning devices must be operable.
3. Windshield wipers must be satisfactory in place, clean and unbroken.
4. Rearview mirrors must be satisfactory in place, clean and unbroken.
5. General body conditions: Body must be satisfactory tight including fenders, bumpers, doors and latches thereto, and other parts which might become dislocated during travel.
6. Lights: All lights required by the type of vehicle/equipment in use shall be functional with satisfactory bulbs and lenses.
8. Fuel system must be free of leaks and show no evidence of loss of fuel and/or fumes.
9. Brakes: All brakes shall be functional and give evidence of the ability to halt the loaded vehicles within safe distances.
10. Tires need not be new but shall contain sufficient tread to indicate safety at operating speed with vehicle loaded.
11. Electric Wiring: All wiring shall be completed insolated as required and in cases considered appropriate waterproofing of wiring shall be required.
12. Motors shall be reasonably clean from excess grease, dust,
and dirt, and if required shall be steam cleaned to the satisfaction of the inspection personnel.

(13) Where applicable, inspection will include other such items as gauges, thermometers, controls, relief valves, piping, mechanical locks, limit switches, connectors, and other safety related devices associated with vehicles and equipment admitted to the Station.

1.6.4 [NRTF] [NRMC], Annapolis, MD

The station is a secured facility. Submit each day to the Contracting Officer a list of employees and representatives to be engaged at the site.

1.6.5 [NSS, Washington, DC]

The station is a secured facility:

a. Application: Furnish to the Contracting Officer a list showing, for employees and representatives to be engaged at the site, the name, address, date and place of birth, social security number, and, for anyone who is not a United States citizen, an alien registration number. Update the list with each addition and deletion to such engagement.

b. Passes and badges: Each individual engaged at the site shall obtain a temporary pass each day. Car passes will be issued for parking on the station. The Contractor shall allow 15 minutes for this procedure at the beginning of each day. Additionally, the Contractor shall expect to lose 25 crew hours over the duration of the contract due to delays in obtaining an escort while working in the inner compound. For the purpose of definition, a crew shall be defined as the size of the Contractor's workforce during any given workday. (If the Contractor has a crew of 10 men delayed 30 minutes on a given day, the delay period is one-half crew hour). Such delays will be at no additional cost to the Government.

c. [Escort: Work in or around Building[s] No. [_____] is in the inner compound and includes areas where an escort furnished by the Government must accompany the Contractor and his representatives and employees at all times.]

1.6.6 [NRL, Washington, DC]

The Contractor shall be working in highly secured areas. These areas include [______]. Furnish notice to the Contracting Officer 30 days prior to working in these areas.

1.6.7 [NSWC, White Oak, MD]

The station is a secured facility. The Contractor shall furnish to the Contracting Officer a completed security questionnaire for each representative and employee to be engaged at the site. The Contractor shall dismiss from the work any individual whose continued engagement at the work is deemed by the Contracting Officer to be contrary to the public interest or detrimental to the national security. [An escort furnished by the Government will accompany the Contractor and his representatives and employees at all times in the following areas.

SECTION 01140 Page 6
1.6.8 [MCDEC, Quantico, VA

Hangars 2102 and 2103 are secured areas. The Contractor shall comply with the following security requirements.

1.6.9 [Naval Support Facility, Thurmont, MD

The station is a secured facility. The Contractor shall comply with the following security requirements.

1.6.10 Bolling Air Force Base (AFDW), Washington, DC

No employee or representative of the Contractor will be admitted to the work site unless he furnishes satisfactory proof that he is a citizen of the United States or is specifically authorized admission by the OICC.

a. Personnel Information - All duty authorized non-military personnel utilizing the base are required to have in their possession at all times a Base Entry Pass. This pass is issued by the Visitors Control Center at the South Gate. Visitors Control is open Monday through Friday, 6:00 a.m. to 3:00 p.m. A minimum of 5 working days prior to start of work, the Contractor shall furnish to the Bolling Air Force Base (AFDW), Washington, DC, Security Department, via the Contracting Officer, the following information for Contractor and subcontractor personnel required to enter the Station:

(1) Name of the company
(2) Name of the employee
(3) Social Security Number
(4) Proof of U.S. citizenship
(5) A completed Contractor/Vendor Criminal History Record Request
(6) A completed application for Base Entry Pass

b. Proof of Citizenship - Proof of citizenship will consist of copies of birth certificates, military dependent ID cards, or naturalization papers, which will be returned once entered into the security computer system. The Security Department will run a criminal history check on Contractor employees and, as a condition of employment, each employee must willingly sign an authorization form allowing the Security Department to conduct the criminal history check. Subject authorization form will be maintained on file by the Security Officer. Based on proof of U.S. citizenship and the results of the criminal history check, the Security Officer will or will not grant entry to the Station. If entry is denied, the contractor will be immediately notified.

c. Contractor Responsibility for Employees The Contractor is
responsible for employees under his employment. Ensure that employees are familiar with and obey station traffic, safety, and security regulations.

d. Motor Vehicle Operation - Ingress and egress of personnel will be subject to the security regulations of the Station.

(1) All personnel must be made aware of the base speed limits:

| Housing areas | 5 mph |
| Parking areas | 10 mph |
| All other areas | 25 mph (unless otherwise posted) |

(2) Parking is in designated areas only, between two white lines. No parking is permitted in fire lanes, on seeded areas, in parking slots reserved for general officers and handicapped personnel.

(3) Traffic accidents should be reported immediately to the Security Police Law Enforcement Desk by calling 767-5000, 5001.

(4) All personnel entering the installation are subject to random vehicle inspections. The purpose of these inspections is to detect the theft of Government and private property, and to detect contraband or illegal drugs.

(5) Required Information on Privately Owned Vehicles - Advise company employees who desire to use their privately owned vehicles to personally bring the vehicle, vehicle registration, copy of vehicle insurance policy, valid state inspection documentation, and driver's license to the Visitor Control Center at the South Gate.

(6) Access to Restricted Areas - Base entry passes allow access to designated areas on the installation only. Entry into off limits areas is prohibited unless the contract requires it.

(7) Current Information - Contractors will be responsible for keeping the vehicle and employee lists current, and for securing and returning identification cards belonging to terminated employees to the Command Manager's Officer.

(8) Base Entry Passes - Contractor base entry passes will be valid for each entry aboard Bolling Air Force Base from 6:00 a.m. to 6:00 p.m., Monday through Friday only, unless prior arrangements have been made with the Resident Officer in Charge of Construction, NDW, and the Base Security Officer, Bolling AFB, has been notified. The passes are the property of the base and are to be returned to Visitors Control at the South Gate upon completion of the contract or termination of employment. Replacement passes must be requested in writing and be accomplished by written authorization from the Contracting Officer.

(9) Providing Information to Subcontractors - Prime Contractors shall be responsible for ensuring that subcontractors receive security information. Failure to comply with the specified requirements will result in prime contractors and subcontractors being denied access to the construction site.
a. Personnel information. A minimum of 5 working days prior to start of work, the Contractor will furnish to the Naval Weapons Station (NWS), Yorktown, Security Department, via the Contracting Officer, the following information for Contractor and subcontractor personnel required to enter the station:

1. Name of company
2. Name of the employee
3. Social Security Number
4. Proof of U.S. citizenship
5. Completed Contractor/Vendor Criminal History Record Request
6. Completed application for gate badge

b. Proof of citizenship. Proof of citizenship shall consist of copies of birth certificate, military dependent identification card (ID), or naturalization papers, which will be returned once entered into the security computer system. The Security Department will run a criminal history check on contractor employees and, as a condition of employment, each employee shall willingly sign an authorization form allowing the Security Department to conduct the criminal history check. Subject authorization form shall be maintained on file by the Security Officer. Based on proof of U.S. citizenship and results of the criminal history check, the Security Officer will or will not grant entry to the station. If entry is denied, the Contractor will be immediately notified.

c. Contractor responsibility for employees. The Contractor is responsible for employees under his employment. Ensure that employees are familiar with and obey station traffic, safety, and security regulations.

d. Motor vehicle operation. Ingress and egress of personnel shall be subject to the security regulations of the station. Motor vehicles operated within the NWS, Yorktown, shall comply with the vehicle codes of Virginia which are incorporated into NWS Instruction 5510.5G, “Security and Traffic Regulations.” Copies may be obtained from the Resident Officer in Charge of Construction, NWS, Yorktown, VA.

1.6.12 [Armed Forces Experimental Training Activity, Williamsburg, VA]

This activity operates under strict security regulations and persons admitted to this activity will be accompanied by a military police escort or an official escort designated by the Security Officer, at all times. The activity Security Officer shall authorize issuance of badges to selected responsible employees of the Contractor which permits the person issued the badge to act as an escort for other Contractor personnel on the activity.

1.6.13 [Norfolk Naval Shipyard, Portsmouth, VA]

If naturalized, the individual shall present his naturalization papers to
the Security Officer for inspection. Foreign born personnel shall present evidence of citizenship regardless of citizenship of parents, as required by immigration laws. Contractors and Contractor personnel shall be the subject of a local police records check. Contractor personnel who possess a security clearance issued by the Defence Industrial Security Clearance Office (DISCO) shall be issued a shipyard badge in the appropriate category. Each Contractor employee shall be required at the time of issuance of a personnel badge to submit a signed Privacy Act Release Form, in duplicate, to complete the local police check. Requested information shall be furnished. Individuals who have felony convictions (e.g., murder, rape, drug offenses, or theft) or who are deemed untrustworthy by the Security Department, Norfolk Shipyard will be denied access to the shipyard and their personnel badge will be recalled.)

1.6.14 [Naval Air Station, Oceana, Virginia Beach, VA]

Contractor personnel shall be required to obtain personnel identification badges. In accordance with the paragraph entitled "Subcontractors and Personnel," the Contractor shall submit, in triplicate, a list of his subcontractors and the work each is to perform. On this listing shall appear the names of the key personnel of the Contractor and subcontractors. A copy of the list of key personnel shall be forwarded to the Naval Air Station, Oceana, Security Department by the Contracting Officer. The key personnel shall be responsible for identifying other Contractor and subcontractor personnel for the purpose of obtaining identification badges. Contractors working in restricted work areas shall also be required to obtain special identification badges for personnel requiring access to the restricted work areas. Immediately after award, the Contractor shall submit a letter to the Contracting Officer with the following information for each employee: Company name, employee's name, Social Security number, height, and weight. Also, indicate the names of persons authorized to vouch for additional employees requiring badges.

1.6.15 [Fleet Trng Cntr Atlantic (FTCLANT), Dam Neck, Virginia Beach, VA]

a. Required Company Information. Furnish the FTCLANT Base Security Officer (Code 14) with the following information on company letterhead:

(1) Contract number and duration of contract.

(2) List of make, model, and license number of company vehicles requiring decals.

(3) Copy of insurance policy covering company vehicles, indicating the Virginia State minimum insurance requirements have been met.

(4) List of employees who will require ID cards with normal work hours.

(5) Name and sample signature of the representative responsible for obtaining and returning ID cards.

The preceding information shall be received by the Commanding Officer, Fleet Training Center Atlantic, Dam Neck, Virginia Beach, VA 23461-5000. Attn: Base Security Officer (Code N31, Bldg. 543); or brought to the Base Security Office located in Building 448, prior to the first day of work.
b. Required Information on Privately Owned Vehicles. Advise company employees who desire to use their privately owned vehicles to personally bring the vehicle, vehicle registration, copy of vehicle insurance policy, valid State inspection documentation, and driver's license to the pass and decal office located at the main gate.

c. Current information. Contractors shall be responsible for keeping the vehicle and employee lists current, and for securing and returning identification cards belonging to terminated employees to the command security manager's office.

d. Valid ID Cards. Contractor ID cards shall be valid for each entry aboard FTCLANT from 6 a.m. to 6 p.m., Monday through Friday only, unless prior arrangements have been made with the Resident Officer in Charge of Construction, Naval Air Station Oceana, and the Base Police Officer, FTCLANT, has been notified.

e. Providing Information to Subcontractors. Prime Contractors shall be responsible for ensuring that subcontractors receive security information. Failure to comply with specified requirements shall result in prime Contractors and subcontractors being denied access to construction sites.

1.6.16 [Commonwealth of Puerto Rico

Each employee of the Contractor shall be required to submit a good conduct certificate issued by the Commonwealth of Puerto Rico Police Department to obtain a temporary pass for the naval activity on which the work is to be performed. Contractors shall obtain the certificates from the Police Department in 2 to 3 weeks.

1.6.17 [Argentina, Newfoundland

Employ and permit access to the work site to only U.S. and Canadian citizens or other persons who have obtained security clearances in accordance with the security regulations of the activity. Personnel other than U.S. citizens shall submit complete personnel history forms for security clearances as may be required. Allow approximately 3 weeks after the personnel history forms have been submitted to receive clearances for employees.

1.6.18 [Naval Base, Norfolk, VA

a. Contractor registration. Register with the Base Police Truck Investigation Team, located at the Gate 5 Truck Control Station, Naval Air Station, Norfolk, VA 23511-5000, telephone number (804) 445-4807.

b. Storage and office trailer registration. Register storage and office trailers to be used on base with the truck investigation team. Trailers shall meet State law requirements and shall be in good condition.

(1) Trailers shall be lockable and shall be locked when not in use.

(2) Trailers shall have a sign in the lower left hand corner of left door of trailer with the following information: Company

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name, address, registration number of trailer or vehicle
identification number, location on base, duration of contract or
stay on base, contract number, local on-base phone number,
off-base phone number of main office, and emergency recall person
and phone number.
c. Equipment markings. Equipment owned or rented by the company
shall have the company name painted or stenciled on the equipment
in a conspicuous location. Rented equipment is to be
conspicuously marked with a tag showing who rented the equipment.
Register the equipment with the truck investigation team.
d. Procedure information. For additional information regarding
registration procedures, contact the Officer in Charge of
Contractors at (804) 445-1464 or Detective Sellars at (804)
445-1463.

1.6.19 [Naval Security Group Activity (NSGA), Northwest, Chesapeake, VA

a. All Contractor personnel and vehicles shall report to Truck
Control upon initial visit. All Contractors working at NSGA
Northwest shall have activity badges. The Contractor shall inform
the Truck Control of the expected duration of the contract and
it's location. Truck Control hours are 6:00 a.m. to 5:00 p.m.,
Monday through Friday. Contractors required to work past 5:00
p.m. shall notify Truck Control in person or by telephone at
421-8383, no later than 2:00 p.m. of that day. Contractors
required to work weekends, or on Government holidays, shall notify
Truck Control no later than 11:30 a.m. the preceding normal work
day.

b. The pass/ID clerk will issue an identification badge upon
completion of part A of the activity pass application form. This
outlines proper procedures and instructions to be followed when
issuing activity badges and vehicle passes to Contractors. The
following procedures apply:

(1) Contractors shall submit to the Security Office via the
contracting Officer, an access list of all personnel who will be
working on the contract job. The Contractor shall present a valid
picture ID that the pass clerk can compare against the access list.

(2) A blue activity pass with photo will be issued for no longer
than one year and no less than thirty days, corresponding with the
length of time listed on the access list. Activity passes without
photo will be issued to Contractors who will be at the job site
for less than twenty nine days. Contractors who will be at the
job site for less than five days are required to check in and out
through Truck Control daily, between the hours of 6:00 a.m. and
5:00 p.m. A Department of Defense decal with a black NSGA decal
will be issued to the Contractor vehicles that will be utilized on
site for over ninety days. This will be verified by the company
or the designated on site supervisor. All privately owned
vehicles and company vehicles used on site less than ninety days
will be issued temporary passes, renewable as required.

(3) Renewal of activity/vehicle passes, or decals will be done
after verifying applicant against a valid access list.
(4) Replacement of a lost or stolen pass will be granted after the applicant completes a signed statement outlining the circumstances. The applicant will be verified against a valid access list.

c. All vehicle operators shall have a valid state drivers license. All Contractor vehicles shall meet the state law requirements of the state in which it is registered.

d. All Contractors will be issued a badge/pass and it shall be returned to Truck Control upon completion of the contract.

e. Any construction materials being removed from the NSGA Northwest base shall be accompanied by a property pass signed with an original authorized signature.

1.6.20 [AEGIS Systems Combat Center, Wallops Island, VA]

a. The Contractor will be working in the AEGIS Combat Systems Center (ACSC), a Navy facility. As soon as possible, and before work begins, the Contractor shall submit to the Contracting Officer a list of all employees who will work on the project, including names, social security numbers, and dates and places of birth. The Contractor must verify that all employees are not known felons nor have felony charges pending. Only United States citizens will be admitted to the work site.

b. At all times, while on Government property, the Contractor, subcontractors, and their employees shall wear badges, and vehicle passes are required to access the jobsite. These badges and passes will be issued for the Navy by the Wallops Flight Facility Security Office at the direction of the Contracting Office. The Contractor must make application for badges to the Navy Contracts Office. Badges previously issued by NASA for NASA projects must not be used to access Navy jobsites. Upon entering the AEGIS Combat Systems Center facility, employees and their gear are subject to inspection.

c. The Contractor shall be held accountable for identification badges and vehicle passes for the life of the contract. The Contractor is required to report badge loss or theft immediately to the Contracting Officer. Failure to surrender all badges and passes at the contract's end may result in the retention of funds or the withholding of final payment by the Contracting Officer.

1.7 [BRITISH INDIAN OCEAN TERRITORY (BIOT) LAWS FOR DIEGO GARCIA]

Applicable on Diego Garcia (DG) and enforced by the representative of the BIOT Commissioner on DG.

1.7.1 [BIOT Immigration Requirements]

Third country Contractors and personnel shall have valid passports. Requirements for Contractor employees who are residents of the BIOT shall be as specified by the Commissioner of the BIOT.

1.7.2 [Contractor I.D.]

Prepare and issue I.D. cards for each person with their equivalent General
Schedule rating as prescribed in the JTR Manual Vol II.

1.7.3 [Contractor-Owned Vehicles]

Approved Contractor-owned vehicles will be permitted on the site. Motor scooters, mopeds, motorcycles, and privately owned vehicles are prohibited on DG. Drivers must have a valid international drivers' license.

1.7.4 [Inspection]

Personnel, equipment and plant are subject to customs inspection. Personnel are also subject to physical searches at random intervals.

1.7.5 [Business or Occupation on DG]

Engaging in commercial enterprise or other than work covered by this contract is prohibited. This prohibition includes, but is not limited to, commercial fishing, oil or mineral exploration, and production in or under those areas of the waters, Continental shelf, and seabed around DG over which the United Kingdom has sovereignty or exercises sovereign rights.

1.7.6 [BIOT Taxes and Customs Duties]

Base bids on the assumption that the Contractor's firm and employees are exempt from BIOT taxes and customs duties. There are import and export controls applicable to the BIOT. Personal household effects, privately-owned vehicles, drugs, firearms, and other controlled materials are not authorized. Authorized goods and materials for a non-U.S. Contractor must be consigned in care of the Contracting Officer.

1.8 [BASE OPERATING SUPPORT (BOS) CONTRACTOR]

The BOS Contractor as mentioned herein is a private contractor retained by the Government for base operating support services. Coordinate with the Contracting Officer for services available from the BOS Contractor.

1.9 [FACILITIES AND SERVICES FOR WAKE ISLAND AND DIEGO GARCIA]

Verify rates and available with the Activity.

1.9.1 [Meal Services for Diego Garcia]

Available on a cost reimbursable basis. U.S. expatriate (EXPAT) and Third Country Nationals (TCN) personnel may obtain meals from the Navy Support Facility Consolidated Dining Facility, and the BOS Contractor TCN Dining Facility, respectively. Each employee shall sign the Meal Signature Record Book (MSRB) before each meal. Submit to the Contracting Officer the MSRB on a daily basis. The Contractor will be charged by the number of personnel on island and not by the number of meals consumed. Cost for three meals per day is $3.65 per person for TCNs and $5.65 per person for EXPATS.

1.9.2 [Dining and Lodging Facilities for Wake Island]

Meals and lodging facilities are available on a cost reimbursable basis. This includes furniture, bed, linen, a towel, janitorial services and shower/toilet facilities. Submit dining and lodging requirements at least 60 days prior to actual requirements for approval. Rates and schedule:
MEAL          RATES          SCHEDULE (DAILY)
Breakfast     $4.85          6:30 a.m. - 8:00 a.m.
Lunch         $6.00          11:00 a.m. - 1:00 p.m.
Dinner        $6.00          5:00 p.m. - 7:00 p.m.
Box Lunch     $2.50

Lodging: $4.00/Person/Day]

1.9.3 [Housing for Diego Garcia]

Provide suitable housing for employees using the Splendidville/PWC Camp facilities or other locations as directed. Approval required to upgrade these seahuts through alteration or construction. Develop and maintain a housing plan which reflects the actual use of housing assets under Contractor control. The housing plan and any revisions thereto will be subject to approval. Maintenance and repair of facilities are available on a cost reimbursable basis. TCN housing shall not be air-conditioned unless approved.

1.9.4 [Medical Facilities for Wake and Diego Garcia]

Limited medical facilities and services are available on a cost reimbursable basis. Submit a medical plan and medical records of employees prior to transporting them to the Island. The following conditions apply.

a. Medical plan: Include narrative description that delineates the procedures for maintaining medical records; screening physical exams and immunization requirements; testing for contagious disease, such as dengue, malaria, tuberculosis; and other diseases that may be associated with the employee’s country of origin.

b. Personnel must receive a thorough dental and physical examination and should bring unique medication/drugs and two pairs of prescription eyeglasses.

c. Rates:
   Out-patient Care     $30.00 per visit
   In-patient Care      $100.00 per day
   Pharmacy             Prevailing cost

d. Government medical services are available in emergencies where life may be in danger and for infectious diseases. Treatment for long-term medical problems or those requiring hospitalization not available. When determined by the attending medical authorities, transfer patients to a non-Governmental medical facility as soon as possible. X-ray services are available for emergencies.

e. The MEDEVAC point is Kadena, Okinawa. The Contractor is responsible for transferring the patient from the air terminal to a private doctor or hospital. In case of extreme emergency, patients may be transferred to a private hospital in Okinawa at the Contractor’s expense.

1.9.5 [Dental Treatment for Diego Garcia]

Limited to out-patient dispensary service, at $30.00 per visit, during regular working hours for relief of pain, contagious oral diseases or
humanitarian reasons.]

1.9.6  [Retail Store]

Limited items and quantities such as canned goods, bread, milk, produce, candy, toilet articles, magazines, and other such items, are available at the prevailing rates. Luxury items are not available for purchase.

1.9.7  [Alcohol and Gambling]

[The Contractor may operate a combined mess and club where beer may be dispensed at authorized times.] Consumption of alcoholic beverages is only authorized in clubs, designated areas or quarters. Gambling is prohibited.

1.9.8  [Postal Services]

Postal services via the U.S. Postal system are available to U.S. personnel. Foreign national employees may send letter mail to non-APO addressees and may receive letter mail. Foreign nationals may neither send nor receive packages or purchase money orders through the U.S. Postal system. Money orders are available.

1.9.9  [Custodial Service for Diego Garcia]

Custodial services for personnel housing and other facilities under the Contractor’s control are available on a cost reimbursable basis.

1.9.10  [Janitorial Services for Wake Island]

Janitorial services, other than those included as part of the dining and lodging facilities, are available on a cost reimbursable basis.

1.9.11  [Recreation Facilities]

Existing recreation facilities and special services activities are available. The Government retains the right to limit Contractor use or schedule such use so as not to interfere with Government employees.

1.9.12  [Club Privileges]

Club privileges may be granted by invitation from the various clubs on the basis of classification or grade of the employee.

1.9.13  [Swimming and Fishing]

Permitted. [However, exercise caution in eating fish caught within the [Midway]/[Wake] reef area as certain species are poisonous. Inform personnel of known species of poisonous fish.]

1.9.14  [Fuel for Wake Island]

[JP-5 and MoGas are available at [_____] and [_____] $, respectively, plus a [_____] and [_____] percent surcharge, respectively. Diesel fuel is not available. The Government will not provide fuel storage facilities and will not be liable for damages and losses due to the use of JP-5 and MoGas purchased from the Government.]

1.9.15  [Fuel for Diego Garcia]
[JP-5, Mogas, and diesel are available at $0.71, $0.82, and $0.69 per gallon, respectively. The Government will not provide fuel storage facilities and will not be liable for damages and losses due to the use of JP-5, Mogas, and diesel purchased from the Government.]}

1.10 OCCUPANCY REQUIREMENTS

a. The [_____] will remain in operation during the entire construction period and the Contractor shall conduct his operations so as to cause the least possible interference with the normal operations of the Activity.

b. Ensure that new utility lines are complete, except for the connection, before interrupting existing service.

c. [Interconnection to Water, Sanitary Sewer, Storm Sewer, Telephone Service, Electric Service, [_____], Air Conditioning, Heating, Fire Alarm, and Compressed Air: These] [The utility interconnection to [_____]] shall be considered utility cutovers pursuant to the paragraph entitled "Work Outside Regular Hours." [Such interruption shall be further limited to [_____].] This limit includes time for deactivation and reactivation.

d. The work under this contract requires special attention to the scheduling and conduct of the work in connection with existing operations. Identify on the project schedule each factor which constitutes a potential interruption to operations. Permission to interrupt any Activity roads, railroads, and/or utility service shall be requested in writing a minimum of [15] [_____] calendar days prior to the desired date of interruption.

The following conditions apply:

(1) [_____]

(2) [_____]

1.11 [CONTRACTOR REGULATIONS FOR PACNAVFACENGCOM]

The Contractor shall develop, promulgate and enforce operating regulations for campsite and other facilities and equipment under his control. The regulations shall include the maintenance of good discipline, security, sanitation, and a fire plan. Prepare and submit for approval after consultation with Navy authorities.

1.12 [TRANSPORTATION OF PERSONNEL, MATERIALS, AND EQUIPMENT]

Coordinate arrangements for transporting materials, equipment, and personnel with the Contracting Officer. [Rates shown were the latest available when this specification was prepared, and is furnished for informational purposes only.] [The Contractor will be charged rates in effect at the time the services are actually provided.] The Contractor has the option to use commercial or privately-owned transportation.

1.12.1 [Surface Transportation]

Use of Government facilities are on a priority basis as determined by the Government. Repair damaged Government property such as docks, buoys, lightening watercraft and equipment due to the Contractor's negligence at
the Contractor's own expense.

a. Military Sealift Command (MSC): [The current shipping cycle to Midway is approximately 90 days but is subject to change without notice]. [There is no regularly scheduled MSC service to [DG] [Wake]]. If the Contractor elects to use MSC services, the Contractor is responsible for costs incurred or delays encountered because of late or nondelivery of materials or equipment. MSC services are subject to the following conditions:

(1) Provided on a space available basis or if no commercial service is available.

(2) The Government has the right to reject cargo offered and to limit the quantities of materials accepted.

(3) The Government incurs no responsibility, expressed or implied, for return transportation, continued frequency, timeliness or reliability of the MSC service.

(4) Pay in advance by means of a special deposit account to the Fleet and Industrial Supply Center (FISC), administering the services for transportation, stevedoring, handling, securing and local accessorrial services. For FISC [Pearl Harbor] rates are:

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<th>Description</th>
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<td>General Cargo</td>
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<td>Special Cargo</td>
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<td>Cargo Trailer</td>
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(5) The BOS Contractor's stevedoring/lighterage rates are:

Laborers: $____ per hour
Operation Supervisor: $____ per hour
Safety Supervisor: $____ per hour
LCM-8 Boat Crew (5 Men per LCM-8): $____ per hr/man
Crane Operator: $____ per hour
Forklift Operator: $____ per hour
Administrative Charges: $____ per day

(6) Damages or loss due to handling, loading, securing,
transporting, failure of, or delay in delivery shall be borne by
the Contractor. Obtain adequate insurance against damage, loss or
failure of, or delay in delivery, as appropriate, and include the
Government as a named insurer.

b. Commercial vessel:

(1) Lighterage operations are [normally 24 hours to avoid
turnaround delay at Midway] [restricted to daylight hours unless
approved otherwise at [Wake] [DG].]

(2) The Contractor is liable for accidental injury or death of
Contractor's personnel and damages to material and equipment
during stevedoring operations performed by the Contractor.

(3) Pay demurrage charges for barges and vessels not under Navy
sponsorship, or vessels where delay results from the failure of
the Contractor to perform specified stevedoring services. When
demurrage is assessed to cargo belonging to several agencies,
arrange with the agencies concerned in sharing such expenses. No
priority will be afforded the Contractor's cargo over others, and
cargo will be handled as the ship's cargo master elects to unload,
except that food or medical supplies will be given first priority.

(5) Unload cargo from ships anchored offshore into BOS Contractor
controlled watercraft and repair damages to Government lightering
watercraft due to Contractor negligence. The movement of the
cargo from the dock to the jobsite shall be the Contractor's
responsibility.

(6) The Contractor will not be charged for the use of the
watercraft dockside crane, and two forklifts for lighterage
operations but will be charged for the labor involved at the
prevailing labor rates. The Contractor shall utilize the BOS
Contractor's operators.

(7) Government lightering watercraft consists of two LCM-8's.
The LCM-8's are 73 feet 8 inches long; 21 feet wide; 9 feet 4
inches side board; 3 feet 3 inches draft light; 4 feet draft
loaded; have 53 1/2 tons load capacity, and 2742 cubic feet cargo
space. The dockside crane capacity is 45,000 pounds. Cargo that
are not adequately crated/packed or cannot be safely handled by
the LCMs or crane will not be unloaded by the Government.
Materials in bulk, such as aggregate, will not be transported or
handled by the BOS Contractor unless bagged or otherwise contained
for convenient handling.]

1.12.2 Purchase Orders for Diego Garcia

Submit three copies of purchase orders for materials and equipment
purchased from the U.S. prior to actual procurement for approval. Also
submit monthly three copies of subsequent revisions or amendments to the
purchase orders with the MSR. Purchase orders shall refer to and contain
the same nomenclature and item number as the corresponding item listed in
the BM.

1.12.3 [Air Transportation]
a. Air Mobility Command (AMC) [is not scheduled on a regular basis to [Wake] [DG].] [Service is subject to the following conditions:]

b. Commercial and private aircraft: If approved, special commercial chartered flights and private aircraft will be permitted to land on [DG] [Wake]. Submit for approval at least 30 days prior to the flight date.

1.12.4 [Agreement]

Submit prior to shipment of materials and equipment by Government air and surface transportation, an agreement in the following form:

"In consideration of the carriage of the property described as follows:

(Description and maximum quantity to be shipped—the latter to be stated in both weight and measurement tons.) I, ______________ (Acting both individually and as the duly authorized agent of ______________, the owner of said property) hereby agrees that neither the carrying vessel, nor the United States, nor an agent or agency incorporated or unincorporated thereof, will be liable for loss of, or damage of any nature whatsoever to, said property or for any failure to deliver above said property in the same quantity and in the same order and condition as when received by the initial carrying vessel, or for any delay in such delivery, whether said loss, damage or failure of or delay in delivery is occasioned by the negligence of the carrying vessel, the United States, or any employee or agency thereof, or by any cause whatsoever. The owner of said property and [_____] hereby further agree to hold harmless and indemnify the United States for any loss or damage arising out of the carriage of the aforesaid property and also agree to pay for freight and terminal service charges as may be determined by the Government loading and discharging terminals."]

1.12.5 [Packaging]

Package in accordance with "Department of Defense Military, Standard Transportation and Movement Procedures" and the requirements of the Government shipping service.

1.13 [EXTRAORDINARY SECURITY REQUIREMENTS FOR PEARL HARBOR]

1.13.1 Shipyard CIA and Sensitive Areas

Six weeks prior to entry into the CIA, submit a visit request for Pearl Harbor Naval Shipyard form (PHNSY 14ND-SYD-5512/28) to the Contracting Officer. The Visit Request must include certification of U.S. citizenship. Entry into the CIA for those listed on the Visit Request may be authorized under one of the following conditions:

a. Contractors having a DOD Facility Security Clearance and whose employees have a DOD security clearance may be badged for immediate unescorted access into the CIA.

b. Employees and representatives having current Shipyard ID badges authorizing CIA access will be permitted entry into the CIA.

c. Employees not holding a current DOD security clearance or current
CIA access badge must establish suitability and eligibility based on a Local Record Check (LRC) prior to being badged for unescorted CIA access. A LRC may take up to 3 weeks to process. Provide a Completed Special Access Determination (NAVSEA 5510/15) (Apr 90) for each employee.

d. For situations other than the above, employees or representatives requiring CIA access may be issued an "Escort Required" ("ER") pass for CIA access under the escort of a cleared individual employed by the activity. Processing of "ER" passes may take up to 5 days.

(1) The initial submittal of Visit Request forms need not be all inclusive. It may be expanded to meet essential requirements of the contractor. Each individual added to the list, however, shall be subject to the same pre-entry screening requirements as outlined above.

(2) Shipyard ID badges will be issued by the Shipyard Pass and Identification Office (Pass and ID Office) located in Building 207 at Eighth Street and Avenue "E."

1.13.2 Vehicle Regulations in the Shipyard CIA

No vehicle will be permitted access to a work site in the CIA without a valid Naval Base vehicle pass and a Shipyard vehicle pass. Naval Base vehicle passes are issued by the Base Security Office located in Building 3455 outside the Nimitz Gate. The Shipyard vehicle passes are issued by the Shipyard Pass and ID Office. Shipyard vehicle passes will not be issued unless a Naval Base vehicle pass has been obtained and proof of vehicle registration to the Contractor's company has been presented to Shipyard Pass and ID. Vehicles are required to conform to Shipyard traffic regulations. The speed limit is 15 mph in the CIA. Outside the CIA, the speed limit is as posted or marked.

1.13.2.1 Shipyard Vehicle Pass

Only those Contractor vehicles meeting the following criteria will be allowed to enter the CIA with the Shipyard vehicle pass:

a. Vehicles must clearly display an authorized company sign or logo.

b. Vehicles must be company or commercial vehicles used to transport heavy equipment or material to the job site or to conduct bonafide and required inspections and surveillance at the job site. Privately-owned vehicles will not be used to transport employees to the job site and will not be allowed in the CIA.

1.13.2.2 Commercial Vehicles

Vehicle passes will be issued to each commercial vehicle that is required for the job, authorizing entry and parking within the CIA. Every vehicle entering the CIA will display the pass on the dashboard or visor (facing outward). The pass will be visible at all times while in the CIA. Parking is limited to those areas that are specifically identified on the pass. If additional passes are required, present adequate justification to the Pass and ID Office via the Contracting Officer.

1.13.2.3 Gates
Vehicles shall enter and exit from one of the two 24-hour gates located on Avenue "C" or on Fifth Street.

1.13.3 Parking

Prohibited on any piers and dry dock/waterfront areas. Do not park on or block the marked fire lanes at any time. Vehicles may stop on the piers or dry dock/waterfront areas for 15 minutes for loading or unloading. An exception may be made for vehicles which are part of the equipment needed to do the required work and are attached or connected to the pier or ship, for example, a truck which uses a mounted generator or a vehicle with built-in equipment. Submit a written request for pier parking authorization with justification to the Shipyard Security Officer (Code 1125.2) via the Contracting Office at least 2 weeks prior to the date parking space is required. Include with request the license number of the vehicle(s), type and size of the vehicle(s) (pickup truck, crane, or forklift), parking location, and purpose and duration.

1.13.3.1 Parking Locations

Parking for privately-owned vehicles is available in lots "A" and "B" on Avenue "B," located between South Avenue and Eighth Street, and in lot "C" on Sixth Street and Central Avenue.

1.13.4 Vehicle Searches

Vehicles are subject to search while entering, remaining in, or leaving the Shipyard or Naval Base areas. Government material being transported out of the CIA shall be covered by a Property Pass (OP-7), issued and signed by the Contracting Officer. Material found without a Property Pass will be confiscated and a police offense report issued.

1.13.5 Authorization of Entry

Coordinate entry into shop/office/ship spaces with respective Shop Superintendent/Office Head/Ship's Commanding Officer via the Contracting Officer.

1.13.6 Escort

For entry to and work inside any building inside the CIA, contact the cognizant Shipyard code for escort services in the affected area.

1.13.7 Government Guard Services

The Shipyard Security Officer (SSO) will provide guard services on a reimbursable basis for work on CIA perimeter fence job sites. Notify and obtain approval from the SSO via the Contracting Office at least 48 hours prior to the time guard services will be required. Submit in writing the purpose and number of hours guard services will be required. Any work on the CIA fence shall be completed by the end of the work day or the openings resulting from that work shall be closed to prevent unauthorized access.

1.13.8 Areas Not Covered by Contract

Contractor personnel will not be permitted to enter Shipyard buildings, spaces, and areas not covered by this contract except on prior approval of the Shipyard department/office/shop having jurisdiction of the areas.
Coordinate action with the Contracting Officer to obtain such entry approval.

1.13.9 Access to Unclassified Information

Access to unclassified U.S. Navy shipbuilding, conversion, or repair technology and related technical information manuals, documents, drawings, plans, specifications, and other unclassified information is restricted to official need-to-know basis, designated by physical markings to show the appropriate control designations. Handle, control, and safeguard to prevent oral, visual, and documentary disclosure to the public, to foreign sources, and to personnel not having an official need-to-know. Return this information to the Pearl Harbor Naval Shipyard upon completion of contracted work; except when specific retention authorization is granted by the Contracting Officer.

1.13.10 Photographs

Photography is prohibited in the Pearl Harbor Naval Shipyard. When operationally required, submit a written request containing specific justification and details to the Video Production Center (Code 103) via review by the Security Officer prior to release.

1.13.11 Contractor Regulations

Comply with the following conditions:

a. Submit a Visit Request (VR) and Special Access Determination (SAD) for each person listed to the Security Officer (Code 1125.2) via the Contracting Officer at least 6 weeks prior to the start date.

b. Employees and representatives requiring access are U.S. citizens or U.S. nationals.

c. Under no circumstances shall personnel handcarry their own visit request.

d. Employees shall provide documented proof of U.S. citizenship to the Pass and ID Office prior to being issued a Shipyard badge.

e. Employees shall be available for interviews upon request by the Shipyard Personnel Security Specialist.

f. Employees' representatives shall attend a 15-minute orientation on the safety, security, and radiological protection aspects of industrial operations within the Shipyard. The briefing, in the form of a video tape presentation, will be given at the Pass and ID Office in groups of 10, prior to the issuance of Shipyard badges or passes. Special arrangements for larger groups can be arranged on request.

g. Employees shall wear and display the Shipyard badge in the chest area at all times while entering, remaining in, and exiting Shipyard spaces and each badge shall be used only by the specific individual named on the badge.

h. Vehicles in Shipyard areas shall display a valid Naval Base vehicle pass and shall have company's name on both sides of any vehicle that enters the CIA.
i. Maintain strict accountability over identification badges and passes issued by the Pass and ID Office. Immediately report to the Pass and ID Office, any badges/passes missing or lost and the circumstances. Return badges/passes to the Contracting Officer immediately upon termination of any employee, expiration, completion of contract, or when no longer required. The Contracting Officer will ensure that all badges/passes are returned and forwarded to the Shipyard Pass and ID Office (Code 1125.2).

j. Restrict hours of work to 7:00 a.m. - 3:30 p.m. Monday through Friday; work days only. When operational needs require scheduling of work after 3:30 p.m. (Monday through Friday) or on weekends and holidays, provide written notification at least 2 weeks in advance to the Contracting Officer who will obtain approval from the respective Shipyard departments, offices, and shops. Such notifications will include specific dates, hours of work, location of work, type of work to be performed, contract number and project title. The Contracting Officer will provide a copy of the notification to the Security Officer along with written notification that work, as scheduled, has been approved by the respective department, office, or shop concerned.

k. Restrict employees/representatives to the work site and control travel directly to and form the work site.

l. Ensure that yellow plastic material is not used for warning signs, covering materials, etc.

m. Restore all traffic/parking/security signs and markings, including space numbers, designations, and lines, to their original form if such signs/markings are defaced or deleted during construction/repair.

n. Be responsible for control and security of Contractor-owned equipment and materials at the work site. Report immediately, missing/lost/stolen property to the Naval Base Police Department (phone 474-1237) as each case occurs.

o. Ensure that no material is stacked within 10 feet of the CIA perimeter. Remove from the work site, or secure ladders or other such equipment which could be used to climb the CIA perimeter fence. Ensure that no vehicles are parked within 10 feet of the CIA perimeter.

p. Provide written notification to the Commander, Pearl Harbor Naval Shipyard via the Contracting Officer 2 weeks prior to actual start of work to allow for notification of the appropriate Shipyard departments, offices, and shops of the impact resulting from the contract work. Such notifications will include specific details such as work schedules (including actual start date for Shipyard entry) and impact.

q. Ensure that no opening in the roof/walls/windows/fence of the building exist at the end of the work day and do not exist where penetration is possible during non-working hours. If the building cannot be secured at the end of the work day, coordinate action with the Contracting Office to notify the cognizant code to
arrange for a security watch by their personnel.

r. Seventy-two hours prior to making any penetrations (such as tunneling under, cutting through a fence or building) in a restricted area, contact Code 1125.2 to make arrangements for a security guard or other measures required to meet all security requirements. Cost of security guard will be charged to the Contractor.

1.13.12 [Other Sensitive Areas]

1.13.12.1 [Extraordinary Security Requirements]

The Contract Clause entitled "Identification of Employees" and the following apply:

a. Vehicle searches. All construction vehicles will be searched by the Marine sentry.

b. Photographs. Photographs are prohibited in and around the building unless a written request containing specific justification and details is approved by the security officer via the Contracting Officer. Four days' advance notice is required. Photographs, when approved, shall be taken in the presence of an activity escort.

c. Personnel restrictions. Due to sensitivity of building operations, the following apply:

(1) Restrict personnel to the designated work site.

(2) Contractor's movements within the building will be restricted. Contractor personnel will be escorted to and from designated work areas. Contractor personnel shall not be permitted outside of designated work areas without being escorted by authorized personnel. Submit requests for entry into the building 4 days in advance with information required by paragraph entitled "Personnel List" for submission to the "Division Project Officer" through the Contracting Officer.]

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --
1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 33 (1993) Concrete Aggregates
ASTM C 136 (1995; Rev. A) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 698 (1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft lbf/ft (600 kN-m/m))
ASTM D 1140 (1992) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve
ASTM D 1556 (1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557 (1991) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft (2,700 kN-m/m))
ASTM D 2407 (1993) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922 (1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017 (1988; R 1993) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600 (1993) Installation of ductile-iron water Mains and Their Appurtenances

COMMERCIAL ITEM DESCRIPTIONS (CID)
1.2.1 Nard Material

Fertilizer

CORPS OF ENGINEERS (COE)

COE EM-385-1-1


1.2 DEFINITIONS

1.2.1 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.2 Rock

Solid homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe-mounted pneumatic hole punchers or rock breakers; also large boulders, buried masonry, or concrete other than pavement exceeding [1/2] [_____] cubic yard in volume Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

1.2.3 Cohesive Materials

Materials ASTM D 2487 classified as CC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

1.2.4 Cohesionless Materials

Materials ASTM D 2487 classified as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

1.2.5 [Pile Supported Structure]

As used herein, a structure where both the foundation and floor slab are pile supported.

1.3 SUBMITTALS

Submit the following in accordance with section entitled "Submittal Procedures.

1.3.1 [SD-04, Drawings]

a. Supporting system drawings

1.3.1.1 Required Drawings

Submit drawings and calculations by a registered professional engineer. Drawings shall include material sizes and types, arrangement of members,
installation and removal.

1.3.2  (SD-05, Design Data
   a. Supporting system calculations

1.3.2.1 Required Data
Submit drawings and calculations by a registered professional engineer. Calculations shall include data and references used.

1.3.3  SD-08, Statements
   [a. Supporting systems work plan]
   [b. Dewatering work plan]
   [c. Blasting work plan]
Submit 15 days prior to starting work.

1.3.4  SD-12, Field Test Reports
   a. Fill and backfill test
   b. Select material test
   c. Porous fill test for capillary water barrier
   d. Density tests

1.4  DELIVERY, STORAGE, AND HANDLING
   Perform in a manner to prevent contamination or segregation of materials.

1.5  CRITERIA FOR BIDDING
   Base bids on the following criteria:
   a. Surface elevations are as indicated.
   b. Pipes or other artificial obstructions, except those indicated, will not be encountered.
   [c. Ground water elevations indicated by the boring log were those existing at the time subsurface investigations were made and do not necessarily represent ground water elevation at the time of construction.]
   [d. Ground water elevation is [_____] feet below existing surface elevation.]
   [e. Material character is indicated by the boring logs.]
   [f. Bermuda limestone and coral will be encountered in most excavations.]
   [g. Guantanamo Bay limestone and coral will be encountered in some excavations.]
Free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and [frozen,] deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1 SOIL MATERIALS

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.2 Backfill and Fill Material


2.1.3 Topsoil

[Provide as specified in Section 02921, “Turf.”]

[Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.]

2.1.4 Select Material

ASTM D 2487, classification GW, GP, SW, SP with a maximum of 10 percent by weight passing ASTM D 1140, No. 200 sieve.

2.2 POROUS FILL FOR CAPILLARY WATER BARRIER

ASTM C 33 fine aggregate grading with a maximum of 3 percent by weight passing ASTM D 1140, No. 200 sieve, or coarse aggregate Size 57, 67, or 77 and conforming to the general soil material requirements specified in paragraph entitled “Soil Materials.”
2.3 BORROW

[Obtain borrow materials required in excess of those furnished from excavations from sources outside of Government property.]

[Obtain borrow materials required in excess of those furnished from excavations from sources outside of Government property, except that borrow materials conforming to common fill (and fill and backfill material) [may be obtained from the Government borrow pit. The Government borrow pit is located [as indicated] [within a haul distance of _____] miles from the work site]. If the Government borrow pit is used, the Contractor shall perform clearing, grubbing, and stripping required for providing access to suitable borrow material. Dispose of materials from clearing and grubbing operations [off Government property] [at the Government landfill indicated]. Strip top 12 inches of soil material from borrow area and stockpile. After removal of borrow material, regrade borrow pit using stockpiled soil material to contours which will blend in with adjacent topography. Maximum side slopes shall be two horizontal to one vertical. Excavation and backfilling of borrow pit shall ensure proper drainage.]

[Borrow material obtained from the Government borrow pit shall be pit site crushed. Provide equipment to excavate, crush to the specified size, and transport.]

2.4 BURIED WARNING AND IDENTIFICATION TAPE

(Polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant polyethylene plastic) warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

**Warning Tape Color Codes**

- [Yellow:] [Electric]
- [Yellow:] [Gas, Oil; Dangerous Materials]
- [Orange:] [Telephone and Other Communications]
- [Blue:] [Water Systems]
- [Green:] [Sewer Systems]
- [White:] [Steam Systems]
- [Gray:] [Compressed Air]

2.4.1 [Warning Tape for Metallic Piping]

Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

2.4.2 [Detectable Warning Tape for Non-Metallic Piping]
Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.4 DETECTION WIRE FOR NON METALLIC PIPING

Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

2.6 MATERIAL FOR RIP-RAP

Bedding material, Grout, Filter fabric] and rock conforming to {these requirements} [DOT] [SSS-[_____] State Standard for construction indicated.]

2.6.1 Bedding Material

Consisting of sand, gravel, or crushed rock, well graded, [or poorly graded] with a maximum particle size of 2 inches. Material shall be composed of tough, durable particles. Fines passing the No. 200 standard sieve shall have a plasticity index less than six.

2.6.2 [Grout

Composed of cement, water, an air-entraining admixture, and sand mixed in proportions of one part portland cement to [two] [_____] parts of sand, sufficient water to produce a workable mixture, and an amount of admixture which will entrain sufficient air to produce durable grout, as determined by the Contracting Officer. Mix grout in a concrete mixer. Mixing time shall be sufficient to produce a mixture having a consistency permitting gravity flow into the interstices of the rip-rap with limited spading and brooming.

2.6.3 Rock

Rock fragments sufficiently durable to ensure permanence in the structure and the environment in which it is to be used. Rock fragments shall be free from cracks, seams, and other defects that would increase the risk of deterioration from natural causes. The size of the fragments shall be such that no individual fragment exceeds a weight of [150] [_____] pounds and that no more than 10 percent of the mixture, by weight, consists of fragments weighing 2 pounds or less each. Specific gravity of the rock shall be a minimum of [2.50] [_____] The inclusion of more than trace [1%] [_____] quantities of dirt, sand, clay, and rock fines will not be permitted.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

3.1.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs. and brush within the clearing limits [____]. Remove stumps entirely. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches
below existing surface.

3.1.2 Stripping

Strip existing topsoil to a depth of [4] [_____] inches without contamination by subsoil material. Stockpile topsoil separately from other excavated material and locate convenient to finish grading area.

3.1.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

3.1.3.1 Proof Rolling

Proof rolling shall be done on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. [After stripping,] proof roll the existing subgrade of-the [building] [_____ with six passes of a 15 ton, pneumatic-tired roller. Operate the roller in a systematic manner to ensure the number of passes over all areas, and at speeds between 2 1/2 to 3 1/2 miles per hour. [When proof rolling under buildings, the building subgrade shall be considered to extend 5 feet beyond the building lines, and one-half of the passes made with the roller shall be in a direction perpendicular to the other passes.] Notify the Contracting Officer a minimum of 3 days prior to proof rolling. Proof rolling shall be performed in the presence of the Contracting Officer. Rutting or pumping of material shall be undercut [as directed by the Contracting Officer] [to a depth of [_____ inches] and replaced with [fill and backfill] [select] material. [Bids shall be based on replacing approximately [_____] square yards, with an average depth of [_____] inches at various locations.]

3.2 PROTECTION

3.2.1 Protection Systems

Provide shoring, bracing, [cribbing,] [underpinning,] and sheeting in accordance with COE EM-385-1-1 , except that banks may be sloped only when approved by the Contracting Officer/. [Provide additional supporting systems where indicated.]

3.2.2 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.2.2.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. Provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein.

3.2.2.2 Dewatering

Groundwater flowing toward or into excavations shall be controlled to...
prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least [_____] feet below the working level.

[Operate dewatering system continuously until construction work below existing water levels is complete. Submit performance records weekly.] [Measure and record performance of dewatering system at same time each day by use of observation wells or piezometers installed in conjunction with the dewatering system.] [Relieve hydrostatic head in previous zones below subgrade elevation in layered soils to prevent uplift.]

3.2.3 Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. (The Contractor shall contact the [Public Works Department] [_____] for assistance in locating existing utilities.) The Contractor shall scan the construction site with electromagnetic and sonic equipment and mark the surface of the ground where existing underground utilities are discovered.

3.2.4 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Refill with [backfill and till material] [select material] [porous fill] and compact to [95] [_____] percent of [ASTM D 698] [ASTM D 1557] maximum density. Unless specified otherwise, refill excavations out below indicated depth with [backfill and fill material] [select material] [porous fill] and compact to [95] [_____] percent of [ASTM D 698] [ASTM D 1557] maximum density.

3.3.1 Structures With Spread Footings

Ensure that footing subgrades have been inspected and approved by the Contracting Officer prior to concrete placement. Fill overexcavations with concrete during foundation placement.

3.3.2 Pile Cap Excavation and Backfilling

Excavate to bottom of pile cap prior to placing or driving piles, unless authorized otherwise by the Contracting Officer. Backfill and compact
overexcavations and changes in grade due to pile driving operations to 95 percent of ASTM D 698 maximum density.

3.3.3 Pipe Trenches

Excavate to the dimension indicated. Grade bottom of trenches to provide uniform support for each section of pipe after pipe bedding placement.

3.3.4 Hard Material (And Rock) Excavation

Remove hard material (and rock) to elevations indicated in a manner that will leave foundation material in an unshattered and solid condition. Roughen level surfaces and cut sloped surfaces into benches for bond with concrete. Protect shale from conditions causing decomposition along joints or cleavage planes and other types of erosion. Removal of hard material (and rock) beyond lines and grades indicated unless previously authorized by the Contracting Officer will not be grounds for a claim for additional payment.

3.4 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

3.4.1 Common Fill Placement

Provide for general site (and under [porous fill of] pile-supported structures). Place in [6] [___] inch lifts. Compact areas not accessible to rollers or compactors with mechanical hand tampers. Aerate material excessively moistened by rain to a satisfactory moisture content. Finish to a smooth surface by blading, rolling with a smooth roller, or both.

3.4.2 Backfill and Fill Material Placement

Provide for paved areas and under concrete slabs, except where select material is provided. Place in [6] [___] inch lifts. Place backfill material adjacent to structures as the structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against the structure.

3.4.3 Select Material Placement

Provide under [porous fill of] structures not pile supported. Place in [6] [___] inch lifts. Backfill adjacent to structures shall be placed as structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against structure.

3.4.4 Porous Fill Placement


3.4.5 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Place and compact backfill under structures and paved areas in [6] [___] inch lifts to top of trench and in [6] [___] inch lifts to one footover pipe outside structures and paved areas.

SECTION 02315 Page 9
3.4.5.1 Bedding Requirements

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe shall be compacted to 95 percent of ASTM D 698 maximum density. Plastic piping shall have bedding to spring line of pipe. Provide ASTM D 2321 materials as follows:

a. Class I: Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

b. Class II: Coarse sands and gravels with maximum particle size of 1.5 inches, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D 2487.

3.5 BURIED WARNING AND IDENTIFICATION TAPE

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.6 BURIED DETECTION WIRE

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. The wire shall extend continuously and unbroken, from manhole to manhole. The ends of the wire shall terminate inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. The wire shall remain insulated over its entire length. The wire shall enter manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, the wire shall terminate in the valve pit at the pump station end of the pipe.

3.7 COMPACITION

Expressed as a percentage of maximum density. Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required. Density requirements specified herein are for cohesionless materials. When cohesive materials are encountered or used, density requirements may be reduced by 5 percent. Compact reach broom under compacted analysis with two passes of a hand-operated plate type vibratory compactor.

3.7.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5 foot line of the structure to [85] [_____] percent of [ASTM D 698] [ASTM D 1557].

3.7.2 Structures, Spread Footings, and Concrete Slabs

Compact top 12 inches of subgrades to [95] [_____] percent of [ASTM D 698] [ASTM D 1557]. Compact (common fill) [fill and backfill material] [select material] to [95] [_____] percent of [ASTM D 698] [ASTM D 1557].

3.7.3 Porous Fill for Capillary Water Barrier
Compact with two passes of a hand-operated, plate-type vibratory compactor.

3.7.4 Adjacent Area

Compact areas within 5 feet of structures to [90] [_____] percent of [ASTM D 698] [ASTM D 1557].

3.7.5 Paved Areas

Compact top 12 inches of subgrades to [95] [_____] percent of [ASTM D 698] [ASTM D 1557]. Compact fill and backfill materials to 95 percent of [ASTM D 698] [ASTM D 1557].

3.7.6 Airfield Pavements

Compact top 24 inches below finished pavement or top 12 inches of subgrades, whichever is greater, to [100] [_____] percent of ASTM D 1557; compact fill and backfill material to [100] [_____] percent of ASTM D 1557.

3.8 Finish Operations

3.8.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

3.8.2 Seed

[Provide as specified in Section 02921, "Turf."]

[Scarify existing subgrade. Provide 4 inches of topsoil for newly graded finish earth surfaces and areas disturbed by the Contractor. [Additional topsoil will not be required if work is performed in compliance with stripping and stockpiling requirements.] [If there is insufficient on-site topsoil meeting specified requirements for topsoil, provide topsoil required in excess of that available.] Seed shall match existing vegetation. Provide seed at 5 pounds per 1000 square feet. Provide CID A-A-1909, Type I, Class 2, 10-10-10 analysis fertilizer at 25 pounds per 1000 square feet. [Provide commercial agricultural limestone of 94-80-14 analysis at 70 pounds per 1000 square feet.] Provide mulch and water to establish an acceptable stand of grass.

3.8.3 Protection of Surfaces

Protect newly graded areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.9 Disposition of Surplus Material

[Waste in Government disposal area [indicated] which is located within a haul distance of [_____] miles] Remove from Government property surplus or other woody material not required or suitable for filling or backfilling. [Excess soil material to be spread on-site at a location agreed to by the Government.

3.10 Field Quality Control

3.10.1 Sampling
Take the number and size of samples required to perform the following tests.

3.10.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

3.10.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 4318 for liquid limit and for plastic limit; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

3.10.2.2 Select Material Testing

Test select material in accordance with ASTM C 136 for conformance to ASTM D 2487 gradation limits; ASTM D 1140 for material finer than the No. 200 sieve; ASTM D 698 or ASTM D 1557 for moisture density relations, as applicable.

3.10.2.3 Porous Fill Testing

Test porous fill in accordance with ASTM C 136 for conformance to gradation specified in ASTM C 33.

3.10.2.4 Density Tests

Test density in accordance with ASTM D 1556, or ASTM D 2922 and ASTM D 3017. When ASTM D 2922 and ASTM D 3017 density tests are used, verify density test results by performing an ASTM D 1556 density test at a location already tested as specified herein. Perform an ASTM D 1556 density test at the start of the job, and for every 10 ASTM D 2922 and ASTM D 3017 density tests thereafter. Test each lift at randomly selected locations every [2000] [_____] square feet of existing grade in fills for structures and concrete slabs, and every [2500] [_____] square feet for other fill areas and every [2000] [_____] square feet of subgrade in cut.

-- End of Section --
PART 1  GENERAL

1.1  REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ASPHALT INSTITUTE (AI)

AI MS-2  (1993) Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29/C 29M  (1991; Rev. A) Unit Weight and Voids in Aggregate

ASTM C 88  (1990) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate


ASTM C 127  (1988; R 1993) Specific Gravity and Absorption of Coarse Aggregate


ASTM C 136  (1995; Rev. A) Sieve Analysis of Fine and Coarse Aggregates


ASTM D 70  (1982; R 1990) Specific Gravity of Semi-Solid Bituminous Materials

ASTM D 75  (1987; R 1992) Sampling Aggregates


ASTM D 546  (1994) Sieve Analysis of Mineral Filler for Road and Paving Materials

ASTM D 692  (1994; Rev. A) Coarse Aggregate for Bituminous Paving Mixtures
ASTM D 054  (1992) Specific Gravity of Soils
ASTM D 979  (1989) Sampling Bituminous Paving Mixtures
ASTM D 1073  (1994) Fine Aggregate for Bituminous Paving Mixtures
ASTM D 1075  (1994) Effect of Water on Cohesion of Compacted Bituminous Mixtures
ASTM D 2041  (1994) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D 2172  (1993) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2726  (1993; Rev. A) Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens

1.2  SUBMITTAL
Submit the following in accordance with Section entitled "Submittal Procedures."

1.2.1  SD-05, Design Data
  a. Job-mix formula

Submit a job-mix formula, prepared within one year of submittal, for approval [by the Government] prior to preparing and placing the bituminous mixture. Design mix using procedures contained in Chapter III, Marshall Method of Mix Design, of AASHTO MS-2. Formulas shall indicate physical properties of the mixes as shown by tests made by a commercial laboratory approved by the Contracting Officer, using materials identical to those to be provided on this project. Submit formulas with material samples. Job-mix formula for each mixture shall be in effect until modified in writing by the Contractor and approved by the Contracting Officer. Provide a new job-mix formula for each source change.
1.2.1.1 Required Data

Job-mix formula shall show the following:

a. Source and proportions, percent by weight, of each ingredient of the mixture;

b. Correct gradation, the percentages passing each size sieve listed in the specifications for the mixture to be used, for the aggregate and mineral filler from each separate source and from each different size to be used in the mixture and for the composite mixture;

c. Amount of material passing the No. 200 sieve determined by dry sieving;

d. Number of blows of hammer compaction per side of molded specimen;

e. Temperature viscosity relationship of the asphalt cement;

f. Stability, flow, percent voids in mineral aggregate, percent air voids, unit weight;

g. Asphalt absorption by the aggregate;

h. Effective asphalt content as percent by weight of total mix;

i. Temperature of the mixture immediately upon completion of mixing;

j. Asphalt viscosity grade [and/or penetration range]; and

k. Curves for the [leveling] [binder] [and] wearing course[s].

1.2.1.2 Charts

Plot and submit, on a grain size chart, the specified aggregate gradation band, the job mix gradation and the job mix tolerance band.

1.2.1.3 Selection of Optimum Asphalt Content

Base selection on percent of total mix and the average of values at the following points on the curves for each mix:

a. Stability: Peak

b. Unit Weight: Peak

c. Percent Air Voids: Median

1.2.2 SD-10, Test Reports

a. Specific gravity test of asphalt

b. Coarse aggregate tests

c. Weight of slag test

d. Percent of crushed pieces in gravel

SECTION 02742 Page 3
e. Fine aggregate tests
f. Specific gravity of mineral filler
g. Bituminous mixture tests

1.2.3 SD-12, Field Test Reports
a. Aggregates tests
b. Bituminous mix tests
c. Pavement courses

1.2.4 [SD-17, Sample Installation
a. Bituminous pavement

Submit in accordance with paragraph entitled "Mock-Up Test Section."

1.3 QUALITY ASSURANCE

1.3.1 Safety Requirements

Provide adequate and safe stairways with handrails to the mixer platform, and safe and protected ladders or other means for accessibility to plant operations. Guard equipment and exposed steam or other high temperature lines or cover with a suitable type of insulation.

1.3.2 [Mock-Up Test Section

Prior to full production of the [binder and] wearing course[s], prepare a quantity of bituminous mixture according to the job-mix formula. Construct a test section 200 feet long by not less than 10 feet wide and of the same compacted depth specified for the construction of the course which the test section represents. The underlying grade or pavement structure upon which the test section is to be constructed shall be the same as the remainder of the course represented by the test section. The equipment used in construction of the test section shall be the same type and weight to be used on the remainder of the course represented by the test section. Test not less than two samples of the mixture produced at the plant for gradation, asphalt cement content, stability, flow, air voids, voids in mineral aggregate, and in weight. Obtain not less than three cores from the test strip for density and thickness tests. Check the test section for smoothness and finish surface texture. If the test section should prove to be unsatisfactory, make the necessary adjustments to the mix design, plant operation, transportation, laydown, [and] [or] rolling procedures. Additional test sections, as required, shall be constructed and evaluated for conformance to the specified requirements. When test sections do not conform to specified requirements, remove and replace the bituminous pavement. A marginal quality test section that has been placed in an area of little or no traffic may be left in place. If a second test section also does not meet specified requirements, remove both sections at the Contractor's expense. Full production shall not begin without the Contracting Officer's approval.

1.4 DELIVERY, STORAGE, AND HANDLING
Inspect materials delivered to the site for damage and store with a minimum of handling. Store aggregates in such a manner as to prevent segregation, contamination, or intermixing of the different aggregate sizes.

1.5 ENVIRONMENTAL CONDITIONS

Place bituminous mixture only during dry weather and on dry surfaces. Place courses only when the surface temperature of the underlying course is greater than 45 degrees F for course thicknesses greater than one inch and 55 degrees F for course thicknesses one inch or less.

1.6 CONSTRUCTION EQUIPMENT

Calibrated equipment, such as scales, batching equipment, spreaders and similar equipment, shall have been recalibrated by a calibration laboratory approved by the Contracting Officer within [12] [____] months of commencing work.

1.6.1 Mixing Plant

Design, coordinate, and operate the mixing plant to produce a mixture within the job-mix formula tolerances and to meet the requirements of ASTM D 995, including additional plant requirements specified herein. The plant shall be a batch type, continuous mix type or drum-dryer mixer type, and shall have sufficient capacity to handle the new bituminous construction. Minimum plant capacity shall be [100] [_____] tons per hour. The mixing plant and equipment shall remain accessible at all times for inspecting operation, verifying weights, proportions and character of materials, and checking mixture temperatures. The plant and plant site shall meet the requirements of Section 01575, "Temporary Environmental Controls."

1.6.1.1 Cold Aggregate Feeder

Provide plant with a feeder or feeders capable of delivering the maximum number of aggregate sizes required in their proper proportion. Provide adjustment for total and proportional feed and feeders capable of being locked in any position. When more than one cold elevator is used, feed each elevator as a separate unit and install individual controls integrated with a master control.

1.6.1.2 Dryer

Provide rotary drum-dryer which continuously agitates the mineral aggregate during the heating and drying process. When one dryer does not dry the aggregate to specified moisture requirements, provide additional dryers.

1.6.1.3 Plant Screens and Bins for Batch and Continuous Mix Plants

Use screen to obtain accurate gradation and allow no bin to contain more than 10 percent oversize or undersize. Inspect screens each day prior to commencing work for plugged, worn, or broken screens. Clean plugged screens and replace worn or broken screens with new screens prior to beginning operations. Divide hot aggregate bins into at least three compartments arranged to ensure separate and adequate storage of appropriate fractions of the aggregate.

1.6.1.4 Testing Laboratory

Provide a testing laboratory for control and acceptance testing functions.
during periods of mix production, sampling and testing, and whenever materials subject to the provisions of these specifications are being supplied or tested. The laboratory shall provide adequate equipment, space, and utilities as required for the performance of the specified tests.

1.6.1.5 Surge and Storage Bins

Use for temporary storage of hot bituminous mixtures will be permitted under the following conditions:

a. When stored in surge bins for a period of time not to exceed 3 hours.

b. When stored in insulated and heated storage bins for a period of time not to exceed 12 hours. If it is determined by the Contracting Officer that there is an excessive amount of heat loss, segregation and oxidation of the mixture due to temporary storage, discontinue use of surge bins or storage bins.

1.6.1.6 Drum-Dryer Mixer

Do not use drum-dryer mixer if specified requirements of the bituminous mixture or of the completed bituminous pavement course cannot be met. If drum-dryer mixer is prohibited, use either batch or continuous mix plants meeting the specifications and producing a satisfactory mix.

1.6.2 Paving Equipment

1.6.2.1 Spreading Equipment

Self-propelled electronically controlled type, unless other equipment is authorized by the Contracting Officer. Equip spreading equipment of the self-propelled electronically controlled type with hoppers, tamping or vibrating devices, distributing screws, electronically adjustable screeds, and equalizing devices. Capable of spreading hot bituminous mixtures without tearing, shoving, or gouging and to produce a finished surface of specified grade and smoothness. Operate spreaders, when laying mixture, at variable speeds between 5 and 45 feet per minute. Design spreader with a quick and efficient steering device; a forward and reverse traveling speed, and automatic devices to adjust to grade and confine the edges of the mixture to true lines. The use of a spreader that leaves indented areas or other objectionable irregularities in the fresh laid mix during operations is prohibited.

1.6.2.2 Rolling Equipment

Self-propelled pneumatic-tired rollers supplemented by three-wheel and tandem type steel wheel rollers. The number, type and weight of rollers shall be sufficient to compact the mixture to the required density without detrimentally affecting the compacted material. Rollers shall be suitable for rolling hot-mix bituminous pavements and capable of reversing without backlash. Pneumatic-tired rollers shall be capable of being operated both forward and backward without turning on the mat, and without loosening the surface being rolled. Equip rollers with suitable devices and apparatus to keep the rolling surfaces wet and prevent adherence of bituminous mixture. Vibratory rollers especially designed for bituminous concrete compaction may be used provided rollers do not impair stability of pavement structure and underlying layers. Repair depressions in pavement surfaces resulting from use of vibratory rollers. Rollers shall be self-propelled, single or
dual vibrating drums, and steel drive wheels, as applicable; equipped with variable amplitude and separate controls for energy and propulsion.

1.6.2.3 Hand Tampers

Minimum weight of 25 pounds with a tamping face of not more than 50 square inches.

1.6.2.4 Mechanical Hand Tampers

Commercial type, operated by pneumatic pressure or by internal combustion.

PART 2 PRODUCTS

2.1 AGGREGATES

Grade and proportion aggregates and filler so that combined mineral aggregate conforms to specified grading.

2.1.1 Coarse Aggregates

ASTM D 692, except as modified herein. At least 75 percent by weight of aggregate retained on the No. 4 sieve shall have two or more fractured faces. Percentage of wear, Los Angeles test, except for slag, shall not exceed 40 in accordance with ASTM C 131. Weight of slag shall not be less than 70 pounds per cubic foot. Soundness test is required in accordance with ASTM C 88: after 5 cycles, loss shall not be more than 12 percent when tested with sodium sulfate or 18 percent when tested with magnesium sulfate.

2.1.2 Fine Aggregate

ASTM D 1073, except as modified herein. Fine aggregate shall be produced by crushing stone, slag or gravel that meets requirements for wear and soundness specified for coarse aggregate. Where necessary to obtain the gradation of aggregate blend or workability, natural sand may be used. Quantity of natural sand to be added shall be approved by the Contracting Officer and shall not exceed 15 percent of weight of coarse and fine aggregate and material passing the No. 200 sieve.

2.1.3 Mineral Filler

Nonplastic material meeting the requirements of ASTM D 242.

2.2 ASPHALT CEMENT

ASTM D 946, penetration Grade [60-70] [85-100] [120-150] or ASTM D 3381, viscosity Grade [AC-30] [AC-20] [AC-10] [AC-5] [AR-2000] [AR-4000] [AR-8000].

2.3 GRADATION OF AGGREGATES

ASTM C 136. Aggregate shall have a gradation within the limits designated in Table I and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grade uniformly from coarse to fine. Table I is based on aggregates of uniform specific gravity and the percentages passing the various sieves are subject to appropriate correction when aggregates of varying specific gravities are provided. When materials of different specific gravities are provided, make satisfactory arrangements for separate stock piles, controlled.

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distribution, and other operations necessary to maintain the specific gravity of the mixture constant and uniform. [The final lift of the overlay surface shall conform to the wearing course as specified herein.]

TABLE I

GRADATION OF AGGREGATES

TOTAL PERCENT PASSING (BY WEIGHT)

<table>
<thead>
<tr>
<th>MIX NO.</th>
<th>1L</th>
<th>2L</th>
<th>1B</th>
<th>2B</th>
<th>1W</th>
<th>2W</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIEVE SIZE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1/2 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 4</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>No. 8</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 16</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No. 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.4 Quantity of Bituminous Material

Mix asphalt cement with aggregates of corresponding mixes in the following proportions:

ASPHALT CEMENT PERCENT BY WEIGHT OF TOTAL MIX

<table>
<thead>
<tr>
<th>Leveling Course</th>
<th>Binder Course</th>
<th>Wearing Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8</td>
<td>4-8</td>
<td>5-9</td>
</tr>
</tbody>
</table>

2.5 COMPOSITION OF MIXTURE

Gradation of mineral aggregate shall be as specified herein. The percentage of bituminous material provided in the bituminous mixtures shall be within the limits specified. Mixtures shall have the following physical properties:
### Test Property Values

- **Stability Flow (0.01 inch)**
  - Not less than 1000 pounds
  - Not more than 20 nor less than 8

- **Stability Flow (0.01 inch)**
  - Not less than 1800 pounds
  - Not more than 16 nor less than 8

- **Percent Air Voids**
  - [Not less than 3 nor more than 8 for binder]
  - [leveling] course; not less than 3 nor more than 5 for wearing course

- **Percent Voids in Mineral Aggregates**
  - See Table II

#### TABLE II

**MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE (VMA)**

<table>
<thead>
<tr>
<th>U.S.A. Standard Sieve Designation</th>
<th>Nominal Maximum Particle Size, In.</th>
<th>Minimum VMA Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 4</td>
<td>0.187</td>
<td>18</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>0.375</td>
<td>16</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>0.500</td>
<td>15</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>0.750</td>
<td>14</td>
</tr>
<tr>
<td>1 inch</td>
<td>1.000</td>
<td>13</td>
</tr>
</tbody>
</table>

2.5.1 **Index of Retained Strength**

ASTM D 1075, [65] [75] or greater.

2.5.2 **Recycled Asphalt Material**

The bituminous concrete mix may contain a maximum of 25 percent (by weight of the total aggregate material) reclaimed asphalt pavement (RAP). The mix design shall meet the requirements for the type of bituminous concrete specified. Clearly state the viscosity of the reclaimed asphalt cement, the grade of new asphalt cement, the properties of the recycling agent (if used) and the percentage of each in the mix. Combine the asphalts and recycling agents to achieve a viscosity of 2000 ± 400 poises at 140 degrees F. Finish a new job mix formula for each change in the percentage of RAP material used.

2.6 **VARIATIONS FROM FORMULA**

Variations from the approved job-mix formula shall not exceed the following, and in no case shall the job-mix formula, with tolerances applied, fall outside the general limits for aggregate gradation and bituminous material specified herein:
Aggregate

<table>
<thead>
<tr>
<th>Size</th>
<th>Tolerance (Plus or Minus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 inch and larger</td>
<td>8 percent</td>
</tr>
<tr>
<td>3/8 and No. 4</td>
<td>7 percent</td>
</tr>
<tr>
<td>Nos. 8 and 16</td>
<td>6 percent</td>
</tr>
<tr>
<td>Nos. 30 and 50</td>
<td>5 percent</td>
</tr>
<tr>
<td>No. 100</td>
<td>4 percent</td>
</tr>
<tr>
<td>No. 200</td>
<td>3 percent</td>
</tr>
<tr>
<td>Asphalt Cement</td>
<td>[0.3] [0.5] percent</td>
</tr>
<tr>
<td>Temperature of Mixture as discharged</td>
<td>20 degrees F</td>
</tr>
</tbody>
</table>

2.7 SOURCE QUALITY CONTROL

Use materials for testing that are identical to materials to be provided in this project. Employ a commercial laboratory approved by the Contracting Officer to perform testing.

2.7.1 Tests

Perform testing in accordance with the following:

a. Specific Gravity Test of Asphalt: ASTM D 70

b. Coarse Aggregate Tests:
   (1) Bulk Specific Gravity: ASTM C 127
   (2) Abrasion Loss: ASTM C 131
   (3) Soundness Loss: ASTM C 88

c. Weight of Slag Test: ASTM C 29/C 29M

d. Percent of Crushed Pieces in Gravel: Count by observation and weight

e. Fine Aggregate Tests:
   (1) Bulk Specific Gravity: ASTM C 128
   (2) Soundness Loss: ASTM C 88

f. Specific Gravity of Mineral Filler: ASTM C 188 or ASTM D 854

g. Bituminous Mixture Tests:
   (1) Bulk Specific Gravity: ASTM D 1188 or ASTM D 2726
   (2) Theoretical Maximum Specific Gravity: ASTM D 2041
   (3) Index of Retained Strength: ASTM D 1075

2.7.2 Specimens

ASTM D 1559 for the making and testing of bituminous specimens with the following exceptions:
Compaction: Apply [75 blows of the hammer to each flat face of the specimens for mix numbers [_____] and [_____] and 50 blows for mix numbers [_____] and [_____]].

Curves: Plot curves for the [leveling,] [binder,] [and] wearing course[s] to show the effect on the test properties of at least four different percentages of asphalt on the unit weight, stability, flow, air voids, and voids in mineral aggregate; each point on the curves shall represent the average of at least four specimens.

Cooling of Specimen: After compaction is completed, allow the specimen to cool in air to the same temperature approximately as that of the water, 77 degrees F, to be used in the specific gravity determination.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Mixing

Produce bituminous mixture in a plant as specified herein.

3.1.2 Preparation of Mineral Aggregates

Store different size aggregate in separate stockpiles so that different sizes will not mix. Stockpile different-sized aggregates in uniform layers by use of a clam shell or other approved method so as to prevent segregation. The use of bulldozers in stockpiling of aggregate or in feeding aggregate to the dryer is prohibited. Feed aggregates into the cold elevator by means of separate mechanical feeders so that aggregates are graded within requirements of the job-mix formulas and tolerances specified. Regulate rates of feed of the aggregates so that moisture content and temperature of aggregates are within tolerances specified herein. Dry and heat aggregates to the temperature necessary to achieve the mixture determined by the job mix formula within the job tolerance specified. Provide adequate dry storage for mineral filler.

3.1.3 Preparation of Bituminous Mixture

Accurately weigh aggregates and dry mineral filler and convey into the mixer in the proportionate amounts of each aggregate size required to meet the job-mix formula. Introduce required amount of asphalt into the mixer at a temperature not to exceed 325 degrees F so that the asphalt can mix uniformly with the aggregate. In batch mixing, after aggregates and mineral filler have been introduced into the mixer and mixed for not less than 15 seconds, add asphalt by spraying or other approved methods and continue mixing for a period of not less than 20 seconds, or as long as required to obtain a homogeneous mixture. The time required to add or spray asphalt into the mixer will not be added to the total wet-mixing time provided the operation does not exceed 10 seconds and a homogeneous mixture is obtained. When a continuous mixer is employed, mixing time shall be more than 35 seconds to obtain a homogeneous mixture. Additional mixing time, when required, will be as directed by the Contracting Officer. Temperature of the mixture at the time of discharge shall not exceed [_____] degrees F. Temperature of the aggregate and mineral filler in the mixer shall not exceed 350 degrees F when asphalt is added. When mixture is prepared in a twin-pugmill mixer, volume of the aggregates, mineral filler,
and asphalt shall not extend above tips of mixer blades when blades are in a vertical position. Overheated and carbonized mixtures, or mixtures that foam or show indication of free moisture, will be rejected. When free moisture is detected in batch or continuous mix plant produced mixtures, waste the mix and withdraw the aggregates in the hot bins immediately and return to the respective stockpiles; for drum-dryer mixer plants, waste the mix, including that in surge or storage bins that is affected by free moisture.

3.1.4 Transportation of Bituminous Mixtures

Transport bituminous material from the mixing plant to the paving site in trucks having tight, clean, smooth beds that have been coated with a minimum amount of concentrated solution of hydrated lime and water or other approved coating to prevent adhesion of the mixture to the truck. Petroleum products will not be permitted for coating truck. If air temperature is less than 60 degrees F or if haul time is greater than 30 minutes, cover each load with canvas or other approved material of ample size to protect the mixture from the loss of heat. Make deliveries so that the spreading and rolling of all the mixture prepared for one day’s run can be completed during daylight, unless adequate approved artificial lighting is provided. Deliver mixture to area to be paved so that the temperature at the time of dumping into the spreader is within the range specified herein. Reject loads that are below minimum temperature, that have crusts of cold unworkable material, or that have been wet excessively by rain. Hauling over freshly laid material is prohibited.

3.1.5 Surface Preparation of Underlying Course

Prior to the laying of the asphalt concrete, clean underlying course of foreign or objectionable matter with power blowers or power brooms, supplemented by hand brooms and other cleaning methods where necessary. [Remove grass and other vegetative growth from existing cracks and surfaces.]

3.1.6 Spraying of Contact Surfaces

Spray contact surfaces of previously constructed pavement with a thin coat of bituminous materials to act as an anti-stripping agent, conforming to Section 02744, “Bituminous Tack Coat.” Paint contact surfaces of structures with a thin coat of emulsion or other approved bituminous material prior to placing the bituminous mixture. Tack coat the previously placed primed coats on base courses when surface has become excessively dirty and cannot be cleaned or when primed surface has cured to the extent that it has lost all bonding effect.

3.2 PLACEMENT

3.2.1 Machine Spreading

The range of temperatures of the mixtures at the time of spreading shall be between 250 and 300 degrees F. Bituminous concrete having temperatures less than minimum spreading temperature when dumped into the spreader will be rejected. Adjust spreader and regulate speed so that the surface of the course is smooth and continuous without tears and pulling, and of such depth that, when compacted, the surface conforms with the cross section, grade, and contour indicated. Unless otherwise directed, begin the placing along the centerline of areas to be paved on a crowned section or on the high side of areas with a one-way slope. Place
mixture in consecutive adjacent strips having a minimum width of 10 feet, except where the edge lanes require strips less than 10 feet to complete the area. Construct longitudinal joints and edges to true line markings. Establish lines parallel to the centerline of the area to be paved, and place string lines coinciding with the established lines for the spreading machine to follow. Provide the number and location of the lines needed to accomplish proper grade control. When specified grade and smoothness requirements can be met for initial lane construction by use of an approved long ski-type device of not less than 30 feet in length and for subsequent lane construction by use of a short ski or shoe, in-place string lines for grade control may be omitted. Place mixture as nearly continuous as possible and adjust the speed of placing as needed to permit proper rolling.

3.2.2 Shoveling, Raking, and Tamping After Machine-Spreading

Shovelers and rakers shall follow the spreading machine. Add or remove hot mixture and rake the mixture as required to obtain a course that when completed will conform to requirements specified herein. Broadcasting or fanning of mixture over areas being compacted is prohibited. When segregation occurs in the mixture during placing, suspend spreading operation until the cause is determined and corrected. Correct irregularities in alinement left by the spreader by trimming directly behind the machine. Immediately after trimming, compact edges of the course by tamping laterally with a metal lute or by other approved methods. Distortion of the course during tamping is prohibited.

3.2.3 Hand-Spreading in Lieu of Machine-Spreading

In areas where the use of machine spreading is impractical, spread mixture by hand. The range of temperatures of the mixtures when dumped onto the area to be paved shall be between 250 and 300 degrees F. Mixtures having temperatures less than minimum spreading temperature when dumped onto the area to be paved will be rejected. Spread hot mixture with rakes in a uniformly loose layer of a thickness that, when compacted, will conform to the required grade, thickness, and smoothness. During hand spreading, place each shovelful of mixture by turning the shovel over in a manner that will prevent segregation. Do not place mixture by throwing or broadcasting from a shovel. Do not dump loads any faster than can be properly handled by the shovelers and rakers.

3.3 COMPACTION OF MIXTURE

Compact mixture by rolling. Begin rolling as soon as placement of mixture will bear rollers. Delays in rolling freshly spread mixture shall not be permitted. Start rolling longitudinally at the extreme sides of the lanes and proceed toward center of pavement, or toward high side of pavement with a one-way slope. Operate rollers so that each trip overlaps the previous adjacent strip by at least one foot. Alternate trips of the roller shall be of slightly different lengths. Conduct tests for conformity with the specified crown, grade and smoothness immediately after initial rolling. Before continuing rolling, correct variations by removing or adding materials as necessary. If required, subject course to diagonal rolling with the steel wheeled roller crossing the lines of the previous rolling while mixture is hot and in a compactible condition. Speed of the rollers shall be slow enough to avoid displacement of hot mixture. Correct displacement of mixture immediately by use of rakes and fresh mixture, or remove and replace mixture as directed. Continue rolling until roller marks are eliminated and course has a density of at least 92 percent.
but not more than 100 percent of that attained in a laboratory specimen of
the same mixture prepared in accordance with ASTM D 1559. During rolling,
omisten wheels of the rollers enough to prevent adhesion of mixture to
wheels, but excessive water is prohibited. Operation of rollers shall be
by competent and experienced operators. Provide sufficient rollers for
each spreading machine in operation on the job and to handle plant output.
In places not accessible to the rollers, compact mixture thoroughly with
hot hand tampers. Skin patching of an area after compaction is prohibited.
Remove mixture that becomes mixed with foreign materials or is defective
and replace with fresh mixture compacted to the density specified herein.
Roller shall pass over unprotected edge of the course only when laying of
course is to be discontinued for such length of time as to permit mixture
to become cold.

3.4 JOINTS

Joints shall present the same texture and smoothness as other portions of
the course, except permissible density at the joint may be up to 3 percent
less than the specified course density. Carefully make joints between old
and new pavement or within new pavements in a manner to ensure a thorough
and continuous bond between old and new sections of the course. Vertical
contact surfaces of previously constructed sections that are coated with
dust, sand, or other objectionable material shall be painted with a thin
uniform coat of emulsion or other approved bituminous material just before
placing fresh mixture.

3.4.1 Transverse

Roller shall pass over unprotected end of freshly laid mixture only when
laying of course is to be discontinued. Except when an approved bulkhead
is used, cut back the edge of previously laid course to expose an even,
vertical surface for the full thickness of the course. When required, rake
fresh mixture against joints, thoroughly tamp with hot tampers, smooth with
hot smoothers, and roll. Transverse joints in adjacent lanes shall be
offset a minimum of 2 feet.

3.4.2 Longitudinal Joints

Space 6 inches apart. Do not allow joints to coincide with joints of
existing pavement or previously placed courses. Spreader screed shall
overlap previously placed lanes 2 to 3 inches and be of such height to
permit compaction to produce a smooth dense joint. With a lute, push back
mixture placed on the surface of previous lanes to the joint edge. Do not
scatter mix. Remove and waste excess material. When edges of longitudinal
joints are irregular, honeycombed, or poorly compacted, cut back
unsatisfactory sections of joint and expose an even vertical surface for
the full thickness of the course. When required, rake fresh mixture
against joint, thoroughly tamp with hot tampers, smooth with hot smoothers,
and roll while hot.

3.5 FIELD QUALITY CONTROL

3.5.1 Sampling

3.5.1.1 Aggregates At Source

Prior to production and delivery of aggregates, take at least one initial
sample in accordance with ASTM D 75 [at the source] [from each stockpile].
Collect each sample by taking three incremental samples at random from the
source material to make a composite sample of not less than 50 pounds. Repeat the sampling when the material source changes or when testing reveals unacceptable deficiencies or variations from the specified grading of materials.

3.5.1.2 Cold Feed Aggregate Sampling

Take two samples daily from the belt conveying materials from the cold feed. Collect materials in three increments at random to make a representative composite sample of not less than 50 pounds. Take samples in accordance with ASTM D 75.

3.5.1.3 Coarse and Fine Aggregates

Take a 50 pound sample from the cold feed at least once daily for sieve analyses and specific gravity tests. Additional samples may be required to perform more frequent tests when analyses show deficiencies or unacceptable variances or deviations. The method of sampling is as specified herein for aggregates.

3.5.1.4 Mineral Filler

ASTM D 546. Take samples large enough to provide ample material for testing.

3.5.1.5 Pavement and Mixture

Take plant samples for the determination of mix properties and field samples for thickness and density of the completed pavements. Furnish tools, labor and material for samples, and satisfactory replacement of pavement. Take samples and tests at not less than frequency specified hereinafter and at the beginning of plant operations; for each day's work as a minimum; each change in the mix or equipment; and as often as directed. Accomplish sampling in accordance with ASTM D 979.

3.5.2 Testing

3.5.2.1 Aggregates Tests


c. Abrasion: ASTM C 131 for wear (Los Angeles test). Perform one test initially prior to incorporation into the work and each time the source is changed.

3.5.2.2 Bituminous Mix Tests

Test one sample for each 500 tons, or fraction thereof, of the uncompacted mix for extraction in accordance with ASTM D 2172; perform a sieve analysis on each extraction sample in accordance with ASTM C 136 and ASTM C 117. Test one sample for each [500] [_____] tons or fraction thereof for stability and flow in accordance with ASTM D 1559. Test one sample for each material blend for index of retained strength in accordance with ASTM D 1075.

3.5.2.3 Pavement Courses
Perform the following tests:

a. Density: For each [1000] [_____] tons of bituminous mixture placed, determine the representative laboratory density by averaging the density of four laboratory specimens prepared in accordance with ASTM D 1559. Samples for laboratory specimens shall be taken from trucks delivering mixture to the site; record in a manner approved by the Contracting Officer the project areas represented by the laboratory densities. From each representative area recorded, determine field density of pavement by averaging densities of 4 inch diameter cores obtained from [leveling,] [binder, and] wearing course[s]; take one core for each [2000] [_____] square yards or fraction thereof of course placed. Determine density of laboratory prepared specimens and cored samples in accordance with ASTM D 1188 or ASTM D 2726, as applicable. Separate pavement layers by sawing or other approved means. Maximum allowable deficiency at any point, excluding joints, shall not be more than 2 percent less than the specified density for any course. The average density of each course, excluding joints, shall be not less than the specified density. Joint densities shall not be more than 2 percent less than specified course densities and are not included when calculating average course densities. When the deficiency exceeds the specified tolerances, correct each such representative area or areas by removing the deficient pavement and replacing with new pavement.

b. Thickness: Determine thickness of [binder and] wearing courses from samples taken for the field density test. The maximum allowable deficiency at any point shall not be more than 1/4 inch less than the thickness for the indicated course. Average thickness of course or of combined courses shall be not less than the indicated thickness. Where a deficiency exceeds the specified tolerances, correct each such representative area or areas by removing the deficient pavement and replacing with new pavement.

c. Smoothness: Straightedge test the compacted surface of [leveling,] [binder, and] wearing course[s] as work progresses. Apply straightedge parallel with and at right angles to the centerline after final rolling. Unevenness of [leveling and] [binder] course[s] shall not vary more than 1/4 inch in 10 feet; variations in the wearing course shall not vary more than 1/8 inch in 10 feet. Correct each portion of the pavement showing irregularities greater than that specified.

d. Finished Grades: Finish grades of each course placed shall not vary from the finish elevations, profiles, and cross sections indicated by more than 1/2 inch. Finished surface of the final wearing course will be tested [by the Contracting Officer] by running lines of levels at intervals of [25] [_____] feet longitudinally and transversely to determine elevations of completed pavement. Within 45 days after completion of final placement, [perform a level survey at the specified grid spacing and plot the results on a plan drawn to the same scale as the drawings. Elevations not in conformance with the specified tolerance shall be noted on the plan in an approved manner. The survey shall be performed by a registered land surveyor.] [The Contracting Officer will inform the Contractor in writing of paved areas that fail to meet the final grades indicated within the]
specified tolerances. Correct deficient paved areas by removing existing work and replacing with new materials that meet the specifications. Skin patching for correcting low areas is prohibited.

c. Finish Surface Texture of Wearing Course: Visually check final surface texture for uniformity and reasonable compactness and tightness. Final wearing course with a surface texture having undesirable irregularities such as segregation, cavities, pulls or tears, checking, excessive exposure of coarse aggregates, sand streaks, indentations, ripples, or lack of uniformity shall be removed and replaced with new materials.

3.6 PROTECTION

Do not permit vehicular [and aircraft] traffic, including heavy equipment, on pavement until surface temperature has cooled to at least 120 degrees F. Measure surface temperature by approved surface thermometers or other satisfactory methods.

-- End of Section --
PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T102 (1983; R 1993) Spot Test of Asphaltic Materials

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 140 (1993) Sampling Bituminous Materials
ASTM D 977 (1991) Emulsified Asphalt
ASTM D 2397 (1991) Cationic Emulsified Asphalt

1.2 SUBMITTALS

Submit the following in accordance with Section entitled "Submittal Procedures."

1.2.1 SD-10, Test Reports

a. Certified test reports: For emulsified asphalt

1.3 DELIVERY AND STORAGE

Inspect the materials delivered to the site for contamination and damage. Unload and store the materials with a minimum of handling.

1.4 WEATHER LIMITATIONS

Apply the tack coat only when the surface is dry. Apply the tack coat only when the ambient temperature is 50 degrees F or above and when the temperature has not been below 35 degrees F for 12 hours immediately prior to application, unless otherwise directed.

PART 2 PRODUCTS

2.1 MATERIALS

Bituminous material for the tack coat shall be emulsified asphalt.

2.1.1 Emulsified Asphalt

[ASTM D 977, Type SS-1 (or SS-1H)] (ASTM D 2397, Type CSS-1 (or CSS-1H))

Dilute the emulsified asphalt with equal parts of water. The base asphalt
used to manufacture the emulsion shall show a negative spot when tested in accordance with AASHTO T102 using standard naphtha.

2.2 CONSTRUCTION EQUIPMENT

Provide equipment dependable and adequate for the purpose intended and properly maintained in satisfactory and safe operating condition. Calibrated equipment such as asphalt distributors, scales, batching equipment, spreaders and similar equipment, shall have been recalibrated by a calibration laboratory within [12] [_____] months prior to commencing work (and every [_____] months thereafter, by such laboratory from the date of recalibration, during the term of the contract).

2.2.1 Bituminous Distributor

The bituminous distributor shall be designed and equipped to distribute the bituminous material uniformly at even heat on variable widths of surface at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard, with a pressure range of 25 to 75 pounds per square inch and with an allowable variation not to exceed 5 percent from any specified rate. Distributor equipment shall include a separate power unit for the bitumen pump, full-circulation spray bars, tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating the materials to the proper application temperature, a thermometer for reading the temperature of the tank contents, and a hose and spray nozzle attachment suitable for applying bituminous material to spots unavoidably missed by the distributor and to areas inaccessible to the distributor. The distributor shall be equipped to circulate and agitate the bituminous material during the heating process.

2.2.2 Heating Equipment for Storage Tanks

The equipment for heating the bituminous material shall be steam, electric, or hot oil heaters. Steam heaters shall consist of steam coils and equipment for producing steam, so designed that the steam cannot get into the material. An armored thermometer with a temperature range from 40 to 400 degrees F shall be fixed to the tank so that the temperature of the bituminous material may be determined at all times.

2.2.3 Brooms and Blowers

Brooms and blowers shall be of the power type suitable for cleaning the surfaces for application of the bituminous material.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

Immediately before applying the tack coat, remove loose material, dirt, clay, and other objectionable material from the surface to be treated by a power broom or blower supplemented with hand brooms. After the cleaning operation and prior to the application of the tack coat, inspect the area to be paved to determine the fitness of the area to receive the bituminous material.

3.2 APPLICATION OF BITUMINOUS MATERIAL

Apply the tack coat when the surface to be treated is dry. Immediately following the preparation of the surface for treatment, apply the
bituminous material by means of the bituminous distributor, within the limits of temperature specified herein and at a rate of not less than (0.05) gallon nor more than (0.15) gallon of diluted emulsion per square yard. Apply the bituminous material so that uniform distribution is obtained over the entire surface to be treated. Treat lightly coated areas and spots missed by the distributor with the bituminous material. Following the application of bituminous material, allow the surface to cure without being disturbed for period of time necessary to permit setting of the tack coat. Apply the bituminous tack coat only as far in advance of the placing of the overlying layer as required for that day's operation. Maintain and protect the treated surface from damage until the succeeding course of pavement is placed.

3.2.1 Application Temperature for Emulsified Asphalt

Between 75 and 130 degrees F.

3.3 FIELD SAMPLING AND TESTING

3.3.1 Sampling Bituminous Materials

Furnish samples of bituminous materials for testing. Test in accordance with ASTM D 140.

3.3.2 Bituminous Material Tests

Perform spot test for asphalt in accordance with AASHTO T102 on each shipment.

3.4 TRAFFIC CONTROLS

Keep traffic off surfaces freshly treated with bituminous material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

-- End of Section --
PART 1  GENERAL

1.1  REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

THE ALUMINUM ASSOCIATION, INCORPORATED (AA)

AA 30  (1986) Aluminum Structures, Construction Manual Series Section 1

AA 45  (1980) Aluminum Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)


AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC FCD  (1990) Quality Certification Program Description


AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)


AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M  (1994) Carbon Structural Steel

ASTM A 463/A 463M  (1995) Steel Sheet, Aluminum-Coated, by the Hot-Dip Process

ASTM A 500  (1993) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ASTM A 529/A 529M  (1994) High-Strength Carbon-Manganese Steel of Structural Quality

ASTM A 572/A 572M  (1994; Rev. C) High-Strength Low-Alloy Columbium-Vanadium Steels of Structural
Quality

ASTM A 588/A 588M (1994) High-Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick

ASTM A 653/A 653M (1995) Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process


ASTM A 792/A 792M (1995) Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process


ASTM C 308 (1985; R 1990) Working, Setting, and Service Strength Setting Times of Chemical-Resistant Resin Mortars

ASTM D 522 (1993; Rev. A) Mandrel Bend Test of Attached Organic Coatings

ASTM D 523 (1989; R 1994) Specular Gloss


ASTM D 2244 (1993) Calculation of Color Differences from Instrumentally Measured Color Coordinates

ASTM E 84 (1995; Rev. A) Surface Burning Characteristics of Building Materials
ASTM E 1592 (1994) Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure

AMERICAN WELDING SOCIETY, INC. (AWS)
AWS D1.1 (1994) Structural Welding Code Steel

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION, INC. (BHMA)
ANSI/DHMA A156.1 (1988) Butts and Hinges (BHMA 101)
ANSI/DHMA A156.2 (1990) Bored and Preassembled Locks and Latches (BHMA 601)
ANSI/DHMA A156.3 (1994) Exit Devices (BHMA 701)
ANSI/DHMA A156.4 (1992) Door Controls - Closers

METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA)

STEEL DECK INSTITUTE (SDEI)

STEEL DOOR INSTITUTE (SDI)

STEEL WINDOW INSTITUTE (SWI)

UNDERWRITERS LABORATORIES INC. (UL)
1.2 DESCRIPTION OF BUILDING

1.2.1 Dimensions

Building dimensions shall be as standard with manufacturer, not less than those indicated, but exceeding the indicated dimensions only by the amount of the closest standard size thereto. Eave height shall be measured from the top of finished floor to intersection of insides of roof and sidewalk sheets. The clear height between finished floor and bottom of roof steel shall be as indicated.

1.2.2 Framing

Provide building with vertical walls and gable roof. Building shall be structures with one of the following framing systems: self-framing, column with single-span or continuous trusses, continuous beam frames, column with rigid frame, or rigid frame type, similar to AISC 3335, Type I construction. End walls shall be of [rigid frame] [beam and column]. Roof slope shall be a minimum of 1 to 24 [to a maximum of [_____]]. [Roof slope greater than that indicated may be furnished if the required materials are provided and appropriate drawings are submitted and approved.] Design framed openings structurally.

1.2.3 Foundation Requirements

Design foundations for allowable soil bearing pressure and a minimum bottom of footing depth as indicated. Use a factor of safety of 1.5 for overturning, sliding and uplift, and a concrete compressive strength as specified in Section 03300, "cast-in-place Concrete." The foundation loads are supplied by the building manufacturer.

1.3 EXPERIENCE

1.3.1 Manufacturer

The manufacturer shall have AISC FCD, category MB certification.

1.3.2 Installer

Installer shall have specialized experience in the erection of metal building systems for a period of at least 3 years.

1.4 DESIGN REQUIREMENTS

MBMA LRAMESM, for loading combinations and definitions with the exceptions of wind load and special collateral loads. Design for each material shall be as specified by the Design Authority as listed in MBMA LRAMESM.

1.4.1 Roof Dead, Live, and Snow Loads

As indicated.

1.4.2 Wind Loads

Compute and apply wind pressures, ASCE 7. Basic wind speed and importance factors are as indicated.

1.4.2.1 Hurricane Loads

SECTION 13121 Page 4
ASTM E 1592, code load [____]; cladding load [____], safety factor 1.65.)

1.4.3 (Seismic Loads

As required for Seismic Zone 4. Importance factor as indicated.)

1.4.4 Collateral Loads

As indicated.

1.4.5 Deflection

1.4.5.1 Structural Members

The maximum deflection of main framing members shall not exceed 1/240th of their respective spans. The maximum deflection due to live load in roof panels and purlins shall not exceed 1/180th of their respective spans.

1.4.5.2 Roof Panels

UL 580, Class 90. The design analysis shall establish that the roof when deflected under dead plus live or snow loads, will not result in a negative gradient. Maximum deflections shall be based on sheets continuous across two or more supports with sheets unfastened and fully free to deflect. In addition, the roof decking shall be designed for a 200-pound concentrated load at midspan on a 12-inch wide section of deck. Panels thinner than 0.03 inches are not permitted for diaphragms used to resist seismic loads in Seismic Zones 2 through 4.

1.4.5.3 Wall panels

The maximum deflection due to wind on wall panels and girts shall be limited to 1/120th of their respective spans except that when interior finishes are used the maximum allowable deflection shall be limited to 1/180th of their respective spans.

1.4.5.4 Openings

Limit deflections of steel framing above and along the side of rolling door openings to a maximum of 1/2 the allowable movement in the telescoping top roller of the doors to ensure proper operation. Frame all equipment openings over 12 inches by 12 inches.

1.5 SUBMITTALS

Submit the following in accordance with section entitled “Submittal Procedures.”

1.5.1 SD-02, Manufacturer’s Catalog Data

a. Preengineered metal building materials

Submit sufficient data indicating conformance to specified requirements on materials provided under this section.

1.5.2 SD-03, Manufacturer’s Standard Color Charts

a. Factory color finish
Submit one sample of each color indicated for verification that the color matches the colors indicated. Where colors are not indicated, submit not less than four different samples of manufacturer's standard colors for selection by the Contracting Officer.

1.5.3 SD-04, Drawings
   a. Preengineered building
   b. Template for anchor bolts
   Submit as necessary to erect the building and install components.

1.5.3.1 Preengineered Building
   Submit complete design drawings for the preengineered building. Submit drawings for the foundations and anchorage.

1.5.4 SD 05, Design Data
   a. Building
   b. Foundation loads
   c. Anchor bolts
   [d. Purlins and girts]
   [e. Bracing]

1.5.4.1 Building
   Submit design calculations for the entire preengineered building and foundations, prepared and stamped by a professional engineer. Also submit for components requested, and stamp with the seal of a professional engineer. Include sizes and location of anchor bolts.

1.5.5 SD-11, Factory Tests
   a. Factory Color Finish
   b. Insulation

1.5.6 SD-13, Certificates
   a. Preengineered metal building materials
   Submit certificates attesting that materials comply with this specification.

1.5.7 SD-19, Operation and Maintenance Manuals
   a. Preengineered Building, data package 1
   Submit operation and maintenance data in accordance with Section 01781, "Operation and Maintenance Data."

1.6 DELIVERY, STORAGE, AND HANDLING
Deliver, store, and handle manufactured items so that materials remain dry and undamaged. Do not store in contact with materials that might cause staining.

1.7 WARRANTY

Provide warranty against water leaks arising out of or caused by ordinary wear and tear by the elements for a period of 20 years. Such warranty shall start upon final acceptance of the work or the date the Government takes possession, whichever is earlier.

PART 2 PRODUCTS

2.1 WALL AND ROOF MATERIALS

MBMA LRMBSM except as specified otherwise herein. Design roof and wall panels, accessories, and flashings to be completely weathertight and free of abrasions, loose fasteners, and deformations.

2.1.1 Minimum Thickness

As required to conform to design requirements but not less than the following:

<table>
<thead>
<tr>
<th>Items</th>
<th>Minimum Thickness (Uncoated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Steel Structural Members Other Than Roof and Wall Panels]</td>
<td>18 Manufacturer's Standard (MFG STD) gage, 0.0476 inch</td>
</tr>
<tr>
<td>Roof and Wall Panels</td>
<td>26 MFG STD gage, 0.0179 inch</td>
</tr>
<tr>
<td>Steel</td>
<td>0.032 inch</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.045 inch</td>
</tr>
<tr>
<td>Plastic</td>
<td></td>
</tr>
<tr>
<td>Gable and Eave Trim, Fascia Closure Strips, Rake Flashings, Copings, and Liner Panels</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>26 MFG STD gage, 0.0179 inch</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.032 inch</td>
</tr>
<tr>
<td>Plastic</td>
<td>0.045 inch</td>
</tr>
<tr>
<td>Interior Gutters</td>
<td>24 MFG STD gage, 0.0239 inch</td>
</tr>
<tr>
<td>Steel</td>
<td>0.040 inch</td>
</tr>
<tr>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>Eave Gutters and Downspouts</td>
<td>26 MFG STD gage, 0.0179 inch</td>
</tr>
<tr>
<td>Steel</td>
<td>0.032 inch</td>
</tr>
<tr>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>Roof Ventilators</td>
<td>26 MFG STD gage, 0.0179 inch</td>
</tr>
<tr>
<td>Steel</td>
<td>0.032 inch</td>
</tr>
<tr>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>Louvers</td>
<td>18 MFG STD gage, 0.0478 inch</td>
</tr>
<tr>
<td>Steel</td>
<td>0.064 inch</td>
</tr>
<tr>
<td>Aluminum</td>
<td></td>
</tr>
</tbody>
</table>
Items         Minimum Thickness (Uncoated)

[Girders and Columns]  3/16 inch

Purlins and Girts  14 Manufacturer's Standard gage (MFG STD)

Roof Panels
Steel        22 MFG STD gage
Aluminum     0.04 inch

Wall Panels
Steel        24 MFG STD gage
Aluminum     0.032 inch

Bracing       3/16 inch thick steel members

Column Base Plates  5/8 inch thick

Column Anchor Bolts  5/8 inch diameter

Gable and Eave Trim, Fascia Closure Strips, rake flashings, Copings, and Liner Panels
Steel        24 MFG STD gage
Aluminum     0.032 inch
Plastic      0.045 inch

Interior Gutters
Steel        24 MFG STD gage
Aluminum     0.040 inch

Eave Gutters and Downspouts
Steel        24 MFG STD gage
Aluminum     0.032 inch

Louvers
Steel        18 MFG STD gage
Aluminum     0.064 inch

2.1.3 Panels

a. Fabricated of zinc-coated steel/aluminum-coated steel [aluminum/zinc-coated steel] [or] [aluminum] [except translucent wall panels indicated].

b. Preformed.

c. Factory-insulated to provide weathertight joint upon installation, with:

[(1) Inner and outer sheets formed and joined at edges into a tongue-and-groove joining system with vinyl seals, closed cell foam tape, or factory-applied nonskimming butyl sealant] [; or]

[(2) Outer sheet designed to overlap adjacent panel a minimum of one configuration.]
d. If designed as diaphragm, roof decks shall be designed in accordance with SDEI DDM.

e. For standing seam roofs, Section 07611, "Steel Standing Seam Roofing."

[Depth of the panels shall be as indicated.] [Insulation in the cores of the panels shall be asbestos-free composition and provide an overall "U" value of not more than 0.10 for wall panels [and] 0.05 for roof panels.] [Insulation in factory-insulated panels shall have a flame spread rating of 75 or less and a smoke development factor of 150 or less]. [Panels over 30 feet in length shall be designed for thermal expansion and contraction.]

2.1.2.1 Zinc-Coated Steel Sheet

2.1.2.2 Aluminum-Coated Steel Sheet
ASTM A 463/A 463M, Type 1 or Type 2.

2.1.2.3 Aluminum/Zinc-Coated Steel Sheet
ASTM A 792/A 792M, AZ 55

2.1.2.4 Aluminum Sheet
Alloy 3004 Alclad conforming to ASTM B 209.

2.1.2.5 Liner Panels
Formed of same type material as used for wall panels to closely approximate configuration of panels indicated.

2.2 FRAMING AND STRUCTURAL MEMBERS

2.2.1 Steel
ASTM A 36/A 36M, ASTM A 529/A 529M, ASTM A 572/A 572M, or ASTM A 588/A 588M.

2.2.2 Aluminum
ASTM B 221 or ASTM C 308.

2.2.3 Structural Tube
ASTM A 500 or ASTM B 221.

2.3 MISCELLANEOUS ITEMS

2.3.1 Caps, Strips, and Plates
Form ridge caps, eave and edge strips, fascia strips, miscellaneous flashings, and miscellaneous sheet metal accessories from the same material and gauge as the roof panels. Wall plates, base angles or base channels, and other miscellaneous framing members may be standard structural steel shapes, or may be formed from steel not lighter than 18 gage thick.

SECTION 13121 Page 9
2.3.2 Closure Strips

Provide closure strips of closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride premolded to match configuration of the covering. Closure strips shall not absorb or retain water.

2.3.3 Sealant

Provide elastomeric type sealant containing no oil or asphalt. Exposed sealant shall cure to a rubberlike consistency. Concealed sealant may be the nonhardening type.

2.3.4 Gaskets and Insulating Compounds

Provide nonabsorptive gaskets and insulating compounds suitable for insulating contact points or incompatible materials. Insulating compounds shall be nonrunning after drying.

2.3.5 Fasteners

Provide fasteners for steel wall and roof panels of zinc-coated steel, aluminum, corrosion resisting steel, or nylon capped steel, type and size specified below or as otherwise approved for the applicable requirements. Fasteners for aluminum wall and roof panels shall be aluminum or corrosion resisting steel. Fasteners for structural connections shall provide both tensile and shear strength of not less than 750 pounds per fastener. Fasteners for accessories shall be the manufacturer's standard. Exposed roof fasteners shall be gasketed or have gasketed washers on the exterior side of the covering to waterproof the fastener penetration. Washer material shall be compatible with the covering; have a minimum diameter of 3/8 inch for structural connections; and gasketed portion of fasteners or washers shall be neoprene or other equally durable elastomeric material approximately 1/8 inch thick. When wall covering is factory color finished, exposed wall fasteners shall be color finished or provided with plastic color caps to match the covering. Nonpenetrating fastener system using concealed clips shall be manufacturer's standard for the system provided.

2.3.5.1 Screws

Provide self-tapping screws not less than No. 14 diameter and not less than No. 12 diameter if self-drilling/self-tapping type.

2.3.5.2 End-Welded Studs

Provide automatic shouldered type studs with a shank diameter of not less than 3/16 inch and cap or nut for holding covering against the shoulder.

2.3.5.3 Explosive Actuated Fasteners

Fasteners for use with explosive actuated tools shall have a shank diameter of not less than 0.145 inch with a shank length of not less than 1/2 inch for fastening panels to steel and not less than 1 inch for fastening panels to concrete.

2.3.5.4 Blind Rivets

Provide aluminum rivets with 3/16 inch nominal diameter shank or stainless steel rivets with 1/8 inch nominal diameter shank. Rivets shall be
threaded stem type if used for other than the fastening of trim. Provide hollow stem rivets with closed ends.

2.3.5.5 Bolts

Provide bolts not less than 1/4 inch diameter, shouldered or plain shank as required, with nuts.

2.4 GUTTERS

Provide complete with mitered corners, end pieces, and special pieces that may be required. Expansion-type slip joints shall be provided at the center of the runs and at intervals of not more than 32 feet for aluminum and not more than 40 feet for steel. Provide water tight seal at all other joints. Provide gutters below the slope line of the roof, to allow snow and ice to slide clear. Provide hangers and fastenings from a metal compatible with the gutters. Space hangers not more than 36 inches apart.

2.5 DOWNSPOUTS

Provide cross sectional area not less than the size of gutter indicated and complete including elbows and offsets. Provide downspouts in approximately 10-foot lengths; end joints shall telescope not less than 1/2 inch, and longitudinal joints shall be locked. Provide gutter outlets with stainless steel wire ball strainers of a standard type. Position downspouts not less than 1/2 inch away from walls and fasten to the walls at top, bottom, and at not to exceed 5 foot centers intermediately between with manufacturer's standard type leader straps, or concealed type fasteners. Form straps and fastenings from a metal compatible with the downspouts. [Provide open downspout.]

2.6 CIRCULAR ROOF VENTILATORS

Provide circular roof ventilators fabricated of aluminum or zinc-coated steel with [manufacturer's standard factory finish, color as indicated] [the same finish specified in paragraph entitled "Finish," color as indicated] [mill finish], furnished with removeable [bird] [insect] screens [and] [chain or cable operated dampers]. Provide rigid weathertight ventilators free from vibration upon installation.

2.7 CONTINUOUS (RIDGE) ROOF VENTILATORS

Provide ventilators fabricated of aluminum, zinc-coated steel, or aluminum-zinc alloy coated steel, of [manufacturer's standard factory finish, color as indicated] [the same finish specified in paragraph entitled "Finish," color as indicated] [mill finish], complete with braces, [chain-operated dampers], and bird screening. Provide ventilators in sections 8 or 10 feet long, braced at midlength. Join sections together with splice plates of the same material as the sections. Provide end closures for each section. [Throat size (vent opening) shall be [_____] inches.]

2.8 LOUVERS

[Provide louvers and frames of the sizes, design, and color indicated. Provide [manufacturer's standard factory finish] [the same finish specified in paragraph entitled "Finish"] [mill finish]. Fold or bead blades at the edges, set at an angle to exclude driving rains, and secure to the frames by riveting or welding as standard with manufacturer. Provide mullions for
louvers over 4 feet in width; provide not less than one million for each 4 foot width. Provide flanges on the interior face of frames where air intakes or exhaust louvers are indicated to be connected with mechanically-operated dampers or metal ductwork. Provide woven wire bird screening, not less than 3 by 3 mesh per square inch in rewireable frames, on the [interior] [exterior] of louvers; install screen frames by means of clips to allow easy removal for cleaning and rewiring. The screens and frames shall be of the same type metal as the louvers; screen wire shall be not less than 0.0475 inch in diameter. [Specified in Section 15810, "Ductwork and Ductwork Accessories." Provide framing and flashings as necessary for installation of louvers.]

2.9 LIGHT TRANSMITTING ROOF PANELS (INSULATING)

Standard with the manufacturer of [a nominal size of [_____] by [_____] feet] (size indicated). The light transmitting roof panels shall consist of an interior and exterior plastic face with a sealed airspace of 1 to 1 1/2 inches. The exterior plastic face shall be not less than 0.055 inch thickness and shall have the same configurations as the roofing panels. The interior plastic face shall be not less than 0.035 inch thickness. Plastic faces shall be fiberglass consisting of polyester synthetic resin reinforced with a fibrous glass mat and rated self-extinguishing by Underwriters Laboratories Inc. The "u" factor of the light transmitting roof panels shall not be more than 0.50.

2.10 LIGHT TRANSMITTING ROOF PANELS (NONINSULATING)

ASTM D 3841, Type II, Grade 1, weighing not less than 8 ounces per square foot, standard with the manufacturer. Size and color as indicated. Provide light transmitting roof panels of the same configuration as the roof panel.

2.11 PLASTIC WALL LIGHTS

ASTM D 3841, Type II, Grade 1, weighing not less than 8 ounces per square foot, standard with the manufacturer. Size and color as indicated. Provide wall lights of the same configuration as the metal wall panels.

3.12 FIELD INSTALLED INSULATION-

Blanket type 0.6 pound fiber-glass as standard with the metal building manufacturer having a factory-applied facing on one side and a permeance rating of 0.05 or less when tested in accordance with ASTM E 96.

a. Facing on insulation shall be vinyl-scrim foil [__, except that behind liner panels [and [______]], facing may be 0.002 inch thick aluminum foil]. Vinyl-scrim foil shall have a tensile strength of not less than 40 pounds machine direction and 30 pounds cross machine direction when tested in accordance with ASTM D 828.

b. The insulation, including facings, shall have a flame spread rating of [75] [_____] or less and a smoke development factor of [120] [_____] or less when tested in accordance with ASTM E 84.

c. Wall insulation shall have guarded hot box values for "R" of [_____] or more as measured in accordance with ASTM C 236 test method. Roof insulation shall have guarded hot box values for "R" of [_____] or more as measured in accordance with ASTM C 236.
d. Provide insulation containing 20 percent or greater recovered material which has been diverted from solid waste, but not including material reused in a manufacturing process. Where two materials have the same price and performance, provide the one containing the higher recovered material content.

2.13 DOORS AND WINDOWS

[Doors and windows are specified in Sections [ , " " ] and [ , " " ]. Provide framing members and flashings as necessary for installation of the doors and windows.]

2.13.1 Swinging Personnel Doors and Frames

ANSI/SDI 100, Grade II, Model 1, 2, 3, or 4, design as indicated, zinc-coated and shop primed, exterior mounting. [Doors shall be glazed with [ ] glass.] [Hardware is specified in Section 08710. "Door Hardware."] [Hardware shall conform to ANSI/BHMA A156.1, ANSI/BHMA A156.2, ANSI/BHMA A156.3, and ANSI/BHMA A156.4.] Doors shall be provided with the following hardware:

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<tr>
<th>DOOR NO.</th>
<th>HARDWARE REQUIRED</th>
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2.13.2 Sliding Doors

[Hollow metal] [or] [sheet metal] type. [Hollow metal type shall conform to ANSI/SDI 100, Grade II, Model 1, 2, 3, or 4, design as indicated, zinc-coated and shop primed.] [Sheet metal type shall consist of steel framework covered with siding of the same type and finish as used for the building.] Provide hardware necessary for the complete installation of sliding doors. Sliding door hardware shall include heavy-duty zinc-coated steel tracks, brackets, end and center stops, not less than two-wheel ball or roller bearing, adjustable type hangers - two per leaf, binders, guides, handles, heavy type cap bolt and socket for one leaf of pairs of doors, padlock eyes or heavy safety hasp, and flashing for outside door tracks. Hardware items shall be approved types, standard with the door manufacturer.

2.13.3 [Aluminum Windows] [or] [Steel Windows]

[a. Aluminum Windows:] ANSI/BHMA 101, Type [A-C] [HS-C] [HS-HC] [C-C] [C-HC] [DH-C] [DH-HC] [P-C] [P-HC]. Windows shall be factory glazed with [ ] glass. Provide aluminum with [an AA-M10-C22-A31 clear anodized finish in accordance with the requirements of AA 45] [manufacturer's standard factory finish, color as indicated] [the same finish specified in paragraph entitled "Finish," color as indicated]. Ventilating sections shall be provided with insect screens. [Windows shall be provided with thermal barrier features.]

[b. Steel Windows:] SW1 SGSW. [commercial projected] [architectural projected] [standard intermediate projected] [standard intermediate casement] type. Provide [manufacturer's standard factory finish, color as indicated] [the same finish specified in paragraph entitled "Finish," color as indicated]. Provide ventilating sections with insect screens. Provide factory glazed windows with [ ] glass. [Provide windows with thermal barrier...]

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2.14 CANOPIES

Of same materials and finish as the building. Soffit materials shall be [_____] [of material indicated].

2.15 Finish

2.15.1 Shop Painting

Ferrous metal work, except factory-finished work, zinc-coated work, aluminum-coated work, and work specified to be painted herein, shall be (1) cleaned of dirt, rust, scale, loose particles, grease, oil, and other deleterious substances; (2) phosphate treated; and (3) then be given one coat of an approved rust-inhibiting primer paint of the type standard with the metal building manufacturer.

2.15.2 Factory Color Finish

Provide exterior and interior exposed surfaces of metal roof and wall panels, [roof ventilators,] [louvers], gutters, downspouts, and metal accessories with a thermal-cured factory finish. Color shall be [selected from manufacturer's standard colors] [as indicated]. Provide an exterior finish top coat of [the building manufacturer's standard paint] [50 percent resin silicone polyester] [70 percent resin fluoropolymer]. Provide standard dry film thickness of [0.8 mil] [1.0 mil] for exterior coating exclusive of primer. Provide exterior primer thickness [standard with building manufacturer] [0.2 mil] [0.8 mil]. Interior color finish shall consist of [the same coating and dry film thickness as the exterior] [a backer coat with dry film thickness of 0.5 mil] [0.2 mil] thick prime coat. Provide [interior and] exterior color finish meeting the test requirements specified below. Tests shall have been performed on the same factory finish and thickness provided.

a. Salt Spray Test: ASTM B 117, minimum [500] [1000] hours.
Undercutting of the paint film from the score line shall not exceed 1/16 inch.

b. Accelerated Weathering Test: ASTM G 23, Method 2, Type D apparatus minimum 2000 hours or Type EH apparatus minimum 500 hours, no checking, blistering or loss of adhesion; color change less than 5 NBS units by ASTM D 2244 and chalking less than No. 8 rating by ASTM D 4214.

c. Flexibility: ASTM D 522, Method A, 1/8 inch diameter, 180 degree bend, no evidence of fracturing to the naked eye.

d. Adhesion: ASTM D 3359, Method B, for laboratory test and film thickness less than 5 mil and Method A for site tests. There shall be no film removed by tape applied to 11 parallel cuts spaced 1/8 inch apart plus 11 similar cuts at right angles.

e. Impact: ASTM D 2794, no loss of adhesion after direct and reverse impact equal to 1.5 times metal thickness in mils, expressed in inch-pounds.

f. Humidity Resistance: ASTM D 2247, [1000] [_____] hours, no signs of blistering, cracking, creepage or corrosion on score panel.
PART 3 EXECUTION

3.1 INSPECTION

Check concrete dimensions, anchor bolt size and placement, and slab elevation with the metal building manufacturer's templates and drawings before setting any steel.

3.2 ERECTION

Erect in accordance with the manufacturer's approved erection instructions and diagrams. Correct defects and errors in the fabrication of building components in a manner approved by the Contracting Officer. If defects or errors in fabrication of components cannot be corrected, remove and provide nondefective components. When installing wall and roof systems, install closure strips, flashing, sealing material, and other accessories in accordance with building manufacturer's instructions to provide a weathertight system, free of abrasions, loose fasteners, and deformations. After erection is complete, repair and coat abraded and damaged, primed or factory-finished surfaces to match adjacent surfaces.

3.2.1 Dissimilar Materials

Prevent direct contact between aluminum surfaces, and ferrous or other incompatible metals, by one of the following methods:

a. Paint the incompatible metal with a coating of manufacturer's standard heavy-bodied paint.

b. Paint the incompatible metal with a prime coat of corrosion inhibitive primer followed by one or two coats of aluminum metal-and-masonry paint, or other suitable protective coating, excluding products containing lead and chromium pigmentation.

c. Provide an approved nonabsorptive gasket.

d. Apply an approved calking between the aluminum and the incompatible metal.

If drainage from incompatible metal passes over aluminum, paint the incompatible metal by method (a) or (b). Paint aluminum surfaces in contact with concrete or masonry materials by method (a). Paint green or wet wood, or wood treated with incompatible wood preservatives, by method (a) or use two coats of aluminum paint.

3.2.2 Rigid Frames, Bases, and Sill Members

Brace frames as necessary to ensure safety. Set accurately, using a nonshrink grout to obtain uniform bearing on the concrete and to maintain a level base line elevation. Clean surfaces to receive the mortar and
thoroughly moisten immediately before placement of mortar. Water cure exposed surfaces of mortar with wet burlap for 7 days.

3.2.2.1 Field Welding
Steel, AWS D1.1. Aluminum, AA 30.

3.2.2.2 Field Bolting
AISC S329

3.2.3 Wall Construction

Apply panels [in the longest obtainable lengths] [full wall heights from base to eave with no horizontal joints except at the junctions of door frames, window frames, louver panels, and similar locations]. Lay side laps away from the prevailing winds. Seal side and end laps with the joint sealing material recommended by the manufacturer. Flash or seal walls at the base, at the top, around windows, door frames, framed louvers, and other similar openings. Flashing will not be required where approved "self-flashing" panels are used. Minimum end laps for all types of panels shall be 2 1/2 inches. Minimum side laps for all types of panels shall be one corrugation, one configuration, or an interlocking joint. Install liner panels to [height indicated] [[_____] feet above finished floor].

3.2.4 Roof Construction

Apply the roofing panels in [the longest lengths obtainable with end laps occurring only at structural members] [full lengths from ridge [or ridge panel] to eaves] [top eave to bottom eave on shed roofs] with no transverse joints except at the junction of ventilators, curbs, light transmitting roof panels, chimneys, and similar openings. Lay side laps away from the prevailing wind, and seal side and end laps with joint sealing material. Flash and seal the roof at the ridge, at eaves and rakes, at projections through the roof, and elsewhere as necessary. Minimum side lap shall be [one corrugation, configuration, or interlocking rib] [except] [1 1/2 corrugations for standard corrugated sheets]. [End laps shall not be less than 6 inches and shall occur only over purlins.]

3.2.5 Minimum Fastener Spacing

Space fasteners according to manufacturer's instructions, but not to exceed:

a. 8 inches o.c. at end laps of covering,
b. 12 inches o.c. at connection of covering to intermediate supports,
c. 12 inches o.c. side laps of roof coverings, 18 inches o.c. at side laps of wall.

3.2.6 Installation of Insulation

3.2.6.1 Roof Insulation

Install over purlins before roof coverings are applied. Hold insulation rigid until secured in place. Insulation facing shall be exposed on the interior side of the building. Fold and staple facing tabs of insulation on 6-inch centers, from exterior side of building to completely seal joints. If folding and stapling can only be accomplished from the inside, push the
tabs neatly up between the edges of adjoining blankets [], and cover side laps of insulation with metal strips formed for this purpose and paint to match the facing material. Install the strips spanning from purlin to purlin and in accordance with the metal building manufacturer's recommendations.

3.2.6.2 Wall Insulation

Install over girts before wall coverings are applied. Hold insulation rigid until secured in place. Expose facing toward the interior side of the building. Fold and staple facing tabs of insulation on 6 inch centers, from exterior side of building, to completely seal joints. If folding and stapling can only be accomplished from the inside, push the tabs neatly up between the edges of adjoining blankets [], and cover side laps of insulation with metal strips formed for this purpose and paint to match the facing material. Install the strips spanning from girt to girt and in accordance with the metal building manufacturer's recommendations.

3.3 FIELD PAINTING

Immediately upon detection, abraded or corroded spots on shop-painted surfaces shall be wire brushed and touched up with the same color and material used for the shop coat. Section 09900, "Paints and Coatings," for painting of shop-primed ferrous surfaces exposed on the outside of the building and all shop-primed surfaces of doors and windows.

3.4 FIELD QUALITY CONTROL

At the discretion of the Contracting Officer, sample panels may be taken at random from each delivery or from stockpiles on the site at any time during the construction period, and tests may be made to check the conformance of the materials to the requirements specified in paragraph entitled "Factory Color Finish." Failure of the sample sheets to pass the required tests shall be cause for rejection of all sheets represented by the samples and replacement of the entire shipment.

-- End of Section --