

PART IV

SCOPE OF SERVICES

**SCOPE OF SERVICES
ON-CALL GENERAL ARCHITECTURAL AND ENGINEERING
CONSULTANT SERVICES**

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1 **GENERAL:**

.1 **Purpose:**

The Washington Metropolitan Area Transit Authority (known hereinafter as the Authority) desires that certain professional on-call general engineering consultant-facilities (GEC-FAC) services be secured to provide design and review services to support the on-going facilities maintenance program, capital improvement program, conduct special complex engineering/architectural studies, provide engineering and architectural support for recovery from emergency conditions, provide design and construction management support for new capital rail construction and for bus system facilities projects, for joint development projects, for adjacent construction related projects, for project and technology development projects, and for additional projects and services as required.

As described in the following, the GEC-FAC shall assist the Authority by providing certain professional engineering and architectural services associated with new construction and the renovation, repair and maintenance of Authority facilities located in the District of Columbia, Maryland and Virginia. This effort pertains to both Metrorail and Metrobus facilities. All new Metrorail or Metrobus facilities must be designed to meet or exceed the requirements for Leadership In Energy and Environmental Design (LEED) Silver Certification rating.

.2 **Background:**

.1 **Architecture:**

.1 Harry Weese's original architecture with its distinctive, elegant, spacious, underground stations has established a standard for architectural design excellence. Above ground stations, while not as dramatic, are designed with just as much attention given to aesthetics, durability, functionality, and quality. This tradition of architectural design has made the system one of the most beautiful and its stations considered by many to be "exemplary works of Modern Design".

.2 All new station designs shall follow Harry Weese's original architecture with its distinctive, elegant, spacious, underground stations has established a standard for architectural design excellence and build upon this standard for design excellence. All new station designs, whether underground or above ground, shall follow and reinforce this design vision and live up to the view that public architecture in the Nation's Capital shall be dignified and grand.

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- .3 While not necessarily duplicating past designs, This tradition of architectural design has made the system one of the most beautiful and its stations considered by many to be "exemplary works of Modern Design". And as such new station designs shall build upon the tradition of superior architectural design and continue to reinforce a unique Metro image that unifies the system as a whole. New station designs shall have the common range of materials and follow the design principles established by Harry Weese and as outlined in WMATA's Design Criteria.
- .4 In addition to station design, WMATA has a history of and an expectation for architectural design excellence for all its facilities both public and non-public. Other public WMATA structures can include parking structures, pedestrian bridges, customer service facilities, etc. Non-public facilities can include but are not limited to industrial facilities such as rail yard and bus maintenance shop buildings, administrative yard buildings, ancillary rail building, traction power substations, office buildings, etc.
- .5 Architectural consultants providing architectural design services for WMATA facilities shall provide an experienced architectural design staff with proven aesthetic design experience and talent to develop functionally economical as well as aesthetically attractive buildings. Consideration shall be given to creative uses of materials, massing, scale, form, texture, and detailing. Buildings shall be visually attractive, innovative, as well as functional and durable. The overall architecture should impart a sense of pride within the local community, and provide a stimulating and attractive environment for the people who will see, work in, and use the buildings on a daily basis.
- .2 Civil:**
- .1 The Washington Metropolitan Area Transit Authority (WMATA) began the first phase of Red Line revenue operation in 1976, which consisted of 5 stations and about 4.6 miles of revenue track. The system has steadily increased in size to its present condition, which currently consists of 86 91 stations and about 106 117 miles of revenue track. WMATA has an equally large number of facilities that support Metrorail operations to include parking garages, parking lots, kiss and ride lots, bus bays, access roads, side walks, underground utilities, storm water management facilities, railcar storage yards and shop facilities, salt domes, traction power facilities, tiebreaker facilities and others. WMATA also operates and maintains an extensive bus fleet, underground storage tanks and bus garage facilities throughout the region. Parts of the present Metrorail system are over 30 years old and are showing signs of age. Many of the Metobus facilities were acquired from the previous local bus providers and are much older than 30 years.

.2 Typically, civil design will focus on restoration of existing facilities adopting new technology and Standards where appropriate. Many improvements in building codes and environmental requirements have occurred since the majority of the system was designed which will present unique challenges for civil designers when retrofitting existing systems to comply with new codes.

.3 **Electrical:**

WMATA utilizes an N+1 distribution configuration throughout the system with the exception for a few locations. WMATA is comprised of 91 active Passenger Stations, 12 Parking Garages, 33 Parking Lots, 26 Bus Loops, 9 Bus Garages, and 6 System Maintenance and Inspection Yards.

.1 **Passenger Stations**

WMATA's Passenger Stations incoming utility service is either 13.8kV or 34.5kV and is configured in a main-tie-tie-main or a main-tie-main arrangement. In some locations the two mains are located in same electrical vault and in other cases they are located in the separate vaults at each end of the station. Each unit substation switchgear lineup is comprised of medium voltage metal-clad switchgear, a dry-type cast coil transformer, and a low voltage 480V switchboard. These unit substations provide electric power to all equipment and devices in the station and in some cases to adjacent facilities such as drainage pumping station, vent shafts, traction power auxiliary equipment, and parking garages.

.2 **System Maintenance and Inspection Yards (S&I)**

WMATA's S&I Yards electrical distribution system is normally similar to the Passenger Station's system with the exception of a few Yards where the traction power equipment is located in the same electrical vault room. The main distribution switchboard shall be 277/480 volt with a current capacity based on facility load calculations and future expansion considerations. The switchboard shall be metal enclosed dead front safety type free standing with a sufficient number of circuit breakers to meet facility design needs and adequate spare capacity to meet future growth. The switchboard fabrication and features shall include hinged front panels, hard drawn copper bus material with silver-plated contact surfaces and uniform capacity over entire length and front panel meters to display phase to phase and phase to neutral voltage and current. The circuit breakers in the switchboard shall be current limiting molded case NEMA AB 1 with 75,000 amp interrupting capacity or as necessary to meet available fault current. The switchboard shall be located in a dedicated electrical equipment room along with the main electrical distribution panelboards and transformers. This room shall be appropriately

sized to accommodate equipment clearance requirements as defined by National Electric Code (NEC) latest revision, International Building Code (IBC), local and State codes, and as described below. Panelboard enclosures shall be NEMA PB 1 Type 1. The motor control centers shall be located in the mechanical equipment room. It is preferred that there be two separate motor control centers, one for equipment on normal power and another for equipment on emergency power. Appropriate space shall be provided in the mechanical equipment room to accommodate equipment clearance requirements as defined by National Electric Code (NEC) latest revision and as described below. Motor control center and disconnect switch enclosures shall be NEMA Type 1 or as otherwise specified to meet environmental conditions. The bus material in this equipment shall be hard drawn copper of 98% conductivity. Main distribution panels and any panelboards rated greater than 200 amps shall be located with 2'-0" clear space on both sides and any other panelboards shall have 18" clear space on both sides for ease of maintenance. Any panels mounted adjacent to each other shall have 2'-0" clear space between them and shall have 3'-0" clear space in front of panels for access, or as otherwise defined by the National Electric Code (NEC) latest revision. Any panelboards and control panels in maintenance or service areas shall be centrally located in the area covered and shall be flush mounted and/or protected by bollards or guard rails. For all panelboards, installation of conduits shall be top or bottom entry at rear of entering surface such that all available rear surface space is used prior to installing conduits on surface toward front of panelboard. Panelboards and their installation shall comply with NFPA 30A. Space shall be provided for conduit runs at ceiling including space consideration for future conduits. All conduit and cable shall be installed as per the latest revision of the National Electric Code (NEC) and NFPA 30A with routing done overhead and drops from ceiling space and not run within slabs on grade. Conduit for power distribution shall be minimum 3/4 inch size. Exterior underground conduit shall be rigid galvanized steel encased in concrete under paved areas and rigid nonmetallic concrete encased in other areas. Interior conduit shall be rigid galvanized steel. All power wiring rated 600 volts and below shall be type THHN/THWN in raceway with a minimum No.12 AWG size. All general purpose duplex receptacles are to be rated for 20 amps, 125 volts.

.3 **Grounding**

WMATA grounding system is very robust and at times it is more stringent than NEC requirements. Each unit substation is grounded to a ground bus bar inside the electrical vault. This ground bus bar is connected to a ground grid that is buried beneath the earth. All metallic structures and surfaces within the station are bonded and grounded for personnel safety. For cathodic protection purposes, structures rebar are isolated from the main

grounding system.

.4 **Uninterruptible Power Supply (UPS)**

An UPS system is installed at Each Passenger Station that is rated between 50kVA - 100kVA, and is capable of providing 3 hours of run time at full load to all critical loads within the station. The batteries are 2V cell, lead acid type that is housed in a separate room adjacent to the electrical vault and is monitored for excess hydrogen buildup.

.5 **Cables and Conduits**

All power cables within the Passenger Stations are of the low smoke, zero halogen type with now exceptions. All exposed conduits in the Passenger Stations and Bus Garages shall be rigid galvanized steel (RGS) except where liquid tight flexible conduits would be more suitable. PVC and FRE conduits are always encased in concrete and are normally used for the incoming service cables.

For Bus Garages and office type buildings, low smoke, zero halogen type power cables are not required. RGS is not required for office type buildings.

.4 **Mechanical:**

.1 CENI-PWRS-MECH is the department at WMATA responsible for the design, build, operation, and maintenance of mechanical related systems (excluding rolling stock). Mechanical related systems at WMATA include the Fire Suppression systems; the Tunnel Ventilation systems; the Tunnel Drain Pumping Stations (DPS); the Train, Bus, and Non-revenue Lift systems; the Overhead and Jib Crane systems; the Plumbing systems; the Heating, Ventilation, and Air Conditioning systems (HVAC) for stations and ancillary facilities; the Building Automation Systems (BAS) for stations and facilities; as well as various other mechanical systems.

.2 **Fire Suppression Systems**

Fire Suppression systems include wet and dry standpipes; wet, dry, pre-action, early suppression fast response, deluge sprinkler systems, and clean agent systems for WMATA facilities throughout the Authority. Additionally, integration of fire and smoke dampers into HVAC systems is common. Fire rated isolation of industrial and commercial facilities, and for Traction Power Substations (TPSS). Some of these systems include fire pumps. Within the rail transit system, understanding and compliance with NFPA 130, Fixed Guideway Transit and Passenger Rail Systems, is required.

.3 Drain Pumping Stations (DPS)

Within the rail tunnels, surface and groundwater enter the system through seepage, Vent and Fan Shafts, and through portals. This water then collects at low points within the tunnel system. DPS systems are located at or near these low points to remove the water from the tunnels. Typically, the DPS pumps discharge either directly to open ground, or into local storm water drainage systems. WMATA DPS systems include all related piping, controls, metering, and remote monitoring equipment.

.4 Lift Systems

At the various WMATA maintenance facilities, lifts are used to raise trains, buses, and other vehicles to an elevation at which they can have service performed on them. The lifts are comprised of; controls, hydraulic systems, mechanical systems, vehicle supports, truck turntables and elevators, and body hoists.

.5 Crane Systems

Overhead and Jib cranes are an integral part of rail and bus facilities. They are used for lifting large parts and assemblies.

.6 Plumbing systems

This includes all standard plumbing within WMATA facilities, stations, and buildings. Subsystems include, but are not limited to, potable water supply, domestic hot water supply, DWV (drain, waste, and vent), septic and sewer piping systems, storm water drainage. This includes; diesel, gasoline and natural gas distribution systems. Also included are all standard plumbing fixtures for locker and restrooms. Rail and bBus maintenance facilities include industrial wastewater pretreatment systems to remove oil and heavy metals from the waste stream.

.7 Chiller Plants and Cooling Towers

WMATA uses chiller plants to generate chilled water, which is then circulated to provide air conditioning. Cooling is required for underground stations, offices, and training and maintenance facilities. The authority has air cooled and water cooled chillers. Chiller plants and cooling towers include all associated controls, pumps, piping, metering, remote monitoring, and water treatment equipment.

.8 Station Ventilation and Air Conditioning

Each underground station has air handling units and air conditioning units in mechanical rooms associated with the station. Chilled air is blown through ducts under the platforms and supplied to the station through the pylons, supply ducts in the side walls, and in the walls under escalators. Air returns through grilles under the station benches, into the under-platform ducts, back to the air handling units. Brake dust in the underground stations creates an accelerated filter loading rate. Air handling units provide air circulation for underground maintenance and control rooms.

.9 Under-Platform Exhaust, Dome Exhaust, and Tunnel Fans

Tunnel Ventilation systems include tunnel vent fans, vent shafts, dome fans, Under-Platform Exhaust (UPE) fans, and damper systems within all rail tunnels. Tunnel fans provide for exhausting of smoke and heat during a fire, and removal of diesel exhaust during maintenance activities. Vent shafts provide relief of the piston action created by moving trains and for emergency egress of passengers. In extreme cold, the vent shafts and fan shafts dampers will close to reduce freezing conditions for water drainage and service piping. Dampers are also integrated into the supplying or exhausting of air for station ventilation during an emergency. The UPE fans removes heat generated by train propulsion equipment while the train is at the platform and removes smoke in an emergency. Dome fans remove heat and smoke from the upper portion the station dome.

.10 Heating, Ventilating, and Air Conditioning (HVAC) systems for buildings

The Mechanical department has responsibility for the HVAC systems in all WMATA buildings, from the very large systems for office and maintenance facilities, down to the simplest exhaust fans. Industrial maintenance spaces, require winter heat and year-round ventilation, both to provide fresh air for technicians, and to remove pollutants from industrial activities. Unoccupied spaces, such as Tie Breaker Stations (TBS) and Traction Power Substations (TPSS) also require some level of winter heating to prevent freezing or condensation on contained equipment, and ventilation to prevent equipment overheating. Additionally, battery rooms have specific minimum ventilation requirements to prevent hydrogen gas buildup.

.11 Building Automation Systems (BAS)

Building Automation Systems at WMATA describes the control systems for HVAC and other utilities and mechanical systems within a building. Typically, each building has its own BAS, although in some locations, buildings may be grouped into a single BAS. The control and monitoring

functions include, but are not limited to: Air handling units , mechanical equipment monitoring and control at Tunnel Fans, Tie Breaker Stations (TBS), Traction Power Substations, Drainage Pumping Stations, Sewage Ejectors, Chiller Plants, Bus Wash, and Train wash systems.

.12 Programable Logic Control Systems (PLC)

Programable Logic Control Systems at WMATA describes the control systems for many complex mechanical systems and processes. These systems typically include Train and Bus wash systems, Drainage Pumping Stations (DPS), Tunnel ventilation control systems, and Bus and Rail vehicle lifting systems. The control and monitoring of such equipment typically consists of a centralized controller and a localized Human Machine Interface (HMI) for system operation and remote monitoring.

The WMATA Network is Ethernet based. BACnet and Modbus protocols are used over TCP or RTU depending on location and need. The goal is to have all of this equipment data available on-line, with appropriate security measures in place for protection.

Building BAS is typically open-source Tritium-Niagara based. Recent installations have used Johnson Controls "Facility Explorer" version of this baseline equipment.

System PLC controls are typically open-source Koyo component based. Recent installations have used the Automation Direct version of these components for baseline equipment.

Within stations and facilities, WMATA designed or built control panels that feature Human-Machine Interface (HMI) devices to integrate data from the system, and communicate with the central network.

.5 **Structural:**

1.2.5.1 WMATA's structural assets consist of mainly above/below grade stations, tunnels, bridges, service buildings at rail yards, Bus garages, parking garages, aerial structures and wayside buildings (traction power/tie- breaker rooms).

.1 ASSET TYPE: STATIONS - there are 86 91 stations in the WMATA system of which 47 stations are underground. Underground stations are mainly cast-in-place concrete construction while above grade stations consist of cast in place concrete, prestressed concrete and post-tensioned concrete structures.

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- .2 TYPICAL PROBLEMS: 39 Above Grade Stations: deteriorated platform slabs, especially along platform edges; broken and delaminated tiles and granites; cracked and leaking platform canopies. 47 Underground Stations: Leaks, cracked and spalled concrete.
- .3 ASSET TYPE: TUNNELS - WMATA system is 106.3 117 miles of which approximately 51.5 miles are underground. Tunnel structures consist of cast in place concrete, bolted steel liners, pre-cast segmental liners, and shotcrete rock liners.
- .4 TYPICAL PROBLEMS: Cracked and spalled concrete tunnels; corroded rebars, steel elements, stray current and tunnel leaks.
- .5 ASSET TYPE: AERIAL STRUCTURES There are 15 Aerial structures in the WMATA system. The Aerial structures consist of approximately 1300 1400 spans and in total are 9.22 12 miles. Aerial structure consist of steel plate girders with concrete decks, steel box girders with concrete decks, post tensioned cast-in-place concrete box girders, precast concrete segmental girders, and precast AASHTO box girders.
- .6 TYPICAL PROBLEMS: Cracked and spalled concrete decks and pier caps, cracked concrete girders and piers; cracked steel pier caps, deteriorated and broken anchor bolts.
- .7 ASSET TYPE: YARDS/ANCILLARY/OTHER There are approximately 210 Rail service yards, bus garages, fan and vent shafts, traction power substations all underground facilities are cast-in-place concrete construction, while the above grade ones are mainly CMU walls with steel beam and joist roofs. Some of the shafts have steel stairs as emergency exits for the rail system.
- .8 TYPICAL PROBLEMS: Corroded hatch doors, frames and stairs; shaft roof, walls and conduits leaking, clogged drains.
- 1.2.5.9** ASSET TYPE: There are 97 traction power substations. Underground traction power substations are all cast-in-place concrete construction, while the above grade ones are mainly CMU walls with steel beam and joist roofs.
- 1.2.5.10 TYPICAL PROBLEMS: Underground Traction Power Substations have cracked concrete walls; ground water leaking through walls, especially along power cable conduits. Above Grade Traction Power Substations have cracked CMU/brick walls and roof leaks. Appropriate designs will be developed and implemented to resolve these issues.

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- 1.2.5.11 ASSET TYPE: There are 8 rail service yards in the WMATA system. These yards contain service and inspection facilities, field base facilities and other structures related to maintenance activities.
- 1.2.5.12 TYPICAL PROBLEMS: Leaking at basement walls, especially through power cable conduits; deteriorated floor slabs; corroded roof structures including steel beams, joists and metal decks at car wash areas.
- 1.2.5.13 ASSET TYPE: There are 11 Bus Garages in the WMATA system. Majority of these garages were rolled over from DC Transit System, Inc., and are older than 50 years. With the exception of two garages that were built by WMATA.
- 1.2.5.14 TYPICAL PROBLEMS: Cracked CMU/brick walls; deteriorated concrete floor slabs and beams, roof repairs/replacement.
- .9 ASSET TYPE: PARKING GARAGES - There are 22 of parking garages in the WMATA system. Majority of the garages consist of pre-cast concrete construction with few cast-in-place post-tensioned structures.
- .10 TYPICAL PROBLEMS: Cracked and spalled concrete slabs, beams and columns; corroded rebars and connections; failing joints; floor leaking and clogged drains, faulty expansion joints.

.3 **Description:**

The work effort is composed of providing professional and technical consulting services with qualified engineers . The services to be provided will include expertise in the full range of transit orientated architectural and engineering disciplines. Consistent with Section 5.2.2, final designs, reports, specifications, calculations, recommendations, studies, estimates and schedules must be approved by an architect or engineer registered in the jurisdiction where the work is to be performed. The GEC-FAC shall evaluate existing problem areas and develop a variety of solutions that describe the beneficial and any adverse effects that may result. All proposed solutions shall describe considerations for safety, technical superiority, life cycle properties, integration with existing system and be environmentally friendly.

.4 **Confidential Information:**

The GEC-FAC shall not divulge any confidential information which is acquired in the course of performing the work under this contract. In this respect, the

estimate of the cost of construction, based upon the approved designs, drawings and specifications thereof, shall constitute the Authority's estimate and, no information pertaining to such estimate or estimating shall be disclosed by the GEC-FAC, associates or employees, except to the extent permitted by the Contracting Officer.

.5 Relationship with Railroads. Private and Public Utilities and Agencies:

The GEC-FAC shall thoroughly coordinate with railroads, public and private utility companies, adjacent property owners and public agencies, as required. Initial contact with the affected utility companies, owners and agencies shall be the responsibility of the GEC-FAC.

2 INFORMATION FURNISHED BY THE AUTHORITY:

.1 General Documents:

The Authority shall furnish the GEC-FAC with documents as guidelines for work to be performed under this contract. These documents present information relative to the work to be performed by the GEC-FAC. It is the responsibility of the GEC-FAC, however, to gather all data necessary for the performance of this contract and to develop complete and final documentation.

3 SCOPE OF SERVICES:

.1 General:

The GEC-FAC shall provide the professional and technical staff required to perform the tasks, at the times requested by the Authority, in the work locations designated in the succeeding paragraphs.

The GEC-FAC shall provide one senior professional engineer/architect and backup to be the point of contact and to work closely with the WMATA point of contact, approved by the Authority and not subject to change without the Authority's approval, to be assigned full time to work directly with the Authority's Assistant Chief Engineer. The Assistant Chief Engineer WMATA point of contact will be designated by the Contracting Officer as Contracting Officer Technical Representative (COTR). The individual will supplement the Authority's technical staff. The individual will serve as liaison between the consultancy and the Authority for larger all tasks requiring related matters, including assessing need for additional resources.

.2 Technical Direction:

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The work will be conducted under the general direction of the Contracting Officer. Specific individuals will be designated as COTR with authority as listed in Article 18 19 of the Special Provisions and as set forth in appointment letter(s), copy of which will be provided to the GEC-FAC.

During the prosecution of the work, the GEC-FAC shall maintain close liaison with the COTR, who will coordinate the work with the user Department and other offices. The GEC-FAC shall direct all requests, from user, offices and departments of the Authority, to the COTR for appropriate action. Program Management functions will also be the responsibility of the COTR.

.3 **Tasks to Be Performed:**

.1 The GEC-FAC shall provide professional technical services to a wide variety of new design and construction related tasks and maintenance, repair and renovation tasks requiring the full range of A/E Services including:

.1 Architectural, Structural, Civil and Mechanical and Specialty Projects

.1 Special Engineering and Architectural Studies

.2 Landscape Architecture

.3 Coatings, Thermal and Moisture Protection Design

.4 Structural Analysis and Design

.5 Geotechnical

.6 Civil Analysis and Design

.7 Grading and Foundation Design

.8 Pavement Design and Restoration

.9 Materials Assessment (Testing and Submittal Review)

.10 Storm Water Management

.11 Right-of-Way

.12 Utilities

.13 Environmental and Planning

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- .14 Mechanical
 - .15 Safety and Security
 - .16 Program and Project Management
 - .17 System Integration
 - .18 Noise and Vibration Investigations
 - .19 Alignment and Plan/Profile Studies
 - .20 Final Design and Contract Document Review
 - .21 Planning, EIS, and MIS studies
 - .22 Project and Program Management Support
 - .23 Engineering Support
 - .24 Elevator & Escalator Support
 - .25 Corrosion Control
 - .26 Electrical
 - .27 Safety and Security
 - .28 System Integration
 - .29 Final Design and Contract Document Review
 - .30 Support for Planning Projects
 - .31 Update Engineering Standards
- .2 The tasks will be differentiated essentially by urgency. Generally, the tasks can be classified into two categories:
- .1 Category I -Normal tasks are tasks which comprise the majority of the work effort. They are planned and prosecuted in accordance with established policy.

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- .2 Category II - Emergency tasks requiring immediate response and quick reaction. which require initiation of critical work effort based on oral guidance from the assigned CNTR or the respective alternate CNTR to be confirmed in writing as time permits. Category II tasks should rarely occur.
- .3 Additional Work Efforts: Because of the nature of the work, it may be necessary in unique situations for the GEC-FAC to obtain additional consultant support from specialty firms from time to time.
- .4 **Process for Issuing Task:**
 - .1 Tasks will be issued whenever the Authority's needs exceed the resources of the GEC-FAC's onsite representatives. Each task shall be initiated by WMATA transmitting a Scope of Service (SOS) to the GEC-FAC and requesting a cost proposal. The SOS will be developed under the direction of the COTR vetted through the GEC-FAC's onsite representative. This will insure both the Authority and the GEC-FAC have a thorough understanding of the SOS and will avoid delays caused when proposals are based on a SOS that is misunderstood and requires rework. SOS will be agreed upon prior to proposal submission.
 - .2 The GEC-FAC shall provide a cost proposal based upon the transmitted SOS. The GEC-FAC should propose solutions that take into consideration factors such as safety, economics, resources and new technologies that maintain or enhance the existing system's configuration. The GEC-FAC shall as appropriate recommend alternative solutions to the Authority for further discussion and possible implementation. The proposal shall identify the firm (prime or sub or combination thereof) who will perform the work, the labor classifications, the time each individual will spend on the task, rates for each individual, a schedule including identification of deliverables and all applicable interim and final milestones and completion date(s), overhead and profit rates, direct costs, and any other relevant cost information. Proposals shall be submitted within a reasonable two weeks of receipt of request, unless a different response time is indicated in the request, or as agreed to by COTR.
 - .3 The Authority will negotiate a fixed price task order if possible. Indefinite quantity with fixed fully loaded billing rates, and cost-plus-fixed-fee method may also be employed.
- .5 **Task Deliverables:**
 - .1 Will be defined in the SOS.

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.6 **Other Tasks:**

.1 The GEC-FAC shall participate in other tasks as required such as those listed below:

.1 Provide follow-up professional services as required by the Authority during warranty and construction phase.

4 **Quality Control Program:**

.1 The GEC-FAC shall develop and be responsible for executing a Quality Control (QC) Program for all Professional Services fully compliant with FTA guidelines. This program shall require internal reviews and checks by supervisors, and independent QC compliance checks by well qualified technical staff to confirm that acceptable quality is provided. The GEC-FAC shall be responsible for signing and sealing each drawing to attest the accuracy and completeness of its contents, and to show evidence of compliance with applicable jurisdictional codes. A Quality Assurance/Quality Control (QA/QC) plan shall be submitted to the Authority for approval.

.2 A part time Quality Control Manager and backup QC Manager shall be designated by the GEC-FAC. Professional Engineering registration in the District of Columbia, Maryland and Virginia is required for this position. The designated QC Manager and backup QC Manager are subject to the approval of the Contracting Officer. The backup QC Manager will only be used in the event the QC Manager is not available (sick, vacation, etc.).

{Do we want to add clause in for audit requirements by either GEC and or WMATA? - Tom Robinson}

5 **ADDITIONAL REQUIREMENTS:**

.1 **General Requirements:**

For all categories of professional services, the following items are required:

.1 All services shall be in accordance with the engineering instructions furnished by the Authority.

.2 Professional services shall consider employee and customer safety, life cycle costs, availability of resources, new technologies that maintain or enhance the existing system's configuration and that implementation will be accomplished in an operating system with minimal down time.

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- .3 The use of critical and strategic materials not otherwise restricted shall be limited to the minimum amounts required consistent with materials policies. Full consideration shall be given to the use of substitute materials.
- .4 Specified materials and methods shall comply with the most stringent environmental criteria as defined by Federal Regulations, State of Maryland, Commonwealth of Virginia, and District of Columbia.
- .5 All engineering manuals, specifications and other data furnished by the Authority, as designated by the Contracting Officer, shall be returned to the Authority at the completion of the contract.
- .6 After submission of the contract plans and specifications and the quantity surveys and cost estimates, the GEC-FAC shall make any corrections thereto as may be necessary.
- .7 All final estimates of cost shall be transmitted to the CO, in envelopes marked "FOR CO EYES ONLY".
- .8 All correspondence shall be referenced to the appropriate project number. Matters relating to the contract, change proposals, billings, etc., shall be addressed and sent, in duplicate to the Contracting Officer, and the CNTR Correspondence between the GEC-FAC and third parties; one copy each to the Contracting Officer and the CNTR.

.2 Specific Requirements:

- .1 For specific categories of GEC-FAC work the following items may be required and will be identified when the task order is approved:

.1 Representation:

During the term of this agreement, the GEC-FAC shall attend, or be represented at, meetings and conferences with officials of the Authority, governmental agencies or others interested in the work as may be directed by the Contracting Officer. All such meetings and conferences shall be made a matter of record. The GEC-FAC is responsible for preparing a memorandum stating the time and place of the meeting, the names and identification of those present, and a brief description of the matters discussed and the agreements reached. Memoranda shall be prepared immediately and mailed no more than ten days after the meeting, with two copies being sent to the CNTR.

.2 Certification:

The GEC-FAC shall furnish the Authority with a statement signed by the Professional Engineer or Architect whose signature appears on the contract completed drawings, certifying that the drawing and specifications conform to WMATA design criteria and standards and the jurisdictional regulations and ordinances. The person signing must be registered in the jurisdiction where the work is to be performed.

.3 Contract drawings and Specifications:

.1 Drawing types, format and sequence are described in WMATA's design criteria and WMATA's cad manual.

.4 Project Cost:

.1 Project Cost Control:

The GEC-FAC shall share the responsibility as required for design cost control with the Authority. Prior to the time of the project intermediate review submittal (70% completion of design), the GEC-FAC shall use the Authority's construction budget cost and schedule as guides in the preparation of the design.

.2 Quantity Survey:

Quantity surveys shall present separate quantities for each line item itemized for individual buildings, facilities and components thereof, as directed by the Contracting Officer. The quantity surveys shall be itemized in units of work, materials and equipment, together with the amounts of the same, in accordance with a breakdown approved by the Contracting Officer. Quantity surveys shall be in sufficient detail to permit proper review and shall not include lump sum items which cannot be readily analyzed. The quantity survey for each building shall also contain a list of the square foot areas by floors and cubages for the buildings, computed in accordance with procedures.

.3 Cost Estimates:

The quantity surveys shall be priced with unit costs for labor, materials and equipment, presented separately, currently prevailing in the vicinity of the project and reflecting anticipated labor conditions due to the other work in progress or contemplated in the near future. Pricing of quantity surveys shall include the pricing of square foot areas and cubage. The total amounts for

each line item or other directed project components and for the project as a whole shall be computed.

.4 Target Cost:

The GEC-FAC shall report to the Authority with regard to the approved Target Cost at (a) 70% completion of each project design or (b) at any time that the GEC-FAC considers that the approved Cost Target may be exceeded.

.1 In the event that changes to the basic design concept of the project are recommended by the GEC-FAC, these recommendations are to be accompanied by an analysis of their effect on the approved Target Cost.

.2 In the event that changes to the basic design concept are initiated by the Authority, the GEC-FAC shall promptly assess the effects of these changes on the approved Target Cost and report to the Authority.

.3 All other factors which significantly influence the estimated cost of the project, and which become apparent as design progresses, are to be fully documented and the Authority is to be kept well informed.

.4 If, upon completion of the design, the GEC-FAC's final estimate exceeds the current Target Cost and it is shown that the procedures described above have not been followed, the GEC-FAC shall redesign at no additional cost to the Authority the project or elements thereof, as directed by the Contracting Officer, to reduce the estimated project cost to the Target Cost level.

.5 Design Schedule:

The design schedule will be prepared by the Authority and issued with the task order. When determining the design schedule the Authority may request input from the consultant as to recourse availability but in general the schedule will be driven by Authority priorities.

.6 Utilities and Agencies:

.7 Approvals:

The GEC-FAC is responsible for coordination, treatment and design of all utilities or properties owned or controlled by utilities, agencies, or private concerns within the project limits.

.8 Review Submittal:

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.1 Project Design Review Submittals, unless otherwise required, shall be made for each separate project design contract, at approximately the conceptual, 70%, and 100% completion of design. The submittal is to include documentation verifying resolution of all comments related to the preceding review.

.2 **Reports, Calculations, Drawings and Specifications:**

Copies of reports, calculations and drawing and specification sets both paper and electronic shall be described in the task order. Electronic documents will be formatted as described in individual task orders. However, as a minimum electronic documents shall be in native format, portable document format (PDF) and rich text format (RTF).

.3 **Review Procedures:**

In general, the Authority will complete the review in approximately 21 working days, after which review comments in writing and on marked-up documents will be furnished to the GEC-FAC. The GEC-FAC will meet with the Authority to discuss the review comments. Within ten (10) days after the review conference, the GEC-FAC shall deliver minutes of the conference, responding to all comments.

.4 **Review Scope:**

Specifically, the review submittal shall include, but shall not be limited to, the following items:

- .1 Contract drawings in sufficient detail to define the design of all major elements, substantially complete and checked. Schedules of equipment and complete flow diagrams are to be included.
- .2 Design computations, substantially complete, indexed and checked.
- .3 Project specific specifications in draft form, but otherwise complete.
- .4 Statement of actions required of the Authority or by others which must be received to complete the design.
- .5 Comprehensive statement individually enumerating specific actions which are required by others to complement the design to enable construction to proceed on schedule, with particular attention to those items of construction indicated in the contract documents to be performed by others.

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- .6 A complete and well-organized construction schedule shall be submitted showing the consultant's analysis of a probable or technically feasible construction schedule. The schedule shall be prepared to a level of detail consistent with the level of design. A narrative shall accompany the schedule explaining principal assumptions, criteria and production rates upon which the schedule is based.
- .7 Engineering estimates of cost of construction on the unit price schedule forms.
- .1 The Authority's review shall be confined to assuring that all assigned tasks were addressed. This review shall not relieve the GEC-FAC of its responsibility for complete and accurate design services.
- .8 Final Delivery of Contract Documents
 - .1 After the review comments have been incorporated, or otherwise resolved, the GEC-FAC shall complete and submit the original contract drawings to the Authority. The original full-size contract drawings shall be checked, bear the professional registration seal, and be signed and ready for reproduction. The original specifications, with the cover, shall be checked, bear the professional registration seals of the various disciplines responsible and ready for reproduction. See Section 5.2.4.8.2.
 - .1 The Authority owns all designs, computations, evaluations, investigation reports, and other professional documents and support data produced under this contract.
 - .2 The following additional items shall be included among the final contract documents to be submitted to the Authority:
 - .1 Engineer's final estimate of construction costs together with a copy of computations and back-up sheets in a sealed envelope marked "FOR CO EYES ONLY" and submitted to the CO.
 - .2 One original copy of all checked design computations, sealed by a Professional Engineer licensed in the local jurisdiction, indexed and bound. See Section 5.2.4.8.2.
 - .3 Construction planning schedule and related documents.
 - .4 Comprehensive statement individually enumerating specific actions which are required by others to complement the design to enable

construction to proceed on schedule. Particular attention is to be given to those items of construction indicated in the contract documents to be performed by others.

.9 **Continuation of Professional Services:**

.1 As stipulated in the General Provisions of the Architect-Engineer contract, the GEC-FAC shall provide follow-up engineering services as may be requested by the Authority during the construction phase of the work for which task orders may have been issued for construction services such as shop drawing review, inspection, etc.. Such services are required to correct errors or omissions in the contract documents, to make changes in the design as directed by revisions to the criteria or standards, to adopt the design to be consistent with modifications in the construction procedure, or for other reasons. Services required to make corrections because of errors or omissions on the original contract documents shall be provided at no extra cost to the Authority; services required for revisions or modifications may be considered to be governed by the provisions of the "Changes" article in the General Provisions of the Architect-Engineer Contract specifications.

6 REPORTING PROCEDURES:

.1 **Reports:**

.1 The GEC-FAC shall provide periodic reports to the Authority. The following reports are required:

.1 Task Order Status Report

.1 The GEC-FAC shall submit Status Reports on all task orders to the Authority monthly. The report shall be updated and contain current information. The report shall contain the following information:

.1 A chronological listing of task orders.

.2 The date the task order was received.

.3 The task order number.

.4 The engineer (s) assigned the task.

.5 The scheduled due date.

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- .6 Any revised due date.
- .7 The task order completion date.
- .8 The current status/ next action of the task.
- .9 The amount the task was issued proposed and settled upon for each task.

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