

SECTION 01 73 40 EXECUTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes general procedural requirements governing execution of Work including:
 - 1. Coordination with Utility Service Providers.
 - 2. Construction Layout.
 - 3. Field Engineering and Surveying.
 - 4. General Installation of Products.
 - 5. Progress Cleaning.
 - 6. Starting and Adjusting.
 - 7. Protection of Installed Construction.
 - 8. Correction of the Work.

1.2 SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor certifying location and elevation of improvements comply with requirements.
- B. Landfill Receipts: Submit copy of receipts issued by landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- C. Certified Surveys: Submit two copies signed by land surveyor.
- D. Quantity Surveys: Submit two copies showing quantities of work performed and actual construction completed in place.
- E. Construction Phasing Plan: Submit and maintain a narrative plan describing the sequence of performing features of Work. The plan shall identify work durations, activities/support needed from the Park, potential risk and mitigation measures in addition to outages associated with each phase. The plan shall be constructed in a manner which minimizes outages and is consistent with the Project Phasing described in Section 01 11 00, Summary of Work.

1.3 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: Professional land surveyor legally qualified to practice in jurisdiction where Project is located and is experienced in providing land-surveying services of kind indicated.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: Existence and location of Site improvements and other construction indicated as existing are not guaranteed.
 - 1. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 2. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: Existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify existence and location of underground utilities and other construction affecting Work.
 - 1. Before construction, verify location and invert elevation at points of connection of sanitary sewer, storm sewer, and reclaimed water and potable water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project Site.
 - 3. Contractor shall coordinate utility locates of existing utilities and perform potholing of all proposed crossings of existing utilities prior to excavation.
 - a. Call Arizona 811 and obtain utility locates from owning utilities.
 - b. Submit a map of the proposed locations of the potholing at each utility crossing to the Contracting Officer.
 - c. Once approved, notify utility owners prior to potholing activities and obtain permits and/or approvals prior to potholing activities.
 - d. After potholing activities, immediately backfill all utilities to the appropriate compaction and match existing ground surfacing.
 - e. Submit a report that includes, at a minimum, locations by Project coordinates, depths below grade at Project datum, and photos of exposed utilities to the Contracting Officer for review and verification with design.
 - f. Contractor shall not proceed with new utility excavation activities until approved by the Contracting Officer.
 - 4. Furnish location data for work related to Project that must be performed by public utilities serving Project Site.

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

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 COORDINATION WITH UTILITY SERVICE PROVIDERS

A. Coordination with Utility Service Providers: Contact following Utility Service providers, sufficiently in advance to avoid delaying the work, to coordinate Contractor's portion of Work, including shutdowns, tie-ins, testing requirements, commissioning, inspections, temporary services.

1. Electrical Service Contact: Contact NPS Contracting Officer to coordinate outages for existing South Rim WWTP facilities. Coordinate with Arizona Public Service for requirements.
 - a. Contractor shall prepare and submit a Temporary Electrical Service Management Plan to the Contracting Officer for approval 30 days prior to commencing construction activities.
 - 1) Temporary electrical service plan shall include activities such as temporary outages for splices, connections, by-pass, detailed plan for providing backup electrical services, durations associated with service outage, testing procedures, and other activities that affect schedule and shutdown durations.
 - b. It is the Construction Contractor's responsibility to provide and maintain electrical service for all existing connections at the South Rim WWTP at no cost to the Government during service outage.

2. Potable Water Service Contact:

- a. Contact NPS Contracting Officer to coordinate Potable Water service outages. The Construction Contractor shall maintain potable water service based on the following:
 - 1) Contractor shall prepare and submit a Temporary Potable Water Service Management Plan to the Contracting Officer for approval 30 days prior to commencing construction activities.
 - a) The temporary water service plan shall include activities such as bypass piping, pipeline/construction production rate estimates, durations associated with testing and disinfection procedures, and other activities that affect schedule and shutdown durations.
 - 2) Construction Contractor shall limit outages to the existing potable water pipeline to the following:
 - a) Maximum shutdown period is approximately 4 hours or as approved by Contracting Officer.
 - 3) It is the Contractor's responsibility to provide and maintain potable water service to all existing water service connections within the limits of construction and at the South Rim WWTP at no cost to the Government during service outage.

3. Reclaimed Water Service Contact:

- a. Contact NPS Contracting Officer to coordinate Reclaimed Water service outages. The Construction Contractor shall maintain reclaimed water service within the limits of construction based on the following:
 - 1) Contractor shall prepare and submit a Temporary Reclaimed Water Service Management Plan to the Contracting Officer for approval 30 days prior to commencing construction activities.
 - a) The temporary water service plan should include activities such as bypass piping, pipeline/construction production rate estimates, durations associated with testing and disinfection procedures, and other activities that affect schedule and shutdown durations.

- 2) Construction Contractor shall limit outages to the existing Reclaimed Water Pipeline to the following:
 - a) Maximum shutdown period is approximately 4 hours, or as approved by Contracting Officer.
 - b) Schedule a minimum 5 calendar day period prior to shutdown period to allow for South Rim School Tank storage to refill.
- 3) It is the Contractor's responsibility to provide and maintain reclaimed water service to all existing reclaimed water service connections at the South Rim WWTP at no cost to the Government during service outage.
4. Wastewater Service Contact: Contact NPS Contracting Officer to coordinate Wastewater service requirements.
 - a. Construction Contractor Responsibilities: Construction activities must not impede or obstruct for any duration the flow of wastewater to the existing treatment facilities.
5. Telephone Service and Fiber Optic Communications Contact:
 - a. Contact telephone service provider, Century Link, to coordinate telephone service requirements. The Construction Contractor shall maintain telephone service within the limits of construction based on the following:
 - 1) Contractor shall prepare and submit a Temporary Communication Service Management Plan to the Contracting Officer for approval 30 days prior to commencing construction activities.
 - a) The temporary communication service plan should include activities such as durations associated with installation, demolition, testing, and other activities that affect schedule and shutdown durations.
 - 2) Construction Contractor shall limit outages to the existing Communication Services to the following:
 - a) Maximum shutdown period is approximately 4 hours, or as approved by Contracting Officer.
 - 3) It is the Contractor's responsibility to provide and maintain communication services to all existing connections at the South Rim WWTP at no cost to the Government during service outage.

- B. Contractor is responsible for the prevention of damage to underground utilities, coordination, permitting, scheduling inspection, and resolving punchlist items for acceptance of Contractor's work.

3.3 PREPARATION

- A. Field Measurements: Take field measurements as required to fit Work properly. Recheck measurements before installing each product. Where portions of Work are indicated fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on the Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of need for clarification of the Contract Documents caused by differing field conditions outside control of Contractor, submit request for information to Contracting Officer in accordance with Section 01 31 00, Project Management and Coordination.

3.4 CONSTRUCTION LAYOUT

- A. Verification: Verify layout information shown on the Drawings, in relation to the existing benchmarks before proceeding to lay out Work. Notify Contracting Officer promptly if discrepancies are discovered.
- B. General: Engage a Professional Land Surveyor to lay out Work using accepted construction surveying practices.
 - 1. Establish benchmarks and control points to set lines of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale the Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check location, level and plumb, of every major element as Work progresses.
 - 5. Notify Contracting Officer when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the established standard.
- C. Site Improvements: Locate and lay out Site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make log available for review by National Park Service (NPS).

3.5 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning Work. Preserve and protect permanent benchmarks and control points during construction operations. Controls destroyed by Contractor will be replaced by Contractor at their expense.
 - 1. Existing Monuments: All benchmarks, land corners, and triangulation points, established by other surveys, existing within construction area shall be preserved. If existing monuments interfere with Work, secure written permission before removing them.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project Site, referenced to data established by survey control points. Comply with NPS requirements for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- C. Certified Survey: On completion of foundation walls, water holding structures, major Site improvements, utilities, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.6 INSTALLATION

- A. General: Locate Work and components of 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 pipes, ducts, and 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 for best possible results. Maintain conditions required for product performance until Substantial Completion.

- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Contracting Officer.
 - 2. Allow for building movement, thermal expansion, and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors to be embedded in concrete or masonry. Deliver to Project Site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials not considered hazardous.
- J. Quantity Surveys: Shall be conducted, and data derived from these surveys shall be used in computing quantities of work performed and actual construction completed and in place.
 - 1. Contractor shall conduct original and final surveys and surveys for any periods for which progress payments are requested. These surveys shall be conducted under direction of a representative of the Contracting Officer, unless Contracting Officer waives requirement in a specific instance. Government shall make such computations as are necessary to determine quantities of work performed or finally in place. Contractor shall make computations based on surveys for any periods for which progress payments are requested.
 - 2. Promptly upon completing a survey, Contractor shall furnish originals of field notes and other records relating to survey or layout of Work to Contracting Officer, who will use them as necessary to determine the amount of progress payments. Contractor shall retain copies of all such material furnished to Contracting Officer.

3.7 PROGRESS CLEANING

- A. General: Clean Project Site, Work areas, and common areas daily. Coordinate progress cleaning for joint-use areas where more than one Installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in National Fire Protection Association (NFPA) 241 for removal of combustible waste materials and debris at the end of every work session.
 - 2. 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 level of cleanliness necessary for proper execution of Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of Work, broom-clean or vacuum 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 surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials not hazardous to health or property and will not damage exposed surfaces.
 - 1. Utilize non-toxic cleaning materials and methods.
 - a. Comply with Green Seal Standard (GS) 37 for general purpose cleaning and bathroom cleaning.
 - b. Use natural cleaning materials where feasible.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials onsite. Do not wash waste materials down sewers or into waterways.
- H. Clean and protect construction in progress and adjoining materials already in place during handling and installation. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

- I. Clean and provide maintenance on completed construction as frequently as necessary through remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations so that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or deleterious exposure during construction period.
- K. Final Cleaning: At completion of Work, remove remaining waste materials, rubbish, tools, equipment, machinery and surplus materials. Clean exposed surfaces and leave Project clean and ready for occupancy.

- 1. Provide final cleaning in accordance with ASTM E1971.

3.8 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 factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 01 40 00, Quality Requirements, and Section 01 79 00, Demonstration and Training.
- E. See Section 01 91 14, Equipment Testing and Facility Startup, and Section 01 91 15, Total Building Commissioning, for additional requirements related to building and treatment equipment.

3.9 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.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 01 73 29, 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 specified condition.
- C. Remove and replace damaged surfaces exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

