**6. ENGINEERING SYSTEMS REQUIREMENTS**

**G40 SITE ELECTRICAL UTILITIES**

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SYSTEMS REQUIREMENTS  
SITE ELECTRICAL UTILITIES TEMPLATE 09/22  
  
Instructions for using this template: There are template files for each UNIFORMAT Level 2 Group Elements. This template is for Group Element G40-SITE ELECTRICAL UTILITIES. Text such as this is hidden text that will not print when the hidden text box in "Print/Options" is unchecked.  
  
The Electrical Designer must edit this template for the requirements of the project and wherever brackets [ ] appear. Use UFC 3-501-01 when determining electrical system requirements.  
  
It is acceptable to place all required information in the main element (such as G4010) and delete the sub-elements provided in this template.  
  
The SYSTEMS REQUIREMENTS are intended to define items that are required throughout the facility or on a system wide basis. Delete all elements that are not required for the project. If additional elements or sub-elements are required for the project that do not appear in the template, refer to the NIST UNIFORMAT II publication for additional building element numbers and descriptions. The Uniformat II Work Breakdown Structure can be found at** [**www.wbdg.org/ndbm/**](http://www.wbdg.org/ndbm/) **. Coordinate with the PERFORMANCE TECHNICAL SPECIFICATION SECTION G40 (Section G40) to ensure that performance requirements are provided for all of the Building Elements listed here and that paragraph numbering matches.  
  
There may be rare occasions when prescriptive specifications may either be edited and included in Part 5 of the RFP or required in Section G40 to be edited by the Contractor's Designer of Record. In both cases, the Engineering Systems Requirements (ESR) must include references to these documents.  
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NOTE: Consider site electrical utilities relative to Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*and UFC 1-200-02, *High Performance and Sustainable Building Requirements*.  
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**SYSTEM DESCRIPTION**  
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NOTE: This specification is generally written around projects that will tap into existing telecommunications and medium voltage power systems. These systems may be overhead or underground. Generally the taps will be radial in nature but may require some switching and tie networks based on the existing system. It is not the intent of this ESR to provide extensive modifications, switching and circuiting to overhead and underground electrical systems. Provisions are included for simple networking but if major changes to the existing systems are required, this ESR and Section G40 will require extensive modifications.  
  
This specification assumes a project will utilize installation-owned utility systems. Should the utilities be owned by a non-installation entity, RFP Editor will need to coordinate with the utility owner for system requirements and make necessary modifications to this ESR and corresponding PTS G40.  
  
Address scope and ensure the system description clearly describes the existing system, designated connection points, and any other information needed for the Contractor to understand the existing system and how the new project will connect to it.   
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[Demolish the existing [ ] system [and provide a new [ ].]

The site electrical utility system consists of all power and telecommunications and fiber optic cabling from the existing distribution system point of connection including all connections, accessories and devices as necessary and required for a complete and usable system. This section covers installations up to within 5 feet (1.5 meters) of new (or existing) building location.

**GENERAL SYSTEM REQUIREMENTS**  
Provide an Electrical System complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable and proper installation. Install all equipment in accordance with PTS Section G40 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

Provide site electrical utilities systems and components that support project sustainability goals of Part 2 UFGS Section 01 33 29, *Sustainability Requirements and Reporting*.

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NOTE: Requirements for Government Furnished Equipment (GFE) are provided in ESR E10, *Equipment*.  
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**G4010 ELECTRICAL DISTRIBUTION**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Edit voltage characteristics to match voltages for the project. All medium voltage work will generally be exterior to the facility and will not extend into any buildings. If medium voltage is required inside a building, ESR D50 will require extensive editing.  
   
Coordinate with local activity utility branch to determine the closest point of connection for the electrical distribution. Preliminary load calculations will be required by the RFP writer for the activity to assure that the existing system will not be overloaded. A site plan and simple one line diagram will generally be required to direct the design builder and coordinate properly with the existing electrical power system if switching and or tie networks are involved.  
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Connect to the existing [ kV], [480Y/277 volt] [208Y/120 volt] [120/240 volt], [three] [single] phase, [four] [three] wire, [60] [50] Hertz electrical power system. The connection point must be [overhead] [underground] at [Pole xxx] [Manhole xxx] [ ] and extended to the project site [overhead] [underground in ductbank] to a [Unit Substation] [Pad Mounted Transformer] [SF6 Insulated Pad Mounted Interrupter Switchgear] [ ].

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NOTE: Provide available fault current when it is known. Use second option below for all other cases. Assuming an infinite bus will assure a conservative design but may result in connections of medium voltage equipment being oversized or inadequate for the conditions. Consult with the activity. When accurate data is not available, choose infinite bus.  
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The available fault current at the point of connection [is [ ]] [must be assumed to be an infinite bus.]

**G401002 TRANSFORMERS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Single-phase pad mounted transformers should be used only for small single phase projects such as individual residential services. Coordinate closely with mechanical design to be certain there are no three phase equipment requirements before using single phase equipment.  
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[Provide a [three phase] [single phase] pad mounted transformer[s] to feed the facility.]

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NOTE: Specify in the below list the basic design features that will be required for the project.  
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Provide the following features:

1. [Dead-Front Design with ANSI specific front plate spacing] [Live-Front Design]

2. [Radial feed switch] [Loop feed switch]

3. [Feed-thru inserts]

4. [Three surge arresters for radial feed circuits.] [[Three] [Six] surge arresters for loop feed circuits.]

5. [Biodegradable less-flammable liquid-insulated]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Pad mounted should be the preferred choice for most if not all installations. When overhead transformers are used, the service entrance should still be underground to the facility. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide [an] overhead pole mounted transformer[s] on pole[s] [ ] to feed the facility.]

**G401003 SWITCHES, CONTROLS AND DEVICES**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate with the activity and provide direction to design builder for locations and connections of switches or cabinets into the existing systems.  
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Provide [SF6 Insulated Pad Mounted Switchgear] [sectionalizing cabinets] configured with the existing overhead and or underground distribution system as follows: [ ].

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NOTE: Pole top switches, reclosers, and sectionalizers are network control devices and are typically not used. They may be required by the activity when tapping into a power grid.   
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[Provide [a] pole top switch[es] at [ ] configured with the existing overhead distribution system as follows: [ ].]

[Provide an automatic recloser switch at [ ] configured with the existing overhead distribution system as follows: [ ].]

[Provide an automatic sectionalizer switch at [ ] configured with the existing overhead distribution system as follows: [ ].]

**G401004 OVERHEAD ELECTRIC CONDUCTORS**

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NOTE: Overhead systems will generally be simple radial taps from existing distribution. Existing poles should be utilized to the extent possible.  
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[Provide a [three] [single] phase overhead pole line from [ ] to [the facility site] [ ] .]

**G401005 TOWERS, POLES, CROSSARMS AND INSULATORS**

[Provide [wood][concrete] [ ] poles for overhead power distribution.]

**G401006 UNDERGROUND ELECTRIC CONDUCTORS**

Provide a [medium voltage] [and] [a] [600 volt secondary] underground electrical power distribution systems to meet the connection requirements as indicated in paragraph G4010 "Electrical Distribution". Provide fused cut-outs on connections to overhead distribution systems.

**G401007 DUCTBANKS, MANHOLES, HANDHOLES AND RACEWAYS**

[Provide a system of concrete encased ductbanks, handholes and manholes for all underground power wiring.] [Provide a direct buried underground power distribution system.]

**G401008 GROUNDING SYSTEMS**

Provide a complete grounding system for the electrical power distribution system.

**G401009 METERING**

[Provide a separate Kilowatt Demand Meter for each [Pad Mounted Transformer] [Unit Substation].]

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NOTE: Coordinate with local activity for any specific energy management requirements. Coordinate this section with interior metering requirements in ESR D50.  
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[Provide each secondary switchgear with a separate digital circuit monitor/analyzer. Provide equipment with capabilities to connect to the existing [ ] monitoring system.]

**G401010 CATHODIC PROTECTION SYSTEMS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate with section A1020 Special Foundations. Retain this section if cathodic protection is retained in A1020 for use with sheet pile foundations. Delete if option is removed in A1020.   
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[Provide cathodic protection as noted in A1020 Special Foundations.]

**G401011 EQUIPMENT REQUIREMENTS FOR COASTAL AND HIGH HUMIDITY AREAS**

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NOTE: Determine if the location will require unique design features related to minimizing equipment degradation associated with premature rusting caused by exposure salt spray in coastal areas or high humidity. UFC 3-501-01 establishes design requirements. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide exterior equipment designed for coastal and high humidity areas.]

**G4020 SITE LIGHTING**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Site lighting refers to lighting typically installed on poles. Building mounted exterior lighting is covered in ESR D50. Provide lighting for safety, security and as required by the using activity. Refer to UFC 3-530-01, *Interior and Exterior Lighting Systems and Controls*for guidance on site lighting.  
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[Provide site lighting for [exterior], [special security], [ ] including [underground] [overhead] distribution, handholes, grounding, poles, fixtures and controls as required for a complete and usable system.

**G402001 EXTERIOR LIGHTING FIXTURES AND CONTROLS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Fill in bracket with description of areas or spaces requiring lighting. Utilize SSL lighting sources (e.g., LED) for exterior lighting, except where lighting is required to match an existing source.  
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[Multipurpose Field Lighting for Multipurpose Field and Outdoor Track]  
[Highway Lighting] for [ ]  
[Secondary Street Lighting] for [ ]  
[Residential Streets] for [ ]  
[Area and Parking Lighting] for [ ]

[Provide [LED] [induction][metal halide] type lighting fixtures, complete with lamps.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Include one of the following options based on owner preference. When first option is used, include times and dates for ON/OFF operation. Include contactor, time switch, photocell switch requirements as applicable.  
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[Provide an automatic lighting control system for exterior lighting fixtures utilizing lighting contactors, time switches, and photocell switches such that lighting will automatically turn "ON" at [ ] and turn "OFF" at [ ].]

[Provide lighting control for exterior lighting fixtures with individual photocell switches on each luminaire.]

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NOTE: Retain the following if Multipurpose Fields or Softball Fields are a component of this project.   
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[Provide [Multipurpose Field and Track multi-level lighting and controls] [Softball Field lighting controls] per FC 4-740-02N, Chapter 5.]

**G402002 SPECIAL SECURITY LIGHTING SYSTEMS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Confirm any special security lighting requirements and edit accordingly. Add fixture and control information.   
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[Provide special security lighting for [ ]].

**G402003 OTHER AREA LIGHTING**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: RFP writer shall confirm any other lighting requirements and edit accordingly. Add fixture and control information.   
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[Provide other area lighting for [ ]].

**G402004 LIGHTING POLES**

[Provide [concrete poles] [fiberglass poles] [wood] [aluminum] [steel] [ ] [direct set] [complete with foundations] for site lighting.]

**G402005 UNDERGROUND ELECTRIC CONDUCTORS**

[Provide a complete underground distribution system for all site lighting systems.]

**G402006 DUCTBANKS, MANHOLES AND HANDHOLES**

[Provide a direct buried underground system including conduits and handholes to meet the connection requirements indicated in paragraph G4020 "Site Lighting".]

**G402007 GROUNDING SYSTEMS**

Provide a complete grounding system for all site lighting systems.

**G4030 SITE COMMUNICATION AND SECURITY**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: This section is written around tapping into an existing site communications infrastructure and extending service to a new or renovated facility. It is not intended to be used as a tool to build or modify a telecommunications infrastructure system. If project scope includes such, this spec will require extensive modifications. Include only the bracketed items relevant to the project. Delete all others.  
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[Provide a site communication and security system including, but not necessarily limited to, [Voice and Data Telecommunications Systems,] [Cable Television (CATV) Systems,] [ ] including all conduit and wiring, underground structures, termination equipment, poles and structures, and grounding systems as required for a complete and usable system.]

**G403001 TELECOMMUNICATIONS SYSTEMS**

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NOTE: Coordinate with local activity Base Communication Officer to determine if exterior telecommunications is the responsibility of the Contractor or Government provided and edit the following accordingly. Connection point may be on an overhead pole but should typically be underground. Copper pairs and fiber counts will typically be determined by the RFP writer working with the BCO.** The ICS Infrastructure fiber optic cable will be terminated in the ICS equipment rack located in the Telecommunications Equipment Room.  
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[The connection point for the site telecommunications systems must be [overhead] [underground] at [Pole xxx] [Manhole xxx] and extended to the project site [overhead] [underground in a system of manholes and ductbank] [underground in direct buried in conduit] to the [telecommunications equipment room] [ ].]

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NOTE: ICS Infrastructure is typically 4-strand single-mode fiber optic cable. Only use multimode mode fiber optic cable if the existing fiber plant is multimode. Otherwise use single mode fiber optic cable. Use the first paragraph if the fiber optic cable is Contractor provided. Use the second paragraph if the fiber optic cable is Government provided.**

**If the ICS Infrastructure is provided separate from the Telecommunications System, identify the requirements for the ICS Infrastructure in G403010.  
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[Provide [ ] pair copper and [ ] strand [single] [multi] mode fiber optic cable between the connection point and building entrance facilities.]

[Provide [ ] empty [ ] inch ([ ] mm) conduits with pull strings for Government provided cable. [ ] will provide [ ] pair copper and [ ] strand [single] [multi] mode fiber optic cable into the building entrance facilities.]

**G403002 CABLE TV SYSTEMS (CATV)**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate with local activity Base Communication Officer to determine if exterior CATV is the responsibility of the Contractor or provided by local CATV provider and edit the following accordingly. Typically CATV cable should be provided by the local CATV company via customer provided conduits. Connection point may be on an overhead pole but should typically be underground.  
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[The connection point for the site CATV must be [overhead] [underground] at [Pole xxx] [Manhole xxx] and extended to the project site [overhead] [underground in ductbank] to the [telecommunications equipment room] [ ].]

[Provide [ ] empty [ ] inch ([ ] mm) conduits with pull strings between the exterior connection point and equipment room. [ ] will provide [ ] cable into the building entrance facilities.]

[Provide [ ] cable between connection point and building entrance facilities.]

**G403003 CABLES AND WIRING**

Cables and wiring for site telecommunications and security systems are required as stated in their respective categories.

**G403004 DUCTBANKS, MANHOLES AND HANDHOLES**

[Provide a system of ductbanks, manholes, and handholes for site telecommunications and security.] [Provide a direct buried system for site telecommunications and security.]

**G403005 TOWERS, POLES AND STANDS**

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NOTE: Site communications should typically be underground.  
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[Provide poles for site communications and security in accordance with paragraph G401005.]

**G403006 TV CAMERAS AND MONITORS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate exterior Closed Circuit Television (CCTV) surveillance systems requirements with the using activity. CCTV Systems are generally provided with empty raceways only. \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide a system of cable supporting structures, including empty conduits with pull strings, junction boxes, outlet boxes, outlet connectors, and cover plates for exterior TV and security camera system.]

[Provide camera outlets in the following locations: [ ].

**G403007 ELECTRONIC SECURITY SYSTEMS (ESS)**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate with the Base Security Officer for surveillance, alarm, and security connection requirements.  
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[Provide exterior ESS consisting of [ ] including all conduit and wiring, underground structures, termination equipment, as required for a complete and usable system.]]

**G403008 OTHER COMMUNICATION AND ALARM**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate with the Base Communication Officer for other communication and alarm requirements.  
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[Provide a [ ] including all conduit and wiring, underground structures, termination equipment, [poles and structures], as required for a complete and usable system.]

**G403009 GROUNDING SYSTEMS**

Provide a complete grounding system for all site communications and security systems.

**G403010 INDUSTRIAL CONTROL SYSTEMS (ICS)**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Only use this section if the ICS Infrastructure is separate from the base Telecommunications System. Coordinate with local activity Base Communication Officer and Public Works ICS Manager to determine if exterior telecommunications is the responsibility of the Contractor or Government provided and edit the following accordingly. Connection point will typically be underground. Fiber counts will typically be determined by the RFP writer working with the BCO. The ICS Infrastructure fiber optic cable will be terminated in the ICS equipment rack located in the Telecommunications Equipment Room.  
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[The connection point for the site ICS Infrastructure must be underground at [Manhole xxx][Pedestal xxx] and extended to the project site [underground in a system of manholes and ductbank] [underground in direct buried in conduit] to the telecommunications equipment room.

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NOTE: ICS Infrastructure is typically 4-strand single-mode fiber optic cable. Only use multimode mode fiber optic cable if the existing fiber plant is multimode. Otherwise use single mode fiber optic cable. Use the first paragraph if the fiber optic cable is Contractor provided. Use the second paragraph if the fiber optic cable is Government provided.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide [ ] strand [single][multi] mode fiber optic cable between the connection point and the telecommunications equipment room.]

[Provide [ ] empty [ ] inch ([ ] mm) conduits with pull strings for Government provided cable. [ ] will provide [ ] strand [single][multi] mode fiber optic cable into the telecommunications equipment room.] ]

**G4090 OTHER SITE ELECTRICAL UTILITIES**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate with the activity and determine any other site electrical utilities requirements.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide other site electrical utility systems consisting of [Solar Systems] [Wind Energy Systems] [ ] including all conduit and wiring, underground structures, termination equipment, and grounding systems as required for a complete and usable system.]

**G409007 PHOTOVOLTAIC ENERGY SYSTEM**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Consider ground mounted crystalline panel Photovoltaic Energy Systems for all buildings with clearance from shading, and site area availability.  
  
 Verify that a life cycle cost analysis (LCCA) has been performed per UFC 1-200-02, by planning or otherwise perform a LCCA before design start. Perform an analysis for your project using "PVWatts" at http://pvwatts.nrel.gov/. Locally verify and apply for incentives, where applicable. Incentives may be found at** [**www.dsireusa.org**](http://www.dsireusa.org) **. Purchased electrical utility rates may be found at** [**https://navyenergy.navfac.mil/duers/index.html**](https://navyenergy.navfac.navy.mil/duers/index.htm) **. EAR 16 Activity Detail Report contains the blended purchase price.   
  
Coordinate special requirements for metering with Activity and add appropriate information on existing and planned systems.  
  
Size Photovoltaic System, verify size specified will physically fit available space.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

Provide a [ground][pole][canopy] mounted, grid connected, photovoltaic energy system including crystalline photovoltaic panels, inverters, combiner boxes, and support systems. System inverters must have an output of [480Y/277v] [208Y/120v] [240/120v] [ ] and a minimum aggregate capacity of [ ]kw.

Design the system to achieve an estimated minimum average annual energy production of [ ] kilowatt-hours per year for the first 5 years of operation.

Provide KWH meters that are compatible to [the existing base AMI system][ ].

-- End of Section --