THOMAS EDISON NATIONAL HISTORICAL PARK
West Orange, NJ

Glenmont Estate Mansion
Intrusion Detection System

PMIS NO. EDIS – 315008

PROJECT SPECIFICATIONS

NATIONAL PARK SERVICE
REGION 1, NORTH ATLANTIC & APPALACIAN
HISTORIC ARCHITECTURE, CONSERVATION
AND ENGINEERING CENTER

October 22, 2024

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SECTION 011000 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. Project Title: Glenmont Estate Mansion
Intrusion Detection Systems

Park Alpha Code:	EDIS
PMIS Number:	315008
Park:	Thomas Edison National Historical Park
Project Location:	119 Park Way West Orange, NJ, 07052

1.2 DEFINITIONS

A. Owner: United States of America, Department of the Interior, National Park Service, hereinafter referred to as 'Government.'

B. Contracting Officer (CO) is the project representative possessing Contract authority for the Government:

1. Designation of Contracting Officer (CO) includes:

a. Contracting Officer's Representative (COR) is the person representing the Government on-site.
b. Any other designated person as selected by the Government.

2. Paramount authorities of CO and role and responsibilities of COR are contained within COR's Designation Letter, which will be provided at preconstruction meeting.

1.3 WORK COVERED BY CONTRACT DOCUCMENTS:

A. Work of this Project includes, but is not necessarily limited to all materials, program software, system programming, labor, equipment and supervision as indicated on drawings and specified herein for the following:

1. Furnish, install, program, test and demonstrate intrusion detection alarm systems in the Glenmont Estate Mansion.

B. Project will be constructed under a single prime contract.

C. Performance Period: 180 calendar days from 'Notice to Proceed'.

1. No Work shall commence until notice has been issued by Government.

D. Pre-Bid Walk-Through:

1. CO or COR will conduct a pre-bid walk-through on a date to be determined.
2. Contractor is strongly encouraged to attend the walk-through to become thoroughly familiar with existing conditions, to identify existing conditions and challenges that will affect proposed construction, and to fully understand the scope of work.

E. Existing Historic Property Information:

1. Project includes construction activities within buildings listed on the National Register of Historic Places. See Project Standards below.

F. Existing Hazardous Material Information:

1. No hazardous material is expected to be encountered in execution of Project. If hazardous material is encountered, Work shall stop in area of encounter.
2. Immediately notify CO of discovery and extents known. Operations in encounter area shall not commence until resolution by CO.
3. Note regarding Asbestos: Asbestos abatement was performed on the site in 1999/2000. An Asbestos Management Plan, dated February 2000 and prepared by Foster Wheeler Environmental Corporation, was developed to monitor the remaining ACM on site. Appendix A from this plan is available. Much of the remaining ACM on site has been encapsulated and is located in or around historic artifacts or in other locations where it is not considered a risk.
4. Note regarding Lead Paint – No test results are available, however, past experience indicates that appropriate precautions shall be taken. Assume that lead paint is present.

G. Buy American Act.

1. Project shall comply with Buy American Act for construction materials (FAR 52.225-9).

1.4 WORK TO BE PERFORMED BY OTHERS

A. The Government will perform the following:

1. The Government will perform limited cutting and patching of architectural finishes as indicated on drawings and specified under Section 017329 – Cutting and Patching.

1.5 CONTRACTOR'S USE OF SITE

A. Contractor shall have limited use of buildings and site for interior electrical work. Access shall be strictly supervised by Government and confined to areas as indicated on drawings or as approved by Government.

1. Take all necessary precautions to protect historic fabric, furnishings and finishes from damage as directed by CO.
2. Maintain public access to and within existing buildings. Do not close or obstruct entrances or egresses without expressed approval by Contracting Officer.

3. Maintain work areas within existing buildings in a weather tight condition throughout construction period and protect buildings and occupants from damage caused by construction operations during contract performance period.
4. Contractor shall maintain the facility in a secure condition during all work. Doors and windows shall remain lockable at the end of the work day.

B. Storage of Materials:
1. Storage of materials shall be confined to areas approved by Government.
2. Bring in no more than one week's worth of supplies.

C. Preservation of Natural Features:

1. Prevent damage to natural surroundings. Restore damaged areas, repairing or replacing damaged trees and plants, at no additional expense to the Government.
2. Provide temporary barriers to protect existing trees and plants and root zones.
3. Do not remove, injure, or destroy trees or other plants without prior approval. Consult with Contracting Officer and remove agreed-on roots and branches that interfere with construction.
4. Do not fasten ropes, cables, or guys to existing trees.
5. Carefully supervise excavating, grading, filling, and other construction operations near trees to prevent damage.

D. Driveways and Entrances. Contractor shall keep driveways and entrances serving the premises always open to Government employees and emergency vehicles.

1. Schedule deliveries to minimize use of driveways and entrances and to minimize space and time requirement for storage of materials and equipment on site.
2. Equipment and deliveries to the Laboratory Complex shall be made via the Lakeside Avenue gate. Parking is not permitted within the historic area.

1.6 SITE SECURITY MEASURES

A. National Park Service personnel will always maintain strict site security over site access.

B. The Contractor shall provide a list of all personnel who require access to the site.

C. The Park reserves the right to inspect all packages, containers, and personal carrying bags of persons entering or leaving the site.

1.7 PUBLIC USE OF SITE

A. Buildings and grounds within and immediately adjacent to project work areas will remain open to the public throughout the contract performance period.

B. At all times, conduct operations to ensure least inconvenience to the public. Building and/ or road closures may be permitted when required only upon specific approval of Government.

1.8 OCCUPANCY REQUIREMENTS FOR BUILDINGS

A. Government Occupancy. Government will occupy Building 35 and the buildings throughout the Laboratory Complex and the Glenmont Estate for ongoing administrative operations and visitor services throughout contract performance period.

B. Cooperate with Government during construction operations to minimize conflicts and facilitate Government usage. Perform the Work so as not to interfere with Government's day-to-day operations. Maintain existing exits, and security door and window locks unless otherwise indicated.

1.9 WORK RESTRICTIONS

A. Use of Premises: Comply with Park Rules and Regulations, as well as those enumerated in 36 CFR, Title 36, Volume 1, Chapter 1 - *Parks, Forests, and Public Property*.

B. On-Site Work Execution Hours: Limit Work on Park grounds and in existing buildings to the following normal business hours:

1. 8:00 a.m. to 4:30 p.m., Monday through Friday unless otherwise authorized by Park.

C. Glenmont Estate Operating Hours: Note that the estate is open to the public as follows:

1. Glenmont Estate Grounds - 11:30 a.m. to 5:00 p.m. Friday, Saturday, and Sunday.
2. Glenmont Mansion guided tours - 10:00 a.m. to 5:00 p.m., Friday, Saturday, and Sunday.
3. Days and Hours may be extended during the months of July and August.

D. Weekend Hours: By approval of COR on case-by-case basis. Request permission in writing three business days minimum in advance.

E. Holiday Hours: By approval of COR on case-by-case basis. Request authorization three business days in advance, minimum, in writing.

F. Existing Utilities

1. Existing Utilities: Notify Contracting Officer and utility companies of proposed locations and times for excavation.
2. Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, repair utility at no additional expense to the Government.
3. If damage occurs to an unknown utility, repair utility. An equitable adjustment will be made in accordance with the Changes clause of the contract.

G. Existing Utility Interruptions:

1. Do not interrupt utilities serving facilities occupied by Government or others unless permitted by Government and those authorities having jurisdiction, and then only after providing temporary utilities per requirements indicated.

2. Temporary interruptions to existing fire alarm and video surveillance systems shall be arranged in advance with Park personnel during normal work hours to prevent nuisance alarms.
3. Restore all systems to full operating condition at the end of each work day.

H. Noise, Vibration, and Odors:

1. Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Government occupancy with Government.

I. Smoking:

1. Smoking is only permitted in outdoor designated areas at the Glenmont Estate.

J. Eating and Drinking:

1. Eating and drinking is prohibited within all historic structures.
2. Food is permitted in Contractor's vehicles or in outside areas designated by the Contracting Officer.

1.10 SPECIAL CONSTRUCTION REQUIREMENTS FOR WORK IN HISTORIC STRUCTURES

A. Construction will be performed in historic structures and shall be performed in accordance with the following requirements:

1. Install devices and associated conduit and wiring to minimize disturbance to historic fabric and to minimize visual intrusion in public visitation areas. Historic preservation shall be taken into account throughout the project.
2. Use existing holes and openings to install conduit and cable. Drill or cut new holes only as a last resort. Coordinate size and locations of cut openings and drilled holes with Contracting Officer.
3. Coordinate cutting and patching of walls, ceilings, and foundations with Contracting Officer

B. Preservation of Artifacts and Historic Furnishings: Work shall occur in furnished buildings. Where possible to move items, Park personnel will move items if required. Where furniture or items are too large to relocate, Contractor shall protect items in place.

1. Contractor shall be responsible for the temporary protection of all existing artifacts and historic furnishings in areas affected by the work.
2. Temporary protection shall prevent dust, dirt and debris from entering.
3. Contracting Officer shall approve all methods of temporary protection.

C. Buildings will remain open during construction work.

D. Government personnel will be present at all times during work in the buildings.

1.11 FIELD VERIFICATION

A. Field verify all new and existing dimensions affecting the work of this contract before ordering products.

1.12 PROJECT STANDARDS

A. Historic Preservation. *The United States Secretary of the Interior's Standards for the Treatment of Historic Properties, Guidelines for Treatment of Cultural Landscapes*.

B. Accessibility. *ABAAS Accessibility Standard for Federal Facilities*, 2004.

C. William-Steiger Occupational Safety and Health Act (OSHA) of 1970, as amended, and modified to date.

D. Intrusion detection alarm system monitoring will be provided by the US Department of Homeland Security Federal Protective Service Mega Center under governmental inter-agency agreement. All systems and equipment installed under this contract shall be compatible with the US Department of Homeland Security FPS Mega Center Alarm Requirements (MAR).

PART 2 - PRODUCTS (Intentionally Not Used)

PART 3 - EXECUTION (Intentionally Not Used)

END OF SECTION 011100

SECTION 012700 - DEFINITION OF CONTRACT LINE ITEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This section briefly describes requirements under contract line items as listed on CONTRACT PRICE SCHEDULE (Form CPS-1) for Intrusion Detection Alarm Systems at Thomas Edison National Historical Park, Building 35, and the Glenmont Estate.

B. Intent of Section is to explain, in general, what is and what is not included in each Contract Line Item, and limits, areas, or cut-off points where one item ends and another begins.

C. If no Contract Line Item exists for a portion of the Work, include the costs in a related item.

1.2 RELATED DOCUMENTS

A. Documents related to the Work of this Section include, but are not limited to:

1. The Federal Acquisition Regulation (FAR)
2. Division 00**,** with attention directed to:

    a. NER NPS CONTRACT PRICE SCHEDULE (Form CPS-1).
    b. DIVISION 01 - all General Requirements Sections of this Project Manual

3. Divisions 02 through 33 - all Trade Sections of this Project Manual.
4. Project Drawings.

1.3 LIST OF CONTRACT LINE ITEMS – (BID ITEMS)

A. **Contract Line-Item No. 01, Base Bid:** Provide fire detection and alarm system throughout Washington’s Headquarters Museum & Visitor Center.

1. This item consists of the following:

    a. Furnish, install, program, test and demonstrate fire alarm and detection system with multiplexed, modular, microprocessor-based controls, main fire alarm control center with fire detection and alarm management software, initiation devices and notification appliances, voice evacuation system and communication links to perform monitoring, alarm, and control functions.
    b. Develop, install, program and test management software and hardware for main fire detection and alarm system control station, and perform tests for the complete and proper operation of systems involved.
    c. Provide separate point address for each initiating device so that device can be identified by exact device location. Exact device location shall be communicated by point address from the fire detection and alarm system control station to the central station.
    d. Complete Department of Homeland Security Federal Protective Service MegaCenter subscriber form with system information required for MegaCenter monitoring services.

- Intrusion detection system shall be monitored by the U.S. Department of Homeland Security FPS MegaCenter.
- Intrusion detection system shall be fully compatible with the U.S. Department of Homeland Security FPS MegaCenter central monitoring station interface standards.

2. Measurement for payment will be percentage complete on line item per scheduled value.
3. Payment will be made at the contract Lump Sum price.

B. **Contract Line-Item No. 01, Base Bid:** Provide fire detection and alarm system throughout Washington's Headquarters Ford Mansion.

1. This item consists of the following:

a. Furnish, install, program, test and demonstrate fire alarm and detection system with multiplexed, modular, microprocessor-based controls, main fire alarm control center with fire detection and alarm management software, initiation devices and notification appliances, voice evacuation system and communication links to perform monitoring, alarm, and control functions.
b. Develop, install, program and test management software and hardware for main fire detection and alarm system control station, and perform tests for the complete and proper operation of systems involved.
c. Provide separate point address for each initiating device so that device can be identified by exact device location. Exact device location shall be communicated by point address from the fire detection and alarm system control station to the central station.
d. Complete Department of Homeland Security Federal Protective Service MegaCenter subscriber form with system information required for MegaCenter monitoring services.
    - Intrusion detection system shall be monitored by the U.S. Department of Homeland Security FPS MegaCenter.
    - Intrusion detection system shall be fully compatible with the U.S. Department of Homeland Security FPS MegaCenter central monitoring station interface standards.

2. Measurement for payment will be percentage complete on line item per scheduled value.
3. Payment will be made at the contract Lump Sum price.

PART 2 - PRODUCTS (Intentionally Not Used)

PART 3 - EXECUTION (Intentionally Not Used)

END OF SECTION 012700

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Construction Coordination.
2. Requests for Information (RFIs).
3. Project meetings.

B. Related Requirements:

1. Section 013216 “Construction Schedule” for preparing and submitting Contractor’s construction schedule.
2. Section 017340 “Execution” for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 “Closeout Procedures” for coordinating closeout of the Contract.

1.2 CONSTRUCTION COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, which depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other Contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.
2. Preparation of the Schedule of Values.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Pre-installation conferences.
6. Project closeout activities.

D. Submit schedule with timing of work in advance for work in buildings and rooms containing fragile artifacts that need to be relocated or large items that need to be protected in place to ensure orderly progress of the Work.

1.3 SUBMITTALS

A. Division 01 documents: The following items shall be submitted a minimum of one week prior to the Preconstruction Conference. Contracting Officer will notify Contractor of tentative date for the Pre-Construction Conference.

1. Letter designating Project Superintendent.
2. Construction Schedule.
3. A comprehensive breakdown of the Schedule of Values.
4. A list of Subcontractors for this project.
5. Written statements from subcontractors certifying compliance with applicable labor standard clauses.
6. Satisfactory evidence of liability insurance coverage and workman’s compensation for the Contactor and all subcontractors.
7. Quality Control Plan.

B. All items listed must be provided to the Contracting Officer before the Pre-Construction Conference is held. If all of these documents have not been received one week prior to the scheduled Pre-Construction Conference date, the conference will be cancelled, Notice to Proceed will not be issued, and the Contracting Officer will consider other contractual remedies. Work shall not commence until written Notice to Proceed has been issued.

1.4 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI utilizing the form attached to Section 013323 “Submittal Procedures”.

1. CO will not respond to RFIs submitted by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in the work.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. RFI number, numbered sequentially.
2. Date.
3. RFI subject.
4. Specification Section number and title and related paragraphs, as appropriate.

5. Drawing number and detail references, as appropriate.
6. Field dimensions and conditions, as appropriate.
7. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
8. Contractor's signature.
9. Requested date for response.
10. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Form: Complete the RFI Form attached to Section 013323 “Submittal Procedures” as follows:

D. Contracting Officer’s Action: CO will review each RFI, determine action required, and respond. CO will determine the critical nature of each RFI and issue a response accordingly.

1. The following are not considered to be RFIs and will receive no action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. CO's action may include a request for additional information, in which case time for response will date from time of receipt of additional information.
3. CO's action on RFIs may result in the need for a change to the Contract Time or the Contract Sum. All contract changes will be processed following the terms and conditions of the contract.

1.5 PROJECT MEETINGS

A. Preconstruction Conference: Before start of construction, Contracting Officer will arrange an on-site meeting with Contractor. The meeting agenda will include the following as a minimum:

1. Roles & Responsibilities/ Lines of Authority.
2. Park rules and regulations.
3. Resolution of comments on required Division 01 documents.
4. Coordination of Subcontractors.
5. Modifications.
6. Payments to Contractor.
7. Contract time.
8. Notice to proceed.

9. Correspondence procedures.
10. Acceptance/rejection of work.
11. Progress meetings.
12. Submittal procedures.
13. As-constructed drawings/operation and maintenance (O&M) manuals.
14. Saturday, Sunday, holiday and night work.

B. Progress Meetings: The Contracting Officer will schedule weekly meetings with the Contractor.

1. Attendees: In addition to Government Representatives, each Contractor, Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. The meeting agenda will include the following:

    a. Approval of minutes of previous meetings.
    b. Submittal status.
    c. Requests for information (RFI) and other issues.
    d. Modifications.
    e. Work in progress and projected.
    f. Construction Schedule update.
    g. Status of Project Record Drawings and O&M manuals.
    h. Other business relating to work.

C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise CO of scheduled meeting dates.
2. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
3. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013216 – CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section consists of Construction Schedule requirements including but not limited to the following:

1. Schedule of Values
2. Construction Schedule Requirements.
3. Construction Schedule Updates.
4. Time Impact Analysis.

B. Purpose: The purpose of the Construction Schedule is to ensure adequate planning, coordination, scheduling, and reporting during execution of the work by the Contractor. The Construction Schedule will assist the Contractor and Contracting Officer in monitoring the progress of the work, evaluating proposed changes, and processing the Contractor's monthly progress payment.

1.2 SUBMITTALS

A. Schedule of Values: After contract award and before the Pre-Construction conference submit a schedule of dollar values based on the Contract Price Schedule.

B. Construction Baseline Schedule: After contract award and before the Pre-Construction conference, submit two paper copies of baseline schedule, large enough to show entire schedule for entire construction period.

C. Construction Schedule Updates: On or before the 7th day preceding the progress payment request date, submit estimates of the percent completion of each schedule activity and necessary supporting data. Provide two paper copies.

1.3 QUALITY ASSURANCE

A. The Contractor shall meet with the Contracting Officer on the day of the preconstruction conference to go over the following:

1. Review time required for review of submittals and re-submittals.
2. Review time required for completion and startup procedures.
3. Review and finalize list of construction activities to be included in schedule.
4. Review baseline schedule comments, resolve issues and progress on incorporating them
5. Review procedures for updating schedule.
6. Discuss reporting requirements and establish a protocol for naming and transmitting schedules.

1.4 COORDINATION

A. Coordinate Construction Baseline Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. In developing the Construction Baseline Schedule, ensure that the Subcontractor's work at all tiers, as well as the prime Contractor's work, is included and coordinated.
2. Secure time commitments for performing critical elements of the Work from parties involved.
3. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SCHEDULE OF VALUES

A. Breakdown each lump-sum item into component work activities used in the schedule, for which progress payments may be requested. The work activities broken out within the schedule of values shall be integrated into and made a logical part of the construction baseline schedule submitted under this specification. The total costs for the component work activities shall equal the contract price for that lump-sum item. The Contracting Officer may request data to verify accuracy of dollar values. Include mobilization, general condition costs, overhead and profit in the total dollar value of unit price items and in the component work activities for each lump-sum item. Do not include mobilization, general condition costs, overhead or profit as a separate item.

B. The total cost of all items shall equal the contract price. The Schedule of Values will form the basis for progress payments.

C. An acceptable Schedule of Values shall be agreed upon by the Contractor and Contracting Officer before the first progress payment is processed.

2.2 CONSTRUCTION SCHEDULE REQUIREMENTS

A. Construction Baseline Schedule: Prepare Construction Baseline Schedule using a computerized, resource-loaded**,** time-scaled CPM network analysis diagram for the Work.

1. Develop and finalize Construction Baseline Schedule so it can be accepted for use no later than 30 days after date established for the Notice of Award.

a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Governments acceptance of the schedule.

2. Establish procedures for monitoring and updating Construction Baseline Schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

B. Construction Baseline Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary CPM network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated duration, sequence requirements, and relationship of each activity in relation to other activities.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. The Construction Baseline Schedule as developed shall show the sequence and interdependence of activities required for complete performance of the work. Ensure all work sequences are logical and the Construction Baseline Schedule shows a coordinated plan of the work.
5. Resource loading of each activity shall include all personnel by labor category and equipment type and capacity proposed to complete the activity in the duration shown.
6. Consider seasonal weather conditions in planning and scheduling all work influenced by high and low ambient temperatures, wind, or precipitation to ensure completion of all work within the contract time.
7. Time Frame: Proposed duration assigned to each activity shall be the Contractor's best estimate of time required to complete the activity considering the scope and resources planned for the activity.

    a. An early finish date may be shown but the late finish date must be the same date as the last day of the contract period. An early completion schedule must contain the following:

        1) Insert an activity titled “Project Float” as a successor to the last activity in the early project completion schedule network.
        2) Add a milestone titled “Contract End Date” as a successor to the activity “Project Float”.
        3) Add duration to the activity “Project Float” as required so the milestone “Contract End Date” equals the last day of the Contract Period.

    b. Contract completion date shall not be changed by submission of a schedule that shows an early completion date.
    c. The Contractor shall limit use of lead or lag duration’s between schedule activities.
    d. Project Calendars: Develop and incorporate the following calendars:

        1) Administrative Calendar: Include a calendar that is based on a 7 day week to be used on any activities that are based on calendar days. Apply this calendar to administrative tasks or any other tasks that are not affected by non-working days (Federal Holidays, weather, etc.).

2) Project Calendar: Include a calendar that is based on the planned work week for the project. Include Federal Holidays, weekends, and any other non-work days indicated in the contract documents. Apply this calendar to activities which are not anticipated to be affected by weather.
3) Weather Calendar: Utilize the Project Calendar and show anticipated normal downtime related to weather as non-working time. Weather days shall be based on data for the local area from a reliable source like the National Oceanic and Atmospheric Administration (NOAA), National Park Service records, or source acceptable to the Contracting Officer. Apply this calendar to activities that are anticipated to be affected by weather.

e. Activity Duration: Define activities so no activity is longer than 15 days, except for non-construction activities including mobilization, shop drawings and submittals, fabrication and delivery of materials and equipment.
f. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 calendar days, as separate activities in the schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
g. Submittal Review Time: Include review and re-submittal times indicated. Coordinate submittal review times in Construction Baseline Schedule.
h. Startup and Testing Time: Include not less than five days for startup and testing.
i. Substantial Completion: Allow time for Government administrative procedures necessary for certification of Substantial Completion. (For more information, refer to Division 01 Specification 017700 Closeout Procedures.)

8. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
a. Work Restrictions: Show the effect of the following items on the schedule and provide schedule in advance so that the Government can adjust visitor operations if necessary, and move artifacts before work begins in a particular room or building:

1) The requirement to perform work in one building at a time. In larger buildings, the requirement to perform work in one room or on one floor at a time.
2) Limitations of continued occupancies.
3) Limitations of working in rooms or spaces containing fragile artifacts that need to be relocated or large items that need to be protected in place.
4) Uninterruptible services.
5) Use of premises restrictions.
6) Seasonal variations.
7) Coordination with existing construction.

b. Work Stages: Indicate important stages of construction for each major portion of the Work.

1) Subcontract awards.
2) Submittals.
3) Purchases.
4) Deliveries.
5) Installation.

6) Tests and inspections.
7) Adjusting.

9. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion.

C. Joint Review, Revision, and Acceptance:

1. Within seven calendar days of receipt of the Contractor's proposed Construction Baseline Schedule, the Contracting Officer and Contractor shall meet for joint review, correction, or adjustment of the initial Construction Baseline Schedule. Any areas which, in the opinion of the Contracting Officer, conflict with timely completion of the project shall be subject to revision by the Contractor.
2. Within seven calendar days after the joint review between the Contractor and Contracting Officer, the Contractor shall revise and resubmit the Construction Baseline Schedule in accordance with agreements reached during the joint review.
3. In the event the Contractor fails to define any element of work, activity, or logic, and the Contracting Officer review does not detect this omission or error, such omission or error, when discovered by the Contractor or Contracting Officer, shall be corrected by the Contractor within seven calendar days and shall not affect the contract period.
4. Upon acceptance of the Construction Baseline Schedule by the Contracting Officer, save the schedule as a baseline and update on a monthly basis. The construction schedule update will be used to evaluate the Contractor's monthly applications for payment based upon information developed at the monthly Construction Schedule update meeting.

D. Recovery Schedule: When periodic schedule update indicates the Work is 7 or more calendar days behind the current accepted schedule, a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule must also be submitted. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE UPDATES

A. Progress Meeting Updates: Provide updated schedule information before each weekly progress meeting.

1. Issue updated schedule concurrently with the report of each such meeting. Incorporate construction progress into the currently accepted schedule in a timely manner.

B. Monthly Schedule Updates:

1. General: Update the Construction Schedule on a monthly basis to reflect actual construction progress and activities throughout the entire contract period and until project substantial completion. The status date of each schedule update shall be the 7th day preceding the progress payment request date.

2. Procedure: The Contractor shall meet with the Contracting Officer each month at a Construction Schedule update meeting to review actual progress made through the status date of the Construction Schedule update, including dates activities were started and/or completed and the percentage of work completed on each activity started and/or completed.
3. Reports: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

    a. Identification of activities that have changed.
    b. Changes in early and late start dates.
    c. Changes in early and late finish dates.
    d. Changes in activity durations in workdays.
    e. Changes in the critical path.
    f. Changes in total float or slack time.
    g. Changes in the Contract Time.

4. Narrative: The report shall include a brief description of the actual progress made during the update period; actual and potential delaying activities; any impediments to progress; issues related to inclement weather; progress toward established milestones and project float. The report shall include a brief description of the work anticipated to be performed in the next month. Any minor revisions to the schedule should be identified so they can be evaluated and accepted or rejected.
5. As the Work progresses, indicate Actual Completion percentage for each activity.
6. If the schedule update shows a late finish date after the contract completion date, at a minimum, include the following in the narrative with your submission:

    a. Any known delays.
    b. Actions that will be taken to get back on schedule.
    c. Pending modifications.
    d. Impediments or constraints affecting progress.

7. Progress Payments: The monthly updating of the currently accepted Construction Schedule shall be an integral part of the process upon which progress payments will be made under this contract. If the Contractor fails to provide schedule updates or revisions, then a portion of the monthly payment may be retained until such corrections have been made.

C. Distribution: Distribute copies of accepted schedule to Contracting Officer, Contracting Officers Representative, Construction Management Representative, Subcontractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

D. Construction Schedule Revisions:

1. Required Revisions: If, as a result of the monthly schedule update, it appears the currently accepted Construction Schedule no longer represents the actual prosecution and progress of the work, the Contracting Officer will request, and the Contractor shall submit, a revision to the Construction Schedule. The Contractor may also request reasonable revisions to the currently accepted Construction Schedule in the event the Contractor's planning for the work is revised. If the Contractor desires to make changes, the Contractor shall notify the Contracting Officer in writing, stating the reason for the proposed revision. Accepted revisions will be incorporated into the currently accepted Construction Schedule for the next monthly schedule update.
2. Procedure: If revision to the currently accepted Construction Schedule is contemplated, the Contractor or Contracting Officer shall so advise the other in writing at least seven calendar days prior to the next monthly schedule update meeting, describing the revision and reasons for the revision. Government-requested revisions will be presented in writing to the Contractor, who shall respond in writing within seven calendar days.
3. Reports: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

    a. Identification of activities that have changed.
    b. Changes in early and late start dates.
    c. Changes in early and late finish dates.
    d. Changes in activity durations in workdays.
    e. Changes in the critical path.
    f. Changes in total float or slack time.

END OF SECTION 013216

SECTION 013323 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other materials before and during construction.

1.2 RELATED DOCUMENTS

A. Documents related to the Work of this Section include, but are not limited to:

1. The Federal Acquisition Regulation (FAR)
2. Division 00**,** with attention directed to:

    a. NER NPS SUBMITTAL TRANSMITTAL (Form CM-16).
    b. NER NPS REQUEST FOR INFORMATION (RFI Form)
    c. DIVISION 01 - all General Requirements Sections of this Project Manual

3. DIVISIONS 02 through 49 – all Trade Sections of this Project Manual.
4. Project Drawings.

1.3 TRANSMISSION OF PROJECT SUBMITTALS AND REQUESTS FOR INFORMATION

A. Electronic Copies: Transmit all project Submittal documents and Requests for Information (RFIs) to COR in electronic format. The CO will notify the Contractor when original documents are required.

B. Material Samples: Deliver material samples with identifying transmittal form (CM-16) under separate cover as directed by COR.

1.4 DEFINITIONS

A. Action Submittals: Written and graphic information, and physical samples which require Government responsive action.

B. Informational Submittals: Written and graphic information, and physical samples that do not require Government responsive action.

C. Request for Information (RFI). Written request for technical clarification or review of impact on the project schedule or contract sum which require Government responsive action.

1.5 REQUESTS FOR INFORMATION (RFI)

A. Submit promptly to the CO and COR, Requests for information for items requiring technical clarification or review of impact on the project schedule or contract sum using the Request for Information form.

B. Each RFI shall be numbered and dated in order of their submission to the COR and shall indicate a date by when a response from the government is required.

1.6 SUBMITTAL AND APPROVAL PROCEDURES

A. All material submittals shall be transmitted using National Park Service form CM-16, dated 4/00 (A copy of the form is included at the end of this section.) No action will be taken on a submittal item unless accompanied by the transmittal form.

B. All Contractor requests for information (RFI) shall be transmitted in writing using the Request for information form. (A copy of the form is included at the end of this section.) Each RFI shall be numbered and dated in order of their submission to the COR and shall indicate a date by when a response from the government is required.

C. Forward submittals to COR at least 30 days before need for approval. Unless a different number is specified, submit four copies of each shop drawing, four copies of manufacturer's catalog sheets (cut sheets), four specimens of each sample, and four copies of all other submittals requested.

1. Shop Drawings: Include the following information with each copy of shop drawings:

    a. Date.
    b. Date of revisions (when applicable).
    c. Contractor's certification that shop drawing has been checked for compliance with contract documents.
    d. Details of fabrication, assembly and erection including connections and engagement to contiguous work.
    e. Materials used.
    f. All required dimensions.
    g. The term "by others" shall not be used. All work to be performed by others shall be identified by Contractor or subcontractor name, discipline, or trade.

2. Samples: Samples shall be large enough to illustrate clearly the functional characteristics and full range of color, texture, or pattern.
3. Manufacturers' Catalog Sheets: Submit only pertinent pages; mark each copy of standard printed data to identify specific products proposed for use.
4. Manufacturer's Installation Instructions: When contract documents require compliance with manufacturer's printed instructions, provide one complete set of instructions for COR and keep another complete set of instructions at the project site until substantial completion.

D. CO reserves the right to require submittals in addition to those called for in individual sections.

1. If the contractor intends on supplying materials that differ from the salient characteristics specified in the individual sections, then a submittal will be required.

E. Approved Equals:

1. For each item proposed as an "approved equal," submit supporting data, including:

a. Drawings and samples as appropriate.
b. Comparison of the characteristics of the proposed item with that specified.
c. Changes required in other elements of the work because of the substitution.
d. Name, address, and telephone number of vendor.
e. Manufacturer's literature regarding installation, operation, and maintenance, including schematics for electrical and hydraulic systems, lubrication requirements, and parts lists.

1.) Describe availability of maintenance service, and state source of replacement materials.

2. A request for approval constitutes a representation that Contractor:

a. Has investigated the proposed item and determined that it is equal or superior in all respects to that specified.
b. Will provide the same warranties for the proposed item as for the item specified.
c. Has determined that the proposed item is compatible with interfacing items.
Will coordinate the installation of an approved item and make all changes required in other elements of the work because of the substitution.
d. Waives all claims for additional expenses that may be incurred as a result of the substitution.

F. Coordinate all submittals and review them for legibility, accuracy, completeness, and compliance with contract requirements.

1. Forward submittals that are related to or affect one another as a package to facilitate coordinated review.
2. Each transmittal shall contain only data specific to that individual submittal.

G. Documents required in Division 1 are to be delivered under separate cover letter.

1. Do not use the CM-16 Transmittal form for these documents.

H. Submittal Identification:

1. COR will provide a project identification stamp which shall be applied by the Contractor.

a. Identification shall include the park name-package number, project title, contract number, and transmittal number.

2. All sets of shop drawings, manufacturer's catalog sheets, samples, and other documents submitted to the COR must have the identification information stamped on the submittal.

a. If the material is bound it will not be necessary to stamp every page, but clearly stamp the cover page with the identification stamp.

3. Identification information shall be applied to the bottom right margin on each page.

a. Identification information on samples shall be applied to the most readily visible area on the sample or on tags attached to sample.

I. Submittal Numbering:

1. Number each submittal consecutively.
2. For re-submittals use the original submittal number, plus a letter suffix beginning with A.
3. Additional re-submittals of the same item shall contain the original number with the next consecutive letter.

J. Contracting Officer's Representative (COR) Review:

1. Submittals will be returned disapproved without technical review if identification information is missing, not filled in, or if placed on the back of the submittal; an incorrect number or format of submittals is provided; the transmittal form is incorrectly filled out; submittals are not coordinated; or submittals do not show evidence of Contractor's approval.
2. Any work done or orders for materials or services placed before approval shall be at the Contractor's own risk.
3. After reviewing submittals, the COR will return one copy of form CM-16 and one copy of applicable (marked up) submittal sheets to the Contractor.

a. Shop drawing review notes will be returned on reproducible original shop drawing.
b. All other submitted items will be retained.
c. The Contractor is responsible for producing additional copies for his/her own use.

4. The returned submittal will be marked in one of three ways as defined below:

a. **APPROVED**: Acceptable with no corrections.
b. **APPROVED WITH NOTATIONS**:

1.) Minor corrections or clarifications required.
2.) All comments are clear, and no further review is required.
3.) The Contractor shall address all review comments when proceeding with work.

c. **DISAPPROVED - RESUBMIT**:

1.) Rejected as not in accordance with contract or requiring major corrections or clarifications.
2.) The COR will identify the reasons for disapproval.
3.) The Contractor shall revise and resubmit with changes clearly identified.

END OF SECTION 013323

SECTION 013523 - SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes establishing an effective accident prevention program and providing a safe environment for all personnel and visitors.

1.2 SUBMITTALS

A. Accident Prevention Plan: After contract award and before the Pre-Construction conference, submit for review, an Accident Prevention Plan. The Contracting Officer will review the proposed Plan. If the plan requires any revisions or corrections, the Contractor shall resubmit the Plan within 10 days. No progress payments will be made until the Plan is accepted.

1.3 QUALITY ASSURANCE

A. Comply with contract clauses entitled "Accident Prevention" and "Permits and Responsibilities". In case of conflicts between Federal, State, and local safety and health requirements, the most stringent shall apply. Equipment or tools not meeting OSHA requirements will not be allowed on the project sites. Failure to comply with the requirements of this section and related sections may result in suspension of work.

B. Qualifications of Employees:

1. All employees must be physically qualified and able to perform their assigned duties in a safe manner.
2. Do not allow employees to perform work whose ability or alertness is impaired because of prescription or illegal drug use, fatigue, illness, intoxication, or other conditions that may expose themselves or others to injury.
3. Operators of vehicles, hoisting equipment, and hazardous plant equipment shall be able to understand signs, signals, and operating instructions, and be fully capable of operating such equipment. Provide operating instructions for all equipment. Newly hired operators shall be individually tested by an experienced operator or supervisor to determine if they are capable of safely operating equipment.

1.4 ACCIDENT REPORTING

A. Reportable Accidents: A project reportable accident is defined as death, occupational disease, traumatic injury to employees or the public, fires, and property damage by accident in excess of $100. Notify Contracting Officer immediately in the event of a reportable accident. Within 7 days of a reportable accident, fill out and forward to Contracting Officer an Accident/Property Damage Report (Form CM-22). Form may be obtained from the Contracting Officer.

PART 2 - PRODUCTS

2.1 ACCIDENT PREVENTION PLAN

A. The Plan shall be written to comply with OSHA and project requirements (a generic plan is not acceptable) including but not limited to the following:

1. Name of responsible supervisor to carry out the program.
2. Weekly and monthly safety meetings.
3. First aid procedures.
4. Outline of each phase of the work, the hazards associated with each major phase, and the methods proposed to provide for property protection and safety of the public, National Park Service personnel, and Contractor's employees. Identify the work included under each phase.
5. Training, both initial and continuing.
6. Planning for possible emergency situations, such as floods, fires, cave-ins, slides, explosions, power outages, and wind storms. Such planning shall take into consideration the nature of construction, site conditions, and degree of exposure of persons and property.

2.2 FIRST AID FACILITIES

A. Provide adequate facilities for the number of employees and the hazards associated with the types of ongoing construction work at the site.

2.3 PERSONNEL PROTECTIVE EQUIPMENT

A. Meet requirements of applicable ANSI standards.

PART 3 - EXECUTION

3.1 EMERGENCY INSTRUCTIONS

A. Post telephone numbers and reporting instructions for ambulance, physician, hospital, fire department, and police in conspicuous locations at the work site.

3.2 FIRE AND LIFE SAFETY

A. Comply with the requirements of NFPA 241 (Standard for Safeguarding Construction, Alteration, and Demolition Operations).

B. Store hazardous materials in accordance with manufacturer’s and OSHA recommendations. Maintain readily available, on site, MSDS for each chemical.

1. Immediately report all spills of hazardous materials to the park.

2. Maintain a spill emergency response kit.

3.3 PROTECTIVE EQUIPMENT

A. Inspect personal protective equipment daily and maintain in a serviceable condition. Clean, sanitize, and repair personal items, as appropriate, before issuing them to another individual.

B. Inspect and maintain other protective equipment and devices before use and on a periodic basis to ensure safe operation.

3.4 SAFETY MEETINGS

A. As a minimum, conduct weekly 15-minute "toolbox" safety meetings. These meetings shall be conducted by a foreman or supervisor and attended by all construction personnel at the worksite.

B. Conduct monthly safety meetings for all levels of supervision. Meetings shall be attended by all contractors and subcontractors performing work on the site. Notify the Contracting Officer of meeting dates and times. These meetings shall be used to review the effectiveness of the Contractor's safety effort, to resolve current health and safety problems, to provide a forum for planning safe construction activities, and for updating the Accident Prevention Plan. The Contracting Officer will attend the meeting and enter the results of the meetings into the daily log.

3.5 HARD HATS AND PROTECTIVE EQUIPMENT AREAS

A. A hard hat area shall be designated by the Contractor. The hard hat area shall be posted by the Contractor in a manner satisfactory to the Contracting Officer.

B. It is the Contractor's responsibility to require all those working in the hard hat area of the site to wear hard hats and other necessary personal protective equipment at all times.

3.6 TRAINING

A. First Aid: Provide adequate training to an adequate number of personnel to ensure prompt and efficient first aid.

B. Hazardous Material: Train and instruct each employee exposed to hazardous material in safe and approved methods of handling and storage. Hazardous materials are defined as explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful substances that could cause death or injury.

END OF SECTION 013523

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements. The quality of all work shall be the responsibility of the Contractor.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with the Contract Document requirements.

C. See Divisions 02 through 33 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

A. Quality Assurance Services: Activities, actions, and procedures performed before and during execution of the work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after execution of the work to evaluate that actual products incorporated into the work and completed construction comply with requirements.

C. Preconstruction Testing: Tests and inspections that are performed specifically for the project before products and materials are incorporated into the work to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), a National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing, to establish product performance and compliance with industry standards.

E. Source Quality Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

F. Field Quality Control Testing: Tests and inspections that are performed on-site for installation of the work and for completed work.

G. Testing Agency or Laboratory: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Using a term such as “carpentry” does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter.” It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.

1.3 CONFLICTING REQUIREMENTS

A. Reference Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Contracting Officer for a decision before proceeding.

B. Minimum Quality Levels: The quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Contracting Officer for a decision before proceeding.

1.4 SUBMITTALS

A. Quality Control Plan:

1. After contract award and before the Pre-Construction conference, submit for approval a written Contractor Quality Control (CQC) plan.
2. If the plan requires any revisions or corrections, the Contractor shall resubmit the plan within 10 days.
3. The Government reserves the right to require changes in the plan during the contract period as necessary to obtain the quality specified.
4. No change in the approved plan may be made without written concurrence by the Contracting Officer.

B. Qualification Data: For testing agencies specified in “Quality Assurance” Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Contractor's Quality Control Daily Reports: Submit showing all inspections and tests on the first workday following the date covered by the report. Quality Control Supervisor shall utilize the forms attached at the end of this Section.

D. Test Reports

1. Test reports shall be completed by the person performing the test.
2. Submit Daily Test Information Sheets with Quality Control Daily Reports.
3. Submit failing test results and proposed remedial actions within four hours of noted deficiency.
4. Submit three copies of complete test results no later than one calendar day after the test was performed.

E. Accessibility Inspection Report:

1. Fill out the applicable sections of the Accessibility Inspection Report and attach to the Quality Control Daily Report.
2. Utilize the attached Accessibility Inspection form to document compliance with the Architectural Barriers Act Accessibility Standards (ABAAS).
3. Inspect at various stages of construction as needed to ensure the finished product meets the standards.
4. Submit report not later than one calendar day after the inspection was performed.

F. Off-Site Inspection Reports: Submit prior to shipment.

G. If the CQC plan and Quality Control Daily Reports are not submitted as specified, the Contracting Officer may retain all payments until such time a plan is accepted and implemented or may retain payments for work completed on days there are no Quality Control Daily Reports.

H. Permits, Licenses, and Certificates: For NPS records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the work.

1.5 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Contractors Quality Control Staff:

1. The Contractor's Quality Control Supervisor may also perform other duties.
2. The Contractor's designated Quality Control Supervisor shall be on the project site whenever contract work is in progress.
3. The Contractor's job supervisory staff may be used to assist the Quality Control Supervisor supplemented, as necessary, by additional certified testing technicians.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.6 QUALITY CONTROL

A. The Contractor is responsible for all testing and inspections. Inspect and test work as needed to ensure that the quality of materials, workmanship, construction, finish, and functional performance are following applicable specifications, drawings, and those required by the Building Code.

1. Engage a qualified testing agency to perform these quality-control services.
2. Submit the appropriate report, for each quality-control service.
3. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
4. The Contracting Officer may designate test locations.

B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

C. Re-testing/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with NPS and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Contracting Officer and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit 3 copies of the certified written report of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the work.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS

2.1 QUALITY CONTROL PLAN

A. The Quality Control Plan shall include:

1. A list of personnel responsible for quality control and assigned duties. Include each person's qualifications.
2. A copy of a letter of direction to the Contractor's Quality Control Supervisor outlining assigned duties.
3. Names, qualifications, and descriptions of laboratories to perform sampling and testing, and samples of proposed report forms.
4. Methods of performing, documenting, and enforcing quality control of all work.
5. Methods of monitoring and controlling environmental pollution and contamination as required by regulations and laws.

PART 3 - EXECUTION

3.1 OFF-SITE CONTROL

A. Items that are fabricated or assembled off-site shall be inspected for quality control at the place of fabrication.

3.2 ON-SITE CONTROL

A. Notification:

1. Notify the Contracting Officer at least 48 hours in advance of the preparatory phase meeting.
2. Notify the Contracting Officer at least 24 hours in advance of the initial and follow-up phases.

B. Preparatory Phase: Perform before beginning each feature of work.

1. Review control submittal requirements with personnel directly responsible for quality assurance and quantity control of the work. As a minimum, the Contractor's Quality Control Supervisor and the foreman responsible for the feature of work shall be in attendance.
2. Review all applicable specifications sections and drawings related to the feature of work.
3. Ensure that copies of all referenced standards related to sampling, testing, and execution for the feature of work are available on site.
4. Ensure that provisions have been made for field control testing.
5. Examine the work area to ensure that all preliminary work has been completed.
6. Verify all field dimensions and advise the Contracting Officer of discrepancies with contract documents.
7. Ensure that necessary equipment and materials are at the project site and that they comply with approved shop drawings and submittals.
8. Document all preparatory phase activities and discussions on the Contractor's Quality Control Daily Report.

C. Initial Phase:

1. As soon as work begins, inspect and test a representative portion of a particular feature of work for quality of workmanship.
2. Review control testing procedures to ensure compliance with contract requirements.
3. Document all initial phase activities and discussions on the Contractor's Quality Control Daily Report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

D. Follow-Up Phase: Inspect and test as work progresses to ensure compliance with contract requirements until completion of work.

E. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be required on the same feature of work for the following reasons:

1. Quality of on-going work is unacceptable.
2. Changes occur in the applicable quality control staff, on-site production supervision, or work crew.
3. Work on a particular feature of work is resumed after a substantial period of inactivity.

3.3 DOCUMENTATION

A. Maintain Quality Control Daily Reports, Daily Test Report Information Sheets, and Accessibility Inspection Reports (attached) of quality control activities and tests.

B. Quality Control Daily Reports may not be substituted for other written reports required under clauses of the contract, such as Disputes, Differing Site Conditions, or Changes.

3.4 ENFORCEMENT

A. The Contractor shall stop work on any item or feature pending satisfactory correction of any deficiency noted by the quality control staff or the Contracting Officer.

3.5 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Comply with the Contract Document requirements for Division 01 Section “Cutting and Patching.”

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum as required.

B. Water Service: Water from existing water system is available for use without metering and without payment of use charges.

C. Electric Power Service: Electric power from existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Environmental Protection: Provide environmental protection as required by authorities having jurisdiction and as indicated in the Contract Documents. Coordinate with requirements of the following:

1. Regulatory Requirements.
2. Indoor Air Quality (IAQ) Management.
3. Noise & Acoustics Management.
4. Environmental Management.
5. Construction Waste Management.

1.4 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before NPS acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices: Office trailers are not permitted for this project. Temporary Contractor space can be made available in Glenmont Garage located within the Glenmont Estate.

B. Storage and Fabrication Sheds: Sheds are not permitted for this project. Temporary Contractor storage space can be made available. Bring in no more than one week's worth of supplies.

C. Toilets: The contractor shall provide sufficiently lighted and ventilated toilet facilities in weatherproof, sight proof, handicap accessible, sturdy enclosures with privacy locks.

D. Project signs: Not permitted.

2.2 MATERIALS

A. Temporary materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

B. Safety Barrier Fence: Orange plastic fence, minimum height, 4 feet.

C. Barrier Tape: Yellow tape Imprinted with "CAUTION: CONSTRUCTION AREA", manufactured by Reef Industries, Inc., Houston, Texas, or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance and as directed by the Contracting Officer.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed.

3.2 TEMPORARY UTILITY INSTALLATION

A. Sanitary Facilities: Provide temporary toilets, and wash facilities for use by construction personnel.

1. Place in Park approved locations.
2. Maintain and clean toilet facilities at least weekly.
3. Completely remove sanitary facilities on completion of work.

B. Electric Power Service: Use of existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to the NPS.

1. When temporary connections are removed, restore existing utility services to their original condition.

C. Telecommunications Services: No telephone or internet service is available on site for Contractor's use.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Cleaning of Equipment: The Contractor shall ensure that prior to moving on to the Project Area, all equipment, is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Ensure that all equipment has been pressure washed and is free of exotic species prior to start-up of operations and moving of equipment to Project Area. Equipment shall be considered free of soil, seeds, and other debris when a visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools are not required.

3.4 SUPPORT FACILITIES

A. Parking: Use designated areas of existing parking areas for construction personnel.

B. Existing Stair Usage: Use of existing stairs will be permitted, as long as stairs are cleaned and maintained in a condition acceptable to Contracting Officer. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If, despite such protection, stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period.

END OF SECTION 015000

SECTION 016700 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and environmental requirements.

1.2 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Contractor is encouraged to obtain materials in biodegradable or recyclable/reusable packaging which uses the minimum amount of packaging possible.

C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
5. Protect stored products from damage and liquids from freezing.

1.5 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Government reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
   4. Where products are accompanied by the term "as selected," Contracting Officer will make selection.
   5. Where products are accompanied by the term "match sample," sample to be matched is Governments.
   6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

B. Product Selection Procedures:
   1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements or approved equal.
   2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements or approved equal.
   3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements or approved equal.
   4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements or approved equal.
   5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
   6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
   7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product, system, or approved equal.
   8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers, or approved equal. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Contracting Officers decision will be final on whether a proposed product matches.
    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Contracting Officer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions: Contracting Officer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Contracting Officer will return requests without action, except to record noncompliance with these requirements:
    1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
    2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    3. Evidence that proposed product provides specified warranty.
    4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.

PART 3 - EXECUTION

3.1 PROTECTION AFTER INSTALLATION

A. Provide adequate coverings as necessary to protect installed materials from damage resulting from natural elements, traffic, and subsequent construction. Remove when no longer needed.

END OF SECTION 016700

SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements and controls for cutting and patching in buildings that contain Historic Fabric. The cutting and patching requirements described herein are general in nature. Specific requirements and limitations applicable to particular work categories are specified elsewhere under individual Sections as described herein.

B. Definition: Cutting and patching work generally includes cutting or core drilling into existing construction to provide for installations or performance of other operations and to allow for inspections of concealed items and restoration and repair of disturbed surfaces and finishes.

1.2 SCOPE OF WORK:

A. The work of this section includes:

1. Cutting and core-drilling through masonry, concrete and rough framing members as required for installation of electrical systems and patching or reconstruction to match existing surrounding construction.

2. Under strict supervision by the Government, cutting through architectural finishes as required for installation of electrical systems, except work designated on drawings to be performed by Government.

1.3 WORK TO BE PERFORMED BY GOVERNMENT.

A. Temporary removals of floor boards, chase covers, trim and millwork items to allow for installation of electrical systems and reinstallations or reconstruction upon completion of the work of this contract.

B. Patching of plaster finishes upon completion of the work of this contract.

1.4 SUBMITTALS

A. Cutting and Patching Plan: Submit a Plan describing procedures at least **10** days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

B. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.

C. Products: List products to be used and entities that will perform the Work.

D. Dates: Indicate when cutting and patching will be performed.

E. Contracting Officer's: Obtain approval of cutting and patching plan before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.5 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 013100 – Project Management and Control.

B. Section 015000 – Temporary Facilities and Controls.

C. Division 26 –Electrical.

D. Division 28 - Electronic Safety and Security.

1.6 QUALITY ASSURANCE:

A. Intent and Visual Standards: Cutting and patching work shall be performed in a manner which creates the least possible physical disturbance of existing materials and finishes and results in a finished product which is concealed and as nearly invisible as possible, matching the appearance of parent materials or adjacent original construction.

B. Cutting and patching of exposed areas shall be performed under strict supervision by the COR. Do not cut and patch exposed construction in a manner that will, in the opinion of the COR, mar or distract from the aesthetic or historic qualities of the property or individual building components.

C. Dimensions related to cutting and patching work as indicated on drawings shall be construed as approximate and shall be adjusted in the field as required to insure proper, accurate matching and integration of new and existing work.

D. Contractor shall conduct all cutting and patching operations as per applicable legal requirements for removal, transport and disposal of the respective materials.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. All patching and reconstruction work shall be performed using materials, details and finishing techniques which match the original parent material or surrounding construction. Unless specifically indicated otherwise, the finished appearance of all patching and reconstruction work shall be identical to the original parent material or surrounding construction.

B. Substitute modern materials may be used only with written approval by the Contracting Officer.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Before cutting or core drilling existing surfaces, the Contractor shall examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. If unsafe or unsatisfactory conditions are encountered, the Contractor shall promptly notify the COR, and take corrective action before proceeding with the work.

B. Before proceeding with the work, the Contractor shall meet with all parties responsible for cutting and patching operations, including mechanical and electrical trades, and review quality standard requirements and procedures in order to resolve potential conflicts.

3.2 PREPARATION:

A. Contracting Officer's Approval. Before cutting or core drilling existing surfaces, the Contractor shall measure and mark all specific locations on the surfaces to be cut for review and approval by the COR. Markings shall be temporary, non-destructive and capable of being adjusted and removed without marring the existing finish.

B. After preliminary approval of the penetration location, the Contractor shall drill a pilot hole as directed by the COR to confirm the location on the opposite side of the wall. Cutting and core drilling shall NOT proceed without COR's specific approval in the field at each location.

3.3 PROTECTION:

A. The Contractor shall take specific precautions to protect and prevent damage to materials and surfaces to be cut or drilled, including bracing, shoring and utilization of templates or masks to dampen vibration and minimize soiling.

1. The Contractor shall take special precautions during cutting and core-drilling operations through finished surfaces. It is intended to the greatest possible extent, that existing finishes, adjacent to and surrounding surface penetrations, remain clean and otherwise undisturbed.

2. The Contractor shall protect all areas and surfaces surrounding and adjacent to cutting and patching work from damage. All damage resulting from the work of this Section shall be repaired by the Contractor as directed by the Contracting Officer at no additional cost to the Government.

B. The Contractor shall provide protection from adverse weather conditions for portions of the work that might be exposed during cutting and patching operations.

C. Items of historical interest, which are uncovered during cutting and patching operations, shall remain the property of the Government. Upon discovery of said items, the Contractor shall promptly notify the Contracting Officer and refrain from moving or altering such items until review by the Government.

3.4 PERFORMANCE:

A. General: Employ skilled workmen to perform cutting and patching.

B. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

C. Cut or core drill existing construction using methods least likely to damage existing construction and adjoining architectural finishes.

1. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, rather than hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill. Percussive drilling is not permitted.

D. Patching. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

1. Restore exposed finishes of patched areas in a manner that will eliminate evidence of patching and refinishing.

3.5 CLEAN-UP

A. Upon approval of patching work, the Contractor shall remove all tools, equipment, debris and temporary protections from the project site and leave the effected area in its original clean condition.

END OF SECTION 017329

SECTION 017340 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. General installation of products.
   2. Quantity Surveys.
   3. Progress cleaning.
   4. Starting and adjusting.
   5. Protection of installed construction.
   6. Correction of the Work.

1.2 SUBMITTALS

A. Quantity Surveys: Submit two copies showing quantities of work performed and actual construction completed and in place.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning Work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

   1. Examine roughing-in security and surveillance systems to verify actual locations of connections before equipment and fixture installation.
   2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
   3. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to the Contracting Officer in accordance with Division 01 Specification 013100 “Project Management and Coordination”.

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

E. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the Contracting Officer.

F. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

G. Quantity surveys: Shall be conducted, and the data derived from these surveys shall be used in computing the quantities of work performed and the actual construction completed and in place.

1. The Contractor shall conduct the original and final surveys and surveys for any periods for which progress payments are requested. All these surveys shall be conducted under the direction of a representative of the Contracting Officer, unless the Contracting Officer

waives this requirement in a specific instance. The Government shall make such computations as are necessary to determine the quantities of work performed or finally in place. The Contractor shall make the computations based on the surveys for any periods for which progress payments are requested.

2. Promptly upon completing a survey, the Contractor shall furnish the originals of all field notes and all other records relating to the survey or to the layout of the work to the Contracting Officer, who shall use them as necessary to determine the amount of progress payments. The Contractor shall retain copies of all such material furnished to the Contracting Officer.

3.4 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 3 days.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
3. Contractor shall provide progress cleaning that minimizes sources of food, water, and harborage available to pests.

D. Installed Work: Keep installed work clean. Clean installed equipment according to written instructions of manufacturer of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

1. Utilize non-toxic cleaning materials and methods.

    a. Comply with GS 37 for general purpose cleaning.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. Final Cleaning: At completion of Work, remove all remaining waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all exposed surfaces; leave Project clean and ready for occupancy.

3.5 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

3.7 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

END OF SECTION 017340

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Project Record Drawings.
2. Closeout Submittals.
3. Substantial Completion and Final Inspection.
4. Final Acceptance of the Work.
5. Warranties.
6. Final Acceptance of the work.

1.2 PROJECT RECORD DRAWINGS

A. Maintain one complete full-size set of contract drawings and one full-size set of vendor-supplied drawings. Clearly mark changes, deletions, and additions using National Park Service drafting standards to show actual construction conditions. Show additions in red, deletions in green and special instructions in blue.

B. Keep record drawings current. Make record drawings available to the Contracting Officer for inspection at the time of monthly progress payment requests. If project record drawings are not current, the Contracting Officer may retain an appropriate amount of the progress payment.

C. On completion of the total project, submit complete record drawings. Include all shop drawings, sketches, and additional drawings that are to be included in the final set, with clear instructions showing the location of these drawings.

1.3 CLOSEOUT SUBMITTALS

A. A list of closeout requirements has been attached at the end of the Division 1 specifications for your convenience. The intent is to provide an overall summary of requirements and not a comprehensive list. The terms and conditions of the contract still require you to satisfy the requirements of the individual specification sections regardless of what is shown on the list. Submit the following before requesting final inspection:

1. Submit specific warranties, guarantees, workmanship bonds, final certifications, and similar documents.
2. Submit Project Record Documents, operation and maintenance manuals, final completion construction digital images recorded on CD-R or DVD-R with index and descriptions, and similar final record information.

3. Posted Operating Instructions: As specified in the individual sections. Furnish operating instructions attached to or posted adjacent to equipment. Include wiring diagrams, control diagrams, control sequence, start-up, adjustment, operation, shutdown, safety precautions, procedures in the event of equipment failure, and other items of instruction recommended by the manufacturer.
4. Deliver spare parts, extra materials, and similar items to location designated by Contracting Officer. Label with manufacturer's name and model number where applicable.

    a. Special Tools: One set of special tools required to operate, adjust, dismantle, or repair equipment. Special tools are those not normally found in possession of mechanics or maintenance personnel.

5. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
6. Complete final cleaning requirements.
7. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
8. Instruct NPS personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videos.

1.4 SUBSTANTIAL COMPLETION AND FINAL INSPECTION

A. When project, or designated portion of project, is substantially complete, request in writing a final inspection. Upon receipt of written request that project is substantially complete, the Contracting Officer will proceed with inspection within 10 days of receipt of request or will advise the Contractor of items that prevent the project from being designated as substantially complete.

B. If, following final inspection, the work is determined to be substantially complete, Contracting Officer will prepare a Punch List to be corrected before final acceptance and issue a Letter of Substantial Completion. Contractor shall complete the work described on the Punch List within 30 calendar days, as weather permits. If the Contractor fails to complete the work within this time frame, the Contracting Officer may either replace or correct the work with an appropriate reduction in the contract price or charge for re-inspection costs in accordance with the Inspection of Construction clause of the contract.

C. If, following final inspection, the work is not determined to be substantially complete; Contracting Officer will notify Contractor in writing. After completing work, Contractor shall request a new final inspection. All re-inspection costs may be charged against the Contractor in accordance with the Inspection of Construction clause of the contract.

1.5 FINAL ACCEPTANCE OF THE WORK

A. After all deficiencies have been corrected, a Letter of Final Acceptance will be issued.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Contracting Officer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. See Division 01 Specification Section “Execution” for information on cleaning agents.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Remove tools, construction equipment, machinery, and surplus material from Project site.
d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.
e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
f. Sweep concrete floors broom clean in unoccupied spaces.
g. Vacuum carpet and similar soft surfaces, removing debris.
h. Remove labels that are not permanent.
i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

    1) Do not paint over "UL" and similar labels, including electrical nameplates.

j. Wipe surfaces of electrical equipment. Remove excess paint and and other foreign substances.
k. Leave Project clean and ready for occupancy.

C. Waste Disposal: Legally dispose of construction waste and debris off NPS property.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Manuals, General.
2. Emergency manuals.
3. Operation manuals.
4. Maintenance manuals.

B. See Divisions 02 through 49 Sections for additional operation and maintenance manual requirements for the Work in those Sections.

1.2 SUBMITTALS

A. Manual: Submit two copies of each manual in draft form at least 15 days before final inspection. Contracting Officer will return copy with comments within 30 days of receipt.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Contracting Officer.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
b. Enable inserted reviewer comments on draft submittals.

2. Correct or modify each manual to comply with Contracting Officers comments. Submit 4 copies of each corrected manual within 15 days of receipt of Contracting Officers comments.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain a title page, table of contents, and manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Project Title.
2. Location.
3. Park.
4. Contract Number.
5. Prime Contractor’s Name and Address.
6. Date of Substantial Completion.
7. Binder Volume number.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: White, commercial quality, hard back, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic window sleeve on front and spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. Cover Sheet: Identify each binder on front and spine, with the project title, location, park, contract number, prime contractor's name and address, date of substantial completion, and binder volume number. Insert cover sheet into clear plastic view pocket on front of binder. Insert sheet into clear plastic view pocket on spine with title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Data: Fill binders to no more than 75 percent of capacity. Punch holes shall not obscure any data. When the contents of a single tabbed section covers more than one item, provide colored paper sheets to separate the data for each item.

    a. Manufacturers' Data: Provide originals for color or copyrighted data. Black and white data may be originals or clean, good quality reproductions. Copies produced by facsimile transmission and sheets with stamps, such as submittal approval stamps, will not be acceptable. Include only sheets that apply to items installed; cross out inapplicable data.
    b. Vendor Furnished As-Built Drawings: Maximum 24-inch by 36-inch sheets with minimum character or lettering size of 1/8 inch. Reduced-size reproductions may be provided instead of full-size drawings if the reproductions are clear and legible. If reduced-size drawings are used, identify as "REDUCED SIZE" and provide graphic scales, if applicable.
    c. Custom Data: Data supplemented by drawings and schematics necessary to describe systems adequately.
    d. Equipment Data Sheet: Data, using form at the end of this section.
    e. Schedules: Schedules reflecting final, as-installed conditions.
    f. Data that is poorly reproduced or in any way illegible will be rejected.

3. Dividers: Divider sheets with Mylar reinforced edges and pre-printed numbered tabs aligned with numbers and title lines on index sheet. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
4. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.2 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for type of emergency, emergency instructions, and emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component for fire, power failure, and equipment failure.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of NPS operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include instructions on shutdown for each type of emergency, operating instructions for conditions outside normal operating limits, and required sequences for electric or electronic systems.

2.3 OPERATION AND MAINTENANCE MANUALS

A. Operation Requirements

1. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and equipment descriptions, operating standards, operating procedures, operating logs, wiring and control diagrams, and license requirements.
2. Descriptions: Include the following:

    a. Product name and model number.
    b. Manufacturer's name.
    c. Equipment identification with serial number of each component.
    d. Equipment function.
    e. Operating characteristics.
    f. Limiting conditions.

g. Complete nomenclature and number of replacement parts.

3. Operating Procedures: Include start-up, break-in, and control procedures; normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; and required sequences for electric or electronic systems.
4. Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

B. Maintenance Requirements for Systems and Equipment

1. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, and equipment data sheets as described below.
2. Source Information: List each system, subsystem, and piece of equipment included in the manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
3. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including maintenance instructions, drawings and diagrams for maintenance, nomenclature of parts and components, and recommended spare parts for each component part or piece of equipment:
4. Maintenance Procedures: Include test and inspection instructions, troubleshooting guide, disassembly instructions, and adjusting instructions, and demonstration and training videotape if available, that detail essential maintenance and environmental procedures.
5. Maintenance and Service Schedules: Include service requirements and separate schedules for preventive and routine maintenance and service with standard time allotment.
6. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
7. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.4 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in the manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Reordering information for specially manufactured products.

D. Environmental Requirements

1. Plastics.

a. Verify that plastic products to be incorporated into the Project are labeled in accordance with ASTM D1972. Where products are not labeled, provide product data indicating polymeric information in Operation and Maintenance Manual.

1) Type 1: Polyethylene Terephthalate (PET, PETE)
2) Type 2: High Density Polyethylene (HDPE).
3) Type 3: Vinyl (Polyvinyl Chloride or PVC).
4) Type 4: Low Density Polyethylene (LDPE).
5) Type 5: Polypropylene (PP).
6) Type 6: Polystyrene (PS).
7) Type 7: Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

E. Maintenance Procedures: Include manufacturer's written recommendations and inspection procedures, types of cleaning agents, methods of cleaning, schedule for cleaning and maintenance, and repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 GENERAL

A. At start of project, begin accumulating operation and maintenance data and initiate an index. Install and index all data in binders within 30 days after delivery of items. As custom written data and test results are produced, add them to the operation and maintenance data file.

B. A list of Operation and Maintenance requirements has been attached at the end of the division 01 specifications for your convenience. The intent is to provide an overall summary of requirements and not a comprehensive list. The terms and conditions of the contract still require

you to satisfy the requirements of the individual specification sections regardless of what is shown on the list.

C. Keep operation and maintenance data current. Make operation and maintenance binders available to the Contracting Officer for inspection at the time of monthly progress payment requests. If operation and maintenance binders are not current the Contracting Officer may retain an appropriate amount of the progress payment.

3.2 MANUAL PREPARATION

A. Manual Types

1. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by NPS operating personnel for types of emergencies indicated.
2. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
3. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

B. Manual Contents: Including but not limited to:

1. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
2. Custom Written Data: For data not in manufacturer's standard literature, provide text, drawings, and schematics specifically applicable to installed systems. Include step-by-step descriptions of operating procedures; identification of individual components and their functions; descriptions of how system components relate to one another and operate together to accomplish a common process or function; and sequence of operation for system control circuits. For seasonally operated systems, provide start-up and shutdown instructions.
3. Equipment Data Sheets: For each item of equipment included in the operation and maintenance data, provide an Equipment Data Sheet using the form at the end of this section. For equipment consisting of a driven machine and a driver (for example, a pump and a motor), the equipment data shall cover both the driven machine and the driver. For similar type equipment (for example, multiple exhaust fans of the same model and type), provide a single equipment data sheet with an attached schedule listing the individual equipment items
4. Vendor Furnished As-Built Drawings: Provide for each electrical system.

    a. Provide circuit schematic drawings. Identify each wire and terminal block number. Show terminal numbers on all devices. Show wires and devices remote from the control panel.

b. For each control panel, provide a general arrangement drawing showing location of each control component and terminal block on the panel front and interior. Include a materials list of all panel-mounted control components as well as field-installed control components remote from the panel, identifying components, manufacturer, model number, and initial set points or sensing ranges of devices where applicable.

C. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for instructing NPS personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Video recordings of live demonstration and training sessions.
4. Manufacturer-produced demonstration and training video recordings.

B. See Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.2 GENERAL REQUIRMENTS

A. A list of System Demonstration and Training requirements has been attached at the end of the division 01 specifications for your convenience. The intent is to provide an overall summary of requirements and not a comprehensive list. The terms and conditions of the contract still require you to satisfy the requirements of the individual specification sections regardless of what is shown on the list.

1.3 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. For each training session, the Contractor shall submit for approval a proposed outline of the subjects to be covered. The training shall not be conducted until the outline is approved.
2. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Manufacturer-Produced Demonstration and Training Video Recordings: Submit two copies of each DVD for all training sessions at least seven days prior to training module.

1. Label each DVD with the subject of the demonstration or training module, the instructor's name, and provide an index of the contents. The index shall list the start and end time of each subject.

C. Video Recordings of Live Demonstration and Training Sessions: Submit two copies of each DVD for all training sessions within seven days of end of each training module.

1. Label each DVD with the date of demonstration or training, the instructor's name, and provide an index of the contents. The index shall list the start and end time of each subject covered during the training session. The sequence of the training subjects shall follow the sequence listed in the approved training outline or as actually conducted

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Contracting Officer.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include system and equipment descriptions, operating standards, regulatory requirements, equipment function, operating characteristics, limiting conditions, and performance curves.
2. Documentation: Review emergency, operations, and maintenance manuals; Project Record Documents; identification systems; warranties and bonds; and maintenance service agreements.

3. Emergencies: Include instructions on shutdown procedures; operating instructions for conditions outside normal operating limits; instructions on meaning of warnings, trouble indications, and error messages; and required sequences for electric or electronic systems.
4. Operations: Include startup, control, and safety procedures; normal shutdown instructions; routine, normal, seasonal, and weekend operating instructions; operating procedures for emergencies and equipment failure; and required sequences for electric or electronic systems.
5. Troubleshooting: Include diagnostic instructions and test and inspection procedures.
6. Maintenance: Include inspection procedures, types of cleaning agents, methods of cleaning, procedures for preventive and routine maintenance, and instruction on use of special tools.
7. Repairs: Include diagnosis, repair, and disassembly instructions; instructions for identifying parts; and review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Contracting Officer for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct NPS personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with NPS through the Contracting Officer with at least seven days' advance notice.
2. Conduct training sessions after the equipment or system has been accepted and turned over to the Government. Coordinate with commissioning requirements.
3. Individual sections specify the duration of training required. If no duration is listed, provide training of sufficient duration to adequately cover the subjects.

3.2 VIDEO RECORDINGS OF LIVE DEMONSTRATION AND TRAINING SESSIONS

A. General: Engage a qualified commercial videographer to record demonstration and training sessions. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Video Format: Digital Video Disc (DVD).

C. Video Recording:

1. Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
2. Record all of the above sessions with high resolution equipment. Provide minimum 640 x 480 video resolution converted to format file acceptable to Government, with commercial-grade graphic label.
3. The instructor's voice shall be clearly audible and understandable on the DVD. Utilize a supplemental microphone worn by the instructor.
4. Film training session(s) in segments not to exceed 15 minutes.
    a. Produce segments to present a single significant piece of equipment per segment.
    b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

5. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
    a. Furnish additional portable lighting as required.

6. DVDs with poor video or audio quality will be rejected and the training recorded again.

D. Narration: Describe scenes on video recording by audio narration by microphone while session is being recorded or by dubbing audio narration off-site after training session. Include description of items being viewed.

E. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment

3.3 MANUFACTURER-PRODUCED DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 017900

SECTION 26 00 10 - GENERAL ELECTRICAL PROVISIONS

PART 1 GENERAL

1 .1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section and all other Division 26 Sections included herein.

1 .2 DESCRIPTION

A. This section includes basic requirements of a common or administrative nature that pertain to all electrical work.

1 .3 WORK INCLUDED

A. As specified and as shown, furnish, install, test, and place in satisfactory and successful operation all equipment, materials, devices, and necessary appurtenances to provide the following:

1. Provide new branch circuits and 20-ampere, 1-pole branch breakers, in existing panel, for feeds to new fire alarm control panels.
2. Provide raceways for fire alarm conductors were called for on the Drawings and/or as required by the fire alarm contractor/installer.

B. Work shall be completed as shown on the Drawings, as specified herein, and as required by job conditions.

1 .4 QUALITY ASSURANCE

A. Worker's Qualifications: All electrical work shall be performed by licensed electricians or under the direct supervision of a licensed electrician.

B. Codes and Regulations:

1. All work shall meet requirements of governing codes and regulations, NFPA 70, latest edition.
2. Advise the Contracting Officer of conflicting codes or conflicts between codes and drawings and specifications.
3. When the requirements of specifications or drawings are more stringent than the codes, regulations, or standards, the specifications or drawings shall prevail.
4. The electrical installation shall meet the requirements of NECA Standard of Installation, except where otherwise specified.

C. UL Listing:

1. All electrical materials and equipment shall meet requirements of the applicable standards of UL if UL standards exist for such materials and equipment.
2. The UL authorized listing mark is acceptable as evidence that the materials meet this requirement.

3. In lieu of UL authorized listing mark, the Contractor may submit independent proof satisfactory to the Contracting Officer that the materials meet the standards.

4. Materials and equipment shall be installed only for their intended operational purpose.

D. Standard Products: Provide only new electrical equipment of current standard design.

E. Finished Surfaces:

1. Finished surfaces of existing facilities that are marred, scratched, or damaged shall be refinished to match original condition.

2. Building surfaces that have been altered for the proper installation of electrical equipment shall be restored by skilled personnel of the trades involved at no additional expense to the Government.

F. Polychlorinated Biphenyl (PCB): Equipment containing PCB is not acceptable.

1 .5 INTENT OF CONSTRUCTION DRAWINGS

A. Electrical drawings do not attempt to show complete details of building construction that affect installation. Diagrams are schematic only and do not necessarily show physical arrangement of equipment. Refer to drawings of other trades for additional details which affect work.

B. Conduit, conductor, and ground connections are shown diagrammatically only. Layout does not necessarily show total number of conduits or conductors for circuits required and should not be used for obtaining quantities for linear runs of conduits or wires. Locations of indicated runs are not intended to show actual routing of conduits. Provide additional conduits and wire wherever needed to complete installation of specific equipment furnished.

C. Locations of outlets on drawings are approximate and may be distorted for clarity in representation.

D. Install electrical outlets and other equipment clear of and in proper relation to radiators, ducts, grilles, pipes, and other equipment, and items such as cabinets and counters.

E. Changes such as offsetting conduit runs, moving outlets, or other minor changes necessary to facilitate installation shall be made at no additional expense to the Government.

1 .6 COORDINATION OF WORK

A. Coordinate electrical work with the National Park Service operations and the work of various other trades that may be on site.

1 .7 SUBMITTALS

A. As specified in Section 013323 Submittal Procedures.

B. Submit manufacturer's literature for items listed below.

1. Panels and Circuit breakers.

2. Receptacles, safety switches and motor starters.

3. Lighting fixtures, light switches, and accessories.

4. Wire and cable

5. Conduit, raceway, and fittings

1.8 CLOSEOUT SUBMITTALS

A. As specified in Section 017700 Closeout Procedures.

B. Record Drawings.

1.9 PROJECT CLOSEOUT

A. As specified in Section 011770.

PART 2 PRODUCTS NOT USED.

PART 3 EXECUTION

3 .1 INSPECTION

A. Demonstrate that electrical work operates satisfactorily and in accordance with the requirements of the drawings and specifications. Before final inspection, remove the front covers on all panelboards and wire gutters. Replace covers after the final inspection is completed.

3 .2 TESTING

A. General:

1. Make all specified tests in the presence of the Contracting Officer’s Representative or other authorized representative.

2. Furnish all instruments and provide qualified personnel to perform all tests in accordance with the drawings and specifications.

3. Perform all tests at no additional expense to the Government.

4. Operate all electrical equipment within the ranges specified by manufacturer.

5. Correct defects revealed by the tests.

B. Balance Test: Test for proper load balance on the system and make adjustments as required.

C. Conductors: Prior to energizing and circuitry, test installed wires and cables to ensure that insulation resistance levels are adequate, test wires and cables for electrical continuity and for short-circuits.

D. Wiring devices: Ensure proper polarity of connections. Prior to energizing the system, test wiring devices in accordance with manufacturer's recommendations.

END OF SECTION 260010

SECTION 26 00 50 – BASIC MATERIALS & METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work of this section consists of general electrical materials and methods. Electrical materials that are a part of equipment specified under other sections shall meet the requirements of this section, unless part of larger factory assembled equipment.

1.2 SUBMITTALS

A. As specified in Section 01 33 23.

B. Submit manufacturer's literature for items listed below.

1. Transient Voltage Surge Protection
2. Wire and cable
3. Conduit, raceway, and fittings
4. Wiring devices
5. Controls as required.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: All materials shall be provided by firms regularly engaged in the manufacture of products and systems required, whose products have been in satisfactory use in similar service for not less than 10 years old.

B. NFPA 70, latest edition for components and installation.

C. Provide products that are UL listed and labeled.

1.4 CLOSEOUT SUBMITTALS

A. As specified in Section 01 77 00.

B. Operation and maintenance data for review and approval as required by Section 01785

1. Operation and Maintenance Manuals for:
2. Product Data Sheets for:
    a. Luminaires, track and accessories
    b. Panelboards/Load Centers
    c. Wiring Devices

1.5 PROJECT CLOSEOUT

A. As specified in Section 011770.

PART 2 - PRODUCTS

2.1 RACEWAYS AND FITTINGS

A. Raceway Systems:

1. Rigid galvanized steel conduit (RGC), UL 6-93.
2. Electrical metallic tubing, (EMT), UL 797-93
3. Flexible nonmetallic tubing (ENT), UL 3-94
4. Flexible metal conduit (FC), UL 1-93
5. Liquidtight flexible steel conduit (LTFC), UL 360-94
6. Surface metal raceway and fittings, UL 5-90
7. Wireways, auxiliary gutters, and associated fittings, UL 870-91
8. Busways and associated fittings, ANSI/UL 857-90
9. Cellular metal floor raceways and fittings, ANSI/UL 209-92
10. Aluminum conduit, UL 6-93
11. Impregnated fiber conduit (heavy or thin wall), UL 543-87.
12. Schedule 40 and Schedule 80 rigid PVC conduit,UL 651-93.
13. Intermediate metal conduit (IMC), UL 1242-93

2.2 CONDUCTORS AND CABLE

A. Color Coding:

1. The secondary service and branch circuit conductors shall have the color insulation identified below:

a. Color code for single phase 120/240 volts ac:

1) Phase A: Black
2) Phase B: Red
3) Neutral: White
4) Ground: Green

b. Color code for three phase 120/208 volts ac:

1) Phase A: Black
2) Phase B: Red
3) Phase C: Blue
4) Neutral: White
5) Ground: green

c. Color code for three phase 277/480 volts ac:

1) Phase A: Brown
2) Phase B: Orange
3) Phase C: Yellow

4) Neutral: Grey
5) Ground: Green or Green with Yellow Stripe

B. Branch and Feeder Circuits:

1. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658. Conductors shall be solid for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.

2. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2.

3. Multi-conductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC with ground wire.

4. Minimum size shall be No. 12 AWG and otherwise meet requirements of NFPA 70, latest edition, or the sizes indicated in the specifications or drawings, whichever is larger.

5. Conductors shall be copper.

6. Copper clad and aluminum conductors are not acceptable.

C. Control Wire: No. 12 AWG copper conductor; 600-volt rated insulation.

2.3 OUTLET, PULL, AND JUNCTION BOXES

A. General: Provide one for each outlet, switch, receptacle, or combination, and each junction point. Boxes shall be as follows:

1. Metal Raceway Systems in Interior Dry Locations: Galvanized sheet metal.

2. Outdoor and Wet Locations: Weatherproof, cast metal, threaded hub.

3. Subject to Constant Moisture: Watertight.

2.4 WIRING DEVICES

A. Receptacles: UL 498-91 and NEMA WD-1-83. Terminals shall be suitable for copper conductors.

1. Duplex Receptacles: Thermosetting plastic, NEMA heavy duty 5-15R and 5-20R configurations, Specification grade with U-shaped grounding pole and a green-colored terminal for connection of a bonding jumper. Color shall be as approved by the Government.

2. Ground Fault Circuit Interrupter Receptacle (GFCI): Duplex 20-ampere with NEMA 5-20R configuration, UL 943-95, Class A, Specification grade. Receptacle shall have built-in surge and load noise suppression, with feed-through capability to protect branch circuit beyond GFCI receptacle against ground fault, and test and reset buttons. Indicator light shall glow only when tripped. Color shall be as approved by the Government.

B. Snap Switches: Specification grade, 15-ampere, 120/277 volts, ac rated, general use, quiet type, NEMA heavy duty, key operated where shown. Screw terminals sized for No. 10 AWG copper. Handle color shall be as approved by the Government.

C. Wireless Switches:

D. Device Plates and Covers: One-piece, with matching countersunk screws, as follows:

1. Indoor Finished Areas: Plastic, color (TBD) – selected by the Government from manufacturer's standard range of colors.

2. Indoor Exposed Raceway Systems: Stamped sheet metal, sized to match box without overlapping sharp edges. Color (TBD) – selected by the Government from manufacturer's standard range of colors.

3. Wet Locations: Gasketed and weatherproof, with spring covers for receptacles, lever operators for switches, and cast aluminum cover plates for junction boxes.

2.5 SURFACE METAL RACEWAY

A. General:

1. System: Provide surface raceway systems for branch circuit. Surface raceway system components necessary for a complete installation shall consist of the following:

   a. Components: Raceway bases, covers, fittings and device mounting plates.

2. Configuration: raceways shall be two-piece design with base and snap on cover. Raceway shall be 3/4" x 1-1/4". Provide raceways from a company that can provide custom sizes and can be cut-to-length in the field.

3. Fittings:

   a. Fittings shall include flat, internal and external elbows, couplings for joining raceway sections, wire clips, blank end fittings, and device mounting brackets and plates as applicable. Where required, provide tamper-resistant form, dividable with barriers and matching the size of the accompanying raceway base.

   b. Provide full-capacity corner elbows and tee fittings to maintain a controlled 2 inches (51 mm) cable bend radius, meeting the specification for Fiber Optic and UTP cabling and exceeding the TIA/EIA-569-A requirements for communications pathways.

4. Device Brackets and Plates: Provide in sizes to match the raceway width and with mounting holes located to ensure proper mounting of devices. Device plates shall be available in any length from 6 inches to 60 inches (152 mm to 1524 mm), with cutouts to accommodate various combinations of power and communications devices. Provide 6 inch and 12 inch (152 mm and 305 mm) long device plates with a flange to overlap the joint of adjacent cover as applicable.

B. Classification:

1. Compliance: Raceway and system components.

   a. UL and CUL listed.

   b. ETL and CETL listed.

2. Surface raceways shall be suitable for use in dry interior locations only, as covered in Article 386 of the National Electrical Code.

3. Surface metal raceways and fittings shall be listed by Underwriters Laboratories under File Number E4376, Listing and Classification Number RJBT and File Number E41751, Listing and Classification Number RJPR respectively.

4. Systems shall comply with UL Standard UL5 for Surface Metal Raceways.

C. Product Requirements: Surface metallic raceway for dry interior locations, conforming to National Electrical Code, Article 352, Part B.

1. Metal Components: UL listed, conforming to specifications of UL 5.

D. Surface Metallic Raceways:

1. Acceptable Product: V2400/V2400D Two-Piece Dual-Channel Metal Raceway by Wiremold.

2. Material: Galvanized steel, minimum thickness 0.040 inch (1 mm) thickness.

3. Finish: color (TBD) – selected by the Government from manufacturer's standard range of colors.

4. Finish: Factory-applied polyester topcoat applied over base suitable for field-applied topcoat.

5. Steel Device Brackets and Plates: Steel overlap device plate for horizontal installation of devices. Plate shall overlap cover to conceal seam.

6. Plastic Overlapping Cover Bracket and Faceplate: Plastic device mounting bracket and trim plate for horizontal installation of devices. Plate shall overlap cover to conceal seam. Faceplate shall accept a variety of power and data/communication devices. Plastic shall be compatible with UL 94 for Plastic.

E. Surface Metallic Raceways: Two-piece system of galvanized steel consisting of a base and snap-on cover.

1. Acceptable Product: Wiremold 2400 Series Two-Piece Metal Raceway by Wiremold.

a. Construction: 0.040 inch (1 mm) metal thickness; 1-7/8 inches (48 mm) wide by 7/8 inch (22 mm) deep; downward facing devices, bend radius control fittings.

b. Finish: color (TBD) – selected by the Government from manufacturer's standard range of colors.

F. Brackets and Faceplates:

1. Steel Device Brackets and Plates: Steel overlap device plate for horizontal installation of devices. Plate shall overlap cover to conceal seam.

G. Plastic Overlapping Cover Bracket and Faceplate: Plastic device mounting bracket and trim plate for horizontal installation of devices. Plate shall overlap cover to conceal seam. Faceplate shall accept a variety of power and data/communication devices. Plastic shall be compatible with UL 94 for Plastic.

2.6 PANELBOARDS

A. Panelboard shall be designed, manufactured, and tested to comply with the following standards

1. UL 67 – Standard for Panelboards

2. UL 50 – Enclosures for Electrical Equipment

3. NEMA PB 1 – Panelboards

4. NFPA 70 – National Electrical Code
5. Federal Specification W-P-115C Type I Class 1 – Circuit Breaker Panelboards
6. NFPA 5000, ASCE/SE17 Seismic Qualification.

B. Enclosures and Bus: As shown on the panelboard schedule. Complete with protective devices and enclosures, copper buses, ground and neutral bars, front covers with door and built-in lock. Protective devices shall be removable without disturbing adjacent units. Flush mounted panelboards shall have adjustable fronts with concealed trim clamps. Subpanel neutrals shall be insulated from their enclosures and grounds. Panelboards used as service entrance shall be UL listed as suitable for service entrance equipment.

C. Circuit Breakers: Thermal-magnetic, multi-pole breakers shall automatically open all poles when an overload occurs in any pole. External tie-handle construction where adjacent poles are on the same phase or leg will not be accepted. Tandem breakers are not acceptable. Branch circuit breakers used for switching duty shall be UL listed as SWD type. Ground fault circuit interrupter protection as required by NEC shall be provided by ground fault circuit interrupting breakers. Main breaker shall be 22,000AIR symmetrical at 240 volts ac. Branch circuit breakers shall have a minimum interrupting rating of 10,000 AIR symmetrical at 240 volts ac.

2.7 LOAD CENTERS

A. Load centers shall be UL Listed and designed, manufactured, and tested to comply with the following standards:

1. File E-6294
2. Federal Specification W-P-115c, Type 1, Class 2
3. Suitable for use as service entrance.
4. 75°C wire rating.

B. Short Circuit Current Rating: Main Circuit Breaker: 22,000 AIR

C. Interior:

1. Shielded, one-piece tin plated copper bus.
2. Removable interior with single, captive mounting screw.
3. Split branch neutral
4. Multiple mounting locations for equipment grounding bar: left, right and bottom.

2.8 TRANSIENT VOLTAGE PROTECTION VARISTOR

A. Suitable for use on system voltages up to 130 volts RMS. Rated transient energy for a 10x1000 microsecond pulse shall be a minimum of 50 joules. Peak rated current for an 8x20 microsecond pulse shall be 6,000 amperes. Maximum clamping voltage at 100 ampere 8x20 microsecond test pulse shall be 325 volts.

PART 3 - EXECUTION - NOT USED

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Grounding systems and equipment.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel 3/4 inch in diameter by 10 feet in length.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches below grade.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

3.4 LABELING

A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for instruction signs. The label or its text shall be green.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System: 10 ohms.

F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Contracting Officer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 26 43 13 - SURGE PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes field mounted SPDs for security system equipment.

1.2 DEFINITIONS

A. MCOV: Maximum continuous operating voltage.

B. Mode(s), also Modes of Protection: The pair of electrical connections where the VPR applies.

C. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.

D. OCPD: Overcurrent protective device.

E. SCCR: Short-circuit current rating.

F. SPD: Surge protective device.

G. VPR: Voltage protection rating.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Copy of UL Category Code VZCA certification, as a minimum, listing the tested values for VPRs, Inominal ratings, MCOVs, type designations, OCPD requirements, model numbers, system voltages, and modes of protection.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For SPDs to include in maintenance manuals.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to replace or replace SPDs that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL SPD REQUIREMENTS

A. SPD with Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

C. Comply with UL 1449.

D. MCOV of the SPD shall be the nominal system voltage.

2.2 SECURITY, DATA, and TELEPHONE SYSTEM SURGE PROTECTIVE DEVICES (SPDs)

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following.

1. Ditek
2. Siemens
3. Advanced Protection Technologies, Inc.
4. Surge Suppression Incorporated.

B. Power Surge Protection:

1. SPD shall be listed or recognized in accordance with UL 1449 Third Edition verifiable by visiting UL.com.
2. SPD shall provide surge current L-N or L-G mode of protection.
3. SPD shall be chase
4. Every mode of protection, shall be protected by internal overcurrent and thermal overtemperature controls.
5. SPD shall meet or exceed the following criteria:
    a. Minimum surge current capability (single pulse rated) per phase shall be:
        1) 120/240 Panel Application 50kA per phase
    b. UL 1449 3rd Edition listed Voltage Protection Ratings for shall not exceed the following:

VOLTAGE	L-N/L-G	MCOV
120V or 240/120V	600V	150V

6. SPD shall have a warranty for a period of two years, incorporating unlimited replacements of suppressor parts if they are destroyed by transients during the warranty period.

C. Telephone line protection

1. SPD shall be UL 497A suitable for compliance to UL 96A Lightning Protection Master Label.

2. SPD shall be solid state, silicon avalanche diode circuitry for protection from overvoltages on 2 or 4 wire signal lines such as balanced pair telephone, metallic pair telephone, buried and overhead field cable, remote radio equipment, and control systems. Unit shall have an external ground lug or wire. Connect ground lug or wire to protected equipment grounding system with a No. 12 green insulated stranded ground wire as short as possible.

a. Pins Protected: Pins 4, 5 on the RJ- 45 Interface; Pins 3, 4 on the RJ-11 Interface
b. Clamping Voltage: 310 Volts in 500 nsec
c. Surge Capacity: 1500 Watts for 1 msec;
d. Protection Mode: Common Mode Pins 4, 5 to shielding braid
Differential Mode Pins 4,5
e. Shall be listed to UL497A Telco Specification

2.3 ENCLOSURES

A. Indoor Enclosures: NEMA 250, Type 1.

B. Outdoor Enclosures: NEMA 250, Type 3R.

2.4 CONDUCTORS AND CABLES

A. Power Wiring: Same size as SPD leads, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Class 2 Control Cables: Multiconductor cable with copper conductors not smaller than **No. 18** AWG, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than **No. 14** AWG, complying with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install an OCPD or disconnect as required to comply with the UL listing of the SPD.

C. Install SPDs with conductors between suppressor and points of attachment as short and straight as possible, and adjust circuit-breaker positions to achieve shortest and straightest leads. Do not splice and extend SPD leads unless specifically permitted by manufacturer. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

D. Use crimped connectors and splices only. Wire nuts are unacceptable.

E. Wiring:

1. Power Wiring: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
2. Controls: Comply with wiring methods in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative.

1. Compare equipment nameplate data for compliance with Drawings and Specifications.
2. Inspect anchorage, alignment, grounding, and clearances.
3. Verify that electrical wiring installation complies with manufacturer's written installation requirements.

B. An SPD will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.3 STARTUP SERVICE

A. Complete startup checks according to manufacturer's written instructions.

B. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests, and reconnect them immediately after the testing is over.

C. Energize SPDs after power system has been energized, stabilized, and tested.

END OF SECTION 264313

SECTION 280513 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. UTP cabling.
2. RS-232 cabling.
3. RS-485 cabling.
4. Low-voltage control cabling.
5. Control-circuit conductors.
6. Identification products.

1.2 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. EMI: Electromagnetic interference.

C. IDC: Insulation displacement connector.

D. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

E. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).

F. RCDD: Registered Communications Distribution Designer.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

B. Source quality-control reports.

C. Field quality-control reports.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test each pair of UTP cable for open and short circuits.

1.6 FIELD CONDITIONS

A. Do not install conductors and cables that are wet, moisture damaged, or mold damaged.

1. Indications that wire and cables are wet or moisture damaged include, but are not limited to, discoloration and sagging of factory packing materials.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 BACKBOARDS

A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 48 inches.

2.3 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ADC.
2. AMP Netconnect; a brand of Tyco Electronics Corporation.
3. Belden Inc.
4. Berk-Tek; a Nexans company.
5. CommScope, Inc.
6. Draka Cableteq USA.
7. Genesis Cable Products; Honeywell International, Inc.
8. Mohawk; a division of Belden Networking, Inc.
9. Superior Essex Inc.
10. SYSTIMAX Solutions; a CommScope, Inc. brand.

11. 3M; Communication Markets Division.

B. Description: 100-ohm, four-pair UTP, covered with a blue thermoplastic jacket.

1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 6.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:

a. Communications, General Purpose: Type CM or CMG.
b. Multipurpose: Type MP or MPG.

2.4 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ADC.
2. American Technology Systems Industries, Inc.
3. AMP Netconnect; a brand of Tyco Electronics Corporation.
4. Belden Inc.
5. Dynacom Inc.
6. Hubbell Incorporated; Hubbell Premise Wiring.
7. Leviton Commercial Networks Division.
8. Molex Premise Networks; a division of Molex, Inc.
9. Panduit Corp.
10. Siemon.

B. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.

2.5 RS-232 CABLE

A. Standard Cable: NFPA 70, Type CM.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Polypropylene insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. PVC jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Plastic insulation.

3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. Plastic jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

2.6 RS-485 CABLE

A. Standard Cable: NFPA 70, Type CM.

1. Paired, 2 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

2.7 LOW-VOLTAGE CONTROL CABLE

A. Paired Cable: NFPA 70, Type CMG.

1. One pair, twisted, No. 16 AWG, stranded (19x29) and No. 18 AWG, stranded (19x30) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

2.8 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway.

B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway or power-limited cable, complying with UL 83, surface mounted or concealed in building finishes.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or TF, complying with UL 83.

2.9 IDENTIFICATION PRODUCTS

A. Manufacturers: Subject to compliance with requirements, [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Brady Worldwide, Inc.
2. HellermannTyton North America.

3. Kroy LLC.
4. Panduit Corp.

B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

C. Comply with requirements in Section 260553 "Identification for Electrical Systems."

2.10 SOURCE QUALITY CONTROL

A. Factory test UTP cables on reels according to TIA/EIA-568-B.1.

B. Factory test UTP cables according to TIA/EIA-568-B.2.

C. Cable will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for installation of supports for cables.

3.2 WIRING METHOD

A. Install wiring in metal pathways and wireways in unfinished spaces including basements, attics, mechanical and storage rooms, and similar spaces.

1. Minimum conduit size shall be trade size 1/2 . Control and data transmission not share conduit with other building wiring systems.
2. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."

B. Install cable, concealed in accessible ceilings, walls, and floors when possible.

C. Wiring within Equipment Enclosures:

1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
2. Install lacing bars and distribution spools.
3. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer.
4. Install conductors parallel with or at right angles to sides and back of enclosure.

5. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks.
6. Mark each terminal according to system's wiring diagrams.
7. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. Conductors: Size according to system manufacturer's written instructions unless otherwise indicated.

C. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
4. Cables shall not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
7. Cold-Weather Installation: Bring cable to room temperature before de-reeling. Heat lamps shall not be used for heating.
8. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

D. UTP Cable Installation: Install using techniques, practices, and methods that are consistent with Category 6 rating of components and that ensure Category 6 performance of completed and linked signal paths, end to end.

1. Comply with TIA/EIA-568-B.2.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.

3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

F. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA-569-B recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.

4. Separation between cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.

5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
6. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4 POWER AND CONTROL-CIRCUIT CONDUCTORS

A. 120-V Power Wiring: Install according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables" unless otherwise indicated.

B. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits, No. 14 AWG.
2. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm and signal circuits, No. 12 AWG.

3.5 CONNECTIONS

A. Comply with requirements in Section 281600 "Intrusion Detection" for connecting, terminating, and identifying wires and cables.

3.6 GROUNDING

A. For communications wiring, comply with J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. For low-voltage wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.7 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.8 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Visually inspect UTP cable jacket materials for NRTL certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

C. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.

D. End-to-end cabling will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

END OF SECTION 280513

NEW INTRUSION DETECTION SYSTEM
GLENMONT ESTATE MANSION

SECTION 281600 - INTRUSION DETECTION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Intrusion detection with multiplexed, modular, microprocessor-based controls, intrusion sensors and detection devices, and communication links to perform monitoring, alarm, and control functions for the following systems:
   a. Building Protection: Intrusion sensors including balanced magnetic switch door and window contacts, window shock/acoustic sensors with magnetic contacts, on-the-glass glassbreak/shock sensors, ceiling mounted glassbreak sensors, dual technology passive infrared and microwave motion sensors, interior alarm horn and strobe, and associated keypads.
   b. Asset Protection: Asset protection consisting of magnetic contacts for display cabinets.
   c. “Off Limits” boundary detection system consisting of motion sensor to detect movement of occupants beyond marked exhibit boundaries.
   d. Pendant Wireless and Permanently Installed Duress-Panic Switches to allow Park staff operator to covertly send a duress signal. Activating switch shall report duress alarm condition to the National Park Service Central Station to dial “911”.

B. Provide separate point address for each sensor so that it can be identified by exact location. Exact device location shall be communicated from the main alarm control panel to the central station.

C. Automatic dialers shall report alarm condition to the National Park Service alarm monitoring service provider - the U.S. Department of Homeland Security Federal Protective Service (FPS).

D. Provide main intrusion detection system control workstation with operating system, management software, programming of system, and printer.

E. Backup Cellular Dialer shall report alarm condition if regular phone service is not available.

F. Provide battery backup for intrusion detection systems: Minimum 48 hours.

G. System shall be fully compatible with the U.S. Department of Homeland Security FPS MegaCenter central monitoring station interface standards.

1.2 DEFINITIONS

A. LCD: Liquid-crystal display.

B. LED: Light-emitting diode.

C. PIR: Passive infrared.

D. RFI: Radio-frequency interference.

E. UPS: Uninterruptible power supply.

F. Control Unit: System component that monitors inputs and controls outputs through various circuits.

G. Master Control Unit: System component that accepts inputs from other control units and may also perform control-unit functions. The unit has limited capacity for the number of protected zones and is installed at an unattended location or at a location where it is not the attendant's primary function to monitor the security system.

H. Monitoring Station: Facility that receives signals and has personnel in attendance at all times to respond to signals. A central station is a monitoring station that is listed.

I. Protected or Protection Zone: A space or area for which an intrusion must be detected and uniquely identified, the sensor or group of sensors assigned to perform the detection, and any interface equipment between sensors and communication link to central-station control unit.

J. Standard Intruder: A person who weighs 190 lb or less and whose height is 72 inches or less; dressed in a long-sleeved shirt, slacks, and shoes.

K. Standard-Intruder Movement: Any movement, such as walking, running, crawling, rolling, or jumping, of a "standard intruder" in a protected zone.

L. Systems Integration: The bringing together of components of several systems containing interacting components to achieve indicated functional operation of combined systems.

M. Zone. A defined area within a protected premises. It is a space or area for which an intrusion must be detected and uniquely identified. The sensor or group of sensors must then be assigned to perform the detection, and any interface equipment between sensors and communication must link to master control unit.

1.3 ACTION SUBMITTALS

A. Product Data: Components for sensing, detecting, systems integration, and control, including dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: Detail assemblies of standard components that are custom assembled for specific application on this Project.

1. Functional Block Diagram: Show single-line interconnections between components including interconnections between components specified in this Section and those furnished under other Sections. Indicate methods used to achieve systems integration. Indicate control, signal, and data communication paths and identify networks and control interface devices and media to be used. Describe characteristics of network and other data communication lines.

    a. Describe methods used to protect against power outages and transient voltages including types and ratings of isolation and surge suppression devices used in data, communication, signal, control, and ac and dc power circuits.

2. Raceway Riser Diagrams: Detail raceway runs required for intrusion detection . Include designation of devices connected by raceway, raceway type and size, and type and size of wire and cable fill for each raceway run.
3. Battery: Sizing calculations.
4. Site and Floor Plans: Indicate final outlet and device locations, routing of raceways, and routing of cables both inside and outside the building. Include room layout for master control unit console, terminal cabinet, racks, and battery cabinet.
5. Master Control-Unit Console Layout.
6. Device Address List: Coordinate with final system programming.
7. System Wiring Diagrams: Include system diagrams unique to Project. Show connections for all devices, components, and auxiliary equipment. Include diagrams for equipment and for system with all terminals and interconnections identified.
8. Details of surge-protection devices and their installation.
9. Sensor detection patterns and adjustment ranges.

C. Equipment and System Operation Description: Include method of operation and supervision of each component and each type of circuit. Show sequence of operations for manually and automatically initiated system or equipment inputs. Description must cover this specific Project; manufacturer's standard descriptions for generic systems are not acceptable.

D. Intrusion Detection System Management Workstation Operation Description: Include features, operating procedures, and methods for entering and executing commands for system status changes and for displaying system status and command related data.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control test reports.

C. Warranty: Special warranty specified in this Section.

D. Other Information Submittals:

1. Test Plan and Schedule: Test plan defining all tests required to ensure that system meets technical, operational, and performance specifications within 60 days of date of Contract award.
2. Examination reports documenting inspections of substrates, areas, and conditions.
3. Anchor inspection reports documenting inspections of built-in and cast-in anchors.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For intrusion detection system to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. Data for each type of product, including features and operating sequences.

2. Documentation for intrusion detection system custom-programmed management software.
3. PC installation and operating documentation, manuals, and copy of custom-programmed software for the PC and all installed peripherals. Software shall include system restore, emergency boot diskettes, and drivers for all installed hardware. Provide separately for each PC. Copy of custom-programmed software shall include, but not be limited to all points, zones, partitions and floor plans.
4. Hard copies of manufacturer's specification sheets, operating specifications, design guides, user's guides for software and hardware, and PDF files on CD-ROM of the hard-copy submittal.
5. System installation and setup guides with data forms to plan and record options and setup decisions.

B. Complete Department of Homeland Security Federal Protective Service MegaCenter subscriber form prior to system testing with the following information:

1. Installer Information including Company name, address, phone number, technician's and service manager's contact information.
2. Alarm system information - Manufacturer, model number
3. Partition information.
4. Keypad information.
5. Floor plans and site plans.
6. Zone/Device list.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Intrusion Detection Devices: Furnish quantity equal to **five** percent of the number of units of each type installed, but no fewer than one of each type.

2. Fuses: Three of each kind and size.
3. Tool Kit: Provide six sets of tools for use with security fasteners, each packaged in a compartmented kit configured for easy handling and storage.
4. Security Fasteners: Furnish no fewer than 1 box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. An experienced intrusion detection equipment Installer who has completed work for installations similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
2. An employer of workers, at least one of whom is a technician certified by the National Burglar & Fire Alarm Association.
3. Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Control Units, Devices, and Communications with Monitoring Station: Listed and labeled by a qualified testing agency for compliance with SIA CP-01.

D. Comply with NFPA 70.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Workstations and Controllers:

1. Store in temperature- and humidity-controlled environment in original manufacturer's sealed containers. Maintain ambient temperature between 50 and 85 deg F (10 and 30 deg C), and not more than 80 percent relative humidity, noncondensing.
2. Open each container; verify contents against packing list; and file copy of packing list, complete with container identification, for inclusion in operation and maintenance data.
3. Mark packing list with the same designations assigned to materials and equipment for recording in the system labeling schedules that are generated by software specified in "Cable and Asset Management Software" Article.
4. Save original manufacturer's containers and packing materials and deliver as directed under provisions covering extra materials.

1.9 PROJECT CONDITIONS

A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:

1. Altitude: Sea level to 4000 feet.
2. Master Control Unit: Rated for continuous operation in an ambient of 60 to 85 deg F and a relative humidity of 20 to 80 percent, noncondensing.
3. Interior, Controlled Environment: System components, except central-station control unit, installed in temperature-controlled interior environments shall be rated for continuous operation in ambients of 36 to 122 deg F dry bulb and 20 to 90 percent relative humidity, noncondensing.
4. Interior, Uncontrolled Environment: System components installed in non-air-conditioned, non-temperature-controlled interior environments shall be rated for continuous operation in ambients of 0 to 122 deg F dry bulb and 20 to 90 percent relative humidity, noncondensing.
5. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambients of minus 30 to plus 122 deg F dry bulb and 20 to 90 percent relative humidity, condensing. Comply with UL 294 and UL 639 for outdoor-use equipment. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph and snow cover up to 24 inches.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Installer agree to repair or replace components of intrusion detection devices and equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

1.11 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Intrusion Detection Devices: Furnish quantity equal to five percent of the number of units of each type installed, but no fewer than one of each type.
2. Fuses: Three of each kind and size.
3. Tool Kit: Provide six sets of tools for use with security fasteners, each packaged in a compartmented kit configured for easy handling and storage.
4. Security Fasteners: Furnish no fewer than 1 box for every 50 boxes or fraction thereof, of each type and size of security fastener installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by Honeywell (Ademco), Bosch Security Systems (Radionics), Caddx, or Digital Monitoring Products (DMP).

2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

A. Supervision: System components shall be continuously monitored for normal, alarm, supervisory, and trouble conditions. Indicate deviations from normal conditions at any location in system. Indication includes identification of device or circuit in which deviation has occurred and whether deviation is an alarm or malfunction.

1. Alarm Signal: Announce signal at National Park Service central-station using automatic dialer and actuate audible and visual alarm devices.
2. Trouble Condition Signal: Distinct from other signals, indicating that system is not fully functional. Trouble signal shall indicate system problems such as battery failure, open or shorted transmission line conductors, or controller failure.
3. Supervisory Condition Signal: Distinct from other signals, indicating an abnormal condition as specified for the particular device or controller.

A. System Control: Master control unit shall directly monitor intrusion detection devices**,** and connecting wiring in a multiplexed distributed control system or as part of a network.

B. System shall automatically reboot program without error or loss of status or alarm data after any system disturbance.

C. Operator Commands:

1. Help with System Operation: Display all commands available to operator. Help command, followed by a specific command, shall produce a short explanation of the purpose, use, and system reaction to that command.
2. Acknowledge Alarm: To indicate that alarm message has been observed by operator.
3. Place Protected Zone in Access: Disable all intrusion-alarm circuits of a specific protected zone. Tamper circuits may not be disabled by operator.
4. Place Protected Zone in Secure: Activate all intrusion-alarm circuits of a protected zone.
5. Protected Zone Test: Initiate operational test of a specific protected zone.
6. System Test: Initiate system-wide operational test.

D. Response Time: Two seconds between actuation of any alarm and its indication at control unit.

E. Circuit Supervision: Supervise all signal and data transmission lines, links with other systems, and sensors from control unit. Indicate circuit and detection device faults with both protected zone and trouble signals, sound a distinctive audible tone, and illuminate an LED. Maximum permissible elapsed time between occurrence of a trouble condition and indication at control unit is 20 seconds. Initiate an alarm in response to opening, closing, shorting, or grounding of a signal or data transmission line.

F. Manual Secure-Access Control: Coded entries at manual keypad stations shall change status of associated protected zone between secure and access conditions.

2.3 SYSTEM COMPONENT REQUIREMENTS

A. Compatibility: Detection devices and their communication features, connecting wiring, and control unit shall be selected and configured with accessories for full compatibility with the Department of Homeland Security Federal Protective Service MegaCenter central monitoring station equipment. The MegaCenter will only accept UL commercially listed panels from Honeywell (Ademco), Bosch (Radionics), Caddx, and DMP.

B. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor entry connection to components.

1. Minimum Protection for Power Lines 120 V and More: Auxiliary panel suppressors."
2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Lines as recommended by manufacturer for type of line being protected.

C. Intrusion Detection Units: Listed and labeled by a qualified testing agency for compliance with UL 639.

D. Interference Protection: Components shall be unaffected by radiated RFI and electrical induction of 15 V/m over a frequency range of 10 to 10,000 MHz and conducted interference signals up to 0.25-V RMS injected into power supply lines at 10 to 10,000 MHz.

E. Tamper Protection: Tamper switches on detection devices, controllers, annunciators, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled and when entering conductors are cut or disconnected. Control unit alarm display shall identify tamper alarms and indicate locations.

F. Addressable Devices: Transmitter and receivers shall communicate unique device identification and status reports to master control unit and central station.

G. System shall be capable of being partitioned for independent arming/disarming of up to 10 individual buildings or areas of buildings.

2.4 ENCLOSURES

A. Interior Sensors: Enclosures that protect against dust, falling dirt, and dripping noncorrosive liquids.

B. Interior Electronics: NEMA 250, Type 12.

C. Exterior Electronics: NEMA 250, Type 4X, fiberglass or stainless steel.

D. Corrosion Resistant: NEMA 250, Type 4X, PVC or stainless steel.

E. Screw Covers: Where enclosures are readily accessible, secure with security fasteners of type appropriate for enclosure.

2.5 SECURE AND ACCESS DEVICES (KEYPADS)

A. Manufacturer: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. DMP - Digital Monitoring Products
2. Radionics - Bosch Security Systems, Inc.
3. Caddx.
4. Ademco - Honeywell International Inc.; Honeywell Security.

B. Keypad and Display Module: Arranged for entering and executing commands for system-status changes and for displaying system-status and command-related data.

2.6 RECESSED DOOR PLUNGER DOOR POSITION SWITCH

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. GE Sentrol.
2. DMP, Digital Monitoring Products.
3. Honeywell International, Inc.

B. Description: Wireless recessed pin plunger, complying with UL 634

1. Recessed Dowel Nominal Size: 0.75” Diameter.
2. Dowel Lid: 0.85” Diameter by 0.06 Thick.
3. Switch Enclosure: Flame retardant ABS plastic.
4. Encapsulated reed switch held in place by polyurethane potting material.
5. Transmit Frequency: 345MHz.
6. Power Source: Replaceable 3.0V lithium coin cell battery, CR1620.
7. Temperature Range: 10°F to 120°F (-12°C to 49°C).

8. Operating Humidity: Up yo 95% RH (max.) non-condensing.
9. Agency Listings:
   a. FCC
   b. ETL Listed: US (Tested to UL 634).
10. Colors: Natural or mahogany to match adjacent surfaces, as directed by the Contracting Officer.
11. Protection Class: IP62.

2.7 BALANCED MAGNETIC SWITCH - DOOR AND WINDOW CONTACTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol, Inc.
2. GE Security, Inc. Interlogix
3. Honeywell International, Inc.
4. Optex, Inc.

B. Description: Balanced-magnetic switch, complying with UL 634

1. Nominal size (switch and magnet): 2.56"L x 0.56"W x 0.50"D.
2. Switch shall be encapsulated in polyurethane potting compound to prevent moisture from entering the switch.
3. Encapsulated reed switches shall resist compromise from introduction of foreign magnetic fields.
4. 1-inch minimum standard gap distance to accommodate installation on loose fitting doors, and to prevent false alarms.
5. Colors: White, grey, or mahogany brown to match adjacent surfaces, as directed by the Contracting Officer.

C. Provide protective corrugated metal jacket for cables serving devices mounted on doors.

2.8 WIRELESS BALANCED MAGNETIC SWITCH - DOOR AND WINDOW CONTACTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol, Inc.
2. GE Security, Inc. Interlogix
3. Honeywell International, Inc.
4. Optex, Inc.

B. Description: Balanced-magnetic switch, complying with UL 634

1. Nominal size (cover with base): 3.20"L x 1.53"W x 1.02"D.
2. Switch shall be encapsulated in polyurethane potting compound to prevent moisture from entering the switch.
3. Encapsulated reed switches shall resist compromise from introduction of foreign magnetic fields.
4. Magnetic sensitivity of reed: 10 to 20 amp turns.
5. .38-inch minimum standard gap distance.
6. Lithium Battery: 3-volt Duracell DL123A
7. Standard battery life: 10 years.
8. Colors: White or brown to match adjacent surfaces, as directed by the Contracting Officer.

2.9 SHOCK ACOUSTIC SENSOR WITH MAGNETIC CONTACT

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol, Inc.
2. GE Security, Inc. Interlogix
3. Honeywell International, Inc.
4. Optex, Inc.

B. Description: Glassbreak sensor with built-in reed switch designed to detect breaking glass by forced entry by processing both acoustic and vibration information.

1. Nominal size: Sensor - 3.95"L x 1.25"W x 0.90"D; Magnet - 1.5"L x .375"W x .25"D.
2. Switch shall be encapsulated in polyurethane potting compound to prevent moisture from entering the switch.
3. Encapsulated reed switch shall resist compromise from introduction of foreign magnetic fields.
4. 3/4-inch minimum standard gap distance to accommodate installation on loose fitting doors, and to prevent false alarms.
5. Color: White.

C. Provide protective corrugated metal jacket for cables serving devices mounted on doors.

2.10 WIRELESS SHOCK ACOUSTIC SENSOR WITH MAGNETIC CONTACT

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol, Inc.
2. GE Security, Inc. Interlogix
3. Honeywell International, Inc.
4. Optex, Inc.

B. Description: Wireless glassbreak sensor with built-in reed switch designed to detect breaking glass by forced entry by processing both acoustic and vibration information.

1. Nominal size: Sensor - 3.95"L x 1.25"W x 0.90"D; Magnet - 1.5"L x .375"W x .25"D.
2. Switch shall be encapsulated in polyurethane potting compound to prevent moisture from entering the switch.
3. Encapsulated reed switch shall resist compromise from introduction of foreign magnetic fields.
4. 3/4-inch minimum standard gap distance to accommodate installation on loose fitting doors, and to prevent false alarms.
5. Color: White or mahogany to match adjacent surface as directed by Contracting Officer.

2.11 360-DEGREE CEILING-MOUNT PIR MOTION SENSOR WITH DUAL-OPTIC TECHNOLOGY

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. General Electric Company; GE-Interlogix Security, Inc.
2. Honeywell International Inc.; Honeywell Security.
3. Visonic Inc.

B. Description: Single unit combining two independent 180-degree fields of view providing 18 30-foot curtains.

1. Minimum Detection Pattern: 30-foot diameter with mounting height of 8 to 16 feet.

C. Dimensions: 5.43" diameter x 2.68"D..

D. Sensor analyzes size, shape, duration, and speed of incoming signals. Adaptive passive infrared technology sensor that detects changes in ambient level of infrared emissions caused by standard-intruder movement within detection pattern.

E. Listed and labeled by a qualified testing agency for compliance with SIA PIR-01.

2.12 WIRELESS CEILING-MOUNT PIR SENSORS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. DMP - Digital Monitoring Products
2. General Electric Company; GE Security, Inc.PrecisionLine Series.
3. Honeywell International Inc.; Honeywell Security.
4. Visonic Inc.

B. Description: Single unit PIR sensor that detects changes in ambient level of infrared emissions caused by standard-intruder movement within detection pattern.

C. Dimensions: 4" diameter x 2"H.

D. Battery: 3.0v lithium with 5-year minimum life expectancy.

E. Listed and labeled by a qualified testing agency for compliance with SIA PIR-01.

F. Device Performance: An alarm is transmitted when sensor detects a standard intruder within a period of three to eight seconds from when the other sensor detects a standard intruder.

1. Minimum Detection Pattern: A room 20 by 20 feet.
2. PIR Sensor Sensitivity: Adjustable pattern coverage to detect a change in temperature of 2 deg F or less, and standard-intruder movement within sensor's detection patterns at any speed between 0.3 to 7.5 fps across two adjacent segments of detector's field of view.

2.13 DUAL TECHNOLOGY PIR AND MICROWAVE MOTION SENSORS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. General Electric Company; GE Security, Inc.PrecisionLine Series.
2. Optex.
3. Honeywell International Inc.; Honeywell Security.
4. Visonic Inc.

B. Description: Single unit combining a sensor that detects changes in microwave signals and a PIR sensor that detects changes in ambient level of infrared emissions caused by standard-intruder movement within detection pattern.

C. Listed and labeled by a qualified testing agency for compliance with SIA PIR-01.

D. Device Performance: An alarm is transmitted when either sensor detects a standard intruder within a period of three to eight seconds from when the other sensor detects a standard intruder.

1. Minimum Detection Pattern: A room 20 by 30 feet.
2. PIR Sensor Sensitivity: Adjustable pattern coverage to detect a change in temperature of 2 deg F or less, and standard-intruder movement within sensor's detection patterns at any speed between 0.3 to 7.5 fps across two adjacent segments of detector's field of view.
3. Microwave Sensor Sensitivity: Adjustable, able to detect standard-intruder movement within sensor's detection pattern at any speed between 0.3 to 7.5 fps. Sensor sensitivity adjustments shall be accessible only when sensor housing is removed, and sensors shall comply with 47 CFR 15.

4. Activation Indicator: LED indicator shall not be visible during normal operation. Indicator shall light when sensor detects a standard intruder. Locate test enabling switch under sensor housing cover.

E. Dimensions: 2.8"L x 5.1"H x 2.3"D

2.14 WEATHERPROOF PIR MOTION SENSORS - INGRESS PROTECTION RATED

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Optex
2. General Electric Company; GE Security.
3. Honeywell International Inc.; Honeywell Security.
4. Visonic Inc.

B. Description: Single unit PIR sensor detects changes in ambient level of infrared emissions caused by standard-intruder movement within detection pattern.

C. Listed and labeled by a qualified testing agency for compliance with SIA PIR-01.

D. Device Performance: An alarm is transmitted when sensor detects a standard intruder within a period of three to eight seconds.

1. Minimum Detection Pattern: A room 40 by 50 feet.
2. PIR Sensor Sensitivity: Adjustable pattern coverage to detect a change in temperature of 2 deg F or less, and standard-intruder movement within sensor's detection patterns at any speed between 0.3 to 7.5 fps across two adjacent segments of detector's field of view.
3. Activation Indicator: LED indicator shall not be visible during normal operation. Indicator shall light when sensor detects a standard intruder. Locate test enabling switch under sensor housing cover.

E. Dimensions: 2.95"L x 6.7"H x 2.11"D.

F. Ingress Protection Rating: IP 54.

2.15 CURTAIN BEAM PASSIVE INFRARED MOTION SENSOR

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Siemens
2. General Electric Company; GE Security, Inc.PrecisionLine Series.
3. Optex.

4. Honeywell International Inc.; Honeywell Security.
5. Visonic Inc.

B. Description: Single unit PIR sensor that detects changes in ambient level of infrared emissions caused by standard-intruder movement within detection pattern.

C. Listed and labeled by a qualified testing agency for compliance with SIA PIR-01.

D. Device Performance: An alarm is transmitted when sensor detects a standard intruder within a period of two to three seconds.

1. Curtain Mirror Minimum Detection Pattern: 65-foot continuous curtain with maximum mounting height 13'-0" and minimum mounting height 6'-0".
2. PIR Sensor Sensitivity: Adjustable pattern coverage to detect a change in temperature of 2 deg F or less, and standard-intruder movement within sensor's detection patterns at any speed between 0.3 to 7.5 fps across two adjacent segments of detector's field of view.

E. Dimensions: 2.0"L x 4.5"H x 1.6"D

2.16 CURTAIN/BARRIER SENSOR FOR SKYLIGHT APPLICATION

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Seco-Larm U.S.A, Inc.
2. General Electric Company; GE Security, Inc.PrecisionLine Series.
3. Optex.
4. Siemens
5. Honeywell International Inc.; Honeywell Security.

B. Description: Two-part PIR sensor consisting of transmitter and receiver that is programmable to detect intrusion upon breaking of any single or two adjacent beams.

C. Listed and labeled by a qualified testing agency for compliance with SIA PIR-01.

D. Device Performance: An alarm is transmitted when sensor detects a standard intruder within a period of 0.5 to 32.5 milliseconds.

1. Minimum Detection Pattern: 50 feet.
2. PIR Sensor Sensitivity: Pattern coverage based on quantity of beams. Product options include 2, 4, 6, 8, or 10 beams.

E. Dimensions:

1. 2 beams: 11.25"L x 1 5/16" W x 7/8"D.

2. 4 beams: 22.5"L x 1 5/16" W x 7/8"D.
3. 6 beams: 44.5"L x 1 5/16" W x 7/8"D.
4. 8 beams: 60.5"L x 1 5/16" W x 7/8"D.

2.17 REFLECTIVE PHOTOELECTRIC BARRIER SENSOR

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Seco-Larm U.S.A, Inc.
2. General Electric Company; GE Security, Inc.PrecisionLine Series.
3. Optex.
4. Siemens
5. Honeywell International Inc.; Honeywell Security.

B. Description: Two-part photoelectric sensor consisting of transmitter/receiver and reflector that detects intrusion upon breaking of beam.

C. Listed and labeled by a qualified testing agency for compliance with SIA PIR-01.

D. Device Performance: An alarm is transmitted when sensor detects a standard intruder within a period of 0.5 to 32.5 milliseconds.

1. Detection Range: 0.5' to 35'.

E. Dimensions:

1. Sensor transmitter/receiver: 13/16"L x 2 5/8" W x 1 5/8"D.
2. Reflector: 2"L x 2 3/8" W x 5/16"D.

2.18 WIRELESS ON-THE-GLASS GLASS-BREAK/SHOCK SENSOR

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol, Inc.
2. GE Security, Inc. Interlogix
3. Honeywell International, Inc.
4. DMP.

B. Description: Glassbreak sensor with piezo tranducer technology designed to detect breaking glass by forced entry. Piezo generates its own electricity when it bends as the glass breaks.

1. Nominal size: Sensor - 1.25"L x 1.25"W x 0.37"D.

2. Housing material: Flame retardant ABS plastic.
3. Colors: White or mahogany to match adjacent surface as directed by Contracting Officer.

C. Device Performance: An alarm is transmitted when sensor detects a breaking of glass within a period of 1 to 10 seconds.

2.19 WIRELESS CEILING MOUNTED ACOUSTIC GLASS-BREAK SENSOR

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. GE Security, Inc. Interlogix
2. Honeywell International, Inc.
3. Optex, Inc.
4. Sentrol

B. Description: Glassbreak sensor with pattern recognition technology designed to detect breaking glass by forced entry by processing acoustic information.

1. Nominal size: Sensor - 4.24"L x 3.13"H x 1.70"D.
2. Housing material: Flame retardant ABS plastic.
3. Color: White.
4. Battery: Duracell DL 123A 3V lithium.
5. Color: White.

C. Device Performance:

1. Range: 20 feet by 360 degrees.
2. Minimum distance from glass: 4 feet.
3. Alarm duration: 4 seconds.

2.20 ACOUSTIC-TYPE, GLASS-BREAK DETECTORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. General Electric Interlogix
2. Digital Security Controls Ltd.; a business unit of Tyco Safety Products.
3. Honeywell International Inc.; Honeywell Security.
4. Sentrol

B. Listed and labeled by a qualified testing agency for compliance with SIA GB-01.

C. Maximum Dimensions: 4-inch diameter x 0.81"D.

D. Device Performance: Detect unique, airborne acoustic energy spectrum caused by breaking glass.

1. Sensor Element: Microprocessor-based, digital device to detect breakage of plate, laminate, tempered, and wired glass while rejecting common causes of false alarms. Detection pattern shall be at least a 25-foot range.
2. Hookup Cable: Factory installed, not less than 72 inches.
3. Activation Indicator: LED on sensor housing that lights when responding to vibrations, remaining on until manually reset at sensor control unit or at master control unit.
4. Control Unit: Integral with sensor housing or in a separate assembly, locally adjustable by control under housing cover.
5. Glass-Break Simulator: A device to induce frequencies into protected glass pane that simulate breaking glass without causing damage to glass.

2.21 ON-THE-GLASS PIEZOELECTRIC-TYPE, GLASS-BREAK SHOCK SENSORS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol, Inc., 5150 Series On-the-Glass Sensor
2. General Electric Company; GE Security, Inc.
3. Honeywell International Inc.; Honeywell Security.
4. DMP.

B. Listed and labeled by a qualified testing agency for compliance with SIA GB-01.

C. Description:.

1. Nominal size: Sensor - 1.25"L x 1.25"W x 0.37"D.
2. Housing material: Flame retardant ABS plastic.
3. Hookup Cable: Factory installed, not less than 72 inches.
4. Colors: White or mahogany to match adjacent surface as directed by Contracting Officer.

D. Device Performance: Detect unique, high-frequency vibrations caused by breaking glass. An alarm is transmitted when sensor detects a breaking of glass within a period of 1 to 10 seconds.

1. Sensor Element: Piezoelectric crystals in a housing designed to mount directly to glass surface with adhesive provided by element manufacturer. Circular detection pattern, with at least a 60-inch radius on a continuous glass pane.
2. Glass-Break Simulator: A device to induce frequencies into protected glass pane that simulate breaking glass without causing damage to glass.

2.22 VIBRATION SENSORS FOR METAL ENCLOSURES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol, Inc. Metal Enclosure Assault Sensors
2. General Electric Company; GE Security, Inc.
3. Honeywell International Inc.; Honeywell Security.

B. Listed and labeled by a qualified testing agency for compliance with SIA GB-01.

C. Description: A sensor control unit and piezoelectric crystal sensor elements that are designed to be rigidly mounted to structure being protected.

D. Device Performance: Detects high-frequency vibrations generated by use of such tools as oxyacetylene torches, oxygen lances, high-speed drills and saws, and explosives that penetrate a structure while not responding to any other mechanical vibration.

1. Circular detection pattern, with at least a 72-inch radius on protected structure.
2. Hookup Cable: Factory installed, not less than 72 inches.
3. Control Unit: Integral with sensor housing or in a separate assembly, locally adjustable by control under housing cover.

2.23 HOLD UP DURESS PANIC SWITCH

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol Series 3040.
2. Honeywell International Inc.; Honeywell Security.
3. Visonic Inc.

B. Description: Panic switch that allows an individual to covertly send a duress signal to the National Park Service central-station, with no audible indication when activated. Switch shall lock in activated position until lever is closed and latching LED circuit is reset at the intrusion alarm control panel.

1. Nominal size: 2.90"L x 1.77"W x 0.76"H.
2. Switch shall be encapsulated in polyurethane potting compound to prevent moisture from entering the switch.
3. Housing material: ABS fire-retardant plastic.
4. Color: White.

2.24 WIRELESS DURESS PANIC SWITCH

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. GE Interlogix Model no. 60-578.
2. Honeywell International Inc.; Honeywell Security.
3. Visonic Inc.

B. Description: Water resistant pendant panic button that allows an individual to covertly send a duress signal to the National Park Service central-station, with no visible or audible indication when activated. Switch shall lock in activated position until reset at the intrusion alarm control panel.

1. Minimum Switch Rating: 50,000 operations.

2.25 WIRELESS RECEIVER

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. DMP - Digital Monitoring Products
2. Radionics - Bosch Security Systems, Inc.
3. Caddx.
4. Ademco - Honeywell International Inc.; Honeywell Security.

B. Description: Two-way communication, supervised, high-power wireless receiver provides extended range transmit and receive amplification in harsh RF environments.

1. Operating Voltage: 8.0 to 14 VDC.
2. Current Draw: 240 mA.
3. Frequency Range: 903-927 MHz with frequency-hopping spread spectrum technology.
4. Supervision: 3, 60, or 240-minute supervision selectable by zone or output.
5. Housing Dimensions: 4.65"L x 1.4"W x 3.1"H.
6. Antenna Dimensions: 8.6"H.

2.26 CONTROL UNIT

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Honeywell Security.
2. DMP.
3. Bosch Security Systems, Inc.
4. Caddx.

B. Description: Panel shall provide supervision of sensors and detection subsystems and their connecting communication links, status control (secure or access) of sensors and detector subsystems, activation of alarms and supervisory and trouble signals, and other indicated functions.

1. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
2. Include a real-time clock for time annotation of events on the event recorder and printer.
3. Addressable initiation devices that communicate device identity and status.
4. Control circuits for operation of mechanical equipment in response to an alarm.

C. Construction: Modular, with separate and independent alarm and supervisory system modules. Alarm-initiating protected zone boards shall be plug-in cards. Arrangements that require removal of field wiring for module replacement are not acceptable.

D. Comply with UL 609 and UL 1076.

A. Controls and Displays: Arranged for interface between human operator at master control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Control-Unit Network: Automatic communication of alarm, status changes, commands, and other communications required for system operation. Communication shall return to normal after partial or total network interruption such as power loss or transient event. Total or partial signaling network failures shall identify the failure and record the failure at the annunciator display and at the system printer.
2. Field Device Network: Communicate between the control unit and field devices of the system. Communications shall consist of alarm, network status, and status and control of field-mounted processors. Each field-mounted device shall be interrogated during each interrogation cycle.
3. Operator Controls: Manual switches and push-to-test buttons that do not require a key to operate. Prevent resetting of alarm, supervisory, or trouble signals while alarm or trouble condition persists. Include the following:

    a. Acknowledge alarm.
    b. Silence alarm.
    c. System reset.
    d. LED test.

4. Timing Unit: Solid state, programmable, 365 days.
5. Confirmation: Relays, contactors, and other control devices shall have auxiliary contacts that provide confirmation signals to system for their on or off status. Software shall interpret such signals, display equipment status, and initiate failure signals.
6. Alarm Indication: Audible signal sounds and a plain-language identification of the addressable detector originating the alarm appears on LED or LCD display at master control unit.

7. Alarm activation sounds a siren and strobe.

B. Protected Zones: Quantity of alarm and supervisory zones as indicated, with capacity for expanding number of protected zones by a minimum of 25 percent.

C. Zoning: Provide separate address for each sensor so that if a particular sensor alarms, it can be identified by exact location. Exact device location shall be communicate from the main alarm panel to the off-site monitoring facility.

D. Partitioning: System shall be capable of being partitioned for independent arming/disarming of up to 10 individual buildings and up to ten individual areas within buildings.

E. Power Supply Circuits: Master control units shall provide power for remote power-consuming detection devices. Circuit capacity shall be adequate for at least a 25 percent increase in load.

F. Cabinet: Lockable, steel enclosure arranged so operations required for testing, normal operation, and maintenance are performed from front of enclosure. If more than a single cabinet is required to form a complete control unit, provide exactly matching modular enclosures. Accommodate all components and allow ample gutter space for field wiring. Identify each enclosure by an engraved, laminated, phenolic-resin nameplate. Lettering on enclosure nameplate shall not be less than 1 inch high. Identify, with permanent labels, individual components and modules within cabinets.

G. Transmission to Monitoring Station: A communications device to automatically transmit alarm, supervisory, and trouble signals to the monitoring station, operating over a standard voice grade telephone leased line. Comply with UL 1635.

H. Monitoring: System shall be monitored for alarm, trouble, loss of power, and low battery by the central station.

2.27 AUDIBLE ALARM DEVICES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Sentrol, Inc. Model MPI-47.
2. General Electric Company; GE Security, Inc.
3. Honeywell International Inc.; Honeywell Security.
4. Cooper Wheelock.
5. Moose.

B. Siren: 4 inches high, 6.5 inches wide, 1.5 inch deep, rated to produce a minimum sound output of 106 dB at 10 feet.

2.28 VISIBLE ALARM DEVICES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Honeywell International, Inc. Model 710BL.
2. Sentrol, Inc.
3. General Electric Company; GE Security, Inc.

B. Strobe: Surface mounted high intensity flashing light.

2.29 BATTERIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Honeywell Security.
2. DMP.
3. Bosch Security Systems, Inc.
4. Caddx.

B. Secondary Power: Supply system with batteries and automatic battery charger and an automatic transfer switch.

1. Batteries: Sealed, valve-regulated, gelled electrolyte lead acid. Batteries shall be housed in the control cabinet or a separate cabinet with adequate cell separation to prevent accidental discharge.
2. The charger shall be automatic in design, adjusting the charge rate to the condition of the batteries. Battery charger shall be housed in the main control panel or the battery cabinet.
3. Battery and Charger Capacity: The battery supply shall be calculated to operate its load in a supervisory mode for forty-eight hours with no primary power applied and, after that time, operate in alarm mode for five minutes. Batteries shall be sized with an added 20% safety margin to allow for deterioration and aging during the life of the battery. Battery calculations shall be submitted to justify the battery size.

2.30 INTRUSION DETECTION SYSTEM MANAGEMENT SOFTWARE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Honeywell Security.
2. DMP.
3. Bosch Security Systems, Inc.
4. Caddx.

B. Description: Combine control of all intrusion detection panels under a single software application providing NPS staff with a consolidated picture-based view of the systems.

C. Develop, install, and test software and hardware, and perform tests for the complete and proper operation of systems involved. Assign software license to Government.

D. System shall consist of the following features and capabilities:

1. Graphical images of protected facility identified by device type, zones and partitions.
2. Point-and-click on devices for more information or to control and change device's operating parameters.
3. Customizable user fields to assign specific rights or events by user or group.
4. Graphical representation of events and alarms to provide at-a-glance feedback.
5. System maps linked from level to level.
6. Macro views of specific rooms or areas.
7. User-defined layers representing different alarm types.
8. Click on alarm display icon to acknowledge an alarm or request additional information.
9. Create automated system actions.
10. Generate a report.
11. Generate an alert email or text message.

E. Locate intrusion detection system management workstation in the Gatehouse.

2.31 CELLULAR TELECOMMUNICATIONS BACKUP (fixed wireless telecommunications device for backup in event that telephone lines become disabled).

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Honeywell Security.
2. Telular Corporation
3. DMP.
4. Bosch Security Systems, Inc.
5. Caddx.

B. Detects when telephone line is not in service and automatically switches all intrusion detection system alarm communications to the cellular network. Transmits alarm signal via cellular signal.

C. Features shall include automatic self test and ability to receive incoming calls over cellular network for downloading host alarm system.

D. Install adjacent to intrusion alarm control panel.

E. Device shall be UL listed for use with security alarm systems.

F. Cellular dialer shall be compatible with Department of Homeland Security (DHS) Federal Protective Service (FPS) MegaCenter central station.

2.32 RADIO ALARM TRANSMITTER

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AES IntelliNet.

B. Transmitter shall comply with 47 CFR 90 and shall be compatible with Department of Homeland Security (DHS) Federal Protective Service (FPS) MegaCenter central station.

C. Description: Manufacturer's standard commercial product; factory assembled, wired, and tested; ready for installation and operation.

1. Packaging: A single, modular, NEMA 250, Type 1 metal enclosure with a tamper-resistant flush tumbler lock.
2. Signal Transmission Mode and Frequency: VHF or UHF 2-W power output, coordinated with operating characteristics of the established remote alarm receiving station designated by Owner.
3. Normal Power Input: 120-V ac.
4. Secondary Power: Integral-sealed, rechargeable, 12-V battery and charger. Provide 48-hour battery capacity; submit calculations.
5. Antenna: Omnidirectional, coaxial half-wave, dipole type with driving point impedance matched to transmitter and antenna cable output impedance. Wind-load strength of antenna and mounting hardware and supports shall withstand 100 mph with a gust factor of 1.3 without failure.
6. Antenna Cable: Coaxial cable with impedance matched to the transmitter output impedance.
7. Antenna-Cable Connectors: Weatherproof.
8. Alarm Interface Devices: Circuit boards, modules, and other auxiliary devices, integral to the transmitter, matching intrusion detection system outputs to message-generating inputs of the transmitter that produce required message transmissions.

D. Functional Performance: Unit shall receive alarm, supervisory, or trouble signal from intrusion detection system control unit or from its own internal sensors or controls and shall automatically transmit signal along with a unique code that identifies the transmitting station to the remote alarm receiving station. Transmitted messages shall correspond to standard designations for burglar alarm reporting system to which the signal is being transmitted and shall include separately designated messages in response to the following events or conditions:

1. Transmitter Low-Battery Condition: Sent when battery voltage is below 85 percent of rated value.

2. System Test Message: Initiated manually by a test switch within the transmitter cabinet, or automatically at an optionally preselected time, once every 24 hours, with transmission time controlled by a programmed timing device integral to transmitter controls.
3. Transmitter Trouble Message: Actuated by failure, in excess of one-minute duration, of the transmitter normal power source, derangement of the wiring of the transmitter, telephone line cut, or any alarm input interface circuit or device connected to it.
4. Local Intrusion-Alarm-System Trouble Message: Initiated by events or conditions that cause a trouble signal to be indicated on the building system.
5. Local Intrusion-Alarm-System Alarm Message: Actuated when the building system goes into an alarm state. Identifies device that initiated the alarm.
6. Local-Alarm-System, Supervisory-Alarm Message: Actuated when the building alarm system indicates a supervisory alarm.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of intrusion detection.

1. Examine roughing-in for embedded and built-in anchors to verify actual locations of intrusion detection connections before intrusion detection installation.
2. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of intrusion detection.

B. Inspect built-in and cast-in anchor installations, before installing intrusion detection, to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with requirements. Reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional anchor installations. Prepare inspection reports.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SYSTEM INSTALLATION

A. Comply with UL 681.

B. Install wall-mounted equipment, with tops of cabinets not more than 72 inches above the finished floor.

3.3 WIRING INSTALLATION

A. Wiring Methods:

1. In areas where it is not possible to install cable in conduit - where doing so will require cutting and patching of historic fabric - install cables, concealed in accessible ceilings, walls, and floors when possible. Where it is not possible to conceal cable, route cables exposed and surface mounted in discrete locations. Where cable is visible in public visitation areas, paint cables to match adjacent surfaces as directed by the Contracting Officer.

2. In basements, attics, mechanical rooms, and similar spaces, install wiring in metal raceways according to Division 26 Section "Raceways and Boxes for Electrical Systems." Minimum conduit size shall be 1/2 inch. Control and data transmission wiring shall not share conduit with other building wiring systems.

B. Install wiring to minimize disturbance to historic fabric and to minimize visual intrusion in public visitation areas. Historic preservation shall be taken into account when installing wiring.

C. Where required, temporary removal of museum artifacts, art, furnishings, and/or architectural components will be performed only by the Government.

D. All cutting and drilling of architectural finishes, including finished flooring, ceilings, plaster, millwork and cabinetry items shall be coordinated with the Contracting Officer. Before cutting or drilling existing surfaces, the Contractor shall mark all specific locations on the surfaces to be cut for review and approval by NPS Staff. Marking shall be temporary, non-destructive and capable of being adjusted and removed without marring the existing finish.

E. Invasive installation methods, including drilling, shall be minimal and shall only be performed following the Contracting Officer’s approval. Device installation methods shall not distract from the historic appearance of the building or impact the historic architectural features.

F. Protect all areas and surfaces surrounding and adjacent to cutting and drilling work from damage. All damage resulting from work of this Section shall be repaired by the Contractor as directed by the Contracting Officer at no additional cost to the government.

G. Do not cut and drill exposed construction in a manner that will, in the opinion of the Contracting Officer, mar or distract from the aesthetic or historic qualities of the museum spaces. Final device placement and location of cable run shall be approved by NPS staff.

H. Before cutting or drilling existing surfaces, the Contractor shall examine surfaces to be cut and patched and conditions under which cutting and drilling is to be performed. If unsafe or unsatisfactory conditions are encountered, the Contractor shall promptly notify the Contracting Officer, and take corrective action before proceeding with the work.

I. The location of cable runs may need to be adjusted in the field as required to insure the cables are adequately hidden.

J. After preliminary approval of the penetration location, if needed, drill a pilot hole as directed by the Contracting Officer to confirm the location on the opposite side of the wall or ceiling. Cutting and drilling shall NOT proceed without the Contracting Officer's specific approval in the field at each location.

K. Cables shall be hidden from view within all museum spaces. Cabling in attic, basement, and similar areas can be exposed.

L. Final patching in museum spaces will be performed by the Government.

M. All equipment shall be contractor furnished. All wiring shall be neatly run out of sight, with a minimum of drilling and patching.

N. Seal fastenings and conduit perpetrations between spaces.

O. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Use lacing bars and distribution spools. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

P. Wires and Cables:

1. Conductors: Size as recommended in writing by system manufacturer, unless otherwise indicated.
2. 120-V Power Wiring: Install according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables," unless otherwise indicated.
3. Control and Signal Transmission Conductors: Install unshielded, twisted-pair cable, unless otherwise indicated or if manufacturer recommends shielded cable, according to Division 28 Section "Conductors and Cables for Electronic Safety and Security."

Q. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

R. Install power supplies and other auxiliary components for detection devices at controllers, unless otherwise indicated or required by manufacturer. Do not install such items near devices they serve.

S. Identify components with engraved, laminated-plastic or metal nameplate for central-station control unit and each terminal cabinet, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Identification for Electrical Systems."

3.4 WIRING INSTALLATION FOR SENSORS LOCATED IN CURATORIAL STORAGE ROOMS

A. Where multiple intrusion detection devices are located in the same curatorial storage room, provide separate wiring for each sensor.

3.5 SURGE PROTECTION

A. Install surge protection on normal ac power and communications cabling for the intrusion detection control panel and its accessories.

B. Install surge protection on all system wiring external to the building housing the intrusion detection control panel.

3.6 SYSTEM SOFTWARE AND HARDWARE

A. Develop, install, and test software and hardware, and perform database tests for the complete and proper operation of systems involved. Assign software license to Government.

B. Engage a factory-authorized service representative to supervise and assist with startup service.

1. Complete installation and startup checks according to approved procedures that were developed in "Preparation" Article and with manufacturer's written instructions.

3.7 FIELD QUALITY CONTROL

A. Prior to system testing, complete the Department of Homeland Security (DHS) Federal Protective Service (FPS) MegaCenter application form and submit to DHS,FPS, MegaCenter to establish monitoring services.

B. Pretesting: After installation, align, adjust, and balance system and perform complete pretesting to determine compliance of system with requirements in the Contract Documents. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.

1. Report of Pretesting: After pretesting is complete, provide a letter certifying that installation is complete and fully operable; include names and titles of witnesses to preliminary tests.

C. Perform the following field tests and inspections and prepare reports:

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

2. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
3. Operational Tests: Schedule tests after pretesting has been successfully completed.

    a. Test all modes of system operation and intrusion detection at each detection device.
    b. Test for detection of intrusion and for false alarms in each protected zone.
    c. Test for false alarms by simulating activities outside indicated detection patterns.
    d. Test for signal transmission to FPS MegaCenter central monitoring station.

4. Electrical Tests: Perform the following:

    a. Verify the absence of unwanted voltages between circuit conductors and ground.
    b. Test all conductors for short circuits using an insulation-testing device.
    c. With each circuit pair, short circuit at the far end of circuit and measure circuit resistance with an ohmmeter. Record circuit resistance of each circuit on Record Drawings.
    d. Verify that each controller is in normal condition as detailed in manufacturer's operation and maintenance manual.
    e. Test signal and data transmission circuits complying with requirements in Division 28 Section "Conductors and Cables for Electronic Safety and Security" for proper signal transmission under open-circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
    f. Verify that transient surge-protection devices are installed according to manufacturer's written instructions.
    g. Test each initiating and indicating device for alarm operation and proper response at central-station control unit.
    h. Test both primary and secondary power. Verify, by test, that battery is capable of operating the system for period and in manner specified.

D. Report of Tests and Inspections: Prepare a written record of tests, inspections, and detailed test results in the form of a test log.

E. Tag all equipment, stations, and other components for which tests have been satisfactorily completed.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train 10 (ten) National Park Service personnel to adjust, operate, and maintain intrusion detection system. Refer to Division 1 Section "Demonstration and Training."

B. Develop separate training modules for the following:

1. Train personnel to manage, update and maintain security management workstation software. Explain setup options and features.
2. Train personnel to operate the security management workstation.
3. Explain features and operating procedures for each type of intrusion detection device.

3.9 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to Project during other than normal occupancy hours for this purpose. Visits for this purpose shall be in addition to any required by warranty.

3.10 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning on date of Final Acceptance of Work. Maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.11 SOFTWARE SERVICE AGREEMENT

A. Technical Support: Beginning on date of Final Acceptance of Work, service agreement shall include software support for two years.

B. Upgrade Service: At date of Final Acceptance of Work, update software to latest version. Install and program software upgrades that become available within two years from date of Final Acceptance of Work. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Government to schedule access to system and to upgrade computer equipment if necessary.

END OF SECTION 281600

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