Glacier National Park

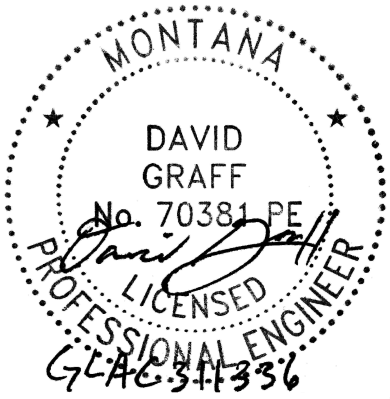
Glacier National Park Bridge Rehabilitation

GLAC 311336

100% PROJECT SPECIFICATIONS

NATIONAL PARK SERVICE

January 28, 2022



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PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

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4. Contractor camping within the park.
5. Conduct of Operations
6. Work restrictions.
7. Special construction requirements.
8. Protection of Parks and Public Lands.
9. Soils Investigation Report.
10. Additional Reports.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Location: The project work is located at three (3) separate locations within Glacier National Park. The work occurring on the western half of the North Fork Bridge is located on US Forest Service Land.

B. The Work consists of the following:

1. The Work includes rehabilitation and preservation of 13 existing bridges occurring in 2 phases. Each phase will occur in a separate construction season; 2022 and 2023. The following lists the primary rehabilitation and preservation items to be completed as described within the construction documents:
   a. Bridge Deck Repair and Sealing
   b. Bridge Approach Repair
   c. Timber Pile Replacement and Preservation
   d. Sidewalk Plank Replacement
   e. Timber Bridge Curb Replacement
   f. Steel Rail Painting
   g. Concrete Repair
   h. Expansion Joint, Bridge Deck, and Pile Cap Cleaning
   i. Scour Protection and Erosion Repair (Gabion Basked and Riprap Placement)
   j. Asphalt Milling and Replacement
   k. Timber Backwall Repair

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

1.3 WORK PHASES

A. The work shall be conducted over two construction seasons with no construction permitted from approximately November 21, 2022 to July 5, 2023. See Section 1.7 F. for specific construction dates by bridge.
   1. Fish Creek Bridge, Appistoki Creek Bridge, Camas Creek Bridge, Dutch Creek Bridge, and Anaconda Creek Bridge shall be constructed and substantially completed during the authorized dates of 2022 prior to the non-construction period.
   2. Logging Creek Bridge, Quartz Creek Bridge, Akokala Creek Bridge, Bowman Creek Bridge, Ford Creek Bridge, and Kintla Creek Bridge shall be constructed and substantially completed during the authorized dates of 2023.
   3. North Fork Bridge and Lee Creek Bridge shall be constructed and substantially completed during the authorized dates of 2022 or 2023 at the discretion of the contractor with approval from the CO.

1.4 CONTRACTOR USE OF SITE

A. General: Contractor shall have limited use of the site for construction operations. Limit use of premises to areas within the Contract limits indicated on the plan. Do not disturb portions of Project site beyond areas in which the Work is indicated.

   1. Limits: Confine constructions operations and site disturbances to the limits of work defined on the construction documents.

B. Storage of Materials: Confine storage of materials to areas agreed upon by the Contractor and Glacier National Park. Approved staging areas are shown in the plans. Additional staging areas not designated in the plans are subject to the approval of the Contracting Officer prior to use. Materials may be stored in closed roadways within 500 ft. of the bridge as approved by the Contracting Officer.

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 Park Natural Resource staff and 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: Keep driveways and entrances serving premises clear and available to Government, Government's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

   1. Schedule deliveries to minimize use of driveways and entrances.
   2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

E. Hauling Restrictions: Comply with all legal load restrictions in the hauling of materials. Load restrictions on park roads are identical to the state load restrictions with such additional regulations as may be imposed by the Park Superintendent. Information regarding rules and regulations for vehicular traffic on park roads may be obtained from the Office of the Park Superintendent. A special permit will not relieve Contractor of liability for damage which may result from moving of equipment.

F. Wildlife: In addition to the following requirements, the contractor shall comply with guidance in the park provided document "Bear, Wildlife, and Sanitation Requirements While Working in Glacier National Park A Handbook for Construction Personnel." Do not approach, feed or disturb wildlife. To prevent unnatural attractants to wildlife, keep all foods, pet foods, garbage, drinks, trash, or food and drink containers inside vehicles, or enclosed construction equipment, except during actual use. Supply garbage bins, within the construction site that are bear and animal proof. Remove all garbage and food trash from the project site daily.

G. Cultural Resources: If previously unknown cultural resources are discovered during the project, the park archaeologist or historic preservation personnel and CO shall be contacted immediately. Contract work in the vicinity of the discovery will be suspended until the site is cleared by the parks cultural resource specialists. Cultural resources include such items as historic cans, bottles, wire, glass shards, insulators, dishware, milled or dimensional lumber, prehistoric pottery pieces, chipped stone, arrowheads, bone, grinding stone, and masonry structures. See Specification 01 35 13.22 Section 3.4 for additional requirements.

H. All workers on the project will be informed of appropriate site etiquette and all about the penalties of illegally collecting artifacts or intentionally damaging any archaeological or historic property. Workers will also be informed of correct procedures if previously unknown resources are discovered during construction activities.

1.5 CONTRACTOR CAMPING WITHIN THE PARK

A. Project personnel will be permitted to camp at Logging Ranger Station with the following requirements:
   1. The use of Logging or Quartz Cr. Campgrounds will be prioritized over camping at the Logging Ranger Station; the ranger station will provide a secondary option for RVs or trailers that cannot be accommodated at the Logging or Quartz Creek Campgrounds.
   2. Contractor shall provide anticipate number and length of vehicles, trailers, and RVs to utilize the campground and ranger station prior to mobilization.
   3. No formalized RV slips will be developed.
   4. RVs or trailers will not exceed 27 feet in length.
   5. Parking/camping at the ranger station is allowed in the graveled and disturbed/maintained lawn area, see attached map. Park staff (including Polebridge Ranger Station, cultural resources, and vegetation resources) will demarcate specific boundaries prior to camping.
   6. Food, garbage and other wildlife attractants will be securely stored according to park regulations; attractant storage regulations will be strictly enforced.
   7. The Superintendent's Compendium permits generator use in campgrounds from 8-10 am, 12-2 pm, and 5-7 pm. Generator use at the ranger station will also be restricted to these times except for in the morning, when generators may run from 6-8 am instead of 8-10 am.
   8. Quiet boxes will be used for generators located outside campers and trailers.
   9. No trees or vegetation will be removed from the campgrounds or ranger station area.

10. Additional social trails will not be created. Existing trails and rocky surfaces will be used whenever possible to avoid trampling soils and vegetation
11. All vehicles and trailers etc. must be parked away from tree drip lines.
12. GLAC resources staff will treat and rehabilitate the ranger station site prior to and after camping.
13. All vehicles and trailers etc. must be pressure washed prior to entering the park to prevent the potential transport of non-native invasive plants into the area.
14. Pets will not be allowed at the campground or ranger station.
15. There are no dump stations in the area. All grey/black water/waste must be removed from the park.
16. Porta-potties will not be brought to the site; toilets at the ranger station and the Logging and Quartz Creek Campgrounds are available.
17. Contractors must bring their own drinking water; drinking water is not available at the site.
18. Vehicles must not be parked in proximity to the hitchrail or wayside exhibits; access to the hitchrail and exhibits will be maintained.
19. Contractor camping will not be permitted alongside the road, at pullouts, or at any other campgrounds within the Park.
20. Mitigation measures listed in the categorical exclusion letter for the bridge preservation project will be followed as applicable.
21. Park staff will monitor camping areas to ensure compliance with resource protection requirements within these specifications.
22. All regulations that apply to the public will also apply to contractors and will be enforced.

1.6 CONDUCT OF OPERATIONS

A. At all times the contractor shall conduct his operations in conformance with the rules and regulations promulgated by the Secretary of the Interior for the National Park Service, and applicable park rules and regulations prescribed by the Park Superintendent.

B. Work on Saturdays, Sundays or Federal holidays may not be performed without prior consent from the Contracting Officer. Night work shall not be permitted. Submit requests 14 days advance of the work to the Contracting Officer for approval.

C. No signs or advertisements (except those specified herein) shall be displayed on the construction site or within the park unless approved by the Contracting Officer.

1.7 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, except when otherwise indicated.

1. Weekend Hours: Subject to Contracting Officer’s approval.
2. Early Morning Hours: Subject to Contracting Officer’s approval.
3. Night work shall not be permitted.

B. Existing Utilities

1. Existing Utilities: Notify Contracting Officer and utility companies of proposed work locations and times for excavation.

2. Contractor shall be responsible for locating and preventing damage to known utilities. If damage occurs, coordinate with the utility cooperator to immediately restore utility service at no expense to the government.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Government or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Contracting Officer not less than 30 days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Contracting Officer's written permission.
3. Hours for Utility Shutdowns: Subject to Contracting Officer's approval.

D. Smoking
1. Smoking will be permitted in designated areas as approved by the CO.
2. Smoking is not permitted while working or operating equipment.
3. Contractor shall provide a wildlife proof disposal container for cigarette butts. Cigarette butts shall not be shall not be disposed of on the ground.
4. Smoking shall not be permitted when fire danger is high, as determined by Park personnel and regulations.

E. No fires shall be permitted within the park.

F. Schedule for construction and road closure shall be established to restrictions below. In-water work is defined as work requiring the use of equipment within the stream's ordinary high-water mark. Work on the underside of the bridge or beneath the bridge footprint shall also be considered in-water work. The dates listed below represent a week of construction starting on the date listed. Dates including * may be revised to an earlier date if the wildlife nesting on or near the structure have confirmed to have fledged by park personnel. "Limited Delays" are a maximum of 15 minutes. See Section 34 10 00 for complete maintenance of traffic requirements.
1. Construction Year 2022
    a. Fish Creek Bridge
        1) Out-of-Water Work
            a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 18, 2022*-August 29, 2022
            b) Full Closure to Vehicular Traffic: September 6, 2022-November 14, 2022.
        2) In-Water Work
            a) Single Lane Closure with Limited Delays to Vehicular Traffic: August 1, 2022-August 29, 2022.
            b) Full Closure to Vehicular Traffic: September 6, 2022-September 26, 2022.
        3) Other Restrictions: Limited vehicular access shall be provided to Glacier National Park personnel during full closures.
    b. Camas Creek Bridge
        1) Out-of-Water Work
            a) Full Closure to Vehicular Traffic: July 18, 2022*-November 14, 2022.
        2) In-Water Work
            a) Full Closure to Vehicular Traffic: August 1, 2022-September 26, 2022.
        3) Other Restrictions: Pedestrian crossing for backcountry access shall be provided during construction.

c. Dutch Creek Bridge
    1) Out-of-Water Work
        a) Full Closure to Vehicular Traffic: July 25, 2022*-November 14, 2022.
    2) In-Water Work
        a) Full Closure to Vehicular Traffic: August 1, 2022-September 26, 2022.
    3) Other Restrictions: The Inside North Fork Road is currently closed at this bridge and shall remain closed for the duration of 2022 construction. Pedestrian crossing for backcountry access shall be provided during construction.

d. Anaconda Creek Bridge
    1) Out-of-Water Work
        a) Full Closure to Vehicular Traffic: July 25, 2022*-November 14, 2022.
    2) In-Water Work
        a) Full Closure to Vehicular Traffic: August 1, 2022-September 26, 2022.
    3) Other Restrictions: The Inside North Fork Road is currently closed at this bridge and shall remain closed for the duration of 2022 construction. Pedestrian crossing for backcountry access shall be provided during construction.

e. Appistoki Creek Bridge
    1) Out-of-Water Work
        a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 5, 2022-September 19, 2022.
        b) Full Closure to Vehicular Traffic: September 26, 2022-November 14, 2022
    2) In-Water Work
        a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 5, 2022-September 19, 2022.
        b) Full Closure to Vehicular Traffic: September 26, 2022-November 14, 2022
    3) Other Restrictions: Limited vehicular access shall be provided to Glacier National Park personnel during full closures.

2. Construction Year 2023
    a. Logging Creek Bridge
        1) Out-of-Water Work
            a) Full Closure to Vehicular Traffic: July 24, 2023*-November 13, 2023
        2) In-Water Work
            a) Full Closure to Vehicular Traffic: July 31, 2023-September 25, 2023.
        3) Other Restrictions: Pedestrian crossing for backcountry access shall be provided during construction.
    b. Quartz Creek Bridge
            a) Full Closure to Vehicular Traffic: July 24, 2023*-November 13, 2023
        2) In-Water Work
            a) Full Closure to Vehicular Traffic: July 31, 2023-September 25, 2023.
        3) Other Restrictions: Pedestrian crossing for backcountry access shall be provided during construction.
    c. Akokala Creek Bridge
        1) Out-of-Water Work
            a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 17, 2023*-August 28, 2023.
            b) Full Closure to Vehicular Traffic: September 5, 2023-November 13, 2023.

2) In-Water Work
   a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 31, 2023-August 28, 2023.
   b) Full Closure to Vehicular Traffic: September 5, 2023-September 25, 2023.
3) Other Restrictions: The contractor shall coordinate with the park and residents to facilitate access for residents between Bowman Creek Bridge and Akokala Creek Bridge during construction.

d. Bowman Creek Bridge
1) Out-of-Water Work
   a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 24, 2023*-August 28, 2023.
   b) Full Closure to Vehicular Traffic: September 5, 2023-November 13, 2023.
2) In-Water Work
   a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 31, 2023-August 28, 2023.
   b) Full Closure to Vehicular Traffic: September 5, 2023-September 25, 2023.
3) Other Restrictions: The contractor shall coordinate with the park and residents to facilitate access for residents between Bowman Creek Bridge and Akokala Creek Bridge during construction

e. Ford Creek Bridge
1) Out-of-Water Work
   a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 17, 2023*-August 28, 2023.
   b) Full Closure to Vehicular Traffic: September 5, 2023-November 13, 2023.
2) In-Water Work
   a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 31, 2023-August 28, 2023.
   b) Full Closure to Vehicular Traffic: September 5, 2023-September 25, 2023.
3) Other Restrictions: None

f. Kintla Creek Bridge
1) Out-of-Water Work
   a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 24, 2023*-August 28, 2023.
   b) Full Closure to Vehicular Traffic: September 5, 2023-November 13, 2023.
2) In-Water Work
   a) Single Lane Closure with Limited Delays to Vehicular Traffic: July 31, 2023-August 28, 2023.
   b) Full Closure to Vehicular Traffic: September 5, 2023-September 25, 2023.
3) Other Restrictions: None

3. Construction Year 2022 or 2023
a. North Fork Bridge
1) All Work

a) Single Lane Closure with Limited Delays to Vehicular Traffic: September 6, 2022*-November 14, 2022, or September 5, 2023*-November 13, 2023.

2) Other Restrictions: None

b. Lee Creek Bridge All Work

1) All Work

a) Single Lane Closure with Limited Delays to Vehicular Traffic: September 6, 2022*-November 14, 2022, or September 5, 2023*-November 13, 2023.

2) Other Restrictions: None

4. Below is a table that shows the schedule that is listed above:

Weeks for Allowable Construction Timeframes Starting on the Date Listed

Bridge	Work Item	June 27, 2022	July 5, 2022	July 11, 2022	July 18, 2022	July 25, 2022	August 1, 2022	August 8, 2022	August 15, 2022	August 22, 2022	August 29, 2022	September 6, 2022	September 12, 2022	September 19, 2022	September 26, 2022	October 3, 2022	October 10, 2022	October 17, 2022	October 24, 2022	October 31, 2022	November 7, 2022	November 14, 2022	November 21, 2022
Fish Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Camas Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Dutch Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Anaconda Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Appistoki Creek Bridge	Out-of-Water Work																						
	In-Water Work																						

Bridge	Work Item	June 26, 2023	July 5, 2023	July 10, 2023	July 17, 2023	July 24, 2023	July 31, 2023	August 7, 2023	August 14, 2023	August 21, 2023	August 28, 2023	September 5, 2023	September 11, 2023	September 18, 2023	September 25, 2023	October 2, 2023	October 9, 2023	October 16, 2023	October 23, 2023	October 30, 2023	November 6, 2023	November 13, 2023	November 20, 2023
Logging Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Quartz Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Akokala Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Bowman Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Ford Creek Bridge	Out-of-Water Work																						
	In-Water Work																						
Kintla Creek Bridge	Out-of-Water Work																						
	In-Water Work																						

		June 27, 2022 or June 26, 2023	July 5, 2022 or July 5, 2023	July 11, 2022 or July 10, 2023	July 18, 2022 or July 17, 2023	July 25, 2022 or July 24, 2023	August 1, 2022 or July 31, 2023	August 8, 2022 or August 7, 2023	August 15, 2022 or August 14, 2023	August 22, 2022 or August 21, 2023	August 29, 2022 or August 28, 2023	September 6, 2022 or September 5, 2023	September 12, 2022 or September 11, 2023	September 19, 2022 or September 18, 2023	September 26, 2022 or September 25, 2023	October 3, 2022 or October 2, 2023	October 10, 2022 or October 9, 2023	October 17, 2022 or October 16, 2023	October 24, 2022 or October 23, 2023	October 31, 2022 or October 30, 2023	November 7, 2022 or November 6, 2023	November 14, 2022 or November 13, 2023
North Fork Bridge	All Work																					
Lee Creek Bridge	All Work																					

Legend:

- Full Closure
- Full Closure with Pedestrian Access
- Single Lane Closure with Limited Delays

1.8 SPECIAL CONSTRUCTION REQUIREMENTS

A. Project Website: A project website administered by the NPS will be used for purposes of managing communication and documents during the construction stage.

1. See Section 01 31 00 “Project Management and Coordination” for requirements on using the Project Website.

B. Provide and maintain portable toilets and other temporary sanitation facilities that are bear resistant.

C. Install tree protection and temporary fencing to protect trees impacted by Construction, but not designated for removal by the Contracting Officer

1.9 PROTECTION OF PARKS AND PUBLIC LANDS

A. All equipment needs to be cleaned, drained, and dry prior to arrival at the park. All equipment shall be cleaned with hot (>140F)-high-pressure water and allow to drain and dry completely before transport to the park. Equipment will be inspected by an NPS representative upon each entry to the park to be sure that no water, mud/dirt, animals such as snails and mussels, aquatic and terrestrial weeds or their seeds enter the park on construction equipment. Dirty equipment will be rejected and require additional cleaning before re-inspection. Subsequent entries in the Park of hauling vehicles will require cleaning and inspection. Notify the CO a minimum of 48 hours before the entry of vehicles and equipment to the Park

B. Notify the CO at least two weeks before starting work so a park lead orientation session can be coordinated. All Contractor and subcontractor employees are required to attend park orientation sessions before commencing work. Orientation sessions will include information about park values, regulations, bear safety and appropriate housekeeping. It will be the responsibility of the prime Contractor to disseminate and enforce all information provided at the orientation meetings, including to all Subcontractors and employees hired after Park orientation meetings. Notify the CO of all orientations that are being conducted.

C. Do not operate or park any equipment off the paved roadway except in approved areas. Do not operate or store vehicles and equipment leaking oil, gas, or anti-freeze within the Park boundaries. Do not drain oil, hydraulic fluids, anti-freeze, or other chemical onto the ground within the park boundaries. Immediately clean any and all contractor equipment and vehicle spills within the park and immediately notify the CO of any spill. Contractor shall provide, maintain, and train employees on the use of a spill emergency response kit.

D. Refueling of equipment shall occur at a minimum of 100 ft. away from any stream. All stationary motorized equipment shall be operated at minimum of 10 ft. away from any stream.

E. If waterway becomes cloudy, off-color, or otherwise turbid during construction as determined by the CMR, work shall be stopped until water clears. Contractor shall correct any issues occurring as a result of water turbidity.

F. Do not produce hot asphalt products within the Park boundaries.

G. Sleeping in vehicles or camping within the Park boundary will not be allowed unless in designated locations.

H. Do not use explosive material within the Park boundaries.

I. Comply with all Park requirements and restrictions, including, but not limited to the following: Do not feed or disturb wildlife within the Park boundaries; store and handle food, fuel, or other attractants in a manner that does not attract bears, i.e., no food, food remnants (such as sunflower seed or other nut shells, banana peels, and orange peels), pet food, garbage, drinks, trash, or food and drink containers will be placed outside vehicles, trailers, buildings, or bear-resistant containers or left in the open beds of trucks or trailers except during actual use. Contractor supplied garbage bins must be bear proof and meet Park requirements. Any mishandling of garbage, trash, food, and other potential bear attractants described above will result in the responsible person, or Contractor, receiving a citation subject to fine.

J. Not materials shall be stored in the open wrapped in plastic or any other petroleum-based product. Petroleum products are an attractant to wildlife.

K. Contractors shall only use water bottles that have only previously contained water and have not contained flavored drink of any kind.

L. Suspend construction activities and immediately notify the CO when a grizzly bear, Canada lynx, wolverine, or any other wildlife approaches, lingers near, or otherwise appears to be attracted to the project area that creates a potential animal/human conflict. Proceed with operations only after authorized by the CO.

M. Immediately remove all debris that falls into any stream as a result of construction operations.

N. Pursuant to FAR Clause 52.236-5(c), remove from the project any driver who receives two traffic citations while driving within Glacier National Park.

O. Do not carry firearms within the Park boundaries.

1.10 SOILS INVESTIGATION REPORT

A. A soils investigation report has not been provided for this project.

1.11 ADDITIONAL REPORTS

A. FHWA 2019 Bridge Inspection Reports

B. FHWA Level 1 Scour Evaluation

C. Western Federal Land Highway Division Level 2 Hydraulic Analysis for the following bridges:
   1. Akokala Creek Bridge
   2. Appistoki Creek Bridge
   3. Camas Creek Bridge
   4. Fish Creek Bridge
   5. Ford Creek Bridge

D. As-Built Drawings for the following bridges
   1. North Fork Bridge
   2. Lee Creek Bridge

3. Fish Creek Bridge
4. Dutch Creek Bridge
5. Anaconda Creek Bridge
6. Logging Creek Bridge
7. Quartz Creek Bridge
8. Bowman Creek Bridge
9. Kintla Creek Bridge
10. Ford Creek Bridge

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 11 00

SECTION 01 26 01 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section consists of administrative and procedural requirements for contract modifications.

1.2 DEFINITIONS AND ALLOWANCES

A. Home Office Overhead: Those costs incurred in support of all of a contractor's projects and not attributable to a specific job. The cost for home office overhead is only allowed as a percentage of all direct work excluding profit. The following items represent allowable home office overhead costs identified in Part 31 of the Federal Acquisition Regulation (FAR):

1. Rent
2. Utilities
3. Furnishings
4. Office equipment
5. Executive and management staff not exclusively assigned to the project
6. Support, accounting, and administrative staff
7. Preparation of cost proposals, estimating, and schedule analyses connected with Modifications
8. Estimating and preconstruction services
9. Mortgage costs
10. Real estate and corporate taxes
11. Automobile maintenance and travel costs for home office personnel
12. Home office insurances i.e. structure, automotive, umbrella, flood, etc.
13. Depreciation of equipment and other assets
14. Home office supplies (paper, staples, etc.)
15. Legal services
16. Accounting and data processing
17. Professional fees/registration

B. General Conditions (Field Office Overhead): Management and administrative costs incurred on site for the designated project. Costs associated with the preparation of modifications will not be allowed. The costs for these items are to be included only in the general conditions of the modification estimate. Only in the case of a contract time extension are additional general conditions included in modifications. The following items, if applicable, are considered allowable costs for calculating General Conditions:

1. Project Manager, Assistant Project Manager
2. Superintendent, Assistant Superintendent
3. Quality Control, Safety Officer, Environmental Manager, etc.
4. Engineers
5. Travel, lodging, and per diem (as established by Federal Travel Regulations)

6. Scheduling
7. Field Office Trailers and associated temporary utilities
8. Field office supplies

    a. Mailing and couriers
    b. Reproduction costs
    c. Storage
    d. Phones
    e. Computers
    f. Copiers

9. Personal vehicles i.e. Superintendent Pickup trucks

C. General Requirements: These are costs directly associated with the project and are necessary to perform the actual work of the modification. These costs shall be shown as direct costs in the estimate. The following items, if applicable, are considered allowable costs for calculating General Requirements:

1. Hoisting
2. Material handling
3. Temporary fencing
4. Port-a-lets
5. Trash removal, dumpsters
6. Barricades
7. Small tools
8. Safety supplies
9. Scaffolding
10. Daily cleaning
11. Traffic control
12. Temporary signage
13. Temporary heating and power

D. Personnel Costs: Costs included in the modification must only be for General Conditions staff and workers actually present and working on the project site. Modification costs for salaried workers are only allowed within the structure of a 40 hour week and no overtime or holiday pay will be allowed.

1. Worker Hourly Rates are costs directly associated with the individual worker and consist of the following:

    a. Base Rate: This is the hourly rate paid directly to the worker
    b. Labor Burden: Employer payments of all applicable burdens, this includes insurance and taxes that the business must pay on behalf of the worker to government entities and educational forums, such as:

        1) Social Security
        2) Medicare
        3) Workers Compensation– Policy and company calculation to be made available.
        4) FUTA– Cap Rate and percentage to be proportionally allocated over one year.
        5) SUTA– Cap Rate and percentage to be proportionally allocated over one year.

6) Union agreement costs – Other costs required under an enforceable collective bargaining agreement.

c. Fringe Benefits: Various non-wage compensations provided to employees such as:

1) Health Care Insurance Premiums
2) Cell Phone
3) Clothing
4) 401K and Pensions
5) Vehicle allowances
6) Gas allowance
7) Life insurance premiums
8) Disability insurance
9) Other Fringe Benefits required under an enforceable collective bargaining agreement

E. Bonuses or Deferred Compensation: No Bonus or Deferred Compensation will be allowed within any components of pricing including Home Office Overhead, General Conditions, General Requirements, Hourly Worker Rates, or the direct costs of work.

F. General Liability Insurance: An insurance policy that protects the contractor from claims resulting from bodily injury or property damage to a third party. Include this as a separate line item within all modification proposals and provide a current insurance quote upon request.

G. Performance and Payment Bonds: A performance bond is a surety bond issued by an insurance company or bank to guarantee satisfactory completion of a project. The Payment Bond guarantees that the contractor will pay the labor and material costs they have incurred. Banks and Insurance companies charge a premium for each individual project based on a sliding scale which relates to the size of the project. Include this as a separate line item in modification proposals and provide current company bonding rates upon request.

H. Builder's Risk Insurance: This covers the contractor's loss due to fire, high winds, or other natural forces. This is not reimbursed by the National Park Service (NPS) and shall not be included in modification proposals.

1.3 MODIFICATION PROPOSAL PRICING REQUIREMENTS

A. General:

1. Your proposal must be received in the format and within the time frame specified in the Request for Proposal letter. Costs or delays resulting from failure of contractor to submit within the time frame specified will not be compensable.
2. The proposal must be detailed with itemized lists of equipment, materials, labor, production rates, overhead, profit, and bond markup for each item. Labor costs must be itemized by craft and hourly rate, including Fringe Benefits and Labor Burden. If the costs of Fringe Benefits and Labor Burden are not itemized, it is assumed that that they are included in the hourly rate shown, or contractor is not requesting reimbursement. Contractor may utilize the government provided Contractor Estimate Form

(https://www.nps.gov/dscw/publicforms.htm#ct), or their own form, provided that it contains the same information and level of detail as the Gov't provided form.

3. Requests for extensions of contract time as a result of this change must be justified with a Time Impact Analysis (TIA). Refer to Division 01 Specification, "Construction Schedule", for time impact analysis requirements. TIA and associated costs must be received with the proposal by the date shown within the Request for Proposal letter. Contractor's failure to submit within the specified time frame will be construed as the Contractor waiving the right for additional time and no time extension will be allowed.
4. All supporting documentation used to justify the proposed modification will be made available to the Contracting Officer upon request.
5. Contractor must review and approve all subcontractor/supplier pricing in detail for proper format, scope, production rates, and pricing prior to submission to the Contracting Officer. All delay costs associated with not reviewing and approving subcontractor/supplier pricing will be borne by the Contractor.
6. All pricing and production rates within the estimate must be based on fair and reasonable pricing and cannot include built-in contingency.

B. Labor:

1. Contractor shall estimate the cost of labor by itemizing each craft involved, indicating worker hourly rate (base rate + labor burden + fringe benefits) for each and itemizing the hours required for each craft that will be directly engaged in modification work. Any work proposed that will require overtime work or premium pay shall be itemized separately. All rates shall be in accordance with the Davis-Bacon Act as incorporated herein. Labor Burden may include payroll taxes, Social Security, unemployment insurances, workers compensation insurance, FICA, FUTA, and other direct costs resulting from Federal, State or local laws.
2. Itemize labor costs for equipment operators separate from equipment costs.
3. The labor cost for foremen shall only be costs for related work required for the modification.

C. Materials:

1. The estimated cost for materials shall include quotes from multiple sources. Material prices must include all applicable fees and credits, including but not limited to, sales tax, freight and delivery charges, and tax rebates.
2. No markup shall be applied to any material provided by the NPS.

D. Equipment:

1. Equipment used for the project must be appropriately sized for the work being performed.
2. Do not include costs for "miscellaneous tools and equipment", in your proposal for a replacement value of $500 or less. Costs shown in excess of $500 must be broken out separately.
3. Regardless of ownership, the rates to be used in determining equipment rental costs shall be the lowest cost from one of the following sources:

    a. U.S. Army Corps of Engineers, Ownership and Operating Expense Schedule (use latest edition and applicable region)
    b. Construction Blue Book

c. Local equipment rental rates, documented by actual invoice charges, or itemized vendor quotes.

4. The estimated equipment rates shall include the operating costs of all fuel, oil, lubrication, supplies, small tools, necessary attachments, ground engaging components, tires & tracks, routine repairs and maintenance (cost of major repair and overhaul is not allowed per FAR 31.105(d)(2)), depreciation, storage, insurance, and all incidentals. Mobilization, if applicable, may be included for equipment solely used on the modification work but must be listed separately.
5. Estimate the full rate for equipment only for the duration that the equipment will be utilized to accomplish the work of the modification.
6. Standby unit rates used are to be in accordance with paragraph 1.3, D, 2, above. If the US Army Corp of Engineers is utilized then their standby rates prevail. If Bluebook or local equipment pricing is accepted, then ½ of the equipment costs minus any operating costs, major repair and overhaul will be accepted.
7. If equipment is in standby mode due solely to a documented NPS delay, the established standby rate shall apply from the first day of the delay.
8. Equipment that is not used and on the jobsite for up to five consecutive days may be classified at standby rates, provided that the equipment is or has been used solely to perform work on the modification and will be necessary to complete additional modification work. Equipment that is still on the jobsite but not in use after five consecutive days will not be considered in the modification pricing.
9. Requests for compensation for equipment stand by time must be justified, documented and itemized separately.
10. The estimated timeframe (daily, weekly, monthly) for use of the equipment must reflect the lowest cost to the Government.

E. Establishment and Application of Overhead and Profit Percentages:

1. Home Office Overhead and Profit (OH&P) shall be applied to direct costs only. Profit shall not be applied to overhead amounts; and overhead shall not be applied to profit. Home office overhead shall contain only allowable, allocable, and reasonable costs per the contract documents and FAR Part 31. Profit percentages are based on risk factors found in FAR Part 31which have been applied to the specific type of work included in this project. Negotiated rates shall not exceed the following percentages for OH&P for contractor self-performed work:

   Overhead……10%
   Profit……..8%

2. Total aggregate limit of markup (OH&P) for contractor and subcontractors on modification work shall not exceed 25%. The NPS will not be responsible for allocation of percentages between contractor and subcontractors at any tier.
3. If contractors form a partnership, than the partnership may only receive home office overhead and profit in the same amount as an individual contractor (refer to par 1.3,E,1 above). It is the responsibility of the partners to decide on the division of revenue.
4. Combined Increases and Decreases: On proposals involving both increases and decreases in the Contract Price, the overhead and profit mark-ups are required on the net increases and deducted on net decreases.
5. At no time can profit be calculated on Overhead or itself, it must be calculated on direct costs of work only.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 VALUE ENGEERING CHANGE PROPOSAL

A. Before undertaking significant expenditures, submit a written description of the value engineering change proposal (VECP) concept in accordance to the requirements of FAR Clause 52.248. Within 14 days the CO will inform the Contractor as to whether the concept appears to be viable or if the concept is unacceptable. If the CO indicates that the concept appears to be viable, prepare and submit the formal VECP.

B. The VECP shall:
   1. Require change to the instant contract to implement; and
   2. Results in reducing the overall projected cost to the agency without impairing essential functions or characteristics; provided, that it does not involve a change:
      a. In deliverable end item quantities only;
      b. In research and development (R&D) items or R&D test quantities that are due solely to results of previous testing under the instant contract; or
      c. To the contract type only. (FAR 48.001)

END OF SECTION 01 26 01

SECTION 01 27 00 – DEFINITION OF CONTRACT LINE ITEMS

PART 1 - GENERAL

1.1 SUMMARY

A. The intent of this section is to explain, in general, what is and what is not included in a contract line item, and the limits or cut-off points where one item ends and another begins.

B. If no contract line item exists for a portion of the work, include the costs in a related item.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF CONTRACT LINE ITEMS –

A. Contract Line Item No. 001: Fish Creek Bridge

1. This item consists of work pertaining to the Fish Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2022.

B. Contract Line Item No. 002: Camas Creek Bridge

1. This item consists of work pertaining to the Camas Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2022.

C. Contract Line Item No. 003: Appistoki Creek Bridge

1. This item consists of work pertaining to the Appistoki Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2022.

D. Contract Line Item No. 004: Akokala Creek Bridge

1. This item consists of work pertaining to the Akokala Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum

3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2023.

E. Contract Line Item No. 005: Bowman Creek Bridge

1. This item consists of work pertaining to the Bowman Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2023.

F. Contract Line Item No. 006: Ford Creek Bridge

1. This item consists of work pertaining to the Ford Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2023.

G. Contract Line Item No. 007: Kintla Creek Bridge

1. This item consists of work pertaining to the Kintla Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2023.

H. Contract Line Item No. 008: North Fork Bridge

1. This item consists of work pertaining to the North Fork Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2022 or 2023.

I. Contract Line Item No. 009: Lee Creek Bridge

1. This item consists of work pertaining to the Lee Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this line item shall occur in 2022 or 2023.

J. Option A: Dutch Creek Bridge

1. This item consists of work pertaining to the Dutch Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this option shall occur in 2022.

K. Option B: Anaconda Creek Bridge

1. This item consists of work pertaining to the Anaconda Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this option shall occur in 2022.

L. Option C: Logging Creek Bridge

1. This item consists of work pertaining to the Logging Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this option shall occur in 2023.

M. Option D: Quartz Creek Bridge

1. This item consists of work pertaining to the Ford Creek Bridge as shown in the contract documents.
2. Measurement for payment will be Lump Sum
3. Payment will be made at the contract lump sum price.
4. Work for this option shall occur in 2023.

END OF SECTION 01 27 00

SECTION 01 31 00 - 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. Definitions
2. Construction Coordination.
3. Submittals
4. Coordination Drawings.
5. Requests for Information (RFIs).
6. NPS/DSC Project Website.
7. Project meetings.
8. Environmental Coordination.
9. Permits

B. Related Requirements:

1. Section 01 32 16 “Construction Schedule” for preparing and submitting Contractor’s construction schedule.
2. Section 01 73 40 “Execution” for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 01 77 00 “Closeout Procedures” for coordinating closeout of the Contract.

1.2 DEFINITIONS

A. Agency with Jurisdiction: An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

B. Construction Permits – Contractor Provided: Permits that will be applied for and obtained by the contractor.

C. Government Furnished Permits: Permits that will be applied for and obtained by the government.

1.3 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.
5. Properly plan construction operations to include permit requirements. Allow enough time to execute permit provisions to maintain work schedule, site visits, inspections, and reporting deadlines.

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. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Permit requirements.
7. Pre-installation conferences.
8. Project closeout activities.

1.4 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. Accident Prevention Plan.
5. A list of Subcontractors for this project.
6. Written statements from subcontractors certifying compliance with applicable labor standard clauses.
7. Satisfactory evidence of liability insurance coverage and workman’s compensation for the Contactor and all subcontractors.
8. Waste Management Plan.
9. Quality Control Plan.
10. Under-An-Acre Pollution Prevention Plan (UPPP).
11. Historic Preservation Treatment Plan.
12. List of Required Construction Permits. Include the following information for each permit:

a. Name of Permit.
b. The Agency(ies) with Jurisdiction issuing the permit.
c. Information required from the Government to complete the permit application.

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.

1.5 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 created on the NPS/DSC Project website.

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 on the NPS/DSC website as follows:

1. Enter the general information at the top of the form.
2. Under the “Action” section at the bottom of the form, select “Question” then select “CMR” in the drop-down of the “Send to” box.
3. Enter the details of the question and attach related documents.
4. Select “Submit Form” at the bottom of the page.

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.

1.6 PROJECT RECORD DRAWINGS

A. A set of record drawings shall be kept current with all updates to the construction drawings that incorporate the results of RFIs and all as-built conditions.

B. Record drawings shall be available to the Contracting Officer for inspection at the time of month progress payment requests to ensure they are current and encompass the work completed to date.

C. Complete record drawings are a required deliverable of this contract. See Section 01 77 00 Closeout Procedures for additional information on project record drawings.

1.7 PROJECT WEB SITE

A. Use the NPS/DSC Project Website for communication throughout the contract period. The NPS/DSC Project Website will be used for the following functions.

1. Project directory.
2. Project correspondence.
3. Meeting agendas and minutes.
4. Contract modifications forms and logs.
5. RFI form and processing.
6. Task and issue management.
7. Photo documentation.
8. Baseline schedule, schedule updates and calendar management.
9. Submittal form and processing.
10. Payment coordination documentation.
11. Drawing and specification document hosting, viewing, and updating.
12. Online document collaboration.
13. Reminder and tracking functions.
14. Archiving functions.
15. Notification of submittal and RFI statuses and current responsible party.
16. Permits and addendums

B. Some documents however are not suitable to be shared using the NPS/DSC Project website. Documents containing Personal Identifying Information (PII) (i.e. certified payrolls) shall not be shared using the NPS/DSC Project website and shall be coordinated with the Project team as appropriate.

C. Submit to the CO a list of all employees who will need access to the website. The users will receive an invitation to register from the Department of Interior (DOI). Once the user is registered on the DOI website, they will be given access to the NPS/DSC Project website. For login procedures and other information, refer to the Workflows website at http://www.nps.gov/dscw/precon_spproj.htm.

D. All users will be required to have the following software packages:

1. Internet Explorer version 7 or later.
2. Adobe Acrobat Professional (Pro) version 9 or later or equivalent PDF software
3. Microsoft Teams

1.8 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. Jobsite Safety.
4. Resolution of comments on required Division 01 documents.
5. Coordination of Subcontractors.
6. Labor law application.
7. Modifications.
8. Payments to Contractor.
9. Payroll reports.
10. Contract time.
11. Liquidated damages.
12. Contractor Performance Evaluation.
13. Display of Hotline posters.
14. Notice to proceed.
15. Correspondence procedures.
16. NPS/DSC Project website.
17. Acceptance/rejection of work.
18. Progress meetings.
19. Submittal procedures.
20. NPS Final Accessibility Inspection.
21. Environmental requirements.
22. Permit requirements.
23. As-constructed drawings/operation and maintenance (O&M) manuals.
24. Saturday, Sunday, holiday and night work.
25. Reference materials.
26. Value engineering.
27. Schedule of Values.

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. Discussion of risk identification and mitigation.
    c. Submittal status.
    d. Review of off-site fabrication and delivery schedules.
    e. Requests for information (RFI) and other issues.
    f. Modifications.
    g. Work in progress and projected.
        1) Status of required inspections (Special Inspections, Accessibility, etc.)
    h. Inspections of work in progress and projected (Special inspections,
    i. Construction Schedule update (provide updated CPM).
    j. Status of Project Record Drawings and O&M manuals.
    k. Other business relating to work.
    l. Permit requirements.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators 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. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Review of mockups.
    i. Possible conflicts.
    j. Compatibility requirements.
    k. Time schedules.
    l. Weather limitations.
    m. Manufacturer's written instructions.
    n. Warranty requirements.
    o. Compatibility of materials.
    p. Acceptability of substrates.

q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of agency(ies) with jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.
z. Discussion of risk identification and mitigation.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. 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.

1.9 ENVIRONMENTAL COORDINATION

A. Contractor's Environmental Manager: Designate an on-site party responsible for overseeing the Contractor's conformance to environmental goals for the project and implementing procedures for environmental protection.

1. Qualifications: Minimum 3 years Construction experience on projects of similar size and scope; with environmental procedures similar to those of this project; familiarity with Environmental Management Systems (EMSs) such as ISO 14001; must be familiar with environmental regulations applicable to construction operations.
2. Responsibilities: Responsibilities shall include:

a. Compliance with applicable Federal, State, and local environmental regulations, including maintaining required documentation.
b. Implementation of the Waste Management Plan (WMP).
c. Implementation of the Indoor Air Quality (IAQ) Management Plan.
d. Implementation of the Storm Water Pollution Prevention Plan (SWPPP).
e. Present an overview of environmental issues and summarize site specific procedures relating to management plans at the Preconstruction conference.
f. Training for Contractor personnel in accordance with their position requirements.
g. Monitoring and documentation of environmental procedures.

B. Perform project quality control in accordance with requirements specified in Related Sections, including:

1. Quality Requirements.
2. Regulatory Requirements.
3. Indoor Air Quality (IAQ) Management.
4. Noise & Acoustics Management.
5. Temporary Storm Water Pollution Prevention Environmental Management.
6. Construction Waste Management.

C. Contractor's Environmental Training Program: Contractor shall provide environmental training for workers performing work on the project site. Training shall include the following:

1. Overview of environmental issues related to the Project.
2. Review of site specific procedures and management plans:

    a. Construction Waste Management.
    b. Temporary Storm Water Pollution Prevention.

3. Pollution Prevention (P2) practices: Submit evidence of P2 training, participation in P2 programs, familiarity with P2 practices.
4. Compliance with environmental regulations: As specified in Regulatory Requirements. Submit Contractor 40 CFR employee training records upon request of Contracting Officer.

D. Provide documentation for environmental procedures as specified herein and in accordance with approved Waste Management Plan, IAQ Management Plan, and Storm Water Pollution Prevention Plan.

1.10 PERMITS

A. General:

1. Permits and Responsibilities: The Contractor shall, without additional expense to the Government, be responsible for obtaining any necessary licenses and permits, and for complying with any Federal, State and municipal laws, codes, and regulations applicable to the performance of the work. The Contractor shall also be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the work.
2. For the purpose of this contract the Contractor will not be considered an agent of the Government. Therefore the Contractor will comply with the appropriate Federal, State and local laws.

B. Government Furnished Permits: During the development of the project's design the permits listed below were negotiated and agreed to by the Government. The terms and provisions of these permits shall be adhered to for the duration specified in each permit. Copies of the permits must be on site during construction.

1. A permit was acquired for United States Army Corps of Engineers (USACE) Section 404 Nationwide Permit 3. The Agency(ies) with Jurisdiction for this permit is USACE.
2. A permit was acquired for USACE Section 404 Nationwide Permit 14. The Agency(ies) with Jurisdiction for this permit is United States Army Corps of Engineers.
3. A permit was acquired for USACE Section 401 Water Quality Certifications. The Agency(ies) with Jurisdiction for this permit is United States Army Corps of Engineers.
4. A permit was acquired for MT DEQ 318. The Agency(ies) with Jurisdiction for this permit is Montana Department of Environmental Quality

C. Potential Permits: The permits listed below were identified during the design process as likely to be required based on typical means and methods of construction. The list is provided to assist the contractor in determining which permits will be required for the contract's chosen means and

methods. The list shall not be considered complete, as it is the responsibility of the contractor to determine means and methods, and obtain the required permits. It is the responsibility of the Contractor to obtain all permits required to legally conduct the work.

1. Construction trailer, Utilities hookup permit – Contact Will Hamerquist at Polebridge Mercantile, Phone: 406-888-5105, E-mail: hammerquist@gmail.com
2. MPDES Construction Dewatering General Permit (CDGP) – Montana Department of Environmental Quality
3. Encroachment Permit for work on west side of North Fork Bridge – Flathead County

D. Coordination with Agency(ies) with Jurisdiction Issuing Permits

1. Coordination: Contact the Agency(ies) with Jurisdiction as needed and sufficiently in advance to avoid delaying the work: Coordinate meetings, reporting requirements, inspections, or any other requirements.

E. Administrative Procedures:

1. Coordinate scheduling and timing of required administrative provisions of project permits with Agency(ies) with Jurisdiction, Construction Manager, and Park to avoid conflicts and to ensure orderly execution of the Work.
2. Supply all needed information to Agency(ies) with Jurisdiction issuing permits, pay any fees required and provide all material needed to comply with the permit's conditions and provisions.
3. Upload permits to the NPS/DSC project website when the permits are obtained.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 31 00

SECTION 01 32 16 – 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 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by the Contracting Officer.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Float: The measure of leeway in starting and completing an activity.

1. Float: Float is not for the exclusive use or benefit of either the Government or the Contractor but is jointly owned.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

1.3 SUBMITTALS

A. Electronic Copies: All schedules and reports submitted shall be posted on the NPS/DSC project website, provided in the native electronic file format. It is the intent of the Government to limit the number of printed reports to only those reports determined by the project team to be essential.

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

C. 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.

D. CPM Reports: Concurrent with CPM schedule, submit three paper copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of predecessor and successor tasks for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.

E. 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.

F. Construction Schedule Revisions and Time Impact Analysis: For each Construction Schedule revision submit two paper copies of a Time Impact Analysis. Each Time Impact Analysis shall include a Fragmentary Network (Fragnet), incorporated into the currently accepted Construction Schedule, demonstrating how the Contractor proposes to incorporate a modification, change, delay, or Contractor request.

1.4 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 software limitations, content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, work stages, area separations, and interim milestones.

4. Review delivery dates for Government-furnished products.
5. Review schedule for work of separate Government contracts.
6. Review time required for review of submittals and re-submittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for completion and startup procedures.
9. Review time required for obtaining and activating permits.
10. Review and finalize list of construction activities to be included in schedule.
11. Review baseline schedule comments, resolve issues and progress on incorporating them
12. Review procedures for updating schedule.
13. Discuss reporting requirements and establish a protocol for naming and transmitting electronic schedules.

B. Contractor's Schedule Representative: Before or at the preconstruction conference, designate an authorized representative to be responsible for the preparation and maintenance of the Construction Schedule. A resume outlining the qualifications of the Scheduler shall be submitted to the Contracting Officer for acceptance. The Scheduler shall have prepared and maintained at least 5 previous schedules of similar size and complexity similar to this Contract, demonstrating proficiency in the use of scheduling software. The authorized representative will be responsible for preparing the Baseline Schedule, all required updates, revisions, Time Impact Analyses, and preparation of reports.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate Contractors.

B. 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. Do not break down unit price items. Use only the contract price for unit price items.

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

D. 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 7 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 14 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. Substantial Completion: Allow time for Government administrative procedures necessary for certification of Substantial Completion. (For more information, refer to Division 01 Specification 01 77 00 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. Phasing: Arrange list of activities on schedule by phase.
b. Work Restrictions: Show the effect of the following items on the schedule:

1) Coordination with existing construction.
2) Limitations of continued occupancies.
3) Uninterruptible services.
4) Partial occupancy before Substantial Completion.
5) Use of premises restrictions.
6) Provisions for future construction.
7) Seasonal variations.
8) Environmental control.
9) Permit provisions.

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

1) Subcontract awards.
2) Submittals.
3) Purchases.
4) Mockups.
5) Fabrication.
6) Sample testing.
7) Deliveries.
8) Installation.
9) Tests and inspections.
10) Adjusting.
11) Curing.

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 14 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.

E. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

1. Use Microsoft Project or Primavera for the current Windows operating system operating system.

PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE UPDATES

A. Progress Meeting Updates: Provide a 2-week look-ahead schedule, derived from the currently accepted schedule, before each weekly progress meeting. Utilize the look-ahead schedule to facilitate and take notes on discussions held during the progress meeting.

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.

3.2 TIME IMPACT ANALYSIS FOR CONTRACT MODIFICATIONS CHANGES DELAYS AND CONTRACTOR REQUESTS:

1. Requirements: When contract modifications or changes are initiated, delays are experienced, or the Contractor desires to revise the currently accepted Construction

Schedule, the Contractor shall submit to the Contracting Officer a written time impact analysis illustrating the influence of each modification, change, delay, or Contractor request on the contract time.

2. Time Extensions: Activity delays, which result in projecting a late completion date, shall not automatically mean that an extension of the contract time is warranted or due the Contractor. It is possible that a modification, change, or delay will not affect existing critical path activities or cause non-critical activities to become critical. A modification, change, or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the Schedule, thereby not causing any effect on the contract time. Time extensions will be granted in accordance with the terms of the contract.
3. Extension of the contract time will be granted only to the extent the equitable time adjustments to the activity or activities affected by the modification, change, or delay exceeds the total (positive or zero) float available on a particular activity.
4. Procedure: Each time impact analysis shall be submitted within the time period stated in a request for proposal, or the time period designated under the clauses entitled Changes or Default. In cases where the Contractor does not submit a written request for extension of time and a time impact analysis within the designated time, it is mutually agreed that the particular modification, change, delay, or Contractor request does not require an extension of the contract time. Upon acceptance, the time impact analysis shall be incorporated into the currently accepted Construction Schedule at the next monthly schedule update.
5. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall Construction Schedule.

END OF SECTION 01 32 16

SECTION 01 32 33 – PHOTO DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Existing condition and periodic construction images of each of the bridges that are included in this project.

2. Existing condition and periodic construction images of the approaches and adjacent roadways to the bridges that are included in this project.

3. Photo documentation of new discovered archeological resources per the requirements of 01 35 13.22 Archeological Protection.

B. See Division 01 Section "Closeout Procedures" for a complete listing of closeout documents.

1.2 RELATED SECTIONS

A. Section 01 35 13.22 for archeological resources.

1.3 SUBMITTALS

A. Construction Images: Submit images electronically within seven days of taking the image. Include the following for each:

1. Include location, date, time and number (sequentially number all images) in filename.
2. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
3. Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
4. Images shall be transferred free of copyright.

B. Closeout: Submit a complete set of digital image electronic files as a Project Record Document**.** Submit on USB drive or electronically.

1. Provide an index as a separate file. List each image as a file name with number, date, and time. Include description and or vantage point image was taken.
2. Submit images that have the same aspect ratio as the sensor, un-cropped.

PART 2 - PRODUCTS

2.1 FORMAT REQUIREMENTS

A. Media: USB drive, DVD, or another approved electronic format.

B. Images:
   1. Provide color images in TIFF "II" format, version 6.0.
   2. Minimum sensor size of 8 mega pixels, and at an image resolution of not less than 3200 by 2400 pixels, and 300 dpi (dots per inch).
   3. Color images must be produced in RGB (Red Green Blue) color mode as 24-bit or 48-bit color files.

PART 3 - EXECUTION

3.1 CONSTRUCTION IMAGES

A. General: Take digital images using the maximum range of depth of field, and that are in focus, to clearly show the Work. Images with blurry or out-of-focus areas will not be accepted. These images shall be in addition to the required images in the daily logs from the contractor.

   1. Maintain index (digital file folder) with each set of Construction images that identifies the location, number, date, time, and direction/orientation for each image.
   2. Maintain one set of images accessible in the field office at the Project site, available at all times for reference.

B. Existing Condition Images: Before starting construction, take color digital images of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Contracting Officer.

   1. Take a minimum of eight separate images at each bridge location to fully show the existing conditions of the approaches and roadway adjacent to the bridges before starting the Work.
   2. Take a minimum of eight separate images of existing bridges to accurately record physical conditions at start of construction of each of the bridges.

C. Periodic Construction Images: Take a minimum of 12 color, digital images weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last images were taken.

D. Additional Images: Contracting Officer may issue requests for additional images, in addition to periodic Construction images specified.

   1. Three days notice will be given, where feasible.
   2. In emergency situations, take additional images within 24 hours of request.
   3. Circumstances that could require additional images include, but are not limited to, the following:

a. Immediate follow-up when on-site events result in construction damage or losses.
b. Images to be taken at fabrication locations away from Project site.
c. Substantial Completion of a major phase or component of the Work.
d. Extra record images at time of final acceptance.

END OF SECTION 01 32 33

SECTION 01 33 23 - 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 submittals.

1.2 DEFINITIONS

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

B. Informational Submittals: Written information that does not require Government's responsive action. Submittals may be rejected for not complying with the requirements.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 GENERAL SUBMITTAL PROCEDURES

A. General: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual specific sections.

1. Contracting Officer reserves the right to require submittals in addition to those called for in individual sections.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Review them for legibility, accuracy, completeness, and compliance with Contract Documents.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Contracting Officer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittal List: A submittal list has been attached to the end of this Specification Section. The intent is to provide an overall summary of submittal requirements and not a comprehensive list. The requirements of the individual Specification Sections, terms and conditions of the Contract still apply regardless of what is shown on the submittal list.

D. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence when an e-mail notification is received by the Contracting Officer (or designee) indicating the submittal has been posted on the NPS/DSC project website and is ready for review. When the Contracting Officer has completed their review, an e-mail notification will be sent to the Contractor indicating the submittal has been processed. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.

1. Action Submittals

    a. Initial Review: Allow 30 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required.
    b. Re-submittal Review: Allow 14 days for review of each re-submittal.

2. Informational submittals

    a. Review: Allow 10 days for review of each submittal.

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. 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.
    d. Will coordinate the installation of an approved item and make all changes required in other elements of the work because of the substitution.
    e. Waives all claims for additional expenses that may be incurred as a result of the substitution.

F. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. CM-SPE Transmittal Form: All submittals shall be transmitted using National Park Service form CM-SPE form. The form is accessed and completed on the NPS/DSC Project website. No action will be taken on a submittal item unless accompanied by the CM-SPE transmittal form.

    a. Complete the general information at the top of the form.
    b. Provide all required information based on the submittal type
    c. Attach all related documents.
    d. Sign the CM-SPE form in the contractor section at the bottom of the form, and select "submit" when complete.

2. Physical samples: Complete the CM-SPE on the NPS/DSC Project website as described above. Deliver the physical sample to the CO (or designee) on site for processing. All comments and actions will be documented on the CM-SPE form on the NPS/DSC Project website.

G. Identification: Submittal number or other unique identifier, including revision identifier.

1. Submittal number shall use a sequential number (e.g., .001). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., .001.A).

H. Re-submittals: Make re-submittals using the same process used with the initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in the title block on the CM-SPE and clearly indicate the extent of revision.
3. Re-submit submittals until they are marked "Approved" or "Approved with notations".

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, and others as necessary for performance of construction activities.

J. Use for Construction: Use only final submittals with mark indicating "Approved" or "Approved with notations". Ensure all notations have been incorporated and, at a minimum, keep one copy of the final approved submittal on site for use during construction.

1.4 CONTRACTOR'S USE OF CAD FILES

A. General: At Contractor's written request, copies of CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:

1. Files will be provided as is; no format or other changes to files or changes to the objects in the drawing will be done by the Government.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's product specifications.
b. Manufacturer's installation instructions: When Contract Documents require compliance with manufacturer's printed instructions, provide one complete set of instructions to Contracting Officer and keep another complete set of instructions at the project site until substantial completion.
c. Manufacturer's catalog cuts: Submit only pertinent pages; mark each page of standard printed data to identify specific products proposed for use.
d. Wiring diagrams showing factory-installed wiring.
e. Printed performance curves.
f. Operational range diagrams.
g. Compliance with specified referenced standards.
h. Testing by recognized testing agency.

4. Submit product data in PDF file format before or concurrent with samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal of CAD Drawings is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams.
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Notation of coordination requirements.
j. Notation of dimensions established by field measurement.
k. Relationship to adjoining construction clearly indicated.
l. Seal and signature of professional engineer if specified.
m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Submit shop drawings as a PDF electronic file.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Complete and post the CM-SPE on the NPS/DSC website for processing and documentation of action on submitted samples.
3. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Submittal Number and title of appropriate Specification Section.

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit two set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Contracting Officer will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit four sets of Samples. Contracting Officer will retain three Sample sets; remainder will be returned.

D. Construction Materials: The Contractor is encouraged to submit for approval products made out of recycled or environmentally responsible material. Every effort will be made by the National Park Service to approve these materials.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by individual Specification Sections.

1. Post informational submittals as PDF electronic files directly to the NPS/DSC project website.

2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Informational submittals that do not comply with the requirements specified in the Contract Documents will be rejected and one copy will be returned.

B. Coordination Drawings: Comply with the requirements specified in Section 01 31 00 "Project Management and Coordination."

C. Contractors Construction Schedule: Comply with the requirements specified in Section 01 32 16 "Construction Schedule."

D. Accident Prevention Plan: Comply with the requirements specified in Section 01 35 23 "Safety Requirements."

E. Schedule of Values: Comply with the requirements specified in Section 01 32 16 "Construction Schedule."

F. Waste Recycling Plan: Comply with the requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."

G. Quality Control Plan: Comply with the requirements specified in Section 01 40 00 "Quality Requirements."

H. Under-An-Acre Pollution Prevention Plan: Comply with the requirements specified in Section 01 57 23 "Under-An-Acre Pollution Prevention" and any storm water permit requirements identified in Section 01 31 00.

I. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

J. Welding Certificates: Prepare written certification that welding procedures and personnel comply with the requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

K. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with the requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

L. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with the requirements in the Contract Documents. Include evidence of manufacturing experience where required.

M. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with the requirements in the Contract Documents.

N. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with the requirements in the Contract Documents.

O. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with the requirements in the Contract Documents.

P. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with the requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Q. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.

R. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

S. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

T. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with the requirements in the Contract Documents.

U. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment.

V. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

W. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

X. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Statement on condition of substrates and their acceptability for installation of product.
2. Summary of installation procedures being followed, whether they comply with the requirements and, if not, what corrective action was taken.
3. Results of operational and other tests and a statement of whether observed performance complies with the requirements.

Y. Permit Compliance Products: Prepare required information for compliance with permit provisions. Products include written notification of project startup, suspension, and completion of work; photo documentation of site conditions; reports; and drawings.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions.

3.2 CONTRACTING OFFICER'S ACTION

A. General: Submittals will be disapproved without technical review if identification information is missing, not filled in, or if placed on the back of the submittal; an incorrect 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.

1. Any work done or orders for materials or services placed before approval shall be at the Contractor's own risk.

B. Action Submittals: Contracting Officer will review each submittal, generate comments on corrections or modifications required, and indicate the appropriate action on the CM-SPE Transmittal Form. The submittal will be marked in one of three ways as defined below:

1. APPROVED: Acceptable with no corrections.
2. APPROVED WITH NOTATIONS: Minor corrections or clarifications required. All comments are clear and no further review is required. The Contractor shall address all review comments when proceeding with the work.
3. DISAPPROVED - RESUBMIT: Rejected as not in accordance with the contract or as requiring major corrections or clarifications. The Contracting Officer will identify the reasons for disapproval. The Contractor shall revise and resubmit with changes clearly identified.

C. Informational Submittals: Contracting Officer will review each submittal and will either accept or reject it.

D. Partial submittals are not acceptable, will be considered non-responsive, and will be returned without review.

END OF SECTION 01 33 23

SUBMITTAL LIST

GLAC/311336/Glacier National Park Bridge Rehabilitation

SUBMITTAL			REQUIREMENTS (indicate with an "X")							
			INFORMATIONAL				ACTION			
Spec. Sec.	Par. No.	Description	CERT./LAB TEST	REPORT/CALC. OR PLAN	Mfg. DATA & INSTRUCTIONS		SHOP DRAWING	SAMPLE	Mfg. DATA & INSTRUCTIONS	
013100	1.4.A.1	Letter designating Project Superintendent		X						
013100	1.4.A.2	Construction Schedule		X						
013100	1.4.A.3	Schedule of Values		X						
013100	1.4.A.4	Accident Prevention Plan		X						
013100	1.4.A.5	A list of Subcontractors for this project		X						
013100	1.4.A.6	Written statements from subcontractors certifying compliance with applicable labor standard clauses		X						
013100	1.4.A.7	Satisfactory evidence of liability insurance coverage and workman's compensation for the Contactor and all subcontractors		X						
013100	1.4.A.8	Waste Management Plan		X						
013100	1.4.A.9	Quality Control Plan		X						
013100	1.4.A.10	Under-An-Acre Pollution Prevention Plan		X						
013100	1.4.A.11	Historic Preservation Treatment Plan		X						
013100	1.4.A.12	List of Required Construction Permits		X						
013216	1.3.B	Schedule of Values		X						
013216	1.3.C	Construction Baseline Schedule		X						
013216	1.3.D	CPM Reports		X						
013216	1.3.D.1	Activity Report		X						
013216	1.3.D.2	Logic Report		X						
013216	1.3.D.3	Total Float Report		X						
013216	1.3.E	Construction Schedule Updates		X						
013216	1.3.F	Construction Schedule Revisions and Time Impact Analysis		X						
013233	1.3.A	Construction Images			X					
013233	1.3.B	Closeout	X							
013513.22	1.3.A	Daily Work Schedule		X						
013523	1.2.A	Accident Prevention Plan		X						
014000	1.4.A	Quality Control Plan		X						
014000	1.4.B	Qualification Data			X					
014000	1.4.C	Contractor's Quality Control Daily Reports		X						
014000	1.4.D	Test Reports		X						
014000	1.4.E	Accessibility Inspection Report		X						
014000	1.4.F	Off-Site Inspection Reports		X						
014000	1.4.H	Permits, Licenses, and Certificates	X							
015723	1.3.A.1	UPPP		X						
015723	1.3.B	Inspection Schedule		X						

015723	1.3.C	Erosion Control Products			X						
016700	1.3.A.1	Affirmative Procurement Reporting Form		X							
016700	1.3.A.2	Environmental data			X						
016700	1.3.A.3	Material Safety Data Sheets	X		X						
016700	1.3.A.4	Chain Of Custody		X							
017340	1.2.A	Landfill Receipts	X								
017340	1.2.B	Quantity Surveys	X								
017419	1.4.A	Waste Management Plan		X							
017419	1.4.B	Progress Documentation		X							
017419	1.4.C	Waste Reduction Calculations	X								
017419	1.4.D	Records of Donation	X								
017419	1.4.E	Records of Sales	X								
017419	1.4.F	Recycling and Processing Facility Records	X								
017419	1.4.G	Landfill and Incinerator Disposal Records	X								
017419	1.4.H	Qualification Data			X						
017419	1.4.I	Progress payment requirement	X								
017419	1.4.J	Closeout Submittals	X								
030900	1.4.A.2	Concrete Mix	X	X			X	X	X		
030900	1.4.A.3	Product Technical Data	X	X					X		
030900	1.4.A.4	Reinforcing Steel	X	X			X		X		
030900	1.4.A.5	Shop Drawings	X	X			X		X		
030900	1.4.A.6	Strength Test Results	X	X					X		
030900	1.4.A.7	Certifications	X	X					X		
030900	1.4.A.8	Test Reports	X	X					X		
033030	1.3.A	Product Information			X			X			
033030	1.3.B	Operator Qualifications	X								
033030	1.3.C	Samples			X			X			
033030	1.3.D	Temporary Shoring Plan		X							
040140.91	1.2.A	Product Data			X						
040140.91	1.2.B	Historic Preservation Treatment Plan		X	X						
040140.91	1.2.C	Samples			X			X			
040140.91	1.2.D	Certifications	X		X						
040140.91	1.2.E	Mortar Samples			X			X			
040140.91	1.3.B	Mock-ups		X				X			
055000	1.3.A.1	Shop Drawings					X				
055000	1.3.B.1	Welder Qualifications	X								
055000	1.3.B.2	Product Technical Data			X						
055000	1.3.B.3	Manufacturer's Installation Instructions			X						
055000	1.3.B.4	Certifications	X								
055000	1.3.B.5	Test Reports	X								
061000	1.2.B	Qualifications	X		X						
061000	1.3	Shop Drawings	X	X			X				
061300	1.4.A	Product Data			X				X		
061300	1.4.B	Shop Drawings		X			X				
061300	1.4.C	Material Certifications	X	X							
061300	1.4.D	Certificates of Inspection	X	X							
071840	1.4.A	Plan		X							

071840	1.4.B	Materials			X					
099190	1.4.A	Shop Drawings		X			X			
099190	1.4.B	Samples			X			X		
311000	1.3.A.1	Product Data			X				X	
311000	1.3.A.2	Product Data			X				X	
312310	1.5.A	Product Data			X					
312310	1.5.B	Samples						X		
312316	1.2.A	Sources	X		X					
312316	1.2.B	Delivery Tickets		X						
312500	1.3.A.	Product Data			X				X	
312500	1.3.B	Temporary Stream Diversion Plan		X						
313613	1.3.A	Shop Drawings		X			X			
313613	1.3.B.1	Product Data			X					
313613	1.3.B.2	Manufacturers Data			X					
313613	1.3.B.3	Certifications	X							
313613	1.3.B.4	Test Reports		X						
313716	1.3.A	Test Reports	X		X					
313716	1.3.B	Samples						X		
313717	1.4.A	Test Reports	X		X					
313717	1.4.B	Samples						X		
321216	1.3.A	Product Data			X				X	
321216	1.3.B	Mix Design	X	X					X	
340100	1.4.A	Traffic Control Plans			X					
340100	1.4.B	Certifications of Work Zone Traffic Control Devices	X							

SECTION 01 35 13.22 – ARCHEOLOGICAL PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. The work of this section consists of protecting archeological resources contained in soil deposits for the Appistoki Bridge work and the roadway work of the Inside North Fork Road.

1.2 RELATED SECTIONS

A. Section 01 32 33 for photo documentation of archeological resources.

1.3 DEFINITIONS

A. Archeological Resources: Archeological resources are the physical evidences of past human activity, including evidences of the effects of that activity on the environment. Archeological resources represent both prehistoric and historic time periods. They are found above and below ground and under water.

B. Archeologically Sensitive Areas: Areas that have the potential to contain significant (National Register eligible) archeological resources. If National Register eligible or listed archeological resources could not be avoided, an appropriate mitigation strategy would be developed in consultation with the state historic preservation officer and, if necessary, associated American Indian tribes.

C. Non-sensitive Areas: Areas with little, if any, potential of containing significant (National Register eligible) archeological resources.

D. Archeological Monitor: Representative of the Government designated to oversee construction activities that could disturb archeological resources.

E. Archeological Resources Protection Act (ARPA) of 1979 (P.L. 96-95; 93 Stat. 712): defines archeological resources as any material remains of past human life or activities that are of archeological interest and at least 100 years old; Section 4 of the statute describes the requirements that must be met before Federal authorities can issue a permit to excavate or remove any archeological resource on Federal or Indian lands; the curatorial requirements of artifacts, and other materials excavated or removed.

1.4 SUBMITTALS

A. Daily Work Schedule; Submit a Daily work Schedule detailing construction work in archeologically sensitive areas. Submit to Contracting Officer 30 days before start of ground disturbing site work.

1.5 QUALITY ASSURANCE

A. At least one week before on-site work begins, Contractor shall meet with Contracting Officer and Archeological Monitor to discuss Daily Work Schedule and equipment and special methods to be used in archeologically sensitive areas. Contractor shall ensure that approved Daily Work Schedule is followed throughout construction.

PART 2 - PRODUCTS

2.1 DAILY WORK SCHEDULE

A. A Daily Work Schedule is required for all work occurring within archeologically sensitive areas. Include all work that is to occur within the area and key the schedule to the drawings to include the following:

1. Starting and ending dates of ground-disturbing construction.
2. Locations of temporary facilities, such as barriers, field offices, staging areas, sanitary facilities, borrow pits, and haul and access roads.
3. Types of construction, such as clearing, topsoil stripping, structure or trench excavation, landscaping, and post construction clean-up.
4. Methods and equipment used for each type of construction.
5. Plan for relocating work in the event of temporary work stoppages at each archeologically sensitive area

PART 3 - EXECUTION

3.1 BARRICADES

A. Comply with requirements specified in Division 01 Section “Temporary Facilities And Controls.”

3.2 ARCHEOLOGICAL INVESTIGATION BY NON-NPS PERSONNEL

A. A permit is required for any archeological investigations (e.g. excavation, shovel testing, coring, pedestrian survey, underwater archeology, rock art documentation, or other types of reconnaissance including the archaeological monitoring of construction) carried out on parklands by non-NPS personnel, unless carried out under a contract or a cooperative agreement specifically written for archeological investigations. Permits are issued under the Archaeological Resources Protection Act of 1979 (ARPA). The NPS does not issue a permit for archeological investigations carried out by NPS archeologists, or to archeologists working on NPS archeological projects under a contract or cooperative agreement.

B. Applicants should submit a Permit Application to the regional director, with a copy to the park manager.

3.3 OBSERVATION

A. Archeological Monitor will observe all ground-disturbing site work, including construction of temporary facilities, at all archeologically sensitive areas, from a safe location mutually agreed on by Contractor and Monitor. As new ground is broken, Monitor will examine excavated materials, using construction layout centerline and perimeter staking as a reference point to record locations of findings.

3.4 DISCOVERY OF RESOURCES

A. If Archeological Monitor discovers resources, immediate relocation of the work to a non-sensitive area may be required to allow Monitor to identify and document resources and, if necessary, develop an appropriate mitigation plan. While Archeological Monitor is documenting resources in sensitive areas, Contractor shall relocate work to non-sensitive areas where monitoring is not normally required.

B. If resources are discovered while Archeological Monitor is absent, stop work immediately and report the discovery to the Contracting Officer.

C. Discovered resources shall be photographed according to the format requirements in Specification 01 32 33 Photo Documentation, Section 2.1.

3.5 WORK STOPPAGE

A. The Contractor shall plan, schedule, and execute the work to prevent stoppages at one area from stopping all work at the construction site

END OF SECTION 01 35 13.22

SECTION 01 35 23 - SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SUBMITTALS

A. Accident Prevention Plan (APP): 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 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. Retain copies of all operators licenses and/or certifications onsite.

1.4 ACCIDENT REPORTING

A. Reportable Accidents (per OSHA 29CFR 1904): 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 (APP)

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 shall be documented with topic and attendees.
3. First aid and rescue 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, with a Job Hazard Analysis (JHA)/Job Safety Analysis (JSA), etc.
5. Training, both initial and continuing.
6. Planning for possible emergency situations, such as cave-ins, earthquake, explosions, fires, floods, power outages, slides, 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 appropriate to 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. Selection shall conform to OSHA 29CFR 1926.95 Subpart E.

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 29CFR1926 Subpart D requirements. Maintain readily available, on site, MSDS/Safety Data Sheets (SDS) for each chemical.

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

2. Maintain a spill emergency response kit.
3. Train employees how to respond to a spill and use the 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, maintain, and document other protective equipment and devices before use and on a periodic basis to ensure safe operation. Retain inspection documentation onsite.

3.4 SAFETY MEETINGS

A. As a minimum, conduct one 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. Topics need to coincide with work scheduled for the following week. Document and submit meeting minutes to the Contracting Officer within one day after the meeting.

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 Officers Representative 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 use 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 on or visiting the site to wear hard hats and other necessary personal protective equipment in good repair at all times. As a minimum, maintain six hard hats and all other APP required equipment.

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 01 35 23

SECTION 01 40 00 - 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 49 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. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Integrated Mockups: Mockups of the project features erected at the Project site, consisting of multiple products, assemblies, and subassemblies.

D. 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.

E. 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.

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

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

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

I. 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 DSC forms available by accessing the DSC Workflows website, http://www.nps.gov/dscw/publicforms.htm.

1. Review CMR Dailies and reconcile any differences prior to posting CQC Dailies on the NPS/DSC Project Website.

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 insure 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. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated (including Structural Tests and Special Inspections (STSI)). Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

G. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the work.

H. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by Contract, is acceptable to the Contracting Officer.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
3. All measuring devices, laboratory equipment, and instruments shall be calibrated at established intervals against certified standards in accordance with NIST requirements. Upon request, measuring and testing devices shall be made available for use by the Government for verification tests.

I. 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.

J. Mockups: Before installing portions of the work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Contracting Officer.
2. Notify Contracting Officer seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Contracting Officer’s approval of mockups before starting work, fabrication, or construction.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

1.6 QUALITY CONTROL

A. The Contractor is responsible for all testing and inspections, including Structural Tests and Special Inspections (STSI), as identified in the attached STSI. Inspect and test work as needed to ensure that the quality of materials, workmanship, construction, finish, and functional performance are in compliance with 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 CO at least 48 hours in advance of the preparatory phase meeting.
2. Notify the CO 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 (Forms may be downloaded from the DSC Workflows website, http://www.nps.gov/dscw/publicforms.htm.) 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. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

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 01 40 00

Statement of Structural Tests and Special Inspections

National Park Service - Denver Service Center

Park: Glacier National Park (GLAC)

PMIS: 311336

Project Name: Glacier Bridge Preservation

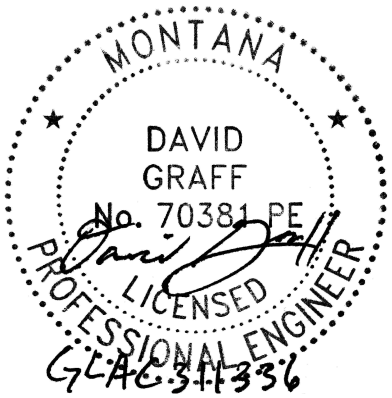
Structural Engineering Firm: Otak, Inc.

This Statement of Structural Tests and Special Inspections is being submitted as required by Chapter 17 of the 2015 International Building Code (IBC-15). It includes the following:

1. Seismic requirements
2. Wind requirements
3. Qualification requirements for Inspectors and Testing Technicians
4. Listing of Required Structural Tests and Special Inspections

The Construction Contractor's Quality Control Supervisor will provide copies of all special inspection reports and associated documentation to the Contracting Officer. The Construction Contractor will be required to correct all deficiencies discovered in the Special Inspection and Structural Testing program.

Prepared by:



David Graff
(Type or print name)

Signature Date

Seismic and Wind Requirements

Seismic Requirements, IBC-15 Section 1704.3

Description of seismic-force-resisting system and designated seismic systems subject to special inspections:

Retaining Walls:
The bridge abutment retaining walls consist of timber bulkheads & pilings that resist horizontal earth pressures and horizontal seismic earth pressures exerted on the back face of the wall with impose overturning and sliding forces on the wall system. The walls resist sliding and overturning forces through the existing timber and replacement steel wingwall and abutment piles. Periodic and continuous special inspections are required for the welding at the replacement pile splice locations. Periodic and continuous special inspections are required for the welding and anchorage at the connection of the replacement steel pile to existing concrete pile cap.

Bridge:
The seismic-force-resisting system consists of the existing timber and replacement steel piles at the bridge abutments. The periodic and continuous special inspections required for the replacement steel piles are as described above.

Wind Requirements, IBC-15 Section 1704.3

Description of wind-force-resisting system and designated wind systems subject to special inspections:

Bridge:
The wind-force-resisting system consists of the existing timber and replacement steel piles at the bridge abutments. The periodic and continuous special inspections required for the replacement steel piles are as described above

Instructions:

1. Place an “X” in the column titled “Required?” for all Special Inspections and Tests required for this project.
2. In the column marked “Required Qualifications” provide the qualifications for the special inspector, using the list beginning on page 4, for all required Structural Tests and Special Inspections.
3. For those items listed as “Continuous,” continuous special inspection shall be as defined in Section 1702.1 and Chapter 2, IBC-15.
4. For those items listed as “Periodic” provide the minimum number of tests, i.e. 20% of all field welds, or the amount of work to be inspected (e.g. 10% of all wall surfaces).
5. Attach completed Statement of Structural Tests and Special Inspections to the end of the Specification Section 01 40 00, Quality Requirements.

Qualification Requirements for Inspectors and Testing Technicians

PE/SE	Structural Engineer – licensed PE or SE specializing in the design of buildings and structures
PE/GE	Geotechnical Engineer – licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – graduate engineer who has passed the Fundamentals of engineering examination

American Concrete Institute (ACI) Certification

ACI-CCSI	Concrete Construction Special Inspector
ACI-LTT	Concrete Laboratory Testing Technician Level 1 or 2
ACI-STT	Concrete Strength Testing Technician
ACI-FTT	Concrete Field Testing Technician – Grade I

American Society of Non-Destructive Testing (ASNT) Certification

Non-Destructive Testing Technician – Level II or III

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector

Exterior Design Institute (EDI) Certification

EDI-EIFS	Certified EIFS inspector

International Code Council (ICC) Certification

ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector
ICC-SSI	Soils Special Inspector
ICC-SFSI	Spray-applied Fireproofing Special Inspector
ICC-SMSI	Structural Masonry Special Inspector
ICC-SSBSI	Structural Steel and Bolting Special Inspector
ICC-SWSI	Structural Welding Special Inspector

National Institute for Certification in Engineering Technologies (NICET) Certification

NICET-CT	Concrete Technician – Levels I, II, III and IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III and IV
NICET-ST	Soils Technician - Levels I, II, III and IV

Other

CMR	**Construction Manager Representative**
CRS	**Glacier National Park Cultural Resources Specialist**

Listing of Required Structural Tests and Special Inspections

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
Steel Construction (ref: IBC-15 Section 1705.2, AISC 360-10 Chapter N, AISC 341-10 Chapter J)					
	Prior to Welding (AISC 360-10 Table N5.4-1)				
X	1. Welding procedure specifications (WPSs) available	AWS-CWI	X		
X	2. Manufacturer certifications for welding consumables available	AWS-CWI	X		
X	3. Material identification (type/grade)	AWS-CWI		X	Once per day
X	4. Welder identification system	AWS-CWI		X	Once per day
	5. Fit-up of groove welds (including joint geometry)				
	a. Joint preparation			X	
	b. Dimensions (alignment, root opening, root face, bevel)			X	
	c. Cleanliness (condition of steel surfaces)			X	
	d. Tacking (tack weld quality and location)			X	
	e. Backing type and fit (if applicable)			X	
	6. Configuration and finish of access holes			X	
	7. Fit-up of fillet welds				
X	a. Dimensions (alignment, gaps at root)	AWS-CWI		X	Once per bridge location
X	b. Cleanliness (condition of steel surfaces)	AWS-CWI		X	Once per bridge location
X	c. Tacking (tack weld quality and location)	AWS-CWI		X	Once per bridge location
X	8. Check welding equipment	AWS-CWI		X	Once per day
	During Welding (AISC 360-10 Table N5.4-2)				
X	1. Use of qualified welders	AWS-CWI		X	Once per day
	2. Control and handling of welding consumables				
X	a. Packaging	AWS-CWI		X	Once per day
X	b. Exposure control	AWS-CWI		X	Once per day
	3. No welding over cracked tack welds	AWS-CWI			
	4. Environmental conditions				
X	a. Wind speed within limits	AWS-CWI		X	Once per day
X	b. Precipitation and temperature	AWS-CWI		X	Once per day
	5. WPS followed				
	a. Settings on welding equipment			X	
	b. Travel speed			X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	c. Selected welding materials			X	
	d. Shielding gas type/flow rate			X	
	e. Preheat applied			X	
	f. Interpass temperature maintained (min. /max.)			X	
	g. Proper position (F, V, H, OH)			X	
	h. Intermix of filler metals avoided unless approved (ref: AISC 341-10)			X	
	6. Welding techniques				
X	a. Interpass and final cleaning	AWS-CWI		X	Once per bridge location
X	b. Each pass within profile limitations	AWS-CWI		X	Once per bridge location
X	c. Each pass meets quality requirements	AWS-CWI		X	Once per bridge location
	After Welding (AISC 360-10 Table N5.4-3)				
X	1. Welds cleaned	AWS-CWI	X		
X	2. Size, length and location of welds	AWS-CWI	X		
	3. Welds meet visual acceptance criteria				
	a. Crack prohibition		X		
	b. Weld/base-metal fusion		X		
	c. Crater cross section		X		
	d. Weld profiles		X		
	e. Weld size		X		
	f. Undercut		X		
	g. Porosity		X		
	4. Arc strikes		X		
	5. k-area		X		
	6. Backing removed and weld tabs removed (if required)		X		
	7. Repair activities		X		
X	8. Document acceptance or rejection of welded joint or member	AWS-CWI	X		
	9. Placement of reinforcing or contouring fillet welds (if required) (ref: AISC 341-10)		X		
	10. Backing removed, weld tabs removed and finished, and fillet welds added (if required) (ref: AISC 341-10)		X		
	Nondestructive Testing (AISC 360-10 Section N5.5)				
	1. Risk Category II Structures - Perform Ultrasonic Testing on 10% of CJP groove welds in butt, T- and corner joints subject to transversely applied tension loading, in materials 5/16 in. thick or greater.			X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	2. Risk Category III or IV Structures - Perform Ultrasonic Testing on all CJP groove welds subject to transversely applied tension loading in butt, T- and corner joints, in materials 5/16 in. thick or greater.		X		
	3. Access Holes – Perform Magnetic Particle Testing or Liquid Penetrant Testing when the flange thickness exceeds 2 in. for rolled shapes, or when the web thickness exceeds 2 in. for built-up shapes.		X		
	4. Welded Joints Subject to Fatigue		X		
	Nondestructive Testing (AISC 341-10 Section J6.2)				
	1. k-area		X		
	2. CJP Groove weld		X		
	3. Lamellar tearing		X		
	4. Beam cope and access hole		X		
	5. Reduced beam section repair		X		
	6. Weld tab removal		X		
	Prior to Bolting (AISC 360-10 Table N5.6-1)				
	These inspections are not required for snug-tight joints				
	1. Manufacturer's certifications available for fastener materials		X		
	2. Fasteners marked in accordance with ASTM requirements			X	
	3. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)			X	
	4. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)			X	
	5. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements			X	
	6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used			X	
	7. Proper storage provided for bolts, nuts, washers and other fastener components			X	
	During Bolting (AISC 360-10 Table N5.6-2)				
	These inspections are not required for snug-tight joints. These inspections are not required for pretensioned joints and slip-critical joints, when the installer is using				

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	the turn-of-nut method with matchmarking techniques, the direct-tension-indicator method, or the twist-off-type tension control bolt method.				
	1. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required			X	
	2. Joint brought to the snug-tight condition prior to the pretensioning operation			X	
	3. Fastener component not turned by the wrench prevented from rotating			X	
	4. Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges			X	
	After Bolting (AISC 360-10 Table N5.6-3)				
	Document acceptance or rejection of bolted connections		X		
	Other Inspection Tasks (AISC 360-10 Section N5.7)				
X	1. Verify compliance of fabricated steel with the details shown on the approved shop drawings.	CMR	X		
	2. Verify compliance of the erected steel frame with the details shown on the approved erection drawings, including braces, stiffeners, member locations and joint details.			X	
	3. Anchor rods and other embedments support structural steel				
X	a. Verify the diameter, grade, type and length of the anchor rod or embedded item.	CMR	X		
X	b. Verify the extent or depth of embedment into the concrete.	CMR	X		
	4. RBS requirements, if applicable (ref: AISC 341-10)				
	a. Contour and finish			X	
	b. Dimensional tolerances			X	
	5. Protected zone—no holes and unapproved attachments made by fabricator or erector, as applicable (ref: AISC 341-10)			X	
	6. H-piles - Protected zone—no holes and unapproved attachments made by the responsible contractor, as applicable (ref: AISC 341-10)			X	
	Cold-formed Steel Deck (IBC-15 1705.2.2)				

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	1. Special inspections in accordance with QA/QC-2011 Standard for Quality control and Quality assurance for Installation of Steel Deck				
	Open-Web steel Joists and Joist Girders (IBC-15 Table 1705.2.3)				
	1. Installation of open-web steel joists and joist girders				
	a. End connections – welding or bolted			X	
	b. Bridging – horizontal or diagonal				
	1. Standard bridging			X	
	2. Bridging that differs from the SJI specifications listed in Section 2207.1			X	

	Inspection of Composite Structures Prior to Concrete Placement (AISC 341-10 Table J9-1)				
	1. Material identification of reinforcing steel (Type/Grade)			X	
	2. Determination of carbon equivalent for reinforcing steel other than ASTM A706			X	
	3. Proper reinforcing steel size, spacing and orientation			X	
	4. Reinforcing steel has not been rebent in the field			X	
	5. Reinforcing steel has been tied and supported as required			X	
	6. Required reinforcing steel clearances have been provided			X	
	7. Composite member has required size			X	
	Inspection of Composite Structures During Concrete Placement (AISC 341-10 Table J9-2)				
	1. Concrete: Material identification (mix design, compressive strength, maximum large aggregate size, maximum slump)			X	
	2. Limits on water added at the truck or pump			X	
	3. Proper placement techniques to limit segregation			X	
	Inspection of Composite Structures After Concrete Placement (AISC 341-10 Table J9-3)				
	1. Achievement of minimum specified concrete compressive strength at specified age			X	
	Cold-formed Steel Trusses Spanning 60-feet or Greater (ref: IBC-15 Section 1705.2.4)				
	1. Verify temporary installation restraint/bracing installed in accordance with the approved shop drawings.			X	
	2. Verify permanent individual truss member restraint/bracing installed in accordance with the approved shop drawings.			X	
Concrete Construction (ref: IBC-15 Table 1705.3)					
X	1. Inspect reinforcing steel, including prestressing tendons, and placement.	NICET-CT		X	Once per concrete pour
	2. Inspection of reinforcing steel welding in accordance with Steel Construction section above.			X	
	3. Inspection of anchors cast in concrete.			X	
X	4. Inspection of anchors post-installed in hardened concrete members.	CMR	X		
X	5. Verify use of approved design mix.	NICET-CT		X	Once per concrete pour
X	6. Prior to placement fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	NICET-CT	X		
X	7. Inspect concrete and shotcrete placement for proper application techniques.	NICET-CT	X		
X	8. Inspect for maintenance of specified curing temperature and techniques.	NICET-CT		X	Once per concrete pour
	9. Inspection of prestressed concrete:				
	a. Application of prestressing forces		X		
	b. Grouting of bonded prestressing tendons in the seismic-force-resisting system.		X		

	10. Erection of precast structural members			X	
	11. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.			X	
X	12. Inspection formwork for shape, location and dimensions of the concrete member being formed.	NICET-CT		X	Once per concrete pour
Masonry Construction (ref: IBC-15 Section 1705.4)					
	1. Inspect masonry construction in accordance with IBC-15 Section 1705.4 and TMS 602-13/ACI 530.1-13/ASCE 6-13 Article 1.6.				
	Level A Quality Assurance				
	Tests: None.				
	Inspection: Verify compliance with the approved submittal and project specifications.	CRS	X		
	Level B Quality Assurance				
	Tests:				
	1. Verify slump flow and Visual Stability Index (VSI) as delivered to the project site in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.5B.1.b.3 for self-consolidating grout.				
	2. Verify f'm and f'aac in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.4B prior to construction, except where specifically exempted.				
	Inspection:				
	1. Verify compliance with the approved submittals and project specifications.			X	
	2. At the start of masonry construction, verify:				
	a. Proportions of site-prepared mortar.			X	
	b. Construction of mortar joints.			X	
	c. Grade and size of prestressing tendons and anchorages.				
	d. Location of reinforcement, connectors, prestressing tendons and anchorages.			X	
	e. Prestressing technique.			X	
	f. Properties of thin-bed mortar for AAC masonry. (Continuous inspection is required for the first 5000 square feet of AAC masonry. Periodic inspection is required after the first 5000 square feet of AAC masonry.)		X	X	
	3. Prior to grouting, verify:				
	a. Grout space is clean.			X	
	b. Grade, type and size of reinforcement and anchor bolts, and prestressing tendons and anchorages.			X	
	c. Placement of reinforcing and connectors, and prestressing tendons and anchorages.			X	

	d. Proportions of site-prepared grout and prestressing grout for bonded tendons.			X	
	e. Construction of mortar joints.			X	
	4. During masonry construction, verify:				
	a. Size and location of structural members.			X	
	b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.			X	
	c. Welding of reinforcement.		X		
	d. Preparation, construction and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).			X	
	e. Application and measurement of prestressing force.		X		
	f. Placement of grout and prestressing grout for bonded tendons is in compliance.		X		
	g. Placement of AAC masonry units and construction of thin-bed mortar joints. (Continuous inspection is required for the first 5000 square feet of AAC masonry. Periodic inspection is required after the first 5000 square feet of AAC masonry.)		X	X	
	5. Observe preparation of grout specimens, mortar specimens and/or prisms.			X	
	Level C Quality Assurance				
	Tests:				
	1. Verify f'm and f'aac in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.4B prior to construction, and for every 5000 square feet during construction.				
	2. Verify proportions of materials in premixed or pre-blended mortar, prestressing grout, and grout other than self-consolidating grout as delivered to the project site.				
	3. Verify slump flow and Visual Stability Index (VSI) as delivered to the project site in accordance with TMS 602-13/ACI 530.1-13/ASCE 6-13 Specification Article 1.5B.1.b.3 for self-consolidating grout				
	Inspection:				
	1. Verify compliance with the approved submittals and project specifications.			X	
	2. Verify:				
	a. Proportions of site-prepared mortar, grout and prestressing grout for bonded tendons			X	
	b. Grade, type and size of reinforcement and anchor bolts, and prestressing tendons and anchorages			X	
	c. Placement of masonry units and construction of mortar joints.			X	
	d. Placement of reinforcement, connectors and prestressing tendons and anchorages.		X		
	e. Grout space prior to grouting.		X		

	f. Placement of grout and prestressing grout for bonded tendons.		X		
	g. Size and location of structural elements.			X	
	h. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X		
	i. Welding of reinforcement.		X		
	j. Preparation, construction and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).			X	
	k. Application and measurement of prestressing force.		X		
	l. Placement of AAC masonry units and construction of thin-bed mortar joints.		X		
	m. Properties of thin-bed mortar for AAC masonry.		X		
	3. Observe preparation of grout specimens, mortar specimens and/or prisms.		X		
Wood Construction (ref: IBC-15 Section 1705.5)					
	1. Inspect prefabricated wood structural elements in accordance with Section 1704.2.5			X	
	2. High load diaphragms:				
	a. Verify sheathing grade and thickness.			X	
	b. Verify nominal size of framing members at adjoining panel edges.			X	
	c. Verify nail or staple diameter and length.			X	
	d. Verify number of fastener lines.			X	
	e. Verify spacing between fasteners in each line and at panel edges.			X	
	3. Shearwalls:				
	a. Verify sheathing grade and thickness.			X	
	b. Verify nominal size of framing members at adjoining panel edges.			X	
	c. Verify nail or staple diameter and length.			X	
	d. Verify number of fastener lines.			X	
	e. Verify spacing between fasteners in each line and at panel edges.			X	
	f. Location and size of holdowns.			X	
	4. Verify nailing, bolting, anchoring and fastening of:				
	a. Drag struts and collectors.			X	
	b. Braces.			X	
	c. Hold-downs.			X	
	5. Metal-plate-connected wood trusses spanning 60 feet or greater:				
	a. Verify temporary installation restraint/bracing installed in accordance with the approved shop drawings.			X	
	b. Verify permanent individual truss member restraint/bracing installed in accordance with the approved shop drawings.			X	

Soils (ref: IBC-15 Table 1705.6)					
	1. Verify materials below shallow foundations are adequate to achieve the required bearing capacity.			X	
X	2. Verify excavations are extended to proper depth and have reached proper material.	NICET-ST		X	Prior to backfilling
	3. Perform classification and testing of compacted fill materials.			X	
X	4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	NICET-ST	X		
X	5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.	NICET-ST		X	Prior to backfilling
Driven Deep Foundation Elements (ref: IBC-15 Table 1705.7)					
	1. Verify materials, sizes and lengths.		X		
	2. Determine capacities of test elements and conduct additional load tests when required. Refer to project specifications.		X		
	3. Observe driving operations and maintain complete and accurate records for each element.		X		
	4. Verify element locations and plumbness.		X		
	a. Verify type and size of hammer.		X		
	b. Record number of blows per foot of penetration.		X		
	c. Determine required penetration to achieve specified capacity.		X		
	d. Record pile tip and butt elevations.		X		
	e. Document any damage to any foundation element.		X		
	5. For steel piling, perform additional inspection in accordance with Section 1705.2 and AISC 341-10, Table J10-1.				
	6. For concrete elements and concrete-filled elements, perform additional inspections in accordance with Section 1705.3.				
	7. For specialty elements, perform additional inspections as required in the project specifications.				
Cast-In-Place Deep Foundations (ref: IBC-15 Table 1705.8)					
	1. Observe drilling operations and maintain complete and accurate records for each element.		X		
	2. Verify element locations and plumbness.		X		
	a. Verify element diameter.		X		
	b. Verify bell diameter (if applicable).		X		
	c. Verify element lengths.		X		
	d. Verify embedment depth into bedrock (if applicable).		X		
	e. Verify adequate end-bearing strata capacity.		X		
	f. Record concrete or grout volumes.		X		
	3. For concrete elements, perform additional inspections in accordance with Section 1705.3.				

Helical Piles (ref: IBC-15 Section 1705.9)					
	1. Verify pile locations		X		
	a. Verify installation equipment used.		X		
	b. Verify pile dimensions.		X		
	c. Verify tip elevations.		X		
	d. Verify final depth.		X		
	e. Verify final installation torque.		X		
	f. Other data as required by the project specifications.		X		
Wind Resistance (ref: IBC-15 Section 1705.11)					
	1. Provide inspections when required by Section 1705.11.				
Seismic Resistance (ref: IBC-15 Section 1705.12)					
	1. Provide inspections when required by Section 1705.12.				
Testing and Qualification for Seismic Resistance (ref: IBC-15 Section 1705.13)					
	1. Test and qualify seismic resistance in accordance with IBC-15 Section 1705.13 and the project specifications.				
Sprayed Fire-Resistant Materials (ref: IBC-15 Section 1705.14)					
	1. Inspect sprayed fire-resistant materials in accordance with IBC-15 Section 1705.14 and the project specifications.				
Mastic and Intumescent Fire-Resistant Coatings (ref: IBC-15 Section 1705.15)					
	1. Perform inspections in accordance with AWCI 12-B and IBC-15 Section 1705.15.			X	
Exterior Insulation and Finish Systems (EIFS) (ref: IBC-15 Section 1705.16)					
	1. Perform inspections in accordance with project specifications and IBC-15 Section 1705.16.			X	
Fire-resistant Penetrations and Joints (ref: IBC-15 Section 1705.17)					
	1. Perform inspections in accordance with project specifications and IBC-15 Section 1705.17.			X	
Smoke Control (ref: IBC-15 Section 1705.18)					
	1. Perform testing in accordance with project specifications and IBC-15 Section 1705.18.				

SECTION 01 50 00 - 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 DEFINITIONS

A. Permanent Enclosure: As determined by Contracting Officer, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.3 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 with metering and with payment of use charges. Provide connections and extensions of services as required for construction operations with any additional permit costs.

C. Electric Power Service: Electric power from existing system is available for use with metering and with payment of use charges. Provide connections and extensions of services as required for construction operations with any additional permit costs.

1.4 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 agency(ies) with jurisdiction and as indicated in the Contract Documents. Coordinate with requirements of the following:

1. Regulatory Requirements.
2. Noise & Acoustics Management.
3. Environmental Management.
4. Construction Waste Management.

1.5 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 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. Pavement: Comply with Division 32 Section "Asphalt Paving."

C. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide galvanized steel bases for supporting posts. Adjust bases material and structure to coordinate fence support with existing conditions.

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

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

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Temporary weather tight sheds or other covered facilities for storage of materials subject to weather damage. Number and size of structures shall be subject to Contracting Officer's approval.

C. Toilets: Adequate natural lighting and ventilated toilet facilities in weatherproof, sight proof, sturdy enclosures with secure privacy locks and non-skid flooring. Toilet location shall be determined by the CO. Toilet facilities shall also adhere to the following requirements.

1. Door shall be latched when not in use and locked when unattended.
2. Bear and wildlife proof.
3. Sufficiently secured with cables or straps to withstand 70 mph winds. Cables and straps shall not be connected to trees or other natural features without prior approval from the CO.
4. In addition to the toilet, a standup urinal shall be provided.
5. Cleaned and pumped to remove contents on a weekly basis.
6. Removed from the Park between construction seasons.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to agency(ies) with jurisdiction, and marked for intended use.

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 or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, NPS, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Acquire all necessary permits.

B. Storm Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers as directed by the agency(ies) with jurisdiction.

C. Non-potable water for construction is available from the streams adjacent to the project site. Install piping and connections as required.

D. Potable water is available on site. Make connections to existing facilities as needed. Facilities must be cleaned and maintained in a condition acceptable to the NPS. At Substantial Completion, restore these facilities to condition existing before initial use.

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

1. Place in approved locations secluded from public observation and convenient to work stations. Relocate as work progress requires.
2. Maintain and clean toilet facilities at least weekly.

3. Completely remove sanitary facilities between construction seasons and upon completion of work.

F. 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.

G. Communication Services: Conventional cell phone and internet service is not available throughout the Park. Provide sufficient satellite phone and satellite internet service to the field offices for continuous communication connectivity with the CO, CMR, and other park personnel during construction.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 50 feet of building lines. Comply with NFPA 241.
2. Maintain support facilities until near Substantial Completion. Remove structures, equipment, and furnishings, and terminate services after punch list is 100 percent completed or when directed by Contracting Officer. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Contracting Officer.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 32 Section "Asphalt Paving."
3. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."

C. Traffic Controls: Erect and maintain barricades, lights, danger signals, and warning signs in accordance with Manual on Uniform Traffic Control Devices (MUTCD), Part IV, latest edition. Refer to section 34 01 00 “Maintenance of Traffic” for additional requirements.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.
3. Illuminate barricades and obstructions at night; keep safety lights burning from sunset to sunrise. Illumination shall not be pointed towards the sky and shall minimize light pollution to the surround area.
4. Adequately barricade and post open cuts in or adjacent to thoroughfares.

5. Protect pedestrian traffic by guardrails or fences.
6. When pedestrian traffic is detoured onto a roadway, provide temporary walkways with protection as required at ends and overhead. For walkways, use lumber running parallel to direction of traffic movement and provide ramps at changes of elevation.
7. Cover pipes, hoses, and power lines crossing sidewalks and walkways with troughs using beveled edge boards.
8. Install Barrier Tape where directed by Contracting Officer. Keep a minimum of two rolls on site at all times

D. Parking: Use designated areas for construction personnel parking as designated by the Contracting Officer.

E. Dewatering Facilities and Drains: Comply with requirements of the agency(ies) with jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

F. Project Identification and Temporary Signs: Provide Project identification and other signs as indicated on Drawings. Fence, barricade, or otherwise block off the immediate work area to prevent unauthorized entry.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.
3. Erect and maintain sufficient detour signs at road closures and along detour routes.

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of agency(ies) with jurisdiction.

3.4 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 equipment is cleaned, drained, and dry and visually inspected by Park personnel prior to move it into the Park to ensure it is free of soil, seeds, vegetative matter, other debris that could contain or hold seeds. Ensure that all equipment has been cleaned, drained and dry and is free of exotic species prior to start-up of operations and moving of equipment into the Park. 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. All equipment shall be cleaned, drained, and dry and inspected by Park personnel prior to moving equipment to a different watershed area within the Park. See 01 11 00 Section 1.8A for additional requirements.

C. Temporary Erosion and Sedimentation Control: Refer to Section 01 57 23 “Temporary Storm Water Pollution Prevention”.

D. Tree and Plant Protection: Refer to Section 01 11 00 “Summary of Work”.

E. Pest Control: Follow NPS requirements and practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

F. Site Enclosure Fence: Before construction operations begin, furnish and install chain link fencing in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Locate vehicular gates to avoid interference with traffic on public thoroughfares.
3. Locate pedestrian entrance gates as required to provide controlled personnel entry.

G. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

H. Barricades, Warning Signs, and Lights: Comply with requirements of MUTCD, part IV, 2003 edition for erecting structurally adequate barricades, including warning signs and lighting. Illumination shall not be pointed towards the sky and shall minimize light pollution to the surround area.

I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Responsible Person: A capable and qualified person shall be placed in charge of fire protection. The responsibilities shall include locating and maintaining fire protective equipment and establishing and maintaining safe torch cutting and welding procedures.
2. Smoking: Smoking within buildings or temporary storage sheds is prohibited.
3. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of NPS. Check with park; many require “burn permits” for welding.
4. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
5. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
6. Hazard Control: Take all necessary precautions to prevent fire during construction. Do not store flammable or combustible liquids in existing buildings. Provide adequate ventilation during use of volatile or noxious substances.
7. Spark Arresters: Equip all gasoline or diesel powered equipment used during periods of potential fire hazards or in potential forest and grass fire locations with spark arresters.

    a. Written determinations of periods and areas of potential fire hazard will be issued by Contracting Officer.

8. Vehicles and Equipment: Provide one extinguisher on each vehicle or piece of equipment.
9. Service and Refueling Areas: Locate areas a minimum of 50 feet from buildings. Shut down equipment before refueling.

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.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. 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. NPS reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period.

3.6 SNOW REMOVAL

A. The Park will provide snow removal on roadways to provide the contractor access to project work areas.

B. The contractor is responsible snow removal within project work areas.

END OF SECTION 01 50 00

SECTION 01 57 19.12 – NOISE & ACCOUSTICS MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Special requirements for noise and acoustics management during deconstruction and construction operations.

1.2 DEFINITIONS

A. Ambient noise level: The total noise associated with a given environment, being usually a composite of normal or existing sounds from all sources near and far, excluding the noise source at issue.

B. Daytime: The hours from 7 a.m. to 9 p.m. on weekdays and 9 a.m. to 9 p.m. on weekends and holidays.

C. Nighttime: All non-daytime hours.

D. Property line: The real or imaginary line along the ground surface and its vertical extension, which separates real property owned or controlled by one person from contiguous real property owned or controlled by another person or from any public right-of-way or from any public space.

E. Receiving noise area: Any real property where people live or work and where noise is heard, excluding the project or source area.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 NOISE MANGEMENT

A. Noise Control: Perform deconstruction and construction operations to minimize noise. Perform noise-producing work in less sensitive hours of the day or week as directed by the Contracting Officer.

B. Repetitive and/or intermittent, high-level noise: Permitted only during Daytime.

1. Do not exceed the following dB(A) limitations at 50 feet:

Sound Level in dB(A)	Time Duration of Impact Noise
70	More than 12 minutes in any hour
80	More than 3 minutes in any hour

2. Maximum permissible construction equipment noise levels at 50 feet:

EARTHMOVING	dB(A)	MATERIALS HANDLING	dB(A)
Front Loaders	75	Concrete Mixers	75
Backhoes	75	Concrete Pumps	75
Dozers	75	Cranes	75
Tractors	75	Derricks Impact	75
Scrapers	80	Pile Drivers	95
Graders	75	Jack Hammers	75
Trucks	75	Rock Drills	80
Pavers, Stationary	80	Pneumatic Tools	80
Pumps	75	Saws	75
Generators	75	Vibrators	75
Compressors	75		

C. Ambient Noise:

1. Maximum noise levels (dB) for receiving noise area at property line shall be as follows:

a.	Residential receiving area	Daytime: 65 dB Nighttime: 45 dB
b.	Commercial/Industrial receiving area	Daytime: 67 dB Nighttime: 65 dB

2. In the event the existing local ambient noise level exceeds the maximum allowable receiving noise level (dB), the receiving noise level maximum for construction operations shall be adjusted as follows:

   a. Residential receiving area: Maximum 3 additional dB above the local ambient as measured at property line.
   b. Commercial/Industrial receiving area: Maximum 5 additional dB above the local ambient as measured at the property line.

3.2 FIELD QUALITY CONTROL

A. Assess potential effects of construction noise on adjacent neighbors and facility occupants in accordance with ASTM E1686 and as follows:

1. Ambient noise measurement: Measure at the property line at a height of at least four (4) feet above the immediate surrounding surface. Average the ambient noise level over a period of at least 15 minutes.
2. Ambient noise measurement at urban sites: Conduct during morning peak traffic hour between 7 A.M. and 9 A.M. and afternoon peak traffic hour between 4 P.M. and 6 P.M. In addition, conduct a 24-hour measurement at the proposed project site to document the noise pattern throughout the day. Adjust and weight for seasonal and climatic variations.

B. Monitor noise produced from construction operations in accordance with ASTM E1780.

END OF SECTION 01 57 19.12

SECTION 01 57 23 – UNDER-AN-ACRE POLLUTION PREVENTION

PART 1 - GENERAL

1.1 SUMMARY

A. NPS Standards and Guidelines require that water quality be protected at all times to ensure compliance with the Organic Act. The Contractor shall prepare an Under-An-Acre Pollution Prevention Plan (UPPP) for each project resulting in less than 1 acre of soil disturbance or not otherwise subject to the requirements of the NPDES program.

B. The work of this section consists of implementing measures to Temporary Storm Water Pollution during construction activities, either through compliance with the NPDES permit program; Or in conformance with NPS guidance for UPPPs.

C. The work in this section applies to each bridge project location and each associated staging area.

1.2 DEFINITIONS

A. Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.

B. UPPP: Developed and implemented pollution prevention plan (including stormwater management measures, if needed) to protect the environment from pollutants on construction projects with less than one acre of disturbance in conformance with NPS guidelines.

1.3 SUBMITTALS

A. After contract award and before the pre-construction conference, prepare and submit:
   1. A UPPP in conformance with NPS guidelines and adherence to all applicable construction storm water management practices.

B. Inspection Schedule: Submit schedule for inspection and monitoring of all pollution prevention measures.

C. Erosion Control Products: Submit manufacturer's product information and installation recommendations for silt fence, filter fabric, erosion control blanket, straw bales, and any other materials proposed for use on this project.

1.4 QUALITY ASSURANCE

A. The Contractor shall prepare and submit a plan to the Contracting Officer (CO) for review and concurrence.

B. Orientation Meeting: The Contractor shall be responsible for arranging and conducting a Pollution Prevention meeting/briefing to inform all parties scheduled to be on-site during the project of the measures to be implemented for proper pollution prevention and control (may be included as part of the Pre-Construction Meeting).

1. Installation of silt fences, storm drain protection, and all other forms of pollution prevention controls shall not begin until after this meeting has occurred.

C. Pollution Prevention Manager: The Contractor shall designate the Pollution Prevention Manager who will be responsible for the implementation, inspection, maintenance, and amendments to the approved plan.

1. The Pollution Prevention Manager shall be familiar with UPPP procedures and Best Management Practices (BMPs) and shall ensure that emergency procedures and the plan are updated as needed and available for inspection.

2. When changes in the approved plan are required, the Pollution Prevention Manager shall prepare and certify an amendment and submit to the CO for review and concurrence.

PART 2 - PRODUCTS

2.1 UNDER-AN-ACRE POLLUTION PREVENTION PLAN:

A. Provide a UPPP which conforms to all NPS requirements (utilize UPPP template; (https://www.nps.gov/dscw/publicforms.htm#CP___PAGEID=411517)) and include the following information and forms:

1. Responsible Parties
2. General Information: Project Scope, Project Details, Site Information, and Spill Prevention.
3. Standards and Constraints
4. Project Scheduling
5. Known Data on Soil and Fill
6. Activities with the Potential to Generate Sediment
7. Activities and Materials with the Potential to Pollute Storm Water
8. Management and Reporting BMPs
9. Waste Management BMPs
10. Non-Storm Water Pollution Control BMPs
11. Soil Stabilization BMPs
12. Sediment Control BMPs
13. Other Pollution Control BMPs
14. References
15. Preparer's Certification
16. Appendices: Contact Information, Pollution Prevention Control Map or Sheet(s), Standard Installation Specifications for each BMP, and Blank forms.

PART 3 - EXECUTION

3.1 ENVIRONMENTAL PROTECTION

A. Protection of Natural Resources: Comply with applicable regulations and these specifications. Preserve the natural resources within the project boundaries and outside the limits of work performed under this Contract in their existing condition or restore to an equivalent or improved condition as approved by the CO.

B. Construction Zone: Arrange construction activities to minimize pollution (i.e., erosion, trash, etc.) to the maximum practical extent.

1. Clearing, excavation, and grading shall be limited to those areas of the project site necessary for construction. Minimize the area exposed and unprotected.
2. Clearly mark and delineate the limits of work activities.
3. Equipment shall not be allowed to operate outside the limits of work or to disturb existing vegetation.
4. Excavation and grading shall be completed during the dry season to the maximum extent possible
5. Material should be stored away from locations where water is present to the greatest extent practicable.

3.2 UNDER-AN_ACRE POLLUTION PREVENTION PLAN

A. Review and Acceptance: The Contractor and the CO will jointly review the draft Plan and agree to any needed revisions. The Contractor shall incorporate all revisions, sign, and submit the final Plan to the CO. The final Plan will be the document enforced on the project.

1. The accepted Plan will describe and ensure implementation of the practices which will be used to reduce the pollutants in storm water discharges.
2. The Contractor shall maintain a current copy of the Plan and all associated records and forms at the jobsite throughout the duration of the project.
3. The Plan shall be available at all times for public inspection and for the inspection and use of the CO.
4. Approval of Contractor’s Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations.

B. Implementation: Implement the Plan as required throughout the construction period and maintain all erosion control elements in proper working order.

1. Do not perform clearing and grubbing or earthwork until the Plan has been implemented.

3.3 SITE INSPECTIONS AND PLAN REVISIONS

A. Inspections: The Contractor and the CO will perform a weekly inspection of the site.

1. The inspection shall include disturbed areas that have not been completely stabilized, areas used for storage of materials, locations where vehicles enter or exit the site, and all other erosion and sediment controls that are included in the Plan.
2. Inspections shall be documented.
3. The inspection forms shall be retained onsite in the Plan notebook throughout the construction period.

B. Plan Revisions: It may be necessary to revise the Plan during construction to make necessary improvements, revisions, or to respond to unforeseen conditions noted during construction or site inspections.

1. The Plan shall specify the mechanism whereby revisions may be proposed by the Contractor or the CO.
2. The Contractor and the CO will jointly review each revision to the Plan before changes are incorporated and implemented. The Contractor will then provide a revised copy of the Plan to the CO.
3. Accepted modifications will be implemented within 7 calendar days following the date of the inspection when deficiencies or necessary corrections are first noted.

C. Negligence: Provide additional temporary erosion and pollution controls made necessary by Contractor's errors or negligence at no additional cost to the Government.

3.4 EROSION CONTROL MEASURES

A. Erosion control measures shall consist of any and all BMPs for storm water discharges, including but not limited to silt fencing, barrier protectors, straw bales, temporary soil retention blankets, excelsior drainage filters, sediment traps and berms.

B. Berms and excelsior drainage filters shall be used to form sediment traps and to control run-on and run-off into other areas, including creeks, streams, marshes, access roads, well areas, and the staging areas.

C. Erosion control measures shall be used to contain only direct precipitation in the construction zone. The contained water shall be allowed to percolate into the ground or drain slowly through the drainage filter sediment traps.

D. Earthen sediment traps or holding ponds shall not be used unless accepted by the CO.

E. Reduce runoff velocity as well as direct surface runoff around and away from all fuel containment, storage, and borrow areas.

F. Divert surface runoff around and away from cut and fill slopes.

G. Place drainage filters around all catch basins to create sediment traps to control run-off from the construction area.

H. Excess water used for dust control shall be contained within the demolition areas by the erosion control measures.

I. The Contractor shall prevent the deposition of materials onto paved areas. The Contractor shall inspect the paved areas for deposited materials weekly and remove the materials immediately.

J. Furnish, install, maintain, and operate necessary control measures and other equipment necessary to prevent erosion as described in the approved UPPP.

K. Before the work begins, sufficient equipment shall be available on the site to assure that the operation and adequacy of the erosion control system can be maintained.

3.5 MAINTENANCE OF TEMPORARY FACILITIES

A. Ensure erosion and sediment control structures remain effective throughout excavation and grading operations. Relocate structures as necessary.

B. Inspect control structures after each significant rainfall. Promptly repair breaches which occur.

C. The Contractor shall remove entrapped sediment from behind excelsior drainage filter after each storm.

3.6 REPORTING

A. If a discharge occurs or if the project receives a written notice or order from any regulatory agency, the Contractor will immediately notify the CO and will file a written report to the Agency(ies) with Jurisdiction within 7 days of the discharge event, notice, or order. Corrective measures shall be implemented immediately following the discharge, notice, or order. The report to the Agency(ies) with Jurisdiction shall contain the following items at a minimum:

1. The date, time, location, nature of operation, and type of discharge, including the cause or nature of the notice or order.
2. The BMPs deployed before the discharge event, or prior to receiving the notice or order.
3. The date of deployment and type of BMPs deployed after the discharge event, or after receiving the notice or order, including additional BMPs installed or planned to reduce or prevent re-occurrence.
4. An implementation and maintenance schedule for any affected BMPs.

3.7 SEDIMENT DISPOSAL

A. Sediment excavated from temporary sediment control structures shall be disposed on the site with general fill, or with topsoil. Sediment shall be allowed to dry out as required before reuse.

B. Contractor shall place the sediment removed from traps and other structures where it will not enter a storm drain or watercourse and where it will not immediately reenter the basin.

3.8 REMOVAL OF TEMPORARY POLLUTION CONTROL MEASURES

A. All temporary control measures shall be removed with permission of the CO within 20 working days after final acceptance of the project, and/or once grading is completed and slopes have stabilized.

END OF SECTION 01 57 23

SECTION 01 67 00 - 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, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. 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.

C. Definitions pertaining to sustainable development: As defined in ASTM E2114.

D. Biobased Materials: As defined in the Farm Security and Rural Investment Act, for purposes of Federal procurement of biobased products, “biobased” means a “commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials.” Biobased materials also include fuels, chemicals, building materials, or electric power or heat produced from biomass as defined by The Biomass Research and Development Act of 2000.

1. Biobased content: The amount of biobased carbon in the material or product as a percentage of weight (mass) of the total organic carbon in the material or product.

E. Chain-of-Custody: Process whereby a product or material is maintained under the physical possession or control during its entire life cycle.

F. Environmentally preferable products: Products and services that have a lesser or reduced effect on the environment in comparison to conventional products and services. Refer to EPA's Final Guidance on Environmentally Preferable Purchasing for more information http://www.epa.gov/oppt/epp/.

G. Stewardship: Responsible use and management of resources in support of sustainability.

H. Sustainability: The maintenance of ecosystem components and functions for future generations.

1. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock. Recycled content claim shall be consistent with ISO 140001 Standard for the Use of Environmental Marketing Claims.
2. Rapidly Renewable Material: Material made from plants that are typically harvested within a ten-year cycle.
3. Regional Materials: Materials that are manufactured and extracted, harvested, or recovered within a radius of 500 miles from the Project location.

1.3 SUBMITTALS

A. Record Submittals as specified in – Sustainable Design Close-Out Documentation, submit the following:

1. Affirmative Procurement Reporting Form. Submit on form in Appendix A of this Section, or similar form as approved by Contracting Officer.
2. Submit environmental data in accordance with Table 1 of ASTM E2129 for the following products:

    a. Masonry
    b. Joint Sealers
    c. Paints & Coatings
3. Material Safety Data Sheets (MSDS): For each product required by OSHA to have a MSDS, submit an MSDS. MSDS shall be prepared within the previous five years. Include information for MSDS Sections 1 – 16 in accordance with ANSI Z400.1 and as follows:

    a. Section 1: Chemical Product and Company Identification.
    b. Section 2: Composition/Information on Ingredients.
    c. Section 3: Hazards Identification.
    d. Section 4: First Aid Measures.
    e. Section 5: Fire Fighting Measures.
    f. Section 6: Accidental Release Measures.
    g. Section 7: Handling and Storage.
    h. Section 8: Exposure Controls/Person Protection.
    i. Section 9: Physical and Chemical Properties.
    j. Section 10: Stability and Reactivity Data.
    k. Section 11: Toxicological Information. Include data used to determine the hazards cited in Section 3. Identify acute data, carcinogenicity, reproductive effects, and target organ effects.

l. Section 12: Ecological Information. Include data regarding environmental impacts during raw materials acquisition, manufacture, and use. Include data regarding environmental impacts in the event of an accidental release.
m. Section 13: Disposal Considerations. Include data regarding the proper disposal of the chemical. Include information regarding recycling and reuse. Indicate whether or not the product is considered to be "hazardous waste" according the US EPA Hazardous Waste Regulations 40 CFR 261.
n. Section 14: Transportation Information. Identify hazard class for shipping.
o. Section 15: Regulatory Information. Identify federal, state, and local regulations applicable to the material.
p. Section 16: Other Information. Include additional information relative to recycled content, biobased content, and other information regarding environmental and health impacts.

4. Chain Of Custody: Submit chain-of-custody documentation for sustainable forestry for the following products:

a. Rough Carpentry

1.4 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.

1.5 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. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

1.6 PACKAGING

A. Where Contractor has the option to provide one of the listed products or equal, preference shall be given to products with minimal packaging and easily recyclable packaging as defined in ASTM D5834.

B. Maximize use of source reduction and recycling procedures outlined in ASTM D5834.

C. Provide minimum 45 percent post-consumer recycled content and minimum 100 percent recovered fiber content of industrial paperboard in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

D. Provide minimum 10 percent post-consumer recycled content and minimum **10** percent recovered fiber content of carrier board in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

E. Provide minimum 5 percent post-consumer recycled content and minimum **5** percent recovered fiber content of brown papers (e.g., wrapping papers and bags) in accordance with EPA's Comprehensive Procurement Guidelines and ASTM D5663.

1.7 ENVIRONMENTALLY PREFERABLE PRODUCTS

A. Provide environmentally preferable products to the greatest extent possible.

1. To the greatest extent possible, provide products and materials that have a lesser or reduced effect on the environment considering raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and/or disposal of the product.
2. Eliminate the use of ozone depleting compounds during and after construction where alternative environmentally preferable products are available, consistent with either the Montreal Protocol and Title VI or the Clean Air Act Amendments of 1990, or equivalent overall air quality benefits that take into account life cycle impacts.
3. Use products meeting or exceeding EPA's recycled content recommendations for EPA-designated products. Use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project.

1.8 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.
5. Samples, 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 01 67 00

AFFIRMATIVE PROCUREMENT REPORTING FORM
Recycled Content Materials & Biobased Content Materials

Project Name: _____ Project Number: _____

Contractor Name: _____ License Number: _____

Contractor Address: _____

Product	Total $ value provided	Total $ value w/ recycled content Pre-con-sumer	Total $ value w/ recycled content Post-con-sumer	Total $ value w/ bi-obased content	Exempted indicate 1,2,3,4	Comments
Hydraulic Mulch (paper based)						
Hydraulic Mulch (wood based)						
Compost						
Parking Stops (Concrete w/ fly ash, slag cement or low cement con-tent)						
Parking Stops (Plastic/Rubber)						
Patio Blocks/Rub-ber						
Patio Blocks/Plas-tic						
Playground Sur-faces						
Concrete w/ fly ash						
Concrete w/ slag cement						
Concrete w/ low cement content						
Plastic lumber						
Building Insula-tion						
Rock Wool						
Fiber glass						
Cellulose						
Perlite Comp Board						
Plastic Rigid Foam						

Glass Fiber Reinf Foam						
Phenolic Rigid Foam						
Ceramic tile						
Resilient flooring						
Floor Tiles/Rubber						
Floor Tiles/Plastic						
Running Tracks						
Carpet (PET)						
Paint						
Reprocessed Latex Paint White & Light Colors						
Reprocessed Latex Dark Colors						
Consolidated Latex Paint						
toilet/shower partitions (plastic or steel)						
Other						

CERTIFICATION

I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials:

1. The product does not meet appropriate performance standards
2. The product is not available within a reasonable time frame
3. The product is not available competitively (from two or more sources)
4. The product is only available at an unreasonable price (compared with a comparable non-recycled content product.)

Signature: _____ Date: _____

END OF
AFFIRMATIVE PROCUREMENT REPORTING FORM
Recycled Content Materials & Biobased Content Materials

SECTION 01 73 40 - 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. 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. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

B. Quantity Surveys: Submit 2 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 sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and 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.

3.2 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 01 31 00 “Project Management and Coordination”.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the existing benchmarks. If discrepancies are discovered, notify Contracting Officer promptly.

B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

C. Record Log: Maintain a 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 the log available for reference by NPS.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations. Controls that are destroyed by Contractor will be replaced by the Contractor at their expense.

1. Existing Monuments: All benchmarks, land corners, and triangulation points, established by other surveys, existing within the construction area shall be preserved. If existing monuments interfere with the 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.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as 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. 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 the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

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

I. 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.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. 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 NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
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 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 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 and bathroom cleaning.
b. Use natural cleaning materials where feasible. Natural cleaning materials include:

1) Abrasive cleaners: substitute 1/2 lemon dipped in borax.
2) Ammonia: substitute vinegar, salt and water mixture, or baking soda and water.
3) Disinfectants: substitute 1/2 cup borax in gallon water.
4) Drain cleaners: substitute 1/4 cup baking soda and 1/4 cup vinegar in boiling water.
5) Upholstery cleaners: substitute dry cornstarch.

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. During handling and installation, clean and protect construction in progress and adjoining materials already in place. 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 the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

K. 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.

1. Provide final cleaning in accordance with ASTM E1971.

3.7 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.

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

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. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

END OF SECTION 01 73 40

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Solid Waste: Garbage, debris, sludge, or other discharged material (except hazardous waste) including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations.

D. Debris: Non-hazardous solid waste generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch (60 mm) particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders). A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.

E. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

F. Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; or degrade the utility of the environment for aesthetic, cultural, or historical purposes.

G. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

H. Hazardous Materials: Any material that is regulated as a hazardous material in accordance with 49 CFR 173, requires a Material Safety Data Sheet (MSDS) in accordance with 29 CFR 1910.1200, or which during end use, treatment, handling, storage, transportation or disposal meets or has components which meet or have the potential to meet the definition of a Hazardous Waste in accordance with 40 CFR 261.

I. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

J. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.3 PERFORMANCE REQUIREMENTS

A. General: Project shall minimize creation of construction, deconstruction, and demolition waste to protect and restore natural habitat and resources. Factors that contribute to waste such as over packaging, improper storage, ordering error, poor planning, breakage, mishandling, and contamination shall be minimized. A Waste Management Plan shall be developed to ensure that existing site and building materials are reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

B. Salvage /Recycle Requirements: Develop waste management plan that results in end-of-Project rates for salvage/recycling of 50 percent by weight of total waste generated by the Work. The following waste categories, at a minimum, shall be diverted from a landfill:

1. Land clearing debris (chipped debris can be used on site for mulch or erosion control)
2. Clean dimensional wood, palettes
3. Plywood, OSB, and particle board
4. Concrete (can be ground and used for fill on site)
5. Asphaltic concrete (can be ground and used for fill on site)
6. Cardboard, paper, packaging, newsprint
7. Metals (from banding, stud trim, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze)
8. Gypsum drywall—unpainted
9. Non-hazardous paint and paint cans
10. Beverage containers: Aluminum, glass, and plastic containers
11. Wiring
12. Other mixed construction and demolition waste as appropriate

C. If any waste materials encountered during the deconstruction/demolition or construction phase are found to contain lead, asbestos, PCBs, (such as fluorescent lamp ballasts), or other harmful substances, they are to be handled and removed in accordance with local, state, and federal laws and requirements concerning hazardous waste.

D. Existing items and material to be removed during the deconstruction/demolition phase shall be reused in the construction phase of the Project. Items that cannot be reused shall be recycled. Items considered for reuse must be in refurbishable condition and must meet the quality standards set forth in these specifications. Contractor shall ensure that the quality of the item(s) in question will meet or exceed accepted industry or trade standards for first quality commercial grade application. During construction, deconstruction, or demolition the Contracting Officer may designate other objects or materials for reuse.

E. Salvage/Recycle Requirements: N/A

F. Salvage/Recycle Requirements: N/A

1.4 SUBMITTALS

A. Waste Management Plan: After award of contract and prior to the scheduled Pre-Construction Conference, Contractor shall submit a draft Waste Management Plan to the Contracting Officer for approval. Submit 3 copies of plan. Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve Contractor of responsibility for compliance with applicable environmental regulations.

B. Progress Documentation: Supplemental to the Waste Management Plan, document solid waste disposal, diversion, and cost/revenue analysis and submit completed worksheet on a monthly basis. Use Appendix A - Project Waste Management Plan Worksheet, and report totals to date for all column headings. Use Appendix B for solid waste volume to weight conversions.

C. Waste Reduction Calculations: Before request for Substantial Completion, submit three copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

D. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

E. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

F. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

G. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

H. Qualification Data: For Waste Management Coordinator.

I. Progress payment requirements:

1. With each Application for payment, submit updated Project Waste Management Plan worksheet for solid waste disposal and diversion.
2. With each Application for Payment, submit manifests, weight tickets, receipts, and invoices specifically identifying the Project and waste material.

J. Closeout Submittals

1. With Closeout Submittals, submit a summary of the Project Waste Management Plan worksheet for solid waste disposal and diversion. Submit on form in Appendix A of this Section.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements, that employs a LEED™-Accredited Professional, certified by the USGBC, as waste management coordinator.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Waste Management Meeting: Conduct separate meeting or cover in the Pre-Construction Conference and comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

PART 2 - PRODUCTS

2.1 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials sold to individuals and organizations, include list of names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials donated to individuals and organizations, include list of names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.

5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:

1. Landfill tip fees/ton
2. If diverted, tip fee savings from landfill diversion
3. Costs of recycling, salvage, or reuse
4. Revenue from recycling, salvage, or reuse
5. Total cost or savings from diversion (Calculate by using tip fee savings and subtracting costs of recycling or adding revenue from recycling)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan as approved by the Contracting Officer. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Contractor shall establish contacts with local recycling and reuse companies to set up lines of responsibility. Contractor shall be responsible for coordination in terms of identifying materials, pickup schedules, and standard quality for recycled materials.

D. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

E. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

F. Separation facilities:

1. Contractor shall designate and Contracting Officer shall approve a specific area or areas to facilitate separation of materials for potential reuse, salvage, recycling, and return.

2. Waste and recycling bins are to be placed near each other, and close to the point of waste generation but out of the traffic pattern.
3. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid co-mingling of materials.
4. Bins shall be protected during non-working hours from off-site contamination.
5. Garbage dumpsters should be checked periodically to monitor recyclables being thrown away or if there are undocumented materials that could be recycled.

G. Materials handling procedures: Materials to be recycled shall be protected from contamination and shall be handled, stored, and transported in a manner that meets the requirements set by the designated facilities for acceptance. Establish a defined area for the operations of each trade, especially woodcutting so that off-cuts will be kept in one area and can be sorted by dimension for future reuse.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Governments Use:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Allow for inspection if necessary.
4. Store items in a secure area until delivery to Government.
5. Transport items to storage area designated by Government.
6. Protect items from damage during transport and storage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Governments property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

A. Asphaltic Concrete Paving: Grind asphalt to maximum 1-1/2-inch (38-mm) size.

B. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.

1. Crush asphaltic concrete paving and screen.

C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 4-inch (100-mm) size.

D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

E. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

F. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

G. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

H. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.

3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Site-Clearing Wastes: Chip brush, branches, and trees on-site.

C. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

D. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Governments property and legally dispose of them.

END OF SECTION 01 74 19

017419 - Appendix A

Project Waste Management Plan Worksheet Example

	A	B	C	D	E	F	G	H	I	J
Material	**Quantity Recycled (in tons)**	**Quantity Salvaged or Reused (in tons)**	**A + B = Total Quantity Diverted from Landfill**	**Quantity To Landfill (in tons)**	**C + D = Total Quantity Generated (in tons)**	**Tip Fee/Ton at Landfill**	**C x F = Tip Fee Savings resulting from Landfill Diversion**	**Cost of Recycling (R), Salvage (S), or Reuse (Re) (Specify R, S, or Re)**	**Revenue from Recycling, Salvage, or Reuse**	**G - H + I = Total Cost (-) or Savings (+) from Diversion**
Asphalt/Concrete										
Brick/Masonry/Tile										
Building Materials (doors, windows, fixtures, shingles, lumber, insulation, sheetgoods, etc.)										
Carpet										
Carpet Padding, Foam Only										
Cardboard										
Ceiling Tile										
Drywall										
Glass										
Scrap Metal Aluminum										
Copper										
Steel										
Unpainted Wood & Pallets										
Yard Trimmings, Brush, Trees, Stumps, etc.										
Garbage/Trash										
Other										
Column Totals										
	Total Quantity Recycled	**Total Quantity Reused or Salvaged**	**Total Quantity Diverted from Landfill**	**Total Quantity To Landfill**	**Total Quantity Generated**		**Tip Fee Savings from Diversion**	**Total Cost of Recycling, Salvage, or Reuse**	**Revenue from Recycling, Salvage, or Reuse**	**Total Cost (-) or Savings (+) from Diversion**

Percentage Diverted = _____ (C divided by E from Column Totals) Should meet specified diversion requirement.

017419 - **Appendix B**

STANDARD SOLID WASTE CONVERSIONS

The following sections provide conversions for solid waste and recyclable materials. Section 1 provides formulas to convert solid waste volume (cubic yards) into tons. Section 2 includes conversion factors to estimate the volume and weight of a number of solid waste and recyclable materials.

1. To convert cubic yards to tons:

A: For un-compacted trash, to convert the units of cubic yards into tons, using the standard density of trash value of 250 pounds per cubic yard:

Using "X" cubic yards, multiply by 250 pounds per cubic yard, divide by 2000 pounds per ton, to obtain value in tons.

"X" *cubic yards* x 250 $\frac{\textit{pounds}}{\textit{cubic yard}}$ ÷ $\frac{1\ \textit{ton}}{2000\ \textit{pounds}}$ = _____ *tons*

This equals:

"X" *cubic yards* x 0.125 $\frac{\textit{tons}}{\textit{cubic yard}}$ = _____ *tons*

In this case, 8 cubic yards = one ton.

B: To determine your own density value for un-compacted trash (instead of using the standard value of 250 pounds per cubic yard), using a 32 gallon trash can:

(1) Weigh the trash can both filled and empty (use a full 32 gallon trash can filled with trash roughly level to the top);
(2) Subtract the empty weight from the filled weight to get the weight of trash (filled weight – empty weight = weight of trash);
(3) Use the formula, using "Y" your weight of trash (pounds), divided by 0.15 cubic yards per 32 gallon trash can, to obtain your value in pounds per cubic yard; which equals:

"Y" $\frac{\textit{pounds}}{\textit{32 gallon can}}$ / 0.15 $\frac{\textit{cubic yards}}{\text{32 gallon can}}$ = _____ $\frac{\textit{pounds}}{\text{cubic yard}}$

(4) Substitute this value for the 250 pounds per cubic yard value in Method A above.

This would be the more accurate measure of your park's specific waste.

C: For compacted trash, to convert cubic yards into tons:

To use a compaction ratio, multiply the appropriate ratio times the un-compacted trash weight in Formula A to obtain the compacted trash weight.

"X" *cubic yards* x $\frac{3}{1}$ (compaction ratio) x 250 $\frac{\textit{pounds}}{\textit{cubic yard}}$ x $\frac{1\ \textit{ton}}{2000\ \textit{pounds}}$ = _____ *tons*

Typical compaction ratios for trash:
3:1 (typical)

4:1 (higher-compaction vehicles)

If you or your hauler don't know the compacting ratio, the typical values for compacted trash are 500 to 1000 lbs./cubic yard, average 700 lbs./cubic yard. **Use 700 lbs. per cubic yard if you don't have more accurate records.**

For compacted trash, 0.4 is used instead of 0.125 in Formula A:

"X" *cubic yards* x 0.4 $\frac{\text{tons}}{\text{cubic yard}}$ = _____ *tons*

D: To convert container size to cubic yards for un-compacted waste:

If you don't have size and weight information on your specific containers, then these typical values can be used:

1 cubic yard = 202 gallons
32 gallon can = 0.15 cubic yards
60 gallon tote = 0.30 cubic yards
90 gallon tote = 0.45 cubic yards

2. EPA's Standard Volume-to-Weight Conversion Factors

Category	Recyclable Materials (u/c = uncompacted/ compacted & baled)	Volume	Estimated Waste (in pounds)
FOOD SCRAPS[A]	Food scraps, solid and liquid fats	55-gal drum	412
GLASS	Bottles[B]		
	Whole Bottles	1 yd^3	500-700
	A. Semicrushed Crushed	1 yd^3	1,000-1,800
	(mechanically)	1 yd^3	1,800-2,700
	Uncrushed to manually broken	55-gal drum	300
	Refillable Whole Bottles[C]		
	Refillable beer bottles	1 case = 24 bottles	10-14
	Refillable soft drink bottles	1 case = 24 bottles	12-22
	8 oz glass container	1 case = 24 bottles	12
LEAD-ACID BATTERIES	Car[D]	1 battery	39.4 lb
	Truck[E]	1 battery	53.3 lb lead and plastic
	Motorcycle[E]	1 battery	9.5 lb lead and plastic

Category	Recyclable Materials (u/c = uncompacted/ compacted & baled)	Volume	Estimated Waste (in pounds)
METALS	Aluminum Cans[F]		
	Whole	1 yd^3	50-75
	Compacted (manually)	1 yd^3	250-430
	Uncompacted	1 full grocery bag	1.5
		1 case = 24 cans	0.9
	Ferrous (tin coated steel cans) [G]		
	Whole	1 yd^3	150
	Flattened	1 yd^3	850
	Whole	1 case = 6 cans	22
	Major Appliances[E]		
	Air conditioners (room)	1 unit	64.2
	Dishwashers	1 unit	92
	Dryers (clothes)	1 unit	130
	Freezers	1 unit	193
	Microwave ovens	1 unit	50
	Refrigerators	1 unit	181.1
	Ranges	1 unit	267
	Washers (clothes)	1 unit	177
	Water heaters	1 unit	131
PAPER	Newspaper[F]		
	Uncompacted	1 yd^3	360-505
	Compacted/baled	1 yd^3	720-1,000
	12 in. stack	-	35
	Old Corrugated Containers[F]		
	Uncompacted	1 yd^3	50-150 (300)[1]
	Compacted	1 yd^3	300-500
	Baled	1 yd^3	700-1,100
	Computer Paper[F]		
	Uncompacted	1 yd^3	655
	Compacted/baled	1 yd^3	1,310
	1 case	2,800 sheets	42
	White Ledger[F]		
	Stacked (u/c)	1 yd^3	375-465/755-925
	Crumpled (u/c)	1 yd^3	110-205/325
	Ream of 20# bond; 8.5”x11”	1 ream = 500 sheets	5
	Ream of 20# bond; 8.5”x14”	1 ream = 500 sheets	6.4
	White ledger pads	1 case = 72 pads	38
	Tab Cards[F]		
	Uncompacted	1 yd^3	605
	Compacted/baled	1 yd^3	1,215-1,350
	Miscellaneous Paper		
	Yellow legal pads[F]	1 case = 72 pads	38
	Colored message pads[F]	1 carton = 144 pads	22
	Telephone directories[H]	1 yd^3	250
	Mixed Ledger/Office Paper[F]		
	Flat (u/c)	1 yd^3	380/755
	Crumpled (u/c)	1 yd^3	110-205/610

Category	Recyclable Materials (u/c = uncompacted/ compacted & baled)	Volume	Estimated Waste (in pounds)
PLASTIC[J]	PET (Soda Bottles)		
	Whole bottles (uncompacted)	1 yd^3	30-40
	Whole bottles (compacted)	1 yd^3	515
	Whole bottles (uncompacted)	gaylord	40-53
	Baled	30” x 62”	500-550
	Granulated	semiload	30,000
	Granulated	gaylord	700-750
	8 bottles (2 L size)	16 L	1
	HDPE (Dairy)		
	Whole (uncompacted)	1 yd^3	24
	Whole (compacted)	1 yd^3	270
	Baled	32” x 60”	400-500
	HDPE (Mixed)		
	Baled	32” x 60”	900
	Granulated	gaylord	800-1,000
	Granulated	semiload	42,000
	Other Plastic		
	Uncompacted	1 yd^3	50
	Compacted/baled	1 yd^3	400-700
	Mixed PET and HDPE (Dairy)		
	Whole	1 yd^3	32
	Film		
	Baled	semiload	50
	Baled	30” x 42” x 48”	400-700
TEXTILES[H]	Mixed Textiles	1 yd^3	175
TIRES	Car Tires		
	Whole tire[E]	1 tire	21
	Crumb rubber[K]	1 tire	12
	Truck Tires		
	Whole tire[E]	1 tire	70
	Crumb rubber[K]	1 tire	60
WOOD	Wood chips[L]	1 yd^3	725
	Pallets[F]	-	30-100 (40 avg)
YARD TRIMMINGS[F]	Grass Clippings		
	Uncompacted	1 yd^3	350-450
	Compacted	1 yd^3	550-1,500
	Leaves		
	Uncompacted	1 yd^3	200-250
	Compacted	1 yd^3	300-450
	Vacuumed	1 yd^3	350
FURNISHINGS[E]	Foam rubber mattress	1 mattress	55
MUNICIPAL SOLID WASTE[M]	Residential waste (uncompacted at curb)	1 yd^3	150-300
	Commercial-industrial waste (uncompacted)	1 yd^3	300-600
	MSW (compacted in truck)	1 yd^3	500-1,000
	MSW (landfill density)	1 yd^3	750-1,250

A. Information obtained from Washington State.
B. Draft National Recycling Coalition Measurement Standards and Reporting Guidelines presented to NRC membership. October 31, 1989.
C. Personal communication with a representative from Allwaste. November 6, 1995.
D. Battery Council International. 1995. 1994 National Recycling Rate Study.
E. U.S. EPA. 1995. Methodology for Characterization of Municipal Solid Waste in the United States: 1994 Update. EPA530-R-96-001. Washington, DC.
F. U.S. EPA. 1993. Business Guide for Reducing Solid Waste. EPA530-K-92-004. Washington, DC.
G. Personal communication with a representative from the Steel Recycling Institute. November 1, 1995.
H. Information obtained from Massachusetts State.
I. Information obtained from New Jersey and New York States.
J. Personal communication with a representative from the American Plastics Council. November 2, 1995.
K. Personal communication with a representative from the Scrap Tire Management Council. November 6, 1995.
L. Information obtained from Northeast Forest Products, Martin Mulch Company, and the Solid Waste Association of North America.
M. Solid Waste Association of North America, Manger of Landfill Operations Training and Certification Course. January 1989.
N. Information obtained from New Jersey and New York States.

SECTION 01 77 00 - 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. Permit Closure and Transfer
5. Final Acceptance of the Work
6. Warranties

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 1% of the progress payment. See Section 01 31 00 Project Management and Coordination for additional information on project record drawings.

C. On completion of the total project, submit complete record drawings. Include shop drawings, sketches, and additional drawings that are to be included in the final set, with clear instructions showing the location of these drawings. Final record drawings shall be submitted electronically. Digitized hand drawn redlined drawings are acceptable as record drawings if legible as determined by the CO and converted to digital format. Contracting Office may retain 1% of the remaining contract value until the project record drawings are submitted and approved.

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. Specific warranties, guarantees, workmanship bonds, final certifications, and similar documents.

2. Project Record Documents, operation and maintenance manuals, final completion construction digital images recorded on DVD-R with index and descriptions, and similar final record information.
3. Environmental Record Documents: As specified in Divisions as follows:

    a. MSDS Data: As specified in Section 01 67 00 - Environmental Requirements for Products.
    b. Affirmative Procurement Reporting Form: As specified in Section 01 67 00 - Environmental Requirements for Products.
    c. Environmental Product Data: As specified in Section 01 67 00 - Environmental Requirements for Products.
    d. Final Summary Of Solid Waste Disposal And Diversion: As specified in Section 01 74 19 - Construction Waste Management.

4. Posted Operating Instructions: As specified in individual sections.
5. Deliver tools, 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.
6. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
7. Complete final cleaning requirements, including touchup painting.
8. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
9. Instruct NPS personnel in operation, adjustment, and maintenance of products, equipment, and systems.

1.4 FINAL INSPECTION, SUBSTANTIAL COMPLETION AND ACCEPTANCE PROCEDURES

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

B. If the work is determined to be substantially complete, following the final inspection. Contracting Officer will prepare a Punch List and issue a Letter of Substantial Completion.

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

D. Contractor shall complete the Punch List within 30 calendar days, documented weather permitting.
    1. Prior to requesting final inspection:

E. If Contractor completes all items of work on the Punch List and all contractually required items, Contracting Officer will issue Letter of final acceptance of work.

F. If the Contractor fails to complete the work within the time frame, the Contracting Officer may correct the work with an appropriate reduction in contract price or charge for re-inspection costs in accordance with the Inspection of Construction contract clause.

1.5 PERMIT CLOSURE AND TRANSFER

A. When the construction work covered by the permits is complete, create a list of tasks required to close or transfer the permits to the Park. Submit to Contracting Officer for approval.

B. After substantial completion and the Punch List has been completed, the permits shall be closed and documented by the Agency(ies) with Jurisdiction for the permit.

C. If responsibility for permits is to be transferred to the Park, the Park shall be informed of the permit provisions completed and responsibilities that will transfer to park staff.

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 (215-by-280-mm) 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.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at the beginning of document.

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: Conduct final 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. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Remove labels that are not permanent.
j. 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 mechanical and electrical nameplates.

k. Replace parts subject to unusual operating conditions.
l. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Provide Government with report.

D. Waste Disposal: Comply with requirements of Division 01 section, “Construction Waste Management and Disposal.

END OF SECTION 01 77 00

SECTION 02 41 00 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, materials, tools, equipment, and services for Demolition, as indicated on the drawings and in accordance with provisions of Contract Documents.

B. Completely coordinate with work of other trades.

C. Work Includes:

1. Removal of components of structures as indicated.
2. Removal of removal debris.
3. Recycling of construction debris where removed materials may be processed for reuse.
4. Protection of construction to remain, including:
   a. Utilities.
   b. Roadways
   c. Bridge superstructure
   d. Bridge substructure
5. Salvage of items as indicated on the drawings

1.2 QUALITY ASSURANCE

A. Conduct work in accordance with OSHA and EPA requirements.

B. National Fire Protection Association (NFPA):

1. NFPA 241 Standards for Safeguarding Construction, Alteration, and Demolition Operations.

C. Design, engineering, and construction of shoring, bracing, temporary supports and debris containment control measures are responsibility of Contractor.

1. Employ a Registered Engineer, licensed to practice structural engineering in State of Montana.
2. Design to support dead, live, and lateral, wind or seismic loads required by code or as otherwise indicated, along with construction loads during demolition until permanent construction is in place. If needed, insert list of conference participants not mentioned in Section 013100 "Project Management and Coordination."

1.3 JOB CONDITIONS

A. Perform preliminary site investigations prior to submitting a bid proposal to ascertain extent of work.
   1. Conditions apparent by investigation shall not be allowed as claim for extra cost.

B. Obtain and pay for permits that may be required by authorities having jurisdiction and notify interested utilities companies prior to commencement of activities.

C. Obtain approval of authorities having jurisdiction for work affecting existing means of egress.
   1. Review with and obtain approval of authorities for temporary construction which affects such areas.
   2. Obtain approval of fire authorities.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 GENERAL DEMOLITION PROCEDURES

A. Structural Demolition:

   1. Remove timber railing from bridge decks on the Inside North Fork Bridge as indicated on the plans.
   2. Remove asphalt to the extents indicated on the plans.
   3. Remove timber piles as indicated on the plans.
   4. Remove remnants of timber abutments and wingwalls on Camas Creek Bridge.
   5. Remove unsound concrete from structures as indicated on the plans.

B. Existing Utilities to Remain.

   1. Keep in service and protect against damage during demolition.
   2. Do not interrupt existing utilities serving occupied or facilities in use, except as authorized by the Contracting Officer and designated utility service provider.
   3. Provide temporary services during interruptions to existing utilities, as acceptable to the Contracting Officer and designated utility service provider.

C. Conduct operations to ensure minimum interference with roads, trails, walks and adjacent facilities.

   1. Do not close or obstruct public thoroughfares and walks without approval of authorities having jurisdiction.

D. All demolition activities shall prevent demolition materials and any other debris from entering the waterways.

E. Provide barricades and safety lights as required.

3.2 PROTECTION OF FACILITIES TO REMAIN

A. Protect all site facilities designated to Remain:
   1. Conduct operations to prevent damage by falling debris or other cause to structures, and other facilities as well as persons. Contractor to submit methods of debris containment for approval

2. Provide shoring, bracing, or support to prevent movement, settlement or collapse of structures.
3. If the stone guardrail on the Appistoki Creek Bridge is damaged during construction or demolition activities, it shall be repaired in accordance with Section 04 01 40.91.

3.3 CLEAN-UP AND DISPOSAL OF DEMOLITION MATERIALS

A. Remove debris, rubbish, and materials resulting from demolition operations.

1. Remove and legally dispose of off-site.
2. Do not burn materials on site.

B. Dispose of items and materials not designated for salvage or reuse.

1. Promptly remove from site.
2. Do not store or sell Contractor salvaged items or materials on site.

C. Undamaged portions of the timber bridge curbs shall be salvaged and delivered to the Trails Barn owned by Glacier National Park near West Glacier. Final location and timing of salvaged timber railings delivery shall be coordinated with Glacier staff. Salvaged timber shall not be reused for the project.

D. Clean adjacent improvements of dust, dirt, and debris caused by demolition operations.

E. Return adjacent areas to condition existing prior to start of work.

END OF SECTION 02 41 00

SECTION 03 09 00 – CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete, high early concrete, and grout.

B. Related Specification Sections include but are not necessarily limited to:
   1. Division 00 - Procurement and Contracting Requirements.
   2. Division 01 - General Requirements. Furnish all labor, material and equipment necessary to complete the work according to the contract.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. American Concrete Institute (ACI):
      a. 117, Specification for Tolerances for Concrete Construction and Materials.
      b. 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
      c. 212.3R, Chemical Admixtures for Concrete.
      d. 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
      e. 304.2R, Placing Concrete by Pumping Methods.
      f. 305.1, Hot Weather Concreting.
      g. 306.1, Cold Weather Concreting.
      h. 318, Building Code Requirements for Structural Concrete.
      i. 347, Guide to Formwork for Concrete.
      j. CT-13, Concrete Terminology.
   2. ASTM International (ASTM):
      a. A82, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
      b. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
      c. A775, Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
      d. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
      e. C33, Standard Specification for Concrete Aggregates.
      f. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
      g. C94/C94M, Standard Specification for Ready-Mixed Concrete.
      h. C138, Standard Method of Test for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
      i. C143, Standard Test Method for Slump of Hydraulic Cement Concrete.
      j. C150, Standard Specification for Portland Cement.
      k. C157, Standard Test Method for Length Change of Hardened Hydraulic-Cement, Mortar, and Concrete.

l. C172, Standard Practice for Sampling Freshly Mixed Concrete.
m. C173, Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
n. C231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
o. C260, Standard Specification for Air-Entraining Admixtures for Concrete.
p. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
q. C330, Standard Specification for Lightweight Aggregates for Structural Concrete.
r. C494, Standard Specification for Chemical Admixtures for Concrete.C496, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
s. C567, Standard Test Method for Determining Density of Structural Lightweight Concrete.
t. C595, Standard Specification for Blended Hydraulic Cements.
u. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
v. C1293, Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction.
w. C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
x. D882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
y. D994, Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
z. D1056, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
aa. D1709, Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
bb. D1751, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
cc. E96, Standard Test Methods for Water Vapor Transmission of Materials.
dd. E329, Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
ee. C311 Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for use in Portland Cement Concrete.

3. Corps of Contracting Officer's Representatives (COE):
   a. CRD-C621, Standard Specification for Packaged, Dry, Hydraulic-Cement Grout (Nonshrink).
4. National Ready Mixed Concrete Association (NRMCA).

B. Quality Control:
1. Concrete testing agency:
   a. Contractor to employ and pay for services of a testing laboratory to:
      1) Perform materials evaluation.
      2) Design concrete mixes.
      3) Perform testing of concrete placed during construction.
   b. Concrete testing agency to meet requirements of ASTM E329.
2. Do not begin concrete production until proposed concrete mix design has been approved by Contracting Officer

a. Approval of concrete mix design by Contracting Officer does not relieve Contractor of his responsibility to provide concrete that meets the requirements of this Specification.

3. Adjust concrete mix designs when material characteristics, job conditions, weather, strength test results or other circumstances warrant.
   a. Do not use revised concrete mixes until submitted to and approved by Contracting Officer.

C. Qualifications:
   1. Ready mixed concrete batch plant certified by NRMCA.

1.3 DEFINITIONS

A. Per ACI CT-13 except as modified herein:
   1. Concrete fill: Non-structural concrete.
   2. Concrete Testing Agency: Testing agency employed to perform materials evaluation, design of concrete mixes or testing of concrete placed during construction.
   3. Exposed concrete: Exposed to view after construction is complete.
   4. Indicated: Indicated by Contract Documents.
   5. Nonexposed concrete: Not exposed to view after construction is complete.
   6. Required: Required by Contract Documents.
   7. Specified strength: Specified compressive strength at 28 days.
   8. Submitted: Submitted to Contracting Officer.

1.4 SUBMITTALS

A. Shop Drawings:
   1. See Specification Section 01 33 23 for requirements for the mechanics and administration of the submittal process.
   2. Concrete mix designs proposed for use.
      a. Concrete mix design submittal to include the following information:
         1) Sieve analysis and source of fine and coarse aggregates per AASHTO T 27 (ASTM 136).
         2) Test for aggregate organic impurities per AASHTO T 21 (ASTM C40).
         3) Test for deleterious aggregate per ASTM C1293.
         4) Proportioning of all materials.
         5) Type of cement with mill certificate for cement.
         6) Type of fly ash with certificate of conformance to specification requirements.
         7) Slump per AASHTO T 119 (ASTM C143).
         8) Air content per AASHTO T 152 (ASTM C231).
         9) Brand, type, ASTM designation, and quantity of each admixture proposed for use.
         10) 28-day cylinder compressive test results of trial mixes per ASTM C39, ACI 318, and as indicated herein.
         11) Shrinkage test results.
         12) Standard deviation value for concrete production facility.
   3. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.
b. Manufacturer's installation instructions.
c. Manufacturers and types:
1) Joint fillers.
2) Curing agents.
3) Bonding and patching mortar.
4) Construction joint bonding adhesive.
5) Nonshrink grout with cure/seal compound.

4. Reinforcing steel:
a. Show grade, sizes, number, configuration, spacing, location and all fabrication and placement details.
b. In sufficient detail to permit installation of reinforcing without having to make reference to Contract Drawings.
c. Obtain approval of Shop Drawings by Contracting Officer before fabrication.
d. Mill certificates.

5. Scaled (minimum 1/8 IN per foot) drawings showing proposed locations of construction joints, control joints, expansion joints (as applicable) and joint dimensions.

6. Certifications:
a. Certification of standard deviation value in psi for ready mix plant supplying the concrete.
b. Certification that the material and sources submitted in the mix design will be used in the concrete for this project.

7. Test reports:
a. Cement mill reports for all cement to be supplied.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage of Material:
1. Aggregate:
a. Store to prevent segregation and contamination with other sizes or foreign materials.
b. Do not use frozen or partially frozen aggregates.
c. Do not use bottom 6 IN of stockpiles in contact with ground.
d. Allow sand to drain until moisture content is uniform prior to use.

2. Admixtures:
a. Protect from contamination, evaporation, freezing, or damage.
b. Maintain within temperature range recommended by manufacturer.
c. Completely mix solutions and suspensions prior to use.

3. Reinforcing steel: Support and store all rebars above ground.

B. Delivery:
1. Concrete:
a. Prepare a delivery ticket for each load for ready-mixed concrete.
b. Truck operator shall hand ticket to Contracting Officer at the time of delivery.
c. Ticket to show:
1) Mix identification mark.
2) Quantity delivered.
3) Amount of each material in batch.

4) Outdoor temp in the shade.
5) Time at which cement was added.
6) Numerical sequence of the delivery.
7) Amount of water added.

2. Reinforcing steel:
   a. Ship to jobsite with attached plastic or metal tags with permanent mark numbers.
   b. Mark numbers to match Shop Drawing mark number.
3. Handling of Epoxy-Coated Rebar:
   a. Use padded or nonmetallic slings and padded straps to protect coated reinforcement from damage.
   b. Handle bundled bars to prevent sagging that could damage the coating.
   c. Do not drop or drag rebars.
   d. Store on wooden cribbing.
   e. Coated rebars subject to rejection by Contracting Officer if rebar coating has been damaged.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement:
   1. Cast-In-Place Concrete: Conform to ASTM C150 Type II
   2. High Early Concrete: Conform to ASTM C150 Type III

B. Fly Ash:
   1. ASTM C311 and ASTM C618 for Class C or F.
   2. Nonstaining.
      a. Hardened concrete containing fly ash to be uniform light gray color.
   3. Maximum loss on ignition: 4 percent.
   4. Compatible with other concrete ingredients.
   5. Obtain proposed fly ash from a source approved by WYDOT for use in concrete for bridges.

C. Admixtures:
   1. Air entraining admixtures: ASTM C260.
   2. Water reducing, retarding, and accelerating admixtures:
      a. ASTM C494 Type A through E.
      b. Conform to provisions of ACI 212.3R.
      c. Follow manufacturer's instructions.
      d. Use chloride free admixtures only.
   3. Maximum total water soluble chloride ion content contributed from all ingredients of concrete including water, aggregates, cementitious materials and admixtures by weight percent of cement:
      a. 0.10 all concrete.
   4. Do not use calcium chloride.
   5. Pozzolanic admixtures: ASTM C618.
   6. Provide admixtures of same type, manufacturer and quantity as used in establishing required concrete proportions in the mix design.

D. Water: Potable, clean, free of oils, acids and organic matter.

E. Aggregates:
1. Normal weight concrete: ASTM C33, except as modified below.
2. Fine aggregate gradation:
a. Fine aggregate gradation shall comply with the following table.

Sieve	% Passing
3/8 inch	100
No. 4	95 - 100
No. 16	45 – 80
No. 50	10 - 30
No. 100	2 – 10
No. 200	0 - 4

b. Use only washed aggregates.
3. Coarse aggregate:
a. Crushed rock, natural gravel, or other inert granular material.
b. Maximum amount of clay or shale particles: 1 PCT.
4. Coarse aggregate gradation:
a. Coarse aggregate gradation shall comply with the following table.

Sieve	% Passing
1 ½ inch	100
1 inch	95 - 100
½ inch	25 - 60
No. 4	0 - 10
No. 8	0 - 5
No. 200	0 - 2

F. Concrete Grout:
1. Nonshrink, nonmetallic grout:
a. Nonmetallic, noncorrosive, nonstaining, premixed with only water to be added.
b. Grout to produce a positive but controlled expansion.
c. Mass expansion not to be created by gas liberation.
d. Minimum compressive strength of nonshrink grout at 28 days: 6500 PSI.
e. In accordance with COE CRD-C621.

G. Reinforcing Steel:
1. Reinforcing bars: ASTM A615, Grade 60.
a. Provide with epoxy coating per ASTM A775.
2. Welded wire fabric: ASTM A1064

H. Forms:
1. Prefabricated or job built.
2. Wood forms:
a. 5/8 or 3/4 IN 5-ply structural plywood of concrete form grade.
b. Built-in-place or prefabricated type panel.
3. Metal forms:

a. Metal forms may be used except for aluminum in contact with concrete..
b. Forms to be tight to prevent leakage, free of rust and straight without dents to provide members of uniform thickness.

4. Chamfer strips: Clear white pine, surface against concrete planed.

I. Form Ties:
1. Commercially fabricated for use in form construction.
a. Field fabricated ties are unacceptable.
2. Constructed so that ends or end fasteners can be removed without causing spalling at surfaces of the concrete.
3. 3/4 IN minimum diameter cones on both ends.
4. Embedded portion of ties to be not less than 1 IN from face of concrete after ends have been removed.
5. Cone size:
a. 3/4 IN minimum diameter cones on both ends.
b. Depth of cone not to exceed the concrete reinforcing cover.
6. Form release: Nonstaining and shall not prevent bonding of future finishes to concrete surface.
a. Nontoxic 30 days after application.
b. Form release shall not be an attractant to wildlife.

J. Chairs, Runners, Bolsters, Spacers, and Hangers:
1. Stainless steel, epoxy coated, or plastic coated metal.
a. Plastic coated: Rebar support tips in contact with the forms only.

K. Membrane Curing Compound:
1. 1. ASTM C309, Type II-B.
2. Resin based, dissipates upon exposure to UV light.
3. 3. Curing compound shall not prevent bonding of any future coverings, coatings or finishes.

L. Expansion Joint Filler:
1. Swell of 2 to 5 PSI compression.
2. All uses:
a. Fiber expansion joint filler.
b. ASTM D1751.

2.2 CONCRETE MIXES

A. General:
1. All concrete to be ready mixed concrete conforming to ASTM C94/C94M.
2. Provide concrete of specified quality capable of being placed without segregation and, when cured, of developing all properties required.
3. All concrete to be normal weight concrete.
4. Provide pozzolan content for all cast-in-place construction.

B. Strength:
1. For Cast-in-Place concrete, provide specified strength of 4,000 PSI at 28 days.
2. For High Early concrete, provide specified strength of 4,000 PSI at 7 days.

C. Air Entrainment:
   1. Provide air entrainment in concrete resulting in a total air content percent by volume of 4.5 to 7.5:
   2. Air content to be measured in accordance with ASTM C231, ASTM C173, or ASTM C138.

D. Slump - 6 IN maximum, 1 IN minimum:
   1. Measured at point of discharge of the concrete into the concrete construction member.
   2. Concrete of lower than minimum slump may be used provided it can be properly placed and consolidated.
   3. Pumped concrete:
      a. Provide additional water at batch plant to allow for slump loss due to pumping.
      b. Provide only enough additional water so that slump of concrete at discharge end of pump hose does not exceed maximum slump specified above.
   4. Determine slump per ASTM C143.

E. Selection of Proportions:
   1. General:
      a. Proportion ingredients to:
         1) Produce proper workability, durability, strength, and other required properties.
         2) Prevent segregation and collection of excessive free water on surface.
   2. Minimum cement contents of 611 lb/yd and maximum water cement ratio of 0.45.
   3. Fly ash:
      a. For cast-in-pace concrete only, a maximum of 20 PCT by weight of Portland cement content per cubic yard may be replaced with fly ash at rate of 1 LB fly ash for 1 LB of cement.
      b. When fly ash is used, the water to cementitious materials ratio shall not exceed the maximum value specified herein.
   4. Required average strength to exceed the specified 28-day compressive strength by the amount determined or calculated in accordance with the requirements of Chapter 5 of ACI 318 using the standard deviation of the proposed concrete production facility.
   5. Allowable Shrinkage: 0.040 percent at 28-days, per ASTM C157.

PART 3 - EXECUTION

3.1 FORMING AND PLACING CONCRETE

A. Formwork:
   1. Contractor is responsible for design and erection of formwork.
   2. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.
      a. Allowable tolerances: As recommended in ACI 347.
   3. Provide slabs of minimum indicated depth when sloping foundation base slabs to drains.
      a. For slabs on grade, slope top of subgrade to provide floor slabs of minimum uniform indicated depth.
   4. Chamfer strips: Place 3/4 IN chamfer strips in forms to produce 3/4 IN wide beveled edges on permanently exposed corners of members.

5. Clean and adjust forms prior to concrete placement.
6. Tighten forms to prevent mortar leakage.
7. Coat form surfaces with form release agents prior to placing reinforcing bars in forms.

B. Reinforcement:
1. Position, support and secure reinforcement against displacement.
2. Locate and support with chairs, runners, bolsters, spacers and hangers, as required.
3. Set wire ties so ends do not touch forms and are directed into concrete, not toward exposed concrete surfaces.
4. Lap splice lengths: ACI 318 Class B top bar tension splices unless indicated otherwise on the Drawings.
5. Extend reinforcement to within 2 IN of concrete perimeter edges.
   a. If perimeter edge is earth formed, extend reinforcement to within 3 IN of the edge.
6. Minimum concrete protective covering for reinforcement: As shown on Drawings.
7. Unless otherwise indicated, provide minimum concrete cover as follows:
   a. Concrete deposited against earth: 3 IN.
   b. Formed surfaces exposed to weather or in contact with earth: 2 IN for reinforcing bars #6 or larger; 1-1/2 IN for reinforcing bars less than #6.
8. Do not weld reinforcing bars.

C. Construction, Expansion, and Contraction Joints:
1. Locate joints as indicated on Contract Drawings or as shown on approved Shop Drawings.
   a. Where construction joint spacing shown on Drawings exceeds the joint spacing indicated in Paragraph below, submit proposed construction joint location in conformance with this Specification Section.
2. Unplanned construction joints will not be allowed.
3. Locate construction joints in foundation base slabs so that concrete placements are approximately square and do not exceed 2500 SF.
4. Install construction joints perpendicular to main reinforcement with all reinforcement continued across construction joints.
5. At least 72 HRS shall elapse between placing of adjoining concrete construction.
6. Thoroughly clean and remove all laitance and loose and foreign particles from construction joints.
7. Before new concrete is placed, dampen concrete surfaces.

D. Embedments:
1. Set and build in anchorage devices and other embedded items required for other work that is attached to or supported by concrete.
2. Use setting diagrams, templates and instructions for locating and setting.

E. Placing Concrete:
1. Place concrete in compliance with ACI 304R and ACI 304.2R.
2. Place in a continuous operation within planned joints or sections.
3. Begin placement when work of other trades affecting concrete is completed.
4. Place concrete by methods which prevent aggregate segregation.
5. Do not allow concrete to free fall more than 4 FT.
6. Where free fall of concrete will exceed 4 FT, place concrete by means of tremie pipe or chute.

F. Consolidation: Consolidate all concrete using mechanical vibrators supplemented with hand rodding and tamping, so that concrete is worked around reinforcement and embedded items into all parts of forms.

G. Protection:
1. Protect concrete from physical damage or reduced strength due to weather extremes.
2. In cold weather comply with ACI 306.1 except as modified herein.
   a. Do not place concrete on frozen ground or in contact with forms or reinforcing bars coated with frost, ice, or snow.
   b. Minimum concrete temperature at the time of mixing:

Outdoor Temperature at Placement (In Shade)	Concrete Temperature at Mixing
Below 30°F	70°F
Between 30-45°F	60°F
Above 45°F	50°F

   c. Do not place heated concrete that is warmer than 80 DEGF.
   d. If freezing temperatures are expected during curing, maintain the concrete temperature at or above 50 DEGF for 7 days or 70 DEGF for 3 days.
   e. Do not allow concrete to cool suddenly.
3. In hot weather comply with ACI 305.1 except as modified herein.
   a. At air temperature of 90 DEGF and above, keep concrete as cool as possible during placement and curing.
   b. Do not allow concrete temperature to exceed 90 DEGF at placement.
   c. Prevent plastic shrinkage cracking due to rapid evaporation of moisture.
   d. Do not place concrete when the actual or anticipated evaporation rate equals or exceeds 0.2 LBS/SF/HR as determined from ACI 305.1, Figure 2.1.5.

H. Curing:
1. Begin curing concrete as soon as free water has disappeared from exposed surfaces.
2. Cure concrete by use of moisture retaining cover, burlap kept continuously wet or by membrane curing compound.
3. Provide protection as required to prevent damage to concrete and to prevent moisture loss from concrete during curing period.
4. Provide curing for minimum of 7 days.
5. Form materials left in place may be considered as curing materials for surfaces in contact with the form materials except in periods of hot weather.
6. In hot weather follow curing procedures outlined in ACI 305.1.
7. In cold weather follow curing procedures outlined in ACI 306.1.
8. Curing vertical surfaces with a curing compound:
   a. Cover vertical surfaces with a minimum of two coats of the curing compound.
   b. Allow the preceding coat to completely dry prior to applying the next coat.
   c. Apply the first coat of curing compound immediately after form removal.
   d. Vertical surface at the time of receiving the first coat shall be damp with no free water on the surface.
   e. A vertical surface is defined as any surface steeper than 1 vertical to 4 horizontal.

I. Form Removal:

1. Remove forms after concrete has hardened sufficiently to resist damage from removal operations or lack of support.
2. Where no reshoring is planned, leave forms and shoring used to support concrete until it has reached its specified 28-day compressive strength.
3. When high early concrete is used in abutment pile replacement, bridge shoring shall remain in place until concrete strength tests show the concrete has reached the specified 7-day concrete strength.

3.2 CONCRETE FINISHES

A. Tolerances: 1/4 IN in 10 FT.

B. Surfaces Exposed to View:
1. Rubbed Finish: Keep concrete to receive a rubbed finish saturated with water.
    a. Ensure the mortar used in pointing is set before wetting.
    b. Rub surfaces with a medium-coarse carborundum stone faced with a small quantity of mortar composed of cement and fine sand mixed in proportions of the concrete being finished.
    c. Rub until form marks, projections, and irregularities have been removed; all voids are filled; and a uniform surface is obtained.
    d. Leave the paste produced by rubbing.
    e. After placing concrete above the treated surface, obtain the final finish by rubbing with a fine carborundum stone and water until the entire surface is smooth and uniform in color.
    f. After final rubbing, and when the surface is dry, rub with burlap to remove loose powder.

C. Surfaces Not Exposed to View:
1. Patch voids, air pockets and honeycomb areas with cement grout.
2. Fill tie holes with nonshrink, nonmetallic grout.

D. Slab Float Finish:
1. After concrete has been placed, consolidated, struck off, and leveled, do no further work until ready for floating.
2. Do not use water to aid in finishing.
3. Begin floating when water sheen has disappeared and surface has stiffened sufficiently to permit operation.
4. During or after first floating, check planeness of entire surface with a 10 FT straightedge applied at not less than two different angles.
5. Cut down all high spots and fill all low spots during this procedure to produce a surface within Class B tolerance throughout.
6. Refloat slab immediately to a uniform sandy texture.

E. Troweled Finish:
1. Float finish surface.
2. Next power trowel, and finally hand trowel.
3. Do not use water to aid in finishing.
4. Produce a smooth surface which is relatively free of defects with first hand troweling.
5. Perform additional trowelings by hand after surface has hardened sufficiently.

6. Final trowel when a ringing sound is produced as trowel is moved over surface.
7. Thoroughly consolidate surface by hand troweling.
8. Leave finished surface essentially free of trowel marks, uniform in texture and appearance and plane to a Class A tolerance.
9. On surfaces intended to support floor coverings remove any defects of sufficient magnitude that would show through floor covering by grinding.

F. Broom Finish: Immediately after concrete has received a float finish as specified, give it a transverse scored texture by drawing a broom across surface.

3.3 GROUT

A. Preparation:
1. Nonshrinking, nonmetallic grout:
   a. Clean concrete surface to receive grout.
   b. Saturate concrete with water for 24 HRS prior to grouting.

B. Application:
1. Nonshrinking, nonmetallic grout:
   a. Mix in a mechanical mixer.
   b. Use no more water than necessary to produce flowable grout.
   c. Place in accordance with manufacturer's instructions.
   d. Completely fill all spaces and cavities below the bottom of baseplates.
   e. Provide forms where baseplates and bedplates do not confine grout.
   f. Where exposed to view, finish grout edges smooth.
   g. Except where a slope is indicated on Drawings, finish edges flush at the baseplate, bedplate, member, or piece of equipment.
   h. Protect against rapid moisture loss by covering with wet rags or polyethylene sheets.
   i. Wet cure grout for seven (7) days, minimum.

3.4 FIELD QUALITY CONTROL

A. Employ and pay for services of a concrete testing laboratory to perform testing of concrete placed during construction.

B. Concrete Quality Control During Construction:
1. Strength tests:
   a. Secure concrete samples in accordance with ASTM C172.
   b. Obtain each sample from a different batch of concrete on a random basis.
   c. For each strength test mold and cure three cylinders from each sample in accordance with ASTM C31.
      1) Record any deviations from requirements on test report.
   d. Test cylinders in accordance with ASTM C39.
   e. Test one (1) cylinder at seven (7) days.
   f. Test two (2) cylinders at 28 days.
2. Provide strength tests as follows:
   a. One strength test consisting of 6 IN DIA x 12 IN high cylinders shall be taken:

1) Not less than one (1) test each day concrete placed.
2) Not less than one (1) test for each 50 CY or fraction thereof placed in 1 day.
3) Not less than one (1) test for each type of concrete poured.
4) Not less than one (1) test for each concrete structure exceeding 2 CY in volume.

b. Determine slump of concrete sample for each strength test.
1) Additional slump tests shall be taken if consistency of concrete appears to vary.
2) Determine slump in accordance with ASTM C143.

c. Determine air content of concrete sample for each strength test in accordance with either ASTM C231, ASTM C173, or ASTM C138.

d. Determine temperature of concrete sample for each strength test.

e. Determine unit weight (LB/CF) of fresh lightweight concrete at point of discharge into construction member for each strength test.

f. Submit results of all concrete strength tests to Contracting Officer in writing as soon as tests are completed.

C. Evaluation of Tests:
1. Strength test results:
a. Average of 28-day strength for cast-in-place concrete or 7-day strength for high early concrete of two cylinders from each sample.
1) If one cylinder manifests evidence of improper sampling, molding, handling, curing or testing, strength of remaining cylinder will be test result.
2) If both cylinders show any of above defects, test will be discarded.

D. Acceptance of Concrete:
1. Strength level of each type of concrete shall be considered satisfactory if both of the following requirements are met:
a. Average of all sets of three consecutive strength tests equals or exceeds the required specified compressive strength.
b. No individual strength test falls below the required specified compressive strength by more than 500 PSI.
2. If tests fail to indicate satisfactory strength level, perform additional tests and/or corrective measures as directed by Contracting Officer.
a. Perform additional tests and/or corrective measures at no additional cost to Contracting Officer.

E. Concrete tolerances per ACI 117.

3.5 SCHEDULES

A. Form Types:
1. Surfaces exposed to view:
a. Prefabricated or job-built wood forms.
b. Laid out in a regular and uniform pattern with long dimensions vertical and joints aligned.
c. Produce finished surfaces free from offsets, ridges, waves, and concave or convex areas.
d. Construct forms sufficiently tight to prevent leakage of mortar.

2. Surfaces normally submerged or not normally exposed to view: Wood or steel forms sufficiently tight to prevent leakage of mortar.
3. Other types of forms may be used:
    a. For surfaces not restricted to plywood or lined forms.
    b. As backing for form lining.

B. Grout:
1. Nonshrinking, nonmetallic grout: General use.

C. Concrete:
1. Normal weight concrete: All concrete.
2. General use concrete: All locations.

END OF SECTION 03 09 00

SECTION 03 30 30 – STRUCTURAL CONCRETE REPAIR

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Patching of spalled and delaminated concrete elements at the following locations:
      a. North Fork Bridge deck, curbs, and pier diaphragms.
      b. Fish Creek Bridge piers
      c. Appistoki Creek Bridge sidewalk, culvert upstream and downstream and faces, and underside of deck.
      d. Camas Creek Bridge backwall
      e. Underside of Lee Creek Bridge deck and southeast bridge exterior corner.
      f. Anaconda Creek Bridge beam #3 web and underside of beam #2 web
   2. Repair of cracks in concrete elements with crack sealant.
   3. Steel reinforcement corrosion protection.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. ASTM International (ASTM):
      a. A 780: Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
      b. C 881: Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
      c. C 928: Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs
      d. D 3963: Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars
      e. D 4285: Indicating Oil or Water in Compressed Air
   2. American Association of State Highway and Transportation Officials (AASHTO)
      a. M 235: Epoxy Resin Adhesives
      b. T 106: Compressive Strength of Hydraulic Cement Mortar (Using 50-mm or 2-in. Cube Specimens)
      c. T 161: Resistance of Concrete to Rapid Freezing and Thawing

1.3 DEFINITIONS

A. Unsound Concrete: Concrete with deterioration, including but not limited to chipping, cracking, spalling, or delamination. Unsoundness of the concrete is determined by visual inspection, sounding or another appropriate method of physical testing.

1.4 SUBMITTALS

A. Product Information:

1. See Specification Section 01 33 23 for requirements for the mechanics and administration of the submittal process.
2. Product technical data for each specified item including:
    a. Acknowledgement that products submitted meet requirements of standards referenced.
    b. Manufacturer's installation instructions.
    c. Manufacturer's data sheet on each product.

B. Operator Qualifications:
1. Evidence that concrete mortar repair will be completed by persons having at least two years of experience in the methods and materials of concrete repair for information.

C. Samples:
1. Prior to concrete repair, a sample of concrete mortar shall be provided for verification by the CO that the pigment matches the color of the surrounding concrete surfaces.
2. Prior to crack repair, a sample crack sealant shall be provided for verification by the CO that the pigment matches the color of the surrounding concrete surfaces.

D. Temporary Shoring Plan
1. If the contractor elects to shore the existing stone parapet at the Appistoki Creek Bridge, a temporary shoring plan shall be submitted for information demonstrating sufficient support of and prevent damage to the parapet during concrete removal and repair procedures.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver the materials in unopened packages with labels clearly indicating the following:
1. Name of Manufacturer
2. Manufacturer’s product name or product number
3. Manufacturer’s lot number
4. Mix ratio
5. Hazardous material rating and appropriate warnings for handling.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Repair Mortar
1. Use only products recommended to repair spalled and delaminated concrete and cracks less than or equal to ¼ inch for each applicable horizontal, vertical or overhead application by the manufacturer.
2. Use a product that meets AASHTO T 106 and ASTM C 928.
3. Use a product that meets AASHTO T 161 Durability Factor of 95 at 28 days.
4. Use a product that can be pigmented to match the color of the surrounding concrete surfaces.

B. Substrate Coating
1. Use a bonding agent or primer recommended by the concrete repair mortar manufacturer.

2. Capable of containing injection adhesive in cracks during pressure injection and until the injection adhesive has cured.
3. Select surface seal to match color or surrounding surfaces.

C. Crack Sealant
1. Use epoxy concrete repair sealant to repair cracks greater than or equal to 1/4 inch in width for each applicable horizontal, vertical, and overhead application by the manufacturer.
2. Use epoxy sealant conforming to ASTM C 881.
3. Select epoxy sealant to match color or surrounding surfaces.

D. Reinforcement Corrosion Protection
1. Use an epoxy primer or cement-based mortar product recommended for the protection on steel reinforcement against corrosion by the manufacturer.
2. Product shall be applied directly to the exposed reinforcement in accordance with manufacturer's recommendations.
3. Use products that are compatible with the concrete repair mortar as recommended by the manufacturer.

2.2 EQUIPMENT REQUIREMENTS

A. Concrete Repair Mortar Mixer
1. Use a small mixer to batch out the concrete repair mortar.

B. Jackhammer
1. 15 lb. class
2. 30 lb. class

C. As required by the manufacturer's recommendations for surface preparation and installation.

PART 3 - EXECUTION

3.1 PREPARATION FOR SPALL AND DELAMINATION REPAIR

A. Locate the repair areas.
1. Sound the items requiring this work and mark the limits of spalled and delaminated areas for repair work in the presence of the CO.

B. Concrete removal
1. During concrete removal, provide proper containment to prevent concrete dust, debris, and any other foreign material from entering adjacent streams.
2. Make ½ inch deep saw cuts in the sound concrete along the perimeter of the repair area.
3. Remove damaged, shattered, and delaminated concrete.
   a. Use 30 lb class jackhammer when allowed.
   b. Do not use pneumatic hammers heavier than 15 lb class for removals in areas directly below the top reinforcing steel.
   c. Use 15 lb class jackhammer or lighter for deck edge repair.
   d. Operate jackhammer at an angle greater than 45 degrees as measured from the element surface.

e. Protect existing reinforcing steel encountered.
f. Replace or repair damaged reinforcing steel.

4. If more than half the diameter of the reinforcing steel is exposed prior to or during concrete removal, a minimum of 1" clear shall be removed from around exposed reinforcing steel.
5. Remove loose materials by dry sweeping or clean and dry compressed air with at least 90 psi pressure. Refer to ASTM D 4285.
6. If more than one layer of reinforcing is exposed during concrete removal procedures, concrete removal procedures at that location shall stop and the CO and EOR shall be contacted.
7. Clean exposed reinforcing steel and concrete surfaces before placing new concrete according to the concrete repair mortar manufacturer's recommendations.
   a. Protect in place sound rebar.
   b. Prevent material and debris from falling into waterways, pedestrian areas, traffic areas, or onto railroad tracks.
8. Clean the repair area by blowing with clean and dry compressed air at 90 psi. Refer to ASTM D 4285

C. For the Appistoki Creek Bridge Concrete Removal
1. Protect adjacent stone parapet during concrete removal and cleaning procedures.
   a. If the depth of concrete removal threatens the stability of the existing stone parapet, temporary shoring may be provided to prevent damage, cracking, deformation or collapse of stone parapet during concrete repair.
      1) If temporary shoring is to be provided, a temporary shoring plan shall be submitted.
   b. If shoring is not or cannot be provided to sufficiently protect the stone parapet, then unstable portion of the stone parapet shall be removed per the following:
      1) Mark and photograph the portion of the stone parapet to be removed in accordance with Section 01 32 33.
      2) Remove stone parapet in accordance with Section 04 01 40.91.
      3) After concrete repairs are completed and concrete repair mortar has reached the proper design strength per the manufacturer's recommendations, replace and repair stone parapet in accordance with Section 04 01 40.91.
   c. If damaged during concrete repair, the stone parapet shall be repaired in accordance with Section 04 01 40.91.

3.2 PREPARATION FOR REINFORCEMENT CORROSION PROTECTION

A. Remove all unsound and delaminated concrete from around exposed reinforcement. If more than half the diameter of the reinforcing steel is exposed prior to or during concrete removal, a minimum of 1" clear shall be removed from around exposed reinforcing steel prior to application of corrosion protection.

B. Remove all rust, scale, mortar, concrete, dust, and other loose and deleterious materials which inhibit bond or contribute to corrosion.

3.3 PREPARATION FOR CRACK REPAIR

A. Locate the areas requiring this work as indicated on the plans and mark the limits of cracking for repair work in the presence of the CO.

B. Crack shall be clean, dry, free of loose concrete, dust, dirt, efflorescence, or any other material that will prevent proper adhesion.

C. Additional surface preparation shall be per the crack sealant manufacturer's specifications.

3.4 REINFORCEMENT CORROSION PROTECTION APPLICATION

A. Exposed reinforcement shall be dry prior to application of the corrosion reinforcement.

B. Apply corrosion protection per the manufacturer's recommendations. Extra care shall be taken to properly coat the underside of the reinforcement if completely exposed.

C. Allow material to dry completely per the manufacturer's recommendations prior to applying concrete repair mortar.

3.5 SPALL AND DELAMINATION REPAIR

A. Formwork
   1. Use forms and braces to place new concrete to the original dimensions.
      a. Rebuild the areas to original shape and dimensions, ± ⅛ inch.
   2. Vibration is required in the forms when the area between forms and existing concrete surface will allow use of vibrators.
   3. For the Appistoki Creek Bridge, the form lines of the concrete repairs shall match the existing historic form lines.

B. Concrete Repairs
   1. Use approved concrete repair mortar.
   2. Prepare the cleaned concrete surface of the repair in accordance with the manufacturer's recommendations.
   3. Place concrete repair mortar in layers not exceeding the manufacturer's recommended application thickness per layer.
   4. Follow the manufacturer's recommendations for finishing and curing.
   5. Concrete repair mortar shall be pigmented to match color of the surrounding concrete surfaces.

3.6 CRACK REPAIR

A. Use approved crack repair sealant per manufacturer's recommendations.

END OF SECTION 03 30 30

SECTION 04 01 40.91 – STONE RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes (all work described herein refers to the Appistoki Creek Bridge stonework separating the sidewalk from the roadway and stone parapet, if applicable):

1. Removal, replacement, and repair of stone, as required.
2. Re-pointing and mortar repair, as required.

1.2 SUBMITTALS

A. Product Data: Manufacturer's technical data for each product indicated including recommendations for their application and use; including test reports and certifications substantiating that products comply with requirements.

B. Historic Preservation Treatment Plan:

1. After contract award and before Pre-Construction conference, submit for approval a written Historic Preservation Treatment Plan (HPTP).
2. If the plan requires revisions or corrections, Contractor shall resubmit plan within 10 days.
3. No change in approved plan may be made without written concurrence by Contracting Officer.

C. Samples: Submit, for verification purposes, prior to mock-erection, samples of each new exposed stone material to be used for replacing existing materials.

D. Certifications: Submit certifications for each individual within company for specified stone patching products and documentation of contractor experience in comparable work.

E. Mortar Samples: Test (3) areas of mortar to determine composition and strength. Mortar used in repointing to match existing strength, texture and composition.

1.3 QUALITY ASSURANCE

A. Restoration Specialist: Work shall be performed by a firm having not less than five years successful experience in comparable stone restoration projects and employing personnel skilled in stone restoration processes and operations indicated.

B. Field-Constructed Mock-Ups:

1. Prior to start of general masonry restoration, prepare following sample areas on parapet where directed by Contracting Officer.
2. Obtain acceptance from the Park's historic preservation personnel of visual qualities before proceeding with work.

3. Retain acceptable panels in undisturbed condition, suitably marked, during construction as a standard for judging completed work.
4. Repointing:

    a. Demonstrate materials, methods and colorants to be used for repointing existing stone; samples should reflect a minimum of 3 LF of repointing and should include both vertical and horizontal joint work.
    b. New mortar color shall match mortar color of cleaned sample area, as well as strength, composition and texture as determined by mortar testing.

5. Patching:

    a. Demonstrate materials and methods to be used for each type of stone surface and condition with samples approximately 2 SF in area.
    b. Allow waiting period of duration indicated, but not less than seven calendar days, after completion of sample cleaning to permit study of sample panels for negative reactions.

6. Repairs:

    a. Repair as described below on one damaged stone parapet area that is designated for repair. If work is accepted by CO, mock-up may become part of body of work.

C. Sandblasting and/or use of non-proprietary acids, alkalis, powdered or liquid, will not be permitted.

D. Final acceptance of stone restoration work shall be subjet to the approval of the historic preservation personnel.

1.4 PROJECT CONDITIONS

A. Erosion and weather are contributing to stone's deterioration.

B. If contractor is to re-point mortar joints or replace stone in air temperatures below 40 degrees F, blankets, heaters, and other approved cold weather protection shall be followed per the cold weather requirements. Cold Weather Requirements: IMIAC-recommended practices and specifications for cold weather masonry construction.

C. Stone Patching:

1. Perform preparation work one day prior.
2. Patching work shall be done in morning to allow for time to monitor curing of patch.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate masonry work with other trades.

B. Perform masonry restoration work in following sequence, as required, after all other construction activities have been completed:

1. Prepare existing masonry for restoration:

    a. Rake out existing mortar from joints where deteriorated or shown to be re-pointed.
    b. Deteriorated joints are defined as having loose or missing mortar; excessively soft mortar; powdery or crumbling mortar; cracks that weaken the bond between units; voids; or badly stained pointing.

2. Patch holes in stone where identified by the CO.

3. Repoint existing mortar joints of masonry which are deteriorated or shown to be restored where identified by the CO.

C. Perform stone parapet repair and replacement in the following sequence.

1. Attempt repair as described below on one damaged area.
2. Obtain CO approval for finished product. If accepted, procced to other areas determined for repair. CO must accept or reject work at each of areas.
3. Where work is rejected, replace stone repair area as directed by the CO.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Mortar – composition to be determined by mortar testing:

1. Portland or natural cement, as applicable.
2. Hydrated lime.
3. Aggregate for mortar.
4. Water: Clean, free of oils, acids, alkalis and organic matter.

B. Masonry Patching Materials:
1. Tube sand with fines passing a #8 sieve removed & discarded.
2. Type N mortar of equivalent color to existing mortar.

C. Injection Grout

2.2 MORTAR MIXES

A. Measurement and Mixing:

1. Measure cementitious and aggregate material in a dry condition by volume or equivalent weight.
2. Do not measure by shovel, use known measure.
3. Mix materials in a clean mechanical batch mixer.

B. Mixing Pointing Mortar:

1. Thoroughly mix cementitious and aggregate materials together before adding any water.
2. Then mix again adding only enough water to produce a damp, unworkable mix which will

retain its form when pressed into a ball.
3. Maintain mortar in this dampened condition for one to two hours.
4. Add remaining water in small portions until mortar of desired consistency is reached.
5. Use mortar within thirty minutes of final mixing; do not re-temper or use partially hardened material.

C. Do not use admixtures of any kind in matching mortar.

PART 3 - EXECUTION

3.1 HISTORIC PRESERVATION TREATMENT PLAN

A. Prepare written plan for preservation work covering preservation components of project. Plan shall verify construction strategy and intent is compatible with Department of the Interior's (DOI) standards for Treatment of Historic Properties, guidelines for Treatment of Cultural Landscapes, and National Park Service management policies for cultural resources. Plan shall satisfy both project scope and resource protection requirements. Plan shall include:

1. Organized list of preservation components of project, systems, and tasks
2. Staging and sequence of work
3. Disassembly and reassembly techniques and steps
4. Equipment and tools required
5. Supplies and materials with manufacturer or supplier identified
6. Skilled trades and crafts required
7. Anticipated testing and analysis of fabric
8. Additional investigations for extents or magnitude of treatments needed
9. Protective measures
10. Seasonal limitations on work
11. Alternative means if primary treatment method is unfeasible
12. Work conducted off-site (Approval from Contracting Officer required prior to taking resources off-site).

3.2 PREPARATION

A. Comply with recommendations of manufacturers for stone cleaning and protecting concrete surfaces, surrounding pavement and landscape against damage from exposure to their products.

B. Protect persons, surrounding surfaces, site and all landscape from injury resulting from stone restoration work.

C. Prevent chemical cleaning and solutions from coming into contact with pedestrians, motor vehicles, landscaping, concrete and other surfaces which could be injured by such contact.

D. Do no stone cleaning during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

E. Dispose of run-off from cleaning operations nightly by legal means in accordance with local codes and in a manner which prevents soil erosion, undermining of paving and foundations, damage to

landscaping and water penetration.

F. Erect temporary protection covers over pedestrian walkways and at points of entrance and exit for persons and vehicles which must remain in operation during course of stone restoration work.

G. Protect metal and wood from contact with detergent cleaners.

H. Prevent grout or mortar used in re-pointing and repair work from staining face of surrounding stone and other surfaces.

I. Remove immediately excess grout and mortar in contact with exposed stone and other surfaces beyond the intended joint.

J. Protect sidewalks and surrounding surfaces from mortar droppings.

K. Stone Removal:
1. Prior to removal, stones shall be marked and photographed from both sides to record each stone's position and orientation.
2. Remove marked stone using manual or pneumatic cutting tools.
3. Area to be repaired shall be square-cut to provide a minimum of 1/4 inch depth.
4. Do not feather the edges.
5. Wash prepared surface with clean water and a bristle brush to remove dust and chips.

3.3 PATCH REMOVED STONEWORK

A. Crack Patching and Repair:

1. Repair procedures presented below address aesthetic repair of non-structural and non-active loss, chips, cracks, and areas of previous patching as a result of the work.

2. Cracks 1/16 inch to 1/4 inch in width, stable unit elements:

a. Cut along full length of crack with grinding tool fitted with appropriate stone grinding tip to widen crack to approximately 3/16 inch wide by 1/2 inch deep.
b. Areas to be cut should be interior "dovetailed" or back-cut to provide positive anchor keying wherever possible.
c. Clean out all residual dust along full length of crack with compressed air, followed by degreasing solution (one part water, one part ethyl alcohol), followed by pressure rinse and pre-wet as appropriate to materials employed.
d. Dam crack with water soluble clay to prevent leakage of grout.
e. Use clay to keep grout back from exterior surface a minimum 1/4 inch.
f. Inject crack with non-shrink injection grout.
g. Following cure of injection grout, apply repair mortar compound sculpted to match original profile.

3. Replace removed stonework:

a. Cut straight back around full perimeter and area to a minimum depth of 1/2 inch with grinding tool fitted with appropriate stone grinding tip so that patch in-fill shall

not have a feathered edge.

b. Make cut as straight and even as possible, following general line of removal.
c. At this perimeter provide interior “dovetailed” or under-cuts to provide positive anchor keying for patching mortar.
d. Remove any residual dust with a pressure water wash.
e. Clean, remove, or abrade any loose or rough material with a non-ferrous abrasive.
f. Scarify surface to assure adhesion of repair.
g. Clean and pre-wet surface as appropriate to receive cementitious repair.
h. Apply repair mortar compound to repair area.
i. Replace stonework to match the original position and orientation of each removed stone at the direction of the historical preservation personnel.
j. Sculpt repair mortar compound to match original joint profiles.

3.4 JOINT POINTING

A. Re-pointing Existing Stone:

1. Rake out deteriorated mortar from joints to depths equal to 2.5 times their widths, but not less than 1/2 inch nor less than that required to expose sound, un-weathered mortar.
2. Re-point stone only where mortar is deteriorated, not providing a weatherproof joint or where mortar is missing.
3. Remove mortar from stone surfaces within raked-out joints to provide reveals with square backs and to expose stone for contact with pointing mortar.
4. Brush, vacuum or flush joints to remove dirt and loose debris.
5. Do not spall edges of stones or widen joints.
6. Replace any stones which become damaged.
7. Cut out old deteriorated mortar by hand with chisel and mallet.
8. Power operated rotary hand saws and grinders may be permitted, but only on horizontal joints (a pneumatic chisel may be allowed on vertical joints to facilitate efficiency) and only on specific written approval of Contracting Officer based on submission by Contractor of a satisfactory quality control program and demonstrated ability of operators to use tools without damage to stone.
9. Quality control program shall include provisions for supervising performance and preventing damage due to worker fatigue.
10. Deteriorated mortar joints are joints which are no longer providing weather protection and/or have lost bond to stone by cracks which are grater than hair-line, or mortar has deteriorated greater than 1/4 inch or existing mortar crumbles to touch.

B. Joint Pointing:

1. Rinse stone joint surfaces with water to remove any dust and mortar particles.
2. Time application of rinsing so that, at time of pointing, excess water has evaporated or run off, and joint surfaces are damp, but free of standing water.
3. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas.
4. Apply in layers not greater than 3/8 inch until a uniform depth is formed.
5. Compact each layer thoroughly to become thumbprint-hard before applying next layer.
6. After joints have been filled to a uniform depth, place remaining pointing mortar in three layers with each of first and second layers filling approximately two-fifths of joint depth and allow to become thumbprint hard before applying next layer.

7. Where existing stones have rounded edges, recess final layer slightly from face. Match tooling profile of existing mortar.
8. Take care not to spread mortar onto exposed stone surfaces, or to featheredge mortar.
9. When mortar is thumbprint hard, tool joints to match original appearance of joints.
10. Remove excess mortar from edge of joint by brushing.
11. Cure mortar by maintaining in a damp condition for not less than seventy-two hours.
12. Where re-pointing work precedes cleaning of existing stone, allow mortar to harden for 7 days before beginning cleaning work.

3.5 CLEANING STONE FOLLOWING RESTORATION WORK

A. After mortar has fully hardened, thoroughly clean exposed stone surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.

B. Heat water to temperature of 140 to 180 degrees F.

C. If sample cleaning reveals that stiff brush scratches masonry, use of a soft bristle brush will be recommended. Use of metal scrapers or brushes will not be permitted.

D. Water and gentle brushing is the preferred method for cleaning. If further effort is absolutely necessary, use mild detergent cleaning agents first; then use a masonry restoration cleaner if further cleaning is required. Use of acid or alkali cleaning agents will not be permitted. Cleaning agents shall not have a pH of less than 5 or greater than 9. Products containing hydrogen fluoride, hydrogen chloride or methylene chloride shall not be used.

END OF SECTION 04 01 40.91

SECTION 05 50 00 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Work under this Section shall consist of the following as shown in the Project plans and as directed by the CO.
   1. Replacing removed timber wingwall and abutment piles with steel piles
   2. Providing dead men for steel wingwall piles
   3. Extending steel deck drains
   4. Repairing steel guardrail.

B. Furnish all labor, material and equipment necessary to complete the work according to the contract.

1.2 QUALITY ASSURANCE

A. Welder Qualifications: Currently qualified according to AWS D1.1.

1.3 SUBMITTALS

A. Shop Drawings:
   1. Show fabrication and installation details including plans, elevations, and details of metal fabrications and their connections.
   2. See Specification 01 33 23 for requirements for the mechanics and administration of the submittal process.

B. Informative Submittals:
   1. Welding qualifications.
   2. Product technical data including:
      a. Steel ASTM Designation and grade.
   3. Manufacturer’s installation instructions.
   4. Certifications
   5. Test reports.
   6. Submit all test and certifications in a sing coordinated submittal.
      a. Partial submittals will not be accepted.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Weathering Steel shapes and plates: ASTM A588 (weathering steel), fy = 36 ksi unless noted otherwise in the Project plans.

B. Weathering Steel Hollow structural steel (HSS): ASTM A847 (weathering steel), fy = 50 ksi unless noted otherwise in the Project plans.

C. Steel shapes and plates: ASTM A36, fy = 36 ksi.

D. Hollow structural steel (HSS): ASTM A500 Gr. B, fy = 42 ksi

E. Steel Wire Rope: ASTM A1023

F. Steel pipe: ASTM A53 Gr. B.

G. Bolts: ASTM A307 Gr. A

H. Galvanizing repair coating: ASTM A780

2.2 FABRICATION

A. Welding:

1. Comply with AWS D1.1.
2. Miter and cope intersections and weld all around.
3. Remove splatter, grind exposed welds to blend and contour surfaces to match those adjacent.
4. Any welds to galvanized steel shall be finished with galvanizing repair coating.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Field verify all controlling dimensions prior to ordering or fabricating materials.

B. All members below or at ground level shall be hot dip galvanized unless otherwise noted on the plans.

C. Perform field welding of metal fabrications in conformance with AASHTO/AWS D1.5. Extreme caution shall be taken when field welding within the park to prevent forest fires. Field welding procedures may be stopped during time when fire danger is high as determined by the CO, Park personnel, or fire regulations.

D. Repair damage to galvanized coating resulting from field welding operations with zinc in conformance with ASTM A123/A123M requirements.

E. Include all items as required for a complete installation.

F. Grind field welds smooth and touch up with red primer where appropriate.

G. Keep work in alignment during installation and welding procedures.

H. Install items plumb and level, accurately fitted, free from distortion or defects.

I. After installation, touch-up field welds, scratched or damaged surfaces as required by the CO.

END OF SECTION 05 50 00

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rough carpentry.
    a. Fabrication and installation of kiln-dried treated timber members.
        1) Timber Sidewalk Planks

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Division 01 - General Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Institute of Timber Construction (AITC):
    a. Timber Construction Manual
    b. 108 Standard for Heavy Timber Construction
2. Lumber Grading Rules and Species:
    a. American Lumber Standards Committee
    b. US Department of Commerce (DOC):
        1) PS 20 American Softwood Lumber Standard.
    c. Western Wood Products Association (WWPA).
3. American Association of State Highway Officials (AASHTO):
    a. M 168 Standard Specifications for Wood Products.
    b. M 232 Standard Specifications for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. American Wood Protection Association (AWPA):
    a. M2, Standard for Inspection of Wood Products Treated with Preservatives.
    b. M3, Standard Quality Control Procedures for Wood Preserving Plants.
    c. M4, Standard for the Care of Preservative-Treated Wood Products.
    d. P5, Standard for Waterborne Preservatives.
    e. U1, Use Category System: User Specification for Treated Wood.
5. Western Wood Preservers Institute
6. Environmental Protection Agency (EPA)
7. National Institute of Standards and Technology (NIST):
    a. PS-20, American Softwood Lumber Standard.
8. West Coast Lumber Inspection Bureau (WCLIB)

B. Qualifications:

1. Manufacture Qualifications: Company specializing in providing products of the type specified in this section, with minimum of 5 years documented experience with products in use.

C. Manufacturing Standard: Conform to AITC A108.
   1. Treated Wood Inspection: AWPA M2.
   2. Wood Treatment Plant: AWPA M3.

D. Miscellaneous:
   1. Factory marking:
      a. Lumber:
         1) Furnish an Inspection Certification from an agency accredited by the American Standards Lumber Committee for species and grade.
         2) Mark all lumber identifying type, grade, moisture content, inspection service, producing mill, inspector identity and other qualities specified.

1.3 SUBMITTALS

A. Shop Drawings:

   1. See Specification Section 01 33 23 for requirements for the mechanics and administration of the submittal process.
   2. Fabrication drawings of all fabricated items.
   3. Product technical data including:
      a. Acknowledgement that products submitted meet requirements of standards referenced.
   4. Certifications:
      a. Chemicals used in treatment process are registered with and approved by EPA.
      b. Moisture content of material prior to treatment: 25 PCT maximum.
      c. Material has been kiln-dried after treatment (KDAT) to the moisture content specified.
   5. Documentation of treatment of treated material in accordance with standards referenced.

1.4 DELIVERY AND STORAGE

A. Delivery, storage and handling of treated wood products:
   1. Lumber: As recommended by the grading agency indicated on the grade stamp.

B. Delivery, storage, handling and disposal of treated wood products: AWPA M4.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Kiln Dried Timber:

1. Douglas Fir, Western Larch, or Southern Yellow Pine; Grade No. 1 or better, FOHC (free of heart center); kiln-dried to 19 percent or less 1 inch from all surfaces.
    a. NIST PS-20.
    b. S4S surfaced timber unless otherwise indicated.
    c. Species:
        1) Coastal Region Douglas Fir or Western Larch No.1 grade or better.
        2) Treated material: as indicated in the appropriate AWPA standard.

B. Preservative Treated Material:
1. Moisture content:
    a. Prior to treatment: 25 PCT.
    b. Kiln-dry after treatment (KDAT), ASTM D4442 and ASTM D4444:
        1) Lumber: 19 PCT maximum.
2. Preservative:
    a. As indicated on the drawings.
3. Pressure-treat material in accordance with AWPA U1.
    a. Use Specification for Treated Wood and TI Processing and Treatment Standard.
    b. Treat Timber Members according to the requirements of the current edition of Western Wood Preservers Institute's Best Management Practices for use of Treated Wood in Aquatic Environments.
    c. Indicate the preservative used, penetration in inches (millimeters), retention in pounds per cubic foot (assay method).
    d. Cut, frame, and bore timbers before treatment when practical. Do not cut or bore timber below the high-water mark in coastal waters.
    e. Handle treated timber according to the AWPA published Consumer Information Sheet. Do not drip or spill preservative into the aquatic environment or onto the ground. Handle treated timbers to prevent damage to their surfaces. Do not use cant dogs, hooks, or pike poles.
    f. Field treat cuts or abrasions with preservative. Dip, soak, spray, or apply three brush coats of the same preservative according to AWPA M4, Standard for the Care of Preservative-Treated Wood Products.
    g. Impregnate holes bored after treatment with the same preservative using tools suitable for proper application. Plug unused holes with the same treated timber.
4. Wherever practicable, material to be treated shall be manufactured in its final form prior to treatment.

C. Fasteners:
1. General: Provide fasteners of size and type indicated that comply with requirements specified.
2. Galvanize all steel fasteners and connections in accordance with AASHTO M232 / ASTM A153. For fasteners and connections in contact with pressure treated lumber provide a G90 coating. In all other locations, provide a G60 coating.
3. Bolts: Steel bolts, hot dip galvanized, complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
4. Nails and screws: Hot dipped galvanized.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify measurements, dimensions, and shop drawing details before proceeding.

B. Coordinate location of supports for attached work.

3.2 ERECTION AND INSTALLATION

A. General:
   1. Provide preservative treated material for all wood used:

B. Attach work securely by anchoring and fastening as indicated or required to support applied loading.
   1. Provide flat washers under all bolt heads and nuts.
   2. Use fasteners of size that will not penetrate members where opposite side will be exposed to view or receive finish materials.
   3. Install fasteners without splitting of wood; predrill as required.
   4. Do not drive threaded friction type fasteners.
   5. Tighten bolts and lag screws at installation and retighten as required.

C. Set work to required levels and lines, plumb, true.
   1. Shim as required.
   2. Cut and fit accurately.

D. Provide wood grounds, nailers, or blocking where required for attachment of other work and surface applied items.

END OF SECTION 06 10 00

SECTION 06 13 00 – HEAVY TIMBER CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for dimension lumber items associated with heavy timber framing.

1.2 SUMMARY

A. Section Includes:
1. Construction using heavy timbers including:
   a. Timber Posts
   b. Timber Curbs
2. Field applied timber preservatives including:
   a. Borate Rods
   b. Copper Naphthenate

1.3 DEFINITIONS

A. Timbers: Lumber of 5 inches nominal or greater in least dimension.

B. Inspection agencies, and the abbreviations used to reference them, include the following:

1. WCLIB: West Coast Lumber Inspection Bureau.
2. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data: For preservative-treated wood products, timber connectors, and field preservatives.

1. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
2. For timber connectors. Include installation instructions.
3. For field preservatives, include manufacturer’s recommendations for handling, storing, and installing materials.

B. Shop Drawings: For heavy timber framing. Show layout, dimensions of each member, and details of connections.

C. Material Certificates:
   1. For timbers specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by ALSC's Board of Review.
   2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

D. Certificates of Inspection: Issued by lumber-grading agency for exposed timber not marked with grade stamp.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Schedule delivery of materials to avoid extended on-site storage and to avoid delaying the Work.

B. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings.

PART 2 - PRODUCTS

2.1 TIMBER

A. Comply with DOC PS 20 and with grading rules of lumber-grading agencies certified by ALSC's Board of Review as applicable.

   1. Factory mark each item of timber with grade stamp of grading agency.
   2. For exposed timber indicated to receive a stained or natural finish, apply grade stamps to surfaces that are not exposed to view, or omit grade stamps and provide certificates of grade compliance issued by grading agency.

B. Timber Species and Grade: Doug-Fir, Western Larch, or Southern Yellow Pine, No. 1 or better.

C. Moisture Content: Provide timber with 15 percent maximum moisture content at time of dressing.

D. Dressing: Provide dressed timber (S4S) unless otherwise indicated.

2.2 PRESERVATIVE TREATMENT

A. Pressure treat materials with waterborne preservative according to AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

B. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

1. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not contain colorants, bleed through, or otherwise adversely affect finishes.

C. Use process that includes water-repellent treatment. Water-repellent treatment shall not interfere with application of indicated finishes.

D. After treatment, redry materials to 19 percent maximum moisture content.

E. Mark treated materials with treatment quality mark of an inspection agency approved by ALSC's Board of Review.
1. For exposed items indicated to receive a stained or natural finish, mark each piece on surface that is not exposed or omit marking and provide certificates of treatment compliance issued by inspection agency.

F. Application: Treat items shown and the following:
1. Sills and similar members in contact with masonry or concrete.
2. Timber framing members less than 18 inches above grade.

2.3 TIMBER CONNECTORS

A. Fabricated from Steel in profiles shown.

B. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A123/A123M or ASTM A153/A153M.

2.4 FIELD APPLIED TIMBER PRESERVATIVE TREATEMENTS

A. Borate Rods
1. Apply according to the manufacturer’s recommendations as indicated on the plans.
2. Drill hole near center of timber member, 1/16th inch greater in diameter and 1” longer than borate rod.
3. Prevent treatment material from entering the waterways during application.

B. Copper Naphthenate
1. Apply according to the manufacturer’s recommendations as indicated on the plans.
2. Prevent treatment material from spilling or otherwise entering the adjacent waterways or environment during application.

2.5 MISCELLANEOUS MATERIALS

A. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with wood finish in Section 09 91 10 “Painting.”

B. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with wood finish in Section 09 91 10 “Painting.”

2.6 FABRICATION

A. Shop fabricate members by cutting and restoring exposed surfaces to match specified surfacing. Finish exposed surfaces to remove planing or surfacing marks, and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.

B. Predrill for fasteners and assembly of units prior to preservative treatment.

C. Where preservative-treated members are indicated, fabricate (cut, drill, surface, and sand) before treatment to greatest extent possible. Where fabrication must be done after treatment, apply a field-treatment preservative to comply with AWPA M4.
   1. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
   2. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

D. Coat crosscuts with end sealer.

E. Seal Coat: After fabricating and surfacing each unit, apply a saturation coat of penetrating sealer on surfaces of each unit except for treated wood where the treatment included a water repellent.

PART 3 - PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Erect heavy timber framing true and plumb. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.

   1. Install horizontal and sloping members with crown edge up, and provide not less than 4 inches of bearing on supports. Provide continuous members unless otherwise indicated; tie together over supports with metal strap ties if not continuous.
   2. Handle and temporarily support heavy timber framing to prevent surface damage, compression, and other effects that might interfere with indicated finish.

B. Cutting and drilling: Avoid extra cutting and drilling after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.

C. Fitting: Fit members by cutting and restoring exposed surfaces to match specified surfacing.
   1. Predrill for fasteners using timber connectors as templates.
   2. Finish exposed surfaces to remove planing or surfacing marks, and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
   3. Coat crosscuts with end sealer.
   4. Where preservative-treated members must be cut or drilled during erection, apply a field-treatment preservative to comply with AWPA M4.
      a. Use inorganic boron (SBX) treatment for members not in contact with the ground and continuously protected from liquid water.
      b. Use copper naphthenate treatment for members in contact with the ground or not continuously protected from liquid water.

D. Install timber connectors as indicated.
   1. Unless otherwise indicated, install bolts with same orientation within each connection and in similar connections.
   2. Install bolts with orientation as indicated or, if not indicated, as directed by CO.

3.2 ADJUSTING

A. Repair damaged surfaces and finishes after completing erection. Replace damaged heavy timber framing if repairs are not approved by CO.

END OF SECTION 06 13 00

SECTION 07 18 40 – BRIDGE DECK SEALING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. A high molecular weight methacrylate (HMWM) resin treatment applied to concrete bridge decks and curbs.

1.2 REFERENCES

A. ASTM C 882: Bond Strength of Epoxy-Resin Systems Used With Concrete by Slant Shear

B. ASTM D 323: Vapor Pressure of Petroleum Products (Reid Method)

C. ASTM D 638: Tensile Properties of Plastics

D. ASTM D 1475: Density of Liquid Coatings, Inks, and Related Products

E. ASTM D 2196: Rheological Properties of Non-Newtonian Materials by Rotational Viscometer

F. ASTM D 3278: Flash Point of Liquids by Small Scale Closed-Cup Apparatus

G. ASTM D 4285: Indicating Oil or Water in Compressed Air

1.3 DEFINITIONS

A. Installer: The entity preparing the surface, installing, and finishing the HMWM resin treatment.

B. Provider: The manufacturer furnishing the HMWM resin treatment.

1.4 SUBMITTALS

A. Placement plan for review at least 14 calendar days before beginning HMWM resin treatment placement. Include at least the following:

1. Schedule of work for each bridge.
   a. Include major work items such as preparing concrete deck surface, sealing cracks, applying HMWM, applying sand, and curing time.
2. Description of equipment for preparing deck surface and applying HMWM resin.
3. A table showing the range of gel time and final cure time in minutes for the allowable ambient temperature range, in increments of 10 degrees F.
4. Application rate if outside the limit shown in this Section, Article 3.3, paragraph E.

a. Include documentation from the Provider supporting the application rate.

5. Description of equipment for applying and removing excess sand.
6. Storage and handling of HMWM resin components.
7. Disposal of excess HMWM resin and containers.

B. Materials

1. Manufacturer's Product Data Sheets and recommended installation instructions for the components of the HMWM resin treatment.
2. Manufacturer's Safety Data Sheets for the components of the HMWM resin treatment for information.
3. Certificate of Compliance for the components of the HMWM resin treatment (resin and sand, for example).
   a. Certificate of Compliance must be accompanied by test results from an independent nationally recognized laboratory.

1.5 QUALITY CONTROL

A. Technical Support Representative

1. Provide a Technical Support Representative from the Provider onsite during surface preparation and application of the HMWM resin treatment on the first day the HMWM resin treatment is used on a structure.
   a. The Technical Support Representative must instruct the workers in proper mixing, application technique, safety precautions, traffic opening time, and environmental requirements.
   b. The Technical Support Representative must be available for consultation but not necessarily present at the job site for the remaining work.
2. The Engineer may waive the requirement for the Technical Support Representative to be onsite if the Installer can demonstrate that the Installer's superintendent for the work has performed at least five satisfactory applications of the HMWM resin treatment on similar bridges in similar environments.
   a. The Technical Support Representative must be available for consultation throughout the duration of the application.
   b. The CO reserves the right to require the Technical Support Representative to be onsite if at any time the Engineer is concerned with the product installation quality.

1.6 HANDLING, STORAGE, AND DELIVERY

A. Ship and store the materials away from one another in a manner that prevents leakage and spillage from one container to contact other containers.

B. Store materials in original containers according to the Provider's requirements and with manufacturer's label.

1. Include on label manufacture date, batch number, trade name, brand, and quantity.

C. Store sufficient quantities of HMWM resin treatment materials according to the Provider's requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall have no residual odor or taste that will be an attractant to wildlife.

B. HMWM Resin Treatment

1. Use a treatment consisting of a HMWM resin and silica sand.

C. HMWM Resin

1. Use a low viscosity, non-fuming, 100 percent solid, high molecular weight methacrylate resin meeting the properties listed in Tables 1 and 2.

TABLE 1

Physical Properties		
Property	Requirements	Test Method
Viscosity	25 cps, maximum (Brookfield RVT with UL adaptor, 50 RPM at 77°F	ASTM D 2196
Density	7.5 lbs/gal, minimum at 77°F	ASTM D 1475
Tensile Elongation	3% minimum	ASTM D 638
Flash Point	180°F minimum	ASTM D 3278
Vapor Pressure	0.02 psi, maximum at 77°F	ASTM D 323
Bond Strength	1,500 psi minimum	ASTM D 882

TABLE 2

Performance Properties	
Cure Speed	Time
Bulk Cure	Less than 3 hours at 77°F
Surface Cure	Less than 6 hours at 77°F
Gel Time	25-75 minutes at application temperature, 1.7 fluid ounce sample

D. Silica Sand

1. Commercial quality dry blast sand containing less that 0.5 percent moisture.
2. Have the following gradation:

TABLE 3

Silica Sand	
Sieve Size	Percent Passing (by weight)
No. 8	95-100

No. 20	0-5

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Shot-Blasting

1. Clean the concrete surface by automatic shot-blasting. Remove all traces of curing compound, laitance, grease, dirt, dust, salt, oil, asphalt, paint, striping, coating, or foreign materials.
   a. Use a cleaning unit equipped with a dust collector that recycles the abrasives.
   b. Do not gouge the surface during shot-blasting operations.
   c. Keep shot-blasting material, removed concrete, and all other from entering the waterways.
   d. Collect and dispose of the removed concrete surfacing.
   e. Clean the surface and cracks with oil free compressed air. Refer to ASTM D 4285.

B. Perform additional surface preparation if recommended by the Technical Support Representative.

C. Cover deck joints, plug deck drains and scuppers, seal cracks on underside of deck, and use other protective measures to protect waterways and bridge components.

D. Do not allow traffic on the deck that has been shot-blasted.

3.2 INSTALLATION

A. Install according to the requirements in this Section.

1. Follow the Provider’s recommendations that are more stringent than the requirements listed in this Section.

B. Protect adjacent concrete surfaces, pedestrians, vehicles, private property and approach roadway during HMWM application.

C. The deck surface must be dry at the time of HMWM resin treatment.

D. Pre-treat visible cracks by filling the cracks and keeping them full.

1. Pre-fill large cracks (wider than 1/32 inch) with sand before applying resin.
2. Treat crack by ponding resin over the crack for between 5 and 10 minutes allowing gravity to feed material into the crack.
3. Repeat ponding procedure until each crack is sealed.

E. Mix the HMWM resin components according to the Provider’s requirements and apply the resin to the deck within five minutes of completing mixing.

F. Evenly distribute the HMWM resin on the clean, dry deck surface at the Provider's recommended rate, but not greater than 125 ft^2/gal.

1. Application rates may vary depending on field conditions.
   a. Texture and absorption of the surface will determine final coverage rates.
   b. The Technical Support Representative will assist the Installer in determining application rates.
2. Apply the HMWM resin to refusal.
3. Redistribute excess material using squeegees or brooms.

G. Broadcast silica sand mechanically over the entire treated area of the bridge deck to obtain a visually uniform coverage of at least 2.0 lb/yd^2.

1. Apply the sand before the resin gels.
2. Remove excess sand if required by the Technical Support Representative.
3. Remove all loose sand that has accumulated along the face of the parapets, in deck drains, and expansion joints at least 14 calendar days after opening the HMWM resin treatment to traffic.

H. Apply the material in the morning and evening hours when the temperatures are lower and the cracks are at their most open point.

3.3 LIMITATIONS

A. Do not use material after the original shelf life date.

B. Allow deck repairs to adequately cure as recommended by the manufacturer of the repair mortar before applying the HMWM resin.

C. Do not apply resin within 48 hours after a rain or when more than 10 percent probability of rain is forecast within 4 hours following the application.

D. Conduct the work in a continuous operation with the HMWM resin treatment application Immediately following surface preparation.

E. Apply HMWM resin treatment only if the deck surface temperature and the air temperature are between 50 degrees F and 90 degrees F and the weather forecast shows air temperatures will remain within that range for at least twelve hours after the application is complete.

F. Do not permit traffic on the treated surface until the silica sand cover adheres sufficiently to prevent tracking.

END OF SECTION 07 18 40

SECTION 09 91 90 – PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, materials, tools, equipment, and services for Painting of the following as indicated, in accordance with provisions of Contract Documents.
   1. North Fork Bridge railings
   2. Fish Creek Bridge railings, sidewalk, curbs, and curb face plates.
   3. Lee Creek Bridge railings, fascia, girders, and floor beams.

B. Section Includes:

   1. Surface Preparation.
   2. Field application of:
      a. Primer.
      b. Sealer.
      c. Coatings.
   3. Environmental controls for field application of coatings.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

   1. The Society for Protective Coatings (SSPC):
      a. SP 2, Hand Tool Cleaning.
      b. SP 3, Power Tool Cleaning.
      c. SSPC QP1, Certification Program (Field Application to Complex Industrial and Marine Structures)
      d. SSPC QP2, Certification Program (Field Removal of Hazardous Coatings)
      e. SSPC Guide 6 – Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations
      f. SSPC Guide 7 – Guide to the Disposal of Lead-Contaminated Surface Preparation Debris
      g. OSHA 29 CFR 1926.62 – Lead
   2. The Society for Protective Coatings/NACE International (SSPC/NACE):
      a. SP 6/NACE No. 3, Commercial Blast Cleaning.
      b. SP 7/NACE No. 4, Brush-off Blast Cleaning.

B. Installer Qualifications: Installer shall demonstrate qualifications by obtaining SSPC QP 1 certification.

1.3 DEFINITIONS

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

B. Paint includes the following:

1. Architectural paints (AP) include: Acrylic latex or alkyd enamel coatings.
2. Special coatings (SC) include: Water-based pigmented resin particles suspended in acrylic latex solution.
3. Stains and varnish include: Alkyd stain and polyurethane varnish.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 23 for requirements for the submittal process.
2. Product technical data including:
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's surface preparation instructions.
   c. Manufacturer's application instructions.

B. Samples:

1. Paint chip samples to the CO for approval of color.

C. Qualifications:

1. Qualification data Installer

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver in original containers, labeled as follows:

1. Name or type number of material.
2. Manufacturer's name and item stock number.
3. Contents, by volume, of major constituents.
4. Warning labels.
5. VOC content.

B. Store materials in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 DEGF.

1.6 PROJECT CONDITIONS

A. Verify that atmosphere in area where painting is to take place is within paint manufacturer's acceptable temperature, humidity and sun exposure limits.
   1. Do not apply coatings in snow, rain, fog or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products from a single manufacturer to the greatest extent practicable.

B. Subject to compliance with the Contract Documents, the following paint manufacturers are acceptable:
   1. Benjamin Moore.
   2. PPG Industries.
   3. Pratt & Lambert.
   4. Sherwin Williams.

2.2 MATERIALS

A. General:

   1. For unspecified materials such as thinner, provide manufacturer's recommended products.
   2. Unless noted otherwise, products listed are manufactured by the manufacturer listed below.
      a. Products of other manufacturers will be considered for use provided that the product:
         1) Is of the same generic formulation.
         2) Has comparable application requirements.
         3) Meets the same VOC levels or better.
         4) Provides the same finish and color options.
   3. Coatings shall comply with the VOC limits of EPA
   4. Primer:
      a. Elements to be repainted on the North Fork Bridge and Lee Creek Bridge shall be primed with an approved lead paint encapsulant primer.
   5. Paint and Colors:
      a. North Fork Bridge:
         1) Color to match existing rail color. Contractor shall submit (3) color samples for approval by Park personnel.
      b. Fish Creek Bridge
         1) Railings, Railing Posts, and Curbs
            a) Sherwin Williams Woodscapes® Solid Color Stain, A15 Series or approved equal. Color: CF14-894 GSA Oxford Brown or approved equal.
         2) Sidewalk

a) Sherwin Williams SuperDeck® Exterior Waterborne Solid Color Deck Stain, SD7-150 Series or approved equal. Color: CF14-894 GSA Oxford Brown or approved equal.

3) Curb Steel Faceplate
   a) Sherwin Williams ProIndustrial WaterBased Alkyd Urethane, B53 Series or approved equal. Color: CF14-894 GSA Oxford Brown or approved equal.

c. Lee Creek Bridge:
   1) Color to match existing rail color. Contractor shall submit (3) color samples for approval by Park personnel.

PART 3 - EXECUTION

3.1 ITEMS TO BE PAINTED

A. Exterior surfaces, including but not limited to:
   1. North Fork Bridge railings
   2. Fish Creek Bridge railings, sidewalk, curbs, and curb face plates.
   3. Lee Creek Bridge railings, fascia, girders, and floor beams.

3.2 PREPARATION

A. General:

   1. Prepare surfaces to be painted in accordance with paint manufacturer's instructions and this Specification Section unless noted otherwise in this Specification Section.
      a. Where discrepancy between paint manufacturer's instructions and this Specification Section exists, the more stringent preparation shall be provided unless approved otherwise, in writing, by the CO.
   2. Remove all loose paint, dust, grease, oil, compounds, dirt and other foreign matter which would prevent bonding of paint to surface.
      a. Protect foreign material listed above from entering adjacent waterways and surrounding environment.
   3. Adhere to manufacturer's recoat time surface preparation requirements.
      a. Surfaces that have exceeded paint manufacturer's published recoat time and/or have exhibited surface chalking shall be prepared prior to additional paint in accordance with manufacturer's published recommendations.
   4. Items to be painted shall remain in place during painting unless otherwise approved.

B. Protection:

   1. Provide sufficient protection to prevent existing, dried, or wet paint, primer, sealer, or solvent from entering the adjacent waterways and surrounding environment.
   2. Mask and protect adjacent surfaces that are not intended to be painted from paint spills, splashes, and drips.
   3. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.

C. Prepare and paint before assembly all surfaces which are inaccessible after assembly.

D. Existing lead-based paint on metal items to be repainted
   1. The steel elements to be repainted have tested positive for lead based paint. If loose paint must be removed as a part of the surface preparation, containment and disposal of lead-based paint shall comply with the following:
      a. SSPC Guide 6 – Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations
      b. SSPC Guide 7 – Guide to the Disposal of Lead-Contaminated Surface Preparation Debris
      c. OSHA 29 CFR 1926.62 – Lead
   2. All removed lead-based paint shall be properly contained to prevent debris from entering the adjacent waterways and surrounding environment.

3.3 APPLICATION

A. General:

   1. Thin, mix and apply paints in accordance with manufacturer's installation instructions.
      a. Where discrepancy exists between manufacturer’s instructions and this Specification Section, the more stringent requirement shall apply.
      b. When materials have been thinned, adjust application rates as necessary to achieve film coverage indicated in Part 2 for unthinned materials.
      c. Backroll spray applied paints.
   2. Temperature and weather conditions:
      a. Do not paint surfaces when surface temperature is below 50 DEGF unless product has been formulated specifically for low temperature application and application is approved in writing by CO and paint manufacturer's authorized representative.
      b. Avoid painting surfaces exposed to hot sun.
      c. Do not paint on damp surfaces.
   3. Apply materials under adequate illumination.
   4. A minimum of one coat of primer and two coats finish shall be applied to designated surfaces. If primer and paint manufacture’s recommendations are more stringent, those recommendations shall be followed.
   5. Evenly spread to provide full, smooth coverage.
      a. All paint systems are "to cover."
         1) When color or undercoats show through, apply additional coats until paint film is of uniform finish and color.
      b. Finished paint system shall be uniform and without voids, bugholes, holidays, laps, brush marks, roller marks, runs, sags or other imperfections.
      c. Where paint failures repair is specified, primer and paint shall be applied for a minimum of 6” beyond the extent of paint failure.
   6. If so directed by CO, do not apply consecutive coats until CO has had an opportunity to observe and approve previous coats.
   7. Work each application of material into corners, crevices, joints, and other difficult to work areas.
   8. When painting rough surfaces, hand brush and backroll paint to work into all recesses.
   9. Smooth out runs or sags immediately, or remove and recoat entire surface.
   10. Allow preceding coats to dry before recoating.

a. Recoat within time limits specified by paint manufacturer.
b. If recoat time limits have expired re-prepare surface in accordance with paint manufacturer's printed recommendations.

11. Allow coated surfaces to cure prior to allowing traffic or other work to proceed.
12. Finish colors not otherwise indicated shall be selected by CO from paint manufacturer’s complete offering.

B. Fillers, surfacers or patching compounds:

1. Provide fillers, surfacers or patching compounds in accordance with manufacturer’s recommendations and as specified herein as necessary to provide a smooth, defect free substrate.

C. Prime Coat Application:

1. Prime all surfaces indicated to be painted.
   a. Prime coat that is applied to lead-based paint shall be an approved lead paint encapsulant primer.
   b. Apply prime coat in accordance with paint manufacturer's written instructions and as written in this Specification Section.
2. Ensure field-applied paints are compatible with factory-applied paints or existing coatings.
   a. Employ services of coating manufacturer's qualified technical representative.
      1) Certify through material data sheets.
      2) Perform test patch.
   b. If field-applied coating is found to be not compatible, require the coating manufacturer's technical representative to recommend, in writing, product to be used as barrier coat, thickness to be applied, surface preparation and method of application.
   c. At Contractor's option, coatings may be removed, surface re-prepared, and new coating applied using appropriate paint system listed in the MATERIALS Article, Paint Systems paragraph of this Specification Section.
      1) All damage to surface as result of coating removal shall be repaired to original condition or better by Contractor at no additional cost to Owner.
3. Back prime all wood scheduled to be painted, prior to installation.
4. Touch up damaged primer coats prior to applying finish coats.
   a. Restore primed surface equal to surface before damage.

D. Finish Coat Application:

1. Apply finish coats in accordance with paint manufacturer's written instructions and in accordance with this Specification Section.
2. Touch up damaged finish coats using same application method and same material specified for finish coat.
   a. Prepare damaged area in accordance with the PREPARATION Article of this Specification Section.

3.4 FIELD QUALITY CONTROL

A. Application Deficiencies:

1. Surfaces showing runs, laps, brush marks, telegraphing of surface imperfections or other defects will not be accepted.
2. Surfaces showing evidence of fading, chalking, blistering, delamination or other defects due to improper surface preparation, environmental controls or application will not be accepted.

B. Provide protection for painted surfaces.

1. Surfaces showing soiling, staining, streaking, chipping, scratches, or other defects will not be accepted.

C. Measure surface temperature of items to be painted with surface temperature gage specifically designed for such.

D. Provide wet paint signs.

3.5 CLEANING

A. Clean paint spattered surfaces.

1. Use care not to damage finished surfaces.

B. Remove masking, adhesive residue or other foreign materials.

C. Remove surplus materials

END OF SECTION 09 91 90

SECTION 31 10 00 – SITE CLEARING

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Related Specification Sections include but are not necessarily limited to:
   1. Section 31 23 10 – Excavation and Backfill.
   2. Section 31 25 00 - Erosion and Sediment Control.
   3. Section 31 23 16 - Topsoil.

1.2 SUMMARY

A. Section includes work consisting of clearing, grubbing, and removal and disposal of trees, vegetation, and debris.

B. Section includes cleaning bridge decks, pile caps, and abutment seats.

1.3 SUBMITTALS

A. Submittals:

   1. Product data for tree protection fencing.

   2. Product data and manufacturer's instructions for herbicide.

PART 2 - PRODUCTS

2.1 TREE PROTECTION FENCING

A. Tree protection fencing shall be an orange plastic web fence, 4 feet high minimum. Wood stakes shall be six (6) foot long by 1 inch by 1 inch square driven a minimum of two (2) feet into the ground. Posts shall be spaced eight (8) feet on center, maximum.

2.2 HERBICIDE

A. Herbicide used to treat tree stumps of removed trees shall be Garlon 4 Ultra or approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect existing trees and other vegetation to remain against damage.

1. Do not smother trees by stockpiling construction materials or excavated materials within drip line.
2. Avoid vehicular traffic or parking of vehicles within drip line.
3. Provide tree protection fencing for tree and vegetation protection.
4. Tree protection required in areas within the work limits as indicated on the plans for trees that are not marked for removal.

B. Repair or replace trees and vegetation damaged by construction operations.

1. All tree repair and removal to be performed by a licensed arborist.
2. Remove trees which cannot be repaired and restored to full-growth status at the direction of the CO, only.
3. Replace with new trees of minimum 4 IN caliper or as required by CO.

3.2 SITE CLEARING

A. Contractor shall submit a tree removal plan to be reviewed by the Park and approved by the CO. Plan shall include locations of all trees to be cut and removed. All trees cut and removed shall be flagged in the field by the Contractor and approved by the Park and the CO.

B. Cut and remove only trees that have been designated by the Park and approved by the CO. All other vegetation shall remain in place. Trees shall be cut flush with adjacent finish grade and remaining stump shall be roughened to give a natural appearance.

C. Tree trimming and removal shall be done by a certified arborist under the supervision of park personnel.

D. All trees that are cut shall be removed and hauled away from the site by the contractor. Per the direction of the CO, some intact, felled trees may remain on site. No heavy equipment is allowed on slopes except within the construction access paths indicated on the plans or as approved by the CO. Tree removal shall be performed in a manner that does not disturb topsoil or disturb root systems.

3.3 TREE REMOVAL

A. All trees marked for removal on the plans shall be cut within 6” of the existing ground. All deciduous trees removed shall be treated with a herbicide to ensure that regrowth does not occur. Herbicide is not required for coniferous trees.

3.4 SNAGS

A. Snags within the work area shall be preserved in place.

3.5 CLEANING

A. Cleaning of bridge decks, pile caps, and abutment seats consist of removing gravel, rock, dirt, soil, dust, and debris.

B. Cleaning shall be by mechanical means such as sweeping vacuuming, or brushing. Compressed air shall not be used to clean above listed structures.

C. Cleaning shall be conducted so that removed materials do not enter the waterways or the surrounding areas.

D. Material removed during cleaning activities shall be disposed as specified in Section 01 74 19 outside the Park.

3.6 DISPOSAL

A. Dispose of debris and excess material as specified in Section 01 74 19 outside the Park.

B. Keep areas free from debris and stored materials that could damage surfaces or interfere with progress of Work.

C. No material will be salvaged by the Park.

3.7 CONSERVATION OF TOPSOIL

A. All suitable soil, organic duff, and material capable of supporting vegetation encountered in the excavation and in areas of grading work shall be removed to such extent and such depth as directed by the Contracting Officer. This material shall be stockpiled in series of windrows. The windrows for the conserved material shall be located in the vicinity where the material was removed for subsequent replacing in the same area. Do not conserve or replace topsoil in a wet or frozen condition. Do not stockpile topsoil over winter unless approved by Contracting Officer.

B. The depth of material conserved for topsoil will not be easy to determine for this project. A minimum of 2 inches of material shall be conserved in all cases, and a depth of 6 inches of material is possible in some locations. Live vegetation less than 3 feet in height and limbs less than 2 inches in diameter may be incorporated as topsoil in the stockpile.

C. Due to the limited amount of material available for topsoil and the need to establish the best growing medium possible to revegetate, nonconventional methods will be required to excavate, stockpile, and place the conserved material. Use equipment capable of excavating small, isolated pockets of soil; work around areas of designated vegetation or tree stumps prior to the grubbing operations; and placing material on slopes will be required to perform the Work.

D. Salvage and store topsoil separate from excavated material. Do not compact topsoil during removal and storage. Take all necessary precautions not to mix topsoil with subsoils. Do not disturb or compact placed topsoil.

3.8 CLEANUP

A. Keep areas free from debris and stored materials that could interfere with progress of Work.

B. Remove excess materials from the site promptly as specified in Section 01 74 19.

END OF SECTION 31 10 00

SECTION 31 23 10 – EXCAVATION AND BACKFILL

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.

1.2 SUMMARY

A. Section Includes:

1. Earthwork - excavation, backfilling, compaction, disposal of waste and surplus materials, placing structural fill, placing crushed stone, placing surface course, geotextiles, sheeting, shoring, bracing, and other Earthwork related work.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 31 25 00 – Erosion and Sediment Control.

1.3 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):
   a. C33, Standard Specification for Concrete Aggregates.
   b. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 FT-LBF/CU FT).
   c. D1241, Standard Specification for Material for Soil-Aggregate Subbase, Base, and Surface Courses.
   d. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 FT-LBF/CU FT(2,700 kN-m/m)).
   e. D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
   f. D3786, Standard Test Method for Bursting Strength of Textile Fabrics—Diaphragm Bursting Strength Tester Method.
   g. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
   h. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
   i. D4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

2. American Association of State Highway and Transportation Officials (AASHTO)

a. M 43, Standard Specification for Sizes of Aggregate for Road and Bridge Construction.
b. M 57, Standard Specification for Materials for Embankment and Subgrades.
c. M 147, Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses.

B. Federal Regulations:

1. Occupational Safety and Health Administration (OSHA):
a. 29 CFR Part 1926.650, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

1.4 DEFINITIONS

A. Contracting Officer: Individual designated and authorized in writing to perform specific technical or Administrative Functions.

B. Excavation:

1. Consists of removal of material encountered to subgrade elevations required or indicated.
2. Includes excavation of soils; pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; boulders; and rock.

C. Foundations: Footings, base slabs, foundation walls, and any other support placed directly on soil or rock.

D. Non-Structural Fill/Backfill: Soil materials placed and compacted to achieve finish grade elevations that do NOT support foundations, slabs, paving, or other flatwork.

E. Structure: Bridges, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

F. Subgrade: The earth or soil layer immediately below foundation bearing elevation, subbase material, fill material, backfill material, or topsoil materials.

G. Unauthorized Excavation:

1. Consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Contracting Officer.
a. Unauthorized excavation, as well as associated remedial work as directed by Contracting Officer, shall be at Contractor's expense.

H. Unsuitable Soil Materials: Soil materials encountered at or below subgrade elevation of insufficient strength and stiffness to support construction as determined by the Contracting Officer.

1.5 SUBMITTALS

A. Product Data:

1. Acknowledgement that products submitted meet requirements of standards referenced.
2. Manufacturer's installation instructions.
3. Certifications.
4. Test reports.
    a. Report and certification of aggregate fill, aggregate surfacing, washed drain rock, crushed surfacing base course, and drainage fill.
    b. Test reports on borrow material.
    c. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
    d. Field reports; in-place soil density and moisture tests.
    e. One optimum moisture-maximum density curve for each type of soil encountered.
    f. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

B. Samples:

1. Coordinate samples and testing for approval of off-site materials with the Contracting Officer.

1.6 PROJECT CONDITIONS

A. Dispose of waste materials, legally, off site.
1. Burning and burying, as a means of waste disposal, is not permitted.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Backfill:

1. Selected material approved from site excavation or from off-site borrow.
2. Bridge Approach Backfill:
    a. Crushed Base Course
        1) Free of organic matter, frozen material and debris.
        2) Properties:
            a) For material passing the No. 4 sieve, the liquid limit must not exceed 25 (as determined by AASHTO T89), and the plasticity index must not exceed 6.
            b) Dust ratio limits do not apply.
            c) A wear factor not exceeding 50% at 500 revolutions.
            d) At least 35% by weight of aggregate retained on the No. 40 sieve has at least one mechanically fractured face.
        3) Gradation:

SIEVE SIZE	% PASSING
2 INCH	100
1 ½ INCH	94-100
¾ INCH	70-88 (6)
3/8 INCH	50-70 (6)
NO. 4	34-58 (6)
NO. 40	6-30
NO. 200	2-8 (3)

() The value in the parentheses is the allowable deviation (+/-) from the target values.

b. Surface course aggregate
   1) Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming to the following:
   2) Properties:
      a) Liquid limit must not exceed 35 (as determined by AASHTO T89).
      b) Plasticity index shall be 10 +/-3 (AASHTO T90).
      c) Los Angeles abrasion must not exceed 50% (AASHTO T96)
      d) Soundness of aggregate using sodium sulfate must not exceed 12% loss (AASHTO T104, 5 cycles).
      e) Durability index (coarse) must not be less than 35 (AASHTO T210).
      f) Durability index (fine) must not be less than 35 (AASHTO T210).
      g) Free of organic matter, frozen material and debris.
   3) Gradation:

SIEVE SIZE	% PASSING
1 INCH	100
½ INCH	70-80 (5)
NO. 4	40-50 (7)
NO. 10	25-40 (6)
NO. 40	15-25 (5)
NO. 200	8.0-14.0 (4)

() The value in the parentheses is the allowable deviation (+/-) from the target values.

c. Washed Drain Rock
   1) Free of organic matter, frozen material and debris.
   2) Material shall be washed.
   3) Gradation:

SIEVE SIZE	% PASSING
2 INCH	100
NO. 4	30-100
NO. 50	10-60
NO. 200	5-20

d. Mechanically reinforced backfill
   1) Free of organic matter, frozen material and debris.
   2) Properties
      a) Liquid limit: Less than 35 (as determined by AASHTO T89).
      b) Maximum plasticity index: 6 (as determined by AASHTO T90).
   3) Gradation:

SIEVE SIZE	% PASSING
1 ½ INCH	99-100
1 INCH	95-100
1/2 INCH	25-60
NO. 4	0-10
NO. 8	0-5

B. Granular Fill Under Slabs-On-Grade:

1. Clean, granular material.
2. Less than 5 PCT fines passing the No. 200 sieve.
3. ASTM C33/AASHTO M43 gradation size No. 89, 3/8 IN to No. 4 or other material acceptable to Contracting Officer.

C. Filter Material:

1. Free draining sand, gravel, slag, or crushed stone.

D. Non-Woven Geotextile Filter Fabric

1. Protect against moisture and ultraviolet exposure prior to placement.
2. Furnish and install non-woven, permeable, drainage geotextile conforming to the following requirements:

Strength and Durability Properties			
Property	ASTM Test Method	Units	Geotextile Fiber
Type of Geotextile			Non-woven
Elongation at Break	D 4632	%	≥50
Minimum Grab Strength	D 4632	LB.	200
Minimum Sewn Seam Strength	D 4632	LB.	180
Minimum Tear Strength	D 4533	LB.	80
Minimum Puncture Strength	D 6241	LB.	430
Minimum Ultraviolet Stability	D 4355	%	50% retained strength after 500 hours of exposure

Hydraulic Properties			
Property	ASTM Test Method	Units	Type B
Maximum Permittivity	D4491	s^{-1}	0.7

Maximum apparent opening size (AOS)	D4751	Sieve size U.S.	No. 70

E. Geotextile Reinforcement for Mechanically Reinforced Backfill

1. Furnish as directed on the plans.
2. Geotextile reinforcement shall be woven fabric with a minimum average roll value of 4800 lb/ft for installations with a gap and 2400 lb/ft for installations without a gap based on ASTM D4595.
3. Geotextile reinforcement shall be placed by alternating machine direction (MD) with cross machine direction (XD) from layer to layer.
4. The geotextile reinforcement wrap at back face of end bent shall be pulled back slack free with its end anchored to soil underneath with staples or pins.
5. Cut the geotextile reinforcement to the minimum extent required to allow the utility lines to pass through. The proposed method shall be approved by the CO.
6. Protect geotextile reinforcement against moisture and ultraviolet exposure prior to placement.

F. Subgrade Stabilization Geotextile

1. Protect against moisture and ultraviolet exposure prior to placement.
2. Furnish and install woven material separation geotextile conforming to the following requirements:

Strength and Durability Properties			
Property	ASTM Test Method	Units	Geotextile Fiber
Type of Geotextile			Woven
Elongation at Break	D 4632	%	<50
Minimum Grab Strength	D 4632	LB.	320
Minimum Sewn Seam Strength	D 4632	LB.	290
Minimum Tear Strength	D 4533	LB.	110
Minimum Puncture Strength	D 6241	LB.	620
Minimum Ultraviolet Stability	D 4355	%	50% retained strength after 500 hours of exposure

Hydraulic Properties			
Property	ASTM Test Method	Units	Type B
Maximum Permittivity	D4491	s^{-1}	0.7
Maximum apparent opening size (AOS)	D4751	Sieve size U.S.	No. 70

PART 3 - EXECUTION

3.1 PROTECTION

A. Erosion Control:

1. See Specification Sections 01 57 23 and 31 25 00.
2. Clean paved roadways daily of any spillage of dirt, rocks or debris from vehicles and equipment entering or leaving site.
3. Conduct work to minimize erosion of site. Remove eroded material washed off site.
    a. If necessary or requested by Contracting Officer, construct stilling areas to settle and detain eroded material.

B. Protect existing surface and subsurface features on-site and adjacent to site as follows:

1. Provide barricades, coverings, or other types of protection necessary to prevent damage to existing items indicated to remain in place.
2. Protect and maintain bench marks, monuments or other established reference points and property corners.
    a. If disturbed or destroyed, replace at own expense to full satisfaction of Contracting Officer and controlling agency.
3. Verify location of utilities.
    a. Omission or inclusion of utility items does not constitute nonexistence or definite location.
    b. Secure and examine local utility records for location data.
    c. Take necessary precautions to protect existing utilities from damage due to any construction activity.
        1) If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.
        2) Do not interrupt existing utilities serving facilities occupied by Contracting Officer or others, during occupied hours, except when permitted in writing by Contracting Officer and then only after acceptable temporary utility services have been provided.
        3) Obtain Contracting Officer’s approval prior to disconnecting any utility service.
    d. Repair damages to utility items at own expense.
    e. In case of damage, notify Contracting Officer at once so required protective measures may be taken.
4. Maintain free of damage, existing sidewalks, structures, and pavement, not indicated to be removed.
    a. Protect new and existing structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
    b. Any item known or unknown or not properly located that is inadvertently damaged shall be repaired to original condition.
    c. All repairs to be made and paid for by Contractor.
5. Provide full access to public premises, sidewalks and other points (unless noted otherwise on the plans) as designated by Contracting Officer to prevent serious interruption of travel.
6. Maintain stockpiles and excavations in such a manner to prevent inconvenience or damage to structures on-site or on adjoining property.

7. Avoid surcharge or excavation procedures which can result in heaving, caving, or slides.

C. Protection of trees to remain:

1. Perform careful excavation within dripline of large trees designated on Drawings to remain. Protect root systems from damage or dryout to the greatest extent possible.
2. Trees to be protected as described in 31 10 00.

3.2 EXCAVATION, FILLING, AND BACKFILLING FOR STRUCTURES

A. General:

1. In general, work includes, but is not necessarily limited to, excavation for structures and retaining walls, removal of underground obstructions and undesirable material, backfilling, filling, and fill, backfill, and subgrade compaction.
2. Obtain fill and backfill material necessary to produce grades required.
   a. Materials and source to be approved by the Contracting Officer.
   b. Excavated material approved by Contracting Officer may also be used for fill and backfill.
3. In the paragraphs of this Specification Section, the word "soil" also includes any type of rock subgrade that may be present at or below existing subgrade levels.

B. Excavation Requirements for Structures:

1. General:
   a. Do not commence excavation for foundations for structures until Contracting Officer approves:
      1) The removal of topsoil and other unsuitable and undesirable material from existing subgrade.
      2) Density and moisture content of site area compacted fill material meets requirements of specifications.
   b. Contracting Officer grants approval to begin excavations.
2. Dimensions:
   a. Excavate to elevations and dimensions indicated or specified.
   b. Allow additional space as required for construction operations and inspection of foundations.
   c. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction.
   d. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
3. Removal of obstructions and undesirable materials in excavation includes, but is not necessarily limited to, removal of old foundations, existing construction, unsuitable subgrade soils, expansive type soils, and any other materials which may be concealed beneath present grade, as required to execute work indicated on Contract Drawings.
   a. If undesirable material and obstructions are encountered during excavation, remove material and replace as directed by the Contracting Officer.
   b. Remove unsuitable subgrade soils located below foundations. The bottom of the overexcavation shall be located outside the exterior limits of foundations around the perimeter of structure the following horizontal distance, whichever is greater:
      1) Distance equal to depth of overexcavation below bottom of foundations.

2) 5 FT.
3) As directed by Contracting Officer.

c. When excavation has reached required subgrade elevations, notify Contracting Officer, who will make an inspection of conditions.
1) If Contracting Officer determines that bearing materials at required subgrade elevations are unsuitable, provide Subgrade Stabilization as specified herein.

4. Construction traffic:
a. Construction traffic not allowed on native soils to avoid soil disturbance unless approved by the CO.
b. Repair disturbed subgrade soils prior to placing fill or construction work as directed by Contracting Officer.

5. Proof-roll all subgrades to receive fill or concrete placement after subgrade has been scarified and compacted.
a. Proof-roll in the presence of Contracting Officer with a fully-loaded tandem axle dump truck or other equipment with a minimum gross weight of 25 tons.

6. Install working surface over approved subgrade (if applicable).
a. Minimum thickness 12 in.

7. Level off bottoms of excavations to receive foundations, pavement, or compacted fill (if applicable).
a. Remove loose materials and bring excavations into approved condition to receive hot mixed asphalt, concrete, or fill material.
b. Where compacted fill material must be placed to bring subgrade elevation up to underside of construction, scarify existing subgrade upon which fill material is to be placed to a depth of 6-inches and then compact to density stated in this Specification Section before fill material can be placed thereon.
c. Do not carry excavations lower than shown for foundations except as directed by the Contracting Officer.
d. If any part of excavations is carried below required depth without authorization, notify Contracting Officer and correct unauthorized excavation as directed. Corrections may include:
1) Under soil supported footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation.
a) Concrete fill may be used to bring elevations to proper position.
2) In locations other than those above, including slabs on grade, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Contracting Officer.
3) No extra compensation will be made to Contractor for correcting unauthorized excavations.

8. Make excavations large enough for working space, forms, and inspection.

9. Notify Contracting Officer as soon as excavation is completed in order that subgrades may be inspected.
a. Do not commence further construction until subgrade under compacted fill material, under foundations, under floor slabs-on-grade, and under retaining wall footings has been inspected and approved by the Contracting Officer as being free of undesirable material, being of compaction density required by this specification, and being capable of supporting the allowable foundation design bearing pressures and superimposed foundation, fill, and building loads to be placed thereon.
b. Contracting Officer shall be given the opportunity to inspect subgrade below fill material both prior to and after subgrade compaction.

c. Place fill material, foundations, retaining wall footings, slabs-on-grade, as soon as weather conditions permit after excavation is completed, inspected, and approved and after forms and reinforcing are inspected and approved.
d. Before concrete or fill material is placed, protect approved subgrade from becoming loose, wet, frozen, or soft due to weather, construction operations, or other reasons.

10. Subgrade stabilization:
    a. If subgrade under foundations, fill material, slabs-on-grade, in a frozen, loose, wet, or soft condition before construction is placed thereon, remove frozen, loose, wet, or soft material and replace with approved compacted material as directed by Contracting Officer.
    b. Provide compaction density of replacement material as stated in this Specification Section.
    c. Loose, wet, or soft materials, when approved by Contracting Officer, may be stabilized by a compacted working mat of well graded crushed stone.
    d. Compact stone mat thoroughly into subgrade to avoid future migration of fines into the stone voids.
    e. Remove and replace frozen materials as directed by Contracting Officer.
    f. Method of stabilization shall be performed as directed by Contracting Officer.
    g. Do not place further construction on the repaired subgrades, until the subgrades have been approved by the Contracting Officer.
11. Protection of structures:
    a. Prevent new and existing structures from becoming damaged due to construction operations or other reasons.
    b. Prevent subgrade under new and existing foundations from becoming wet and undermined during construction due to presence of surface or subsurface water or due to construction operations.
12. Shoring:
    a. All excavation, trenching, and related sheeting, bracing, etc. shall comply with the requirements of OSHA standards 29 CFR Part 1926.650 Subpart P, and state requirements.
    b. Shore, slope, or brace excavations as required to prevent them from collapsing.
    c. Remove shoring as backfilling progresses but only when banks are stable and safe from caving or collapse.
13. Drainage:
    a. Control grading around structures so that ground is pitched to prevent water from running into excavated areas or damaging structures.
    b. Maintain excavations where fill materials are to be placed free of water.
    c. Provide pumping required to keep excavated spaces clear of water during construction.
    d. Should any water be encountered in the excavation, notify Contracting Officer.
    e. Provide free discharge of water by trenches, pumps, wells, well points, or other means as necessary and drain to point of disposal that will not damage existing or new construction or interfere with construction operations.
14. Frost protection:
    a. Do not place foundations, slabs-on-grade, equipment support pads, or fill material on frozen ground.
    b. When freezing temperatures may be expected, do not excavate to full depth indicated, unless foundations, slabs, or fill material can be placed immediately after excavation has been completed and approved.
    c. Protect excavation from frost if placing of concrete or fill is delayed.

C. Filling and Backfilling Outside of Structures.
   1. This paragraph of this Specification applies to fill and backfill placed outside of structures above bottom level of both foundations and piping but not under paving.
   2. Provide material as approved by Contracting Officer for filling and backfilling outside of structures.
   3. Fill and backfill placement:
      a. Prior to placing fill and backfill material, obtain optimum moisture and maximum density properties for proposed material from Contracting Officer.
      b. Place fill and backfill material in thin lifts as necessary to obtain required compaction density.
      c. Compact material with equipment of proper type and size to obtain density specified.
      d. Use hand operated equipment for filling and backfilling within 5 FT of walls and less than 3 FT above pipes.
         1) Compaction equipment exceeding 3000 LBS dead weight shall not be used within 5 FT of the wall as a minimum.
         2) Contractor is responsible for method of compaction so as not to damage walls or buried commodities.
      e. Use only hand operated equipment for filling and backfilling next to walls and retaining walls.
      f. Do not place fill or backfill material when temperature is less than 40 DEGF and when subgrade to receive material is frozen, wet, loose, or soft.
      g. Use vibratory equipment for compacting granular material; do not use water.
   4. Backfilling against walls:
      a. Do not backfill around any part of structures until each part has reached specified 28-day compressive strength and backfill material has been approved.
      b. Do not start backfilling until concrete forms have been removed, trash removed from excavations, have been completed.
      c. Bring backfill and fill up uniformly around the structures.

D. Backfilling Outside of Structures Under Piping or Paving:
   1. When backfilling outside of structures requires placing backfill material under piping or paving, the material shall be placed from bottom of excavation to underside of piping or paving at the density required for fill under piping or paving as indicated in this Specification Section.
   2. This compacted material shall extend transversely to the centerline of piping or paving a horizontal distance each side of the exterior edges of piping or paving equal to the depth of backfill measured from bottom of excavation to underside of piping or paving.
   3. Provide special compacted bedding or compacted subgrade material under piping or paving as required by other Specification Sections for the Project.

3.3 USE OF EXPLOSIVES

A. Blasting with any type of explosive is prohibited.

3.4 COMPACTION DENSITY REQUIREMENTS

A. Compact each layer of material to a minimum 95% of maximum dry density at optimum moisture +/- 2%.

3.5 SUBGRADE PROTECTION

A. Obtain approval from Contracting Officer with regard to suitability of soils and acceptable subgrade prior to subsequent operations.

B. Provide dewatering system necessary to successfully complete compaction and construction requirements.

C. Remove frozen, loose, wet, or soft material and replace with approved material as directed by Contracting Officer.

D. Stabilize subgrade with well graded granular materials as directed by Contracting Officer.

3.6 FIELD QUALITY CONTROL

A. All excavation, trenching, and related sheeting, bracing, etc. shall comply with the requirements of OSHA standards 29 CFR Part 1926.650 Subpart P, and state requirements. Where conflict between OSHA and state regulations exists, the more stringent requirements shall apply.

B. Responsibilities of Contractor:

1. Review proposed materials for fill and backfill around structures.
2. All testing, observation and work indicated as being performed by the Material Testing Firm in this Specification Section.
3. Services will include verification and documentation of satisfactory soil materials, subgrade quality, sampling, placement, moisture conditioning, compaction and testing of proposed soil materials, and field testing for quality control.
4. Moisture density relations, to be established by the CO required for all materials to be compacted.
5. Extent of compaction testing will be as necessary to assure compliance with specifications.
6. Prepare and submit inspection and test reports to CO.
7. Test reports to include the following:
    a. Report and certification of aggregate fill and drainage fill.
    b. Test reports on borrow material.
    c. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
    d. Field reports; in-place soil density and moisture tests.
    e. One optimum moisture-maximum density curve for each type of soil encountered.
    f. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.
    g. Other documentation necessary for CO to approve earthwork.
    h. Assist CO to determine corrective measures necessary for defective work.
8. Give minimum of 24 HR advance notice to Material Testing Firm when ready for compaction or subgrade testing and inspection.
9. Should any compaction density test or subgrade inspection fail to meet specification requirements, perform corrective work as necessary.

C. Responsibilities of Testing Agency for Excavation and Backfilling:

1. All testing, observation and work indicated as being performed by the Contracting Officer in other than Article 3.6 of this Specification Section.

2. Services will include verification and documentation of satisfactory soil materials, subgrade quality, sampling, placement, moisture conditioning, compaction and testing of proposed soil materials, and field testing for quality control.
3. Moisture density relations, to be established by the Contracting Officer required for all materials to be compacted.
4. Extent of compaction testing will be as necessary to assure compliance with specifications.

END OF SECTION 31 23 10

SECTION 31 23 16 – TOPSOIL

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following: furnishing, stripping, stockpiling and placing topsoil on a previously prepared subgrade.

B. Related Sections:

1. Section 31 10 00 – "Site Clearing"
2. Section 31 23 10 – "Excavation and Backfill"

1.2 SUBMITTALS

A. Sources: Submit name and address of sources for imported soil materials. Sources must be on GLAC approved list of Quarries, Borrow Pits and Other Material Sources Outside of GLAC Boundaries. Approved topsoil sources:

1. Creston Topsoil, Kalispell, MT. Contact: Tom Gorton 406-756-8217.

2. Black Gold Topsoil, PO Box 5315 Kalispell, MT. Contact: 406-257-7782.

B. Delivery Tickets: Submit delivery tickets to CO on a daily basis upon delivery of these materials:

1. Imported Topsoil

1.3 QUALITY ASSURANCE

A. Topsoil sources shall be inspected and approved by a representative of Glacier National Park each year prior to bringing material into the park.

B. Submit soil analysis report for imported topsoil from the State University Agricultural Extension Service or other approved soil testing laboratory. Report shall cover soil textural classification (percentages of sand, silt, and clay), pH, % organic matter, and soluble salts (electric conductivity in millimoles/centimeter), and shall include additive recommendations. Testing will be at the expense of the Contractor.

1.4 DELIVERY, STORAGE AND HANDLING

A. Do not deliver or place topsoil in frozen, wet, or muddy condition.

B. Do not park vehicles or equipment on temporary stockpiles of topsoil.

C. Cover imported topsoil during transport to prevent weed contamination.

PART 2 - PRODUCTS

2.1 ON-SITE TOPSOIL

A. On-Site Topsoil – Topsoil limits shall be the top six (6) inches of soil within the limits of the area disturbed by the Contractor. If sufficient Topsoil does not occur on site, on-site topsoil can include on-site surface soil. Remove and stockpile sufficient topsoil to allow replacement on all planted surfaces to a minimum depth of six (6) inches after natural settlement. A minimum depth of twelve (12) inches after natural settlement is required in areas of road or pavement removal. The Contractor shall protect placed topsoil from undue compaction for the duration of construction.

2.2 IMPORTED TOPSOIL

A. Topsoil will include natural humus bearing soils or approved soils. If there is a shortage of topsoil remaining from site clearing, notify the CO, who will consult with Glacier National Park representative for an acceptable source of additional material located outside the park. If GLAC approved borrow pits do not have suitable topsoil, GLAC will consider contractor provided options, but will need to inspect the quarry for weeds. Provide notice of at least 1 month before topsoil needs to be applied.

B. All imported topsoil shall be a loam or sandy loam. Topsoil shall be furnished by the Contractor and shall be a natural, weed free, friable soil representative of productive soils in the vicinity. It shall be obtained from the top 12″ of well drained areas. Imported topsoil or other imported soil must be inspected by park Vegetation Program staff for approval on texture, biologic activity and absence of exotic plant species prior to delivery.

1. Fertile, friable, loamy soil, reasonably free from weeds, subsoil, refuse, roots, heavy or stiff clay, stones larger than 1 inch, coarse sand, seeds, sticks, brush, litter, and other deleterious substances; suitable for the germination of seeds and the support of vegetative growth. The pH value shall be between 7.0 and 8.0.
2. Soil Texture: Soil can be loamy sand, sandy loam, sandy clay loam, or loam. Sand 30-50%, Silt 0-50%, Clay 5-30%.
3. Additives: none
4. % Organic Content: 2.0% minimum.
5. Soluble Salts: Electric conductivity shall be less than 2.0 mmhos/cm

PART 3 – EXECUTION

3.1 EXAMINATION:

A. General: Verify that existing site conditions are as specified and indicated before beginning work under this Section.

1. Grades: Inspect to verify rough grading is within +/- 0.1 foot of grades indicated and specified.
2. Damaged Earth: Inspect to verify that earth rendered unfit to receive planting do to concrete, water, mortar, limewater or any other contaminant dumped on it has been removed and

replaced with clean earth from a source approved by the CO.

B. Surface Grade: Remove weeds, sticks, debris, clods, and rocks larger than 2" and other debris detrimental to application, growth, or maintenance of seeding. Dispose of accumulated debris at direction of the CO.

C. Runoff: Take measures and furnish equipment and labor necessary to control the flow, drainage, and accumulation of water. Insure that all water will run off grades.

3.2 PREPARATION

A. Remove vegetation prior to stripping of topsoil.

B. Strip topsoil and surface soil from 4″ to 6″ depth to prevent intermingling with underlying subsoil or other waste material.

C. Limits of topsoil stripping shall be verified with the Contracting Officer prior to removal, and stockpile locations shall be identified so as not to interfere with the other work.

3.3 INSTALLATION

A. Soil Preparation and Fine Grading in areas to be landscaped under the supervision of the Park.

1. Scarify soil and cultivate the seeding areas and any area to be restored by the Park Vegetation Program to a minimum depth of 4″ by plowing, harrowing, or disking until soil is well pulverized and thoroughly mixed. In areas where roadway, footings or asphalt pavement are removed, scarify subgrade to a depth of 12″; remove all aggregate basecourse prior to scarifying subgrade.
2. For ground surface areas surrounding concrete and structures, maintain required positive drainage away from concrete and structures.
3. Establish finish grades to 0.1 foot of grades indicated.
4. Weeds or parts thereof shall not be present in the surface grade.
5. Prior to acceptance of grades, hand rake to smooth, even surface, free of debris, clods, rocks and vegetable matter greater than 2". Prepare a firm but friable seedbed for the acceptance of seeding.

3.4 PLACING TOPSOIL

A. Scarify compacted subgrade to a 3-inch depth to bond topsoil to subsoil. Place topsoil to a minimum depth of 6-inches after settlement. Topsoil shall be free from weeds, sod, clods and stones larger than 8″, toxic substances, litter or other deleterious material. Spread evenly and grade to elevations and slopes shown. Hand rake areas inaccessible to machine grading.

B. Utilize salvaged topsoil as the top layer to the extent available.

3.5 STORING

A. The topsoil, after being stripped, shall be immediately stockpiled for reuse.

B. Stockpile slopes shall not be steeper than 3 horizontal to 1 vertical and stockpiles shall be protected from wind and water erosion, unnecessary compaction, and contaminants. Topsoil stockpiles shall be separate from each other and from other excess and unsuitable material piles.

C. Stockpiles shall be watered down periodically by the Contractor as necessary to mitigate the formation of windblown dust.

D. Stockpile topsoil and surface soil away from edge of excavations without intermixing it with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Limit height of topsoil stockpiles to 36″ unless authorized by Contracting Officer.
2. Do not stockpile topsoil within drip line of remaining trees
3. Stockpile surplus topsoil to allow for respreading a thicker layer of topsoil

3.6 WEED CONTROL

A. All stockpiles shall remain weed free.

END OF SECTION 31 23 16

SECTION 31 25 00 – EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes:
   1. Erosion and Sediment Control
   2. Temporary Stream Diversion
   3. Aquatic Resource Protection

B. Related Sections:

   1. Section 01 57 23 – Temporary Storm Water Pollution Prevention
   2. Section 31 10 00 – Site Clearing
   3. Section 31 23 10 – Excavation and Backfill

1.3 SUBMITTALS

A. Product data for the following:

   1. Wattles.
   2. Gravel Bags.
   3. Fish Screen Mesh.
   4. Filter Bags.
   5. Sediment Mats.

B. Temporary Stream Diversion Plan

   1. Contractor shall submit a Temporary Stream Diversion (TSD) Plan a minimum of 30 calendar days prior to work below the Ordinary High Water Line. A separate TSD plan shall be prepared and submitted for each temporary stream diversion that is required. The Contractor shall include the details of a contingency system in the TSD Plan. The TSD Plan shall consist of a narrative and drawings detailing all temporary stream diversion requirements and shall encompass and protect all the areas affected by the Contractor's temporary stream diversion Work.

   2. The Contractor shall fully implement the TSD Plan throughout the duration of the associated Work. The Contractor shall update the TSD Plan throughout project construction to reflect actual site conditions and the Contractor's Work. A copy of the TSD Plan shall be on the project site at all times.

3. The TSD Plan shall describe measures that will be taken to comply with applicable permits, environmental commitments and these specifications.

4. The Contractor shall incorporate the Diversion Schedule and Sequence into their Progress Schedule.

5. The TSD Plan shall provide the following information in the following order:

    a. Description and Location of the temporary stream diversion

        i. Identify the name of the water body where the temporary stream diversion will be placed. Provide a description of the temporary stream diversion.

        ii. Provide drawings showing the location of the temporary stream diversion, including proposed access routes and equipment to be used to construct the diversion.

    b. Schedule and Sequence

        i. Provide a sequence of Work, dates, and durations for when the following will occur, in accordance with the in-water work window:

            1. Fish exclusion.

            2. TSD Plan Implementation Meeting.

            3. TSD installation.

            4. Dewatering of the isolated Work area, including a schedule for installing the water treatment system and when and where water quality monitoring will be done.

            5. Restoration and stabilization of the temporary stream diversion Work area to prevent erosion.

            6. Any relocations of the temporary stream diversion to accommodate the Work sequence (if needed).

            7. Channel rewatering.

            8. Removal of the TSD.

            9. Fish block removal.

            10. Include other Work that needs to be coordinated with the TSD (e.g., temporary erosion control).

    c. Calculations and Materials

        i. Detail all elements of the temporary stream diversion, including but not limited to pipes, pumps, and other equipment.

ii. Calculations shall demonstrate the diversion system conveys an appropriate Exceedance Probability Mean Daily Flow as provided in the plans to maintain flows and the integrity of the work area isolation during construction.

iii. Temporary stream diversion shall include a water conveyance system to be used for dewatering and rewatering that is capable of maintaining dry work conditions within the isolated area and conveying the flow required for the temporary stream diversion. The Contractor shall not excavate below the elevation of Ordinary High Water while standing water exists within the isolated and dewatered work area.

iv. Provide work area isolation dewatering details that address the need to maintain dry conditions in the work zone as detailed, pump characteristics, well depth, and measures to remove suspended sediments prior to discharge to surface waters.

v. Methods for anchoring temporary stream diversion pipe and associated hardware; include calculations to demonstrate the device's ability to anchor the pipe and associated hardware.

vi. Specifications for all materials and equipment to be used as part of the diversion including pump or diversion capacities and hose sizes. For example, provide the type, profile, and size of pipe.

vii. Provide the size of fish screens (mesh size and surface area) to be used

d. Stream Flow Blocking and Dewatering

i. Provide the method(s), including locations and details (narrative and drawings), for blocking both the upstream and downstream ends of the diversion. Describe how minor leakage from upstream and downstream will be addressed.

ii. Include provisions for scour protection at the temporary stream diversion inlet and outfall.

iii. Identify the means and methods for dewatering and disposal of the water.

iv. Provide locations and frequency of water quality monitoring.

e. Contingency Plan

i. The Contractor shall include the details of the contingency system in the TDS Plan sections that are applicable.

ii. Describe the Work that will be implemented to prevent the work area from becoming inundated.

iii. Provide the type and size of materials that will be used in the event of the Work area becoming inundated, including fish exclusion coordination with the Contracting Agency if the block nets are compromised.

iv. Describe how the contingency equipment and materials will be stored, inspected and maintained so they are ready for use if required.

v. Describe how the contingency system will deployed and operational within two (2) hours.

f. Inspection and Maintenance

i. Provide the schedule and frequency for inspection of the temporary stream diversion; include weekends and holidays.

ii. Describe how maintenance will be conducted when inspections identify deficiencies in the temporary stream diversion. These include, but are not limited, to removal and disposal of trapped sediment or debris and repairing leaks.

iii. The Contractor shall keep a record of all inspections and maintenance of the temporary stream diversion.

g. Rewatering the Stream Channel

i. Detail how the stream channel will be rewatered to comply with water quality requirements.

ii. Identify measures that will prevent the stranding of fish during rewatering (i.e. describe methods, rates, and durations of the rewatering process knowing that flows downstream of the fish block must be maintained to protect fish).

h. Removal of the Temporary Stream Diversion

i. Describe the sequence that will be used for removing the temporary stream diversion and methods to prevent water quality impacts.

ii. Describe how disturbed soil will be permanently stabilized.

iii. Describe any temporary pipes to remain (requires approval of the CO): their type, pipe class, size, location, and plugging procedure.

PART 2 - PRODUCTS

2.1 WATTLES

A. Wattles shall be made of cleaned mattress coir fiber or certified weed free rice straw material to reduce the spread of invasive plant species seed. The wattles shall be contained by a high strength

bristle coir twine netting (min. 2”x2” openings) or a continuous biodegradable burlap tubing material to reduce animal entrapment. Wattles shall be BioD-Watl by Rolanka International, Inc., Rice Straw Wattles with burlap by Earth Saver Erosion Control Products, or approved equal.

2.2 GRAVEL BAGS

A. Bag Material: Bags shall be woven polypropylene, polyethylene, or polyamide fabric, minimum unit weight 4 ounces per square yard; mullen burst strength exceeding 300 psi in conformance with the requirements in ASTM designation D3786; and ultraviolet stability exceeding 70 percent in conformance with the requirements in ASTM designation D4355.

B. Fill Material: Clean gravel shall be used inside the sandbags. Gravel shall be clean and free from clay balls, organic matter, weeds, and other deleterious materials that could leach from the bag. Fill material is subject to approval by the CO.

2.3 SEDIMENT MAT

A. Sediment Mat shall be composed of 100% Aspen wood or 100% Coconut fiber. Mats shall be of consistent thickness, with fibers evenly distributed throughout the entire area of the blanket. The top and bottom of each blanket shall be covered with netting to secure fibers in place. Mat material shall not contain any weed, seed or chemical additives. Mats shall be designed for shear stress of at least 2.0 lb/sf or for minimum flow velocity of 5 feet per second.

2.4 FILTER BAG

A. Filter bags shall consist of 8 oz. or 10 oz. weight non-woven fabric. Seams shall have an average strength per ASTM D4884 of 60 lb/in for 8 oz. fabric and 100 lb/in for 10 oz. fabric.

B. Filter bags shall meet the following specifications:

Property	Test Method	Test Value
Grab Tensile Strength	ASTM D 4632	200 lbs
Puncture Strength	ASTM D 4833	110 lbs
Mullen Burst Strength	ASTM D 3786	380 psi
Water Flow Rate	ASTM D 4491	70-100 gpm/ft^2
UV Resistance	ASTM D 4355	70%

C. Each filter bag shall have a spout opening large enough to accommodate at least a 4-inch pump discharge hose with an attached strap to tie unit closed. Filter bags shall be a minimum 10’ x 15’ dimension.

2.5 CLEAR PLASTIC COVERING

A. Plastic covering shall meet the requirements of ASTM D4397 for polyethylene sheeting.

2.6 FISH SCREENS

A. Material for fish screens shall be 6-14 or 6-16 (six squares per inch, 14 or 16 gauge) woven wire mesh.

2.7 BY-PASS PIPE

A. By-pass pipe shall be sized using an acceptable probability flow from Table *2*. Stream Diversion By-Pass Design Flows. These flows are estimates of mean daily discharges for the three-month period August, September, and October. These flow estimates do not account for instantaneous peak discharges associated with extreme weather events, nor do they account for diurnal stream flow fluctuations that often occur in glacial and snowmelt stream systems. Additionally, these flows are based on historical records and do not account for climate change.

B. A pipe sized for the 50% exceedance probability flow is provided in Table *1*. This information has been included as a reference for the contractor when preparing a bid. The pipe size used for the Temporary Stream Diversion Plan, and during the construction of the project, shall be sized exclusively by the contactor. The pipe sizes in Table *1* were developed with a 20% factor of safety, to create no more than 3 ft of head water at the upstream end of the pipe, and have a headwater to pipe diameter ration of less than 1.5.

C. By-pass pipes shall be corrugated polyethylene storm sewer pipe or high-density polyethylene pipe meeting the following specifications:

1. Corrugated polyethylene storm sewer pipe

a. Corrugated polyethylene storm sewer pipe, couplings, and fittings shall meet the requirements of AASHTO M294 Type S or D. The maximum pipe diameter for corrugated polyethylene storm sewer pipe shall be the diameter for which a manufacturer has submitted. Fittings shall be blow molded, rotational molded, or factory welded.

b. All joints for corrugated polyethylene storm sewer pipe shall be made with a bell/bell or bell and spigot coupling and shall conform to ASTM D3212 using elastomeric gaskets conforming to ASTM F477. All gaskets shall be factory installed on the pipe in accordance with the manufacturer's recommendations.

c. Qualification for each manufacturer or corrugated polyethylene storm sewer pipe requires joint system conformance to ASTM D3212 using elastomeric gaskets conforming to ASTM F477 and a formal quality control plan for each plant proposed for consideration.

d. A Manufacturer's Certificate of Compliance shall be required and shall accompany the materials delivered to the project. The certificate shall clearly identify production lots for all materials represented.

2. High-density polyethylene (HDPE) pipe

   a. HDPE pipe shall be manufactured from resins meeting the requirements of ASTM D3350 with a cell classification of 345464C and a Plastic Pipe Institute (PPI) designation of PE 4710.

   b. The pipes shall have a minimum standard dimension ratio (SDR) of 32.5.

   c. HDPE pipe shall be joined into a continuous length by an approved joining method.

   d. The joints shall not create an increase in the outside diameter of the pipe. The joints shall be fused, snap together, or threaded. The joints shall be watertight, rubber gasketed if applicable, and pressure testable to the requirements of ASTM D3212.

   e. Joints to be welded by butt fusion shall meet the requirements of ASTM F2620 and the manufacturer's recommendations. Fusion equipment used in the joining procedure shall be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, fusion temperature, alignment, and fusion pressure. All field welds shall be made with fusion equipment equipped with a Data Logger. Temperature, fusion pressure, and a graphic representation of the fusion cycle shall be part of the Quality Control records. Electro fusion may be used for field closures, as necessary. Joint strength shall be equal to or greater than the tensile strength of the pipe.

   f. Fittings shall be manufactured from the same resins and cell classification as the pipe unless specified otherwise. Butt fusion fittings and Flanged or Mechanical joint adapters shall have a manufacturing standard of ASTM D3261. Electro fusion fittings shall have a manufacturing standard of ASTM F1055.

   g. The supplier shall furnish a Manufacturer's Certification of Compliance stating that the materials meet the requirements of ASTM D3350 with the correct cell classification with the physical properties listed above. The supplier shall certify that the dimensions meet the requirements of ASTM F714.

   h. At the time of manufacture, each lot of pipes, liners, and fittings shall be inspected for defects and tested for Elevated Temperature Sustained Pressure in accordance with ASTM F714. The Contractor shall not install any pipe that is more than 2 years from the date of manufacture.

   i. At the time of delivery, the pipe shall be homogeneous throughout, uniform in color, and free of cracks, holes, foreign materials, blisters, or deleterious faults.

   j. Pipe shall be marked at 5-foot intervals or less with a coded number that identifies the manufacturer, SDR, size, material, machine, and date on which the pipe was manufactured.

Table 1. Pipe Sizing for the 50% Exceedance Probability Flow

Stream Name	Total Length of Pipe (ft)	Channel Slope (ft/ft)	Upsream Invert Elevation (ft)	Downstream Outlet Elevation (ft)	Pipe Diameter (in)	Number of Barrels	Headwater Elevation (ft)	Headwater Depth (ft)	Design Flow (cfs)	Approx. Exceedance Probability	Headwater / Diameter Ratio
Akokala Creek	94.5	0.0079	3554.5	3553.75	36	3	3557.4	2.9	82	50%	1.0
Anaconda Creek	86	0.0120	3581.16	3580.13	36	2	3584.1	2.9	56	50%	1.0
Appistoki Creek	101	0.0269	5190.14	5187.42	24	1	5191.7	1.6	5	50%	0.8
Bowman Creek	103.5	0.0110	3560.2	3559.06	36	4	3563.2	3.0	113	50%	1.0
Camas Creek	101	0.0008	3756.88	3756.8	36	3	3759.5	2.6	69	50%	0.9
Dutch Creek	70	0.0057	3638.2	3637.8	36	2	3640.9	2.7	48	50%	0.9
Fish Creek	117.5	0.0062	3198.91	3198.18	24	2	3201.5	2.6	28	50%	1.3
Ford Creek	96	0.0207	3714.84	3712.85	24	2	3717.1	2.3	24	50%	1.1
Kintla Creek	83	0.0077	3831.39	3830.75	36	4	3834.4	3.0	115	50%	1.0
Logging Creek	80	0.0156	3432.6	3431.35	36	3	3435.4	2.8	77	50%	0.9
Quartz Creek	70.5	0.0043	3508.6	3508.3	36	4	3511.4	2.8	105	50%	0.9

Table 2. Stream Diversion By-Pass Design Flows

Stream	Basin Area (sq mi)	Exceedance Probability				
		10% (cfs)	20% (cfs)	50% (cfs)	80% (cfs)	90% (cfs)
Akokala Creek	41.1	164	123	82	41	33
Anaconda Creek	28.1	112	84	56	28	22
Appistoki Creek	2.6	10	8	5	3	2
Bowman Creek	56.4	226	169	113	56	45
Camas Creek	34.5	138	104	69	35	28
Dutch Creek	24.1	96	72	48	24	19
Fish Creek	14.2	57	43	28	14	11
Ford Creek	11.9	48	36	24	12	10
Kintla Creek	57.3	229	172	115	57	46
Logging Creek	38.5	154	116	77	39	31
Quartz Creek	52.4	210	157	105	52	42

2.8 WATER

A. Water for dust control or other minor construction related activities (non-potable) can be obtained in one of the following ways:

1. The Park can provide water as needed

2. Pumping from streams/creeks will be allowed with the following requirements:

a. Pumping equipment shall be drained, cleaned, and dried prior to use.

b. Pumping equipment used at sites along the Inside North Fork Road shall be cleaned, drained, and dry before being used at Appistoki Creek or Lee Creek.

c. Pump intake pipes shall be covered with 1/8-inch screen.

d. Document quantity of water pumped, location of pumping, and date/time of pumping.

PART 3 - EXECUTION

3.1 WATTLES

A. Installation:

1. Coir Logs: Rows of coir wattles should be placed 8 – 12 feet apart. Cut a 2-inch deep trench and place the wattle in the trench. These wattles should be anchored with 18-inch long wood stakes with a notch on the top and 8-in long metal staples. Place a wood stake in every 3 feet from the bottom side of the slope and a metal staple in every foot from the up side of the slope. This will provide good contact between the wattle and the ground and prevent undercutting. Coir wattles can easily be joined with coir twine to get to the desired length.

2. Rice Straw Wattle: Wattles can be placed into a 2-3 inch deep trench and staked thru the middle every 4 feet. A “lashed” installation which requires no trench is where stakes are partially pounded in on either side of the wattle and rope is criss-cross lashed between the stakes, then the stakes are pounded in the rest of the way until the wattles are lashed down securely. Wattles can also be weighted with gravel bags where staking is not possible. In all installations, wattles should conform to any irregularities in the soil and no daylight should be visible under the wattle.

B. Maintenance:

1. Close attention shall be paid to the repair of damaged wattles, end runs, and undercutting beneath wattles. Necessary repairs to wattles or replacement of wattles shall be accomplished promptly.

2. Sediment deposits shall be removed when deposits reach one-half of the height of the wattle.

3. When a wattle barrier is no longer required, it shall be removed. The immediate area occupied by the wattles and any sediment deposits shall be shaped to an acceptable grade.

C. Removal and Clean-up:

1. With approval from CO, remove and properly dispose of all wattles at final completion of project. Clean, regrade and stabilize the area.

3.2 STREAM DIVERSION

A. General

1. The Contractor shall excavate, provide, install, and maintain the temporary stream bypass system as shown on the plans to ensure that all stream and stormwater flows bypass the construction site area safely without damage to surrounding property or downstream systems and to ensure that the work area is free from standing water or other saturated condition that impedes or interrupts the work.

2. Sediment must not be conveyed downstream during the construction period.. The bypass system and any dewatering measures required must be in operation prior to any work done within the stream channel. The bypass pipe shall outlet to a sediment mat to avoid erosion of the streambed. The Contractor shall be responsible for removal of the temporary stream bypass system upon project completion.

3. The CMR or Park staff will monitor installation of dewatering/stream diversion. Notify CO at least 7 days in advance of installation of dewatering/stream diversion.

4. The same dewatering / stream diversion equipment may be used at all locations located along the Inside North Fork Road. The dewatering / stream diversion equipment used at Appistoki Creek cannot be the same equipment used at the locations along the Inside North Fork Road.

B. Standard Operating Procedures

1. The stream bypass system shall be sized to pass the appropriate Exceedance Probability Design Flow as determined by the contractor. The Exceedance Probability Design Flow Table is provided in the plans for the Contractors convenience and it is the Contractors responsibility to verify all pipes and pumps, where applicable, are appropriately sized to ensure the stream flows will be sufficiently bypassed. The Contractor shall maintain base flows in the downstream reach at all times. If the Contractor finds that the bypass pipe or pump(s) is undersized, the Contractor shall notify the CO immediately. The Contractor shall monitor the weather reports and if precipitation in excess of the capacity of the bypass system is forecasted within 24 hours, the Contractor shall initiate the Emergency Operating Procedures described below.
2. Sediment must not be conveyed downstream during the construction period. The bypass system and any dewatering measures required must be in operation prior to any work done within the stream channel. The temporary stream bypass system shall be relocated as needed to allow for all work shown in the Plans. The bypass system and any dewatering measures required shall remain operational for the duration of the project.

3. If the downstream water becomes cloudy, work shall be stopped immediately. The cause of discoloration shall be identified and addressed. Work may resume after water has cleared.
3. Any pumps that are used as part of the standard operation shall be continuously monitored at night and during non-working hours.

C. Fish Removal

1. The Contractor shall provide for and coordinate with an experienced, local fisheries Biologist for fish removal of the stream reach being isolated by the temporary stream bypass system. The fisheries Biologist in accordance with any permits shall perform the following tasks:

    a. Fish shall be removed from the stream reach to be diverted by first installing fish screens upstream and downstream of the in-water work area. The fish screens shall remain in place for the duration of the construction activities. Once the fish screens are in place, a beach seine net should be dragged downstream while guiding all fish to the downstream net and collecting the fish at this end.

    b. During dewatering of the reach, fish stranded in remaining pools shall be removed with dip nets and if necessary, by conducting four-pass electrofishing. Electrofishing must be conducted according to the NMFS (2000) Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act.

    c. Upon removal, fish should be transported in clean buckets half-filled with stream water and immediately reintroduced into the stream downstream of the project site. Fish transportation equipment should be ready and on the job site in advance.

2. The temporary stream bypass system shall be relocated as required to allow improvements under the bridges or inside the box culverts.

D. Temporary In-Stream Gravel Bag Berm

1. The Temporary Stream Bypass berm shall consist of gravel bags, and plastic sheeting and be constructed so that the initial row of gravel bags are keyed into the ground and makes tight contact with the ground for the length of the berm. Gravel bags shall be placed to ensure there are no gaps.
2. Clear plastic covering shall be placed under the keyed-in gravel bags and cover the entire upstream face of the gravel bag berm.

E. Placing Filter Bags

1. All dewatering water must flow through a Filter Bag prior to discharging to the creek. Filter bags shall be installed per the supplier instructions. Filter bags shall be located to release filtered water to the stream channel in a dispersed fashion. Replace the filter bag when the unit is ½ full of sediment or when sediment has reduced the flow rate of the pump discharge to an impractical rate. Dispose of the unit and sediment at an approved disposal site.

F. Emergency Procedures

1. The Contractor shall provide pumps, generators, hoses, and personnel as backup to the bypass piping in the event the piping becomes non-operational pumps may be required during construction. Pumps shall be continuously monitored at night and during non-working hours in the event of a power failure.
2. Emergency bypass pump intake shall be screened in order to protect juvenile fish. The area of the screen shall be a minimum of seven (7) square feet and be fully submerged. Screen types shall be of the following:

   Perforated plate: 0.0938 inch maximum opening diameter or maximum slot width.
   Profile bar: 0.069 inch maximum width opening.
   Woven wire: 0.087 inch maximum in the narrowest direction.

3. The Contractor shall inspect and remove any debris accumulated on the face of the screen.

G. Inspection and Maintenance

1. At a minimum, the Contractor shall perform the following activities once per day (including weekends and holidays):

   a. Check for and correct leaks;
   b. Ensure the fish block nets remain sealed to the channel substrate.

2. The fish block nets shall be kept clear of debris that could jeopardize the integrity of the nets. The Contractor shall perform the following activities a minimum of three times per day or when requested by the CO. On working days, these activities shall be performed at the start, middle, and end of the working day. On non-working days, these activities shall be performed between 6:00 am and 8:00 am, between 11:00 am and 1:00 pm, and between 4:00 pm and 6:00 pm:
   a. Inspect the upstream and downstream fish block nets and remove debris;
   b. Inspect the upstream fish block net and all screens and similar facilities for impinged fish;
      i. The Contractor shall immediately notify the CO when impinged fish are discovered.
      ii. The Contractor shall remove any impinged fish.
3. The Contractor shall maintain a written record of all inspection and maintenance activities; record to be available at the request of the CO.

H. Rewatering the Stream Channel

1. The Contractor shall notify the CO a minimum of seven (7) calendar days in advance of rewatering the stream channel.
2. The Contractor shall introduce water to the new stream channel section and trap sediments until the stream section meets the requirements of these Provisions. Rewatering shall occur at a rate to avoid loss of surface water downstream while the new channel section is rewatered.

I. Removal of the Temporary Stream Diversion

1. The Contractor shall notify the CO two (2) business days in advance of beginning the temporary stream diversion removal sequence.
2. Once the water in the new stream channel will meet the applicable turbidity standards, the Contractor may begin the removal of the temporary stream diversion and the opening of the stream channel to flows.
3. The Contractor shall immediately take all corrective actions necessary to prevent the water from exceeding the turbidity standards should the stream turbidity increase. All Work within the channel, except for removal of the temporary erosion control items, shall be completed before the temporary stream diversion is removed. The Contractor must finish all construction activities within the limits of the Ordinary High Water Line, including but not limited to piling replacement, rip rap placement, and creek bed channel restoration, before the removing the fish block nets.
4. The final removal of the temporary stream shall be staged such that flow is metered into the previously blocked channel to prevent turbidity from moving downstream. Metering shall be performed such that one-quarter of the existing flow is released into the stream channel for 24-hours. Subsequent metering in one-quarter of total flow increments over 24-hour periods shall be performed up to full channel flow. The entire existing flow shall be released into the stream channel in no less than four (4) days
5. All materials used for the diversion shall become the property of the Contractor and removed from the project limits, with the exception of any materials supplied by the Park, unless otherwise specified by the CO.

3.3 AQUATIC RESOURCE PROTECTION

A. Do not spill or dump material from equipment into regulated aquatic resources.

B. Do not discharge wastewater from washout of concrete related equipment, concrete finishing, saw cutting, wet concrete, etc. into any regulated aquatic resource.

C. Locate staging or storage areas at least 50 feet horizontally from any aquatic resource, top of stream bank, or the highest anticipated water level during the construction period, whichever is furthest from the resource.

D. Locate re-fueling areas at least 100 feet horizontally from any aquatic resource, top of stream bank, or the highest anticipated water level during the construction period, whichever is furthest from the resource.

1. Do not “top off” fuel tanks.
2. Do not allow drivers or operators to leave their vehicles or equipment unattended while fueling.
3. Place drip pans under fueling locations to catch any drips during fueling process.
4. When fueling small equipment in the field like lawn movers, small sweepers, weed trimmers, blowers, portable generators, etc., do so over a drip pan.
5. Conduct daily inspections of the fueling area and clean up any spills and dirty absorbent on the ground.
6. Keep spill response information and spill cleanup materials onsite and readily available.

E. Store and handle petroleum products, chemicals, cement and other deleterious materials to prevent their entering regulated aquatic resources.

F. Provide sediment and erosion controls for material stockpiles, staging areas, access roads, channel changes, and instream excavations.

G. Clean, maintain, and operate equipment so that petroleum-based products do not leak or spill into any regulated aquatic resource.

1. Place secondary containment under generators used to power dewatering pumps.

END OF SECTION 31 25 00

SECTION 31 36 13 – GABION BASKET

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. The work under this specification includes furnishing, assembling, filling and tying open welded wire mesh bins rectangular compartmented gabions placed on a prepared surface of geotextile and filter materials, as specified, and in accordance with the lines, grades, and dimensions indicated or otherwise established in the field.
   a. Gabion boxes are welded wire mesh bins of variable sizes, uniformly partitioned into internal cells, interconnected with other similar units, and filled with rock at the project site to form flexible, permeable, monolithic structures.
   b. Gabion boxes shall be manufactured with all components mechanically connected at the production facility with the exception of the mattress lid, which is produced separately from the base.
      1) The supply to the jobsite of unassembled individual wire mesh components (panels) forming gabion boxes (and mattresses) will not be permitted.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. American Association of State Highway Officials (AASHTO)
   a. T85 Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate.
   b. T96 Standard Method of Test for Resistance to degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
   c. T104 Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
   d. T210 Standard Method of Test for Aggregate Durability Index.

2. ASTM International (ASTM)
   a. A82 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement
   b. A90 Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
   c. A185 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
   d. A370 Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
   e. A606-4 Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Roller and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
   f. A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

g. D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
h. D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
i. D4533 Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
j. D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
k. D4751 Standard Test Methods for Determining Apparent Opening Size of a Geotextile.
l. D4833 Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.

1.3 SUBMITTALS

A. Shop Drawings:

1. See Specification 01 33 23 for requirements for the mechanics and administration of the submittal process.

2. Show fabrication and installation details including plans, elevation, sections, and details of gabion baskets.

B. Informative Submittals:

1. Product technical data including:
   a. Wire mesh size and gauge
   b. Wire mesh ASTM designation and steel grade.
   c. Acknowledgement that products submitted meet requirements of standards referenced.
2. Manufacturer's installation instructions.
3. Certifications.
4. Test reports.
5. Submit all tests and certification in a single coordinated submittal.
   a. Partial submittals will not be accepted.

PART 2 - PRODUCTS

2.1 GABION BOXES

A. Gabion welded wire mesh bins shall be of a single unit construction.

1. The bottom mat, sides, dividers, back face and front face all connected and spiraled into rectangular bins of the sizes indicated.

B. Weathering steel welded wire fabric for the manufacturing and assembly of the gabion boxes shall conform to the following requirements:
1. Front face, back face, sides and dividers: 4"x4", 5ga welded wire fabric in accordance with ASTM A606-4 and ASTM A370.

2. Spiral binders: 9ga wire in accordance with ASTM A606-4 and ASTM A370.

2.2 ROCK-FILLED GABIONS

A. Furnish angular stone from a rock quarry that is hard, durable, free of organic and spoil material, and resistant to weathering and water action. Ripap used to fill the gabion baskets will conform to the riprap specifications and meet the color percentages listed in Table 3 in section 31 37 16.

B. Conform to the following Material Properties:

Description	**Requirement**
1. Durability index (course), AASHTO T21	50, minimum
2. Gradation. Furnish rock with breadth and thickness at least one-third its length. a. Maximum dimension b. Minimum dimension	 21 inch (530 mm) 6 inch (130 mm)
3. Los Angeles abrasion, ASSHTO T96	50% maximum
4. Unit Weight	110 pcf

2.3 GEOTEXTILE FILTER MATERIAL

A. Protect against moisture and ultraviolet exposure prior to placement.

B. Furnish and install non-woven material separation geotextile conforming to the following requirements:

Strength and Durability Properties			
Property	ASTM Test Method	Units	Geotextile Fiber
Type of Geotextile			Non-woven
Elongation at Break	D 4632	%	≥50
Minimum Grab Strength	D 4632	LB.	200
Minimum Sewn Seam Strength	D 4632	LB.	180
Minimum Tear Strength	D 4533	LB.	80
Minimum Puncture Strength	D 6241	LB.	430
Minimum Ultraviolet Stability	D 4355	%	50% retained strength after 500 hours of exposure

Hydraulic Properties			
Property	ASTM Test Method	Units	Type B
Maximum Permittivity	D4491	s^{-1}	0.7
Maximum apparent opening size (AOS)	D4751	Sieve size U.S.	No. 70

PART 3 - EXECUTION

3.1 PREPARATION

A. Shape embankment as indicated to allow for the full thickness of gabion

B. Excavate the slope from undisturbed material; shape to a plane and compact the underlying material with hand-operated compaction equipment until no visible deformation occurs.

3.2 BOX ASSEMBLY

A. Furnish welded wire baskets. Do not damage wire during basket assembly, structure erection, cell filling, or backfilling.

B. Rotate the basket panels into position and join the vertical edges with fasteners according to manufacturer recommendations.

C. Rotate the diaphragms into position and join the vertical edges.

3.3 STRUCTURE ERECTION

A. Place the empty gabion baskets on the prepared filter layer surface and adjoining empty baskets set to line and grade, and common sides with adjacent baskets thoroughly fastened along top and vertical edges using permanent fasteners. They shall be placed in a manner to remove any kinks or bends in the mesh and to uniform alignment.

B. Where spiral binders are used, crimp the ends to secure the binders in place.

C. Interconnect each vertical layer of baskets to the underlying layer of baskets along the front, back, and sides. Stagger the vertical joints between baskets of adjacent rows and layers by at least one-half the cell length.

3.4 CELL FILLING

A. Remove kinks and folds in the wire mesh, and properly align the baskets.

B. The stone used to fill the baskets shall meet the gradation specified on the plans and riprap specifications and the rock color percentages also listed in section 31 37 16.

C. Place rock carefully in the basket cells to prevent bulging of and damage to the baskets and to minimize voids in the rock fill. The voids shall be minimized by using well graded stone fill and by hand placement of the facing rock (if necessary in order to achieve a dense, compact stone fill.

D. The stone fill shall be placed into the gabion units in 1' lifts. Cells shall be filled to a depth not exceeding 1' at a time.

E. Maintain the basket alignment.

F. Place stiffeners in each unrestrained exterior basket cell greater than 12 inches in height. This includes interior basket cells left temporarily unrestrained. Place stiffeners concurrently with rock placement.

G. Fill the cells in a row or layer to ensure no cell is filled more than 12 inches above an adjacent cell.

1. Repeat this process until the basket is full and the lid bears on the final rock layer.

2. Gabions shall be uniformly overfilled by about 1-2 inches to account for structural settlement.

H. Secure the lid to the sides, ends, and diaphragms according to manufacturer recommendations.

I. Make exposed basket surfaces smooth and neat with no sharp rock edges projecting through the wire mesh.

3.5 BACKFILLING

A. Place a material separation geotextile over the back face of the gabion structure.

B. Place backfill as shown on plans. Compaction of backfill is not required.

END OF SECTION 31 36 13

SECTION 31 37 16 – RIPRAP

PART 1 - GENERAL

1.1 SUMMARY

A. Work under this Section shall consist of excavation, installing bedding material, geotextile and riprap. Furnish all labor, material and equipment necessary to complete the work according to the contract.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. American Association of State Highway and Transportation Officials (AASHTO):
   a. AASHTO T 85: Specific Gravity and Absorption of Coarse Aggregate
   b. AASHTO T 96: Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
   c. AASHTO T 104: Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

1.3 SUBMITTALS

A. Test reports.
   1. Product technical data including:
      a. Acknowledgement that products submitted meet requirements or gradation, color, and standards referenced.
   2. Manufacturer's installation instructions.
   3. Certifications.
   4. Test reports.

B. Samples.
   1. Color samples shall be provided for approval by park personnel.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Furnish and install rock conforming to:

1. Angular, hard, durable, resistant to weathering and free from seams, cracks and other structural defects.
   a. Local rock shall be used for all riprap and stacked boulders. The local rock is primarily limestone, argillite (green and pink metamorphic mudstone/shales), and quartzite, with few volcanics.

b. Do not use shale, mudstone, or other rock that may break into smaller pieces in the process of handling and placing
c. Do not use concrete or asphalt rubble.
d. Do not import into the project limits rock, sand, or gravel that have not been certified free of non-native, invasive plant species. Materials imported into the project limits which do not include a noxious weed free certification may be rejected and ordered by the CO to be removed from the project limits. The CO has the discretion of requesting inspection of certified materials by a third party and rejecting the use of the source if non-native plants or seeds thereof are found to be present.
e. Rock shall be weed free.

2. Well graded rock throughout the riprap layer to produce a dense mass. Refer to the contract drawings for the riprap gradation limits and Table 1 for gradation requirements.
   a. Control gradation by sample measurement or by visual inspection, as determined by the CO.
3. Riprap color percentages for each site shall approximate the percentages provided in Table 2 and as approved by the CO.

Table 1 - Gradation Requirements for Riprap

Class	% of Rock Equal or Smaller by Count, D_X	Range of Intermediate Dimensions,[2] inches (millimeters)	Range of Rock Mass,[3] pounds (kilograms)
1	100	9 – 15 (230 – 380)	59 – 270 (27 – 120)
	85	7 – 11 (180 – 280)	28 – 110 (13 – 50)
	50	5 – 8 (130 – 200)	10 – 42 (5 – 19)
	15	3 – 6 (80 – 150)	2 – 18 (1 – 8)
2	100	15 – 21 (380 – 530)	270 – 750 (120 – 340)
	85	11 – 15 (280 – 380)	110 – 270 (50 – 120)
	50	8 – 11 (200 – 280)	42 – 110 (19 – 50)
	15	6 – 8 (130 – 200)	10 – 42 (6 – 19)
3	100	21 – 27 (530 – 690)	750 – 1600 (340 – 730)
	85	15 – 19 (380 – 480)	270 – 560 (120 – 250)
	50	11 – 14 (280 – 360)	110 – 220 (50 – 100)
	15	8 – 10 (200 – 250)	42 – 81 (19 – 37)
4	100	27 – 33 (690 – 840)	1600 – 2900 (730 – 1300)
	85	19 – 23 (480 – 580)	560 – 990 (250 – 450)
	50	14 – 17 (360 – 430)	220 – 400 (100 – 180)
	15	9 – 12 (230 – 300)	59 – 140 (27 – 64)
5	100	33 – 39 (840 – 990)	2900 – 4850 (1300 – 2200)
	85	23 – 28 (580 – 710)	990 – 1800 (450 – 820)
	50	17 – 20 (430 – 510)	400 – 650 (180 – 290)
	15	11 – 15 (280 – 380)	110 – 270 (50 – 120)
6	100	39 – 45 (990 – 1140)	4850 – 7400 (2200 – 3350)
	85	28 – 32 (710 – 810)	1800 – 2650 (820 – 1200)
	50	20 – 23 (510 – 580)	650 – 990 (290 – 450)
	15	13 – 17 (330 – 430)	180 – 400 (82 – 180)
7	100	45 – 54 (1140 – 1370)	7400 – 12,800 (3350 – 5800)
	85	32 – 38 (810 – 970)	2650 – 4450 (1200 – 2000)
	50	23 – 28 (580 – 710)	990 – 1800 (450 – 820)
	15	15 – 20 (380 – 510)	270 – 650 (120 – 290)
8	100	54 – 66 (1370 – 1680)	12,800 – 23,400 (5800 – 10,600)
	85	38 – 47 (970 – 1190)	4450 – 8450 (2000 – 3850)
	50	28 – 35 (710 – 890)	1800 – 3500 (820 – 1600)
	15	19 – 25 (480 – 640)	560 – 250 (250 – 570)
9	100	66 – 78 (1680 – 1980)	23,400 – 38,600 (10,600 – 17,500)
	85	47 – 55 (1190 – 1400)	8450 – 13,500 (3850 – 6100)
	50	35 – 41 (890 – 1040)	3500 – 5600 (1600 – 2550)
	15	22 – 30 (560 – 760)	870 – 2200 (390 – 1000)
10	100	78 – 90 (1980 – 2290)	38,600 – 59,300 (17,500 – 26,900)
	85	55 – 64 (1400 – 1630)	13,500 – 21,300 (6100 – 9650)
	50	41 – 48 (1040 – 1220)	5600 – 9000 (2550 – 4100)
	15	26 – 36 (660 – 910)	1450 – 3800 (660 – 1700)

(1) Gradation includes spalls and rock fragments to provide a stable, dense mass.

(2) The intermediate dimension is the longest straight-line distance across the rock that is perpendicular to the rock's longest axis on the rock face with the largest projection plane.

(3) Rock mass is based on a specific gravity of 2.65 and 85 percent of the cubic volume as calculated using the intermediate dimension.

Table 2 - Riprap Color Percentages by Site

Riprap Color	Rock Type	Akokala Creek	Appistoki Creek	Camas Creek	Fish Creek	Ford Creek
Green	Argillite	40%	33%	40%	50%	40%
Red	Argillite or Quartzite	50%	33%	50%	40%	50%
Tan	Limestone	10%	33%	10%	10%	10%

B. Geotextile material shall conform to the following specifications:

1. Non-Woven Geotextile: Furnish separation and stabilization geotextile conforming to Table 3 for Class 2 (non-woven), hydraulic properties Type A.

Table 3 - Separation and Stabilization Geotextile and Geotextile Filter Requirements

Strength and Durability Properties						
Property	**Test Method ASTM**	**Units**	**Class 1**		**Class 2**	
Type of Geotextile			**Woven**	**Nonwoven**	**Woven**	**Nonwoven**
Elongation at break	D4632	%	< 50	≥ 50	< 50	≥ 50
Minimum grab strength	D4632	lb (N)	320 (1420)	200 (890)	250 (1110)	160 (710)
Minimum sewn seam strength	D4632	lb (N)	290 (1290)	180 (800)	220 (980)	140 (620)
Minimum tear strength	D4533	lb (N)	110 (490)	80 (360)	90 (400)	55 (240)
Minimum puncture strength	D6241	lb (N)	620 (2760)	430 (1910)	500 (2220)	310 (1380)
Minimum ultraviolet stability	D4355	%	50% retained strength after 500 hours of exposure			

Hydraulic Properties							
Property	**Test Method ASTM**	**Units**	**Type A**	**Type B**	**Type C**	**Type D**	**Type E**
Minimum permittivity	D4491	s^{-1}	0.7	0.5	0.2	0.1	0.1
Maximum apparent opening size (AOS)	D4751	Sieve size U.S. (mm)	No. 40 (0.425)	No. 40 (0.425)	No. 60 (0.250)	No. 40 (0.425)	No. 70 (0.212)

(1) Do not use woven slit film geotextile.

PART 3 - EXECUTION

3.1 GENERAL

A. Excavate and grade underlying surface to provide a firm and uniform bearing surface.

B. Install bedding material and erosion control geotextile as shown in the plans and as directed by the CO.
   1. Place geotextile in intimate contact with the bedding material without wrinkles or folds.
   2. Geotextile will be secured at each end by burying the end of the fabric at least 18-inches deep.
   3. Geotextile splices shall overlap a minimum of 18-inches, with upstream or upslope geotextile overlapping the abutting downslope geotextile.
   4. Use care to ensure the geotextile is not damaged during installation.
   5. Limit atmospheric exposure of the uncovered geotextile to 10 days to minimize damage potential due to sunlight, rain, dirt and contamination.
   6. Replace holes and tears by placing a new layer of geotextile extending beyond the defect at least 12 IN in all directions.

C. Place rocks to provide a secure unsegregated dense mass. Distribute and manipulate the rocks so that the larger rocks are uniformly distributed, and the smaller rocks serve to fill the spaces between the larger rocks.

END OF SECTION 31 37 16

SECTION 31 37 17 – STACKED BOULDER REVETMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. The work under this specification includes the installation of stacked boulder walls and revetment

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. American Association of State Highway Officials (AASHTO)
   a. T85 Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate.
   b. T96 Standard Method of Test for Resistance to degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
   c. T103, Standard Method of Test for Soundness of Aggregates by Freezing and Thawing.
   d. T104 Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
   e. T210 Standard Method of Test for Aggregate Durability Index.

2. ASTM International (ASTM)
   a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).

1.3 DEFINITIONS

A. Terms “boulders” and “rock” may be used interchangeably in this section.

1.4 SUBMITTALS

A. Test reports.
   1. Product technical data including:
      a. Acknowledgement that products submitted meet requirements or gradation, color, and standards referenced.
   2. Manufacturer’s installation instructions.
   3. Certifications.
   4. Test reports.

B. Samples.
   1. Color samples shall be provided for approval by park personnel.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Boulders

1. Boulders used shall be the type designated on the drawings and shall conform to the following:

Nominal Size (inches)	Range in Smallest Dimension of Individual Rock Boulders (inches)	Maximum Ratio of Largest to Smallest Rock Dimension of Individual Boulders
18	17 - 20	1.5:1
24	22 - 26	1.5:1
30	28 - 32	1.5:1
36	34 - 38	1.5:1
42	40 - 44	1.5:1
48	45 - 51	1.5:1

2. The shape of the boulders shall be slightly tumbled and primarily rectilinear.
3. The specific gravity of the boulders shall be two and one-half (2.5) or greater.
4. Boulder specific gravity shall be according to the bulk-saturated, surface-dry basis, in accordance with AASHTO T85.
5. The bulk density for the boulder shall be 1.3 ton/cy or greater.
6. The boulders shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96.
7. The boulders shall have a percentage loss of not more than ten percent (10%) after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate.
8. The boulders shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.
9. The colors of boulders shall be randomly but evenly mixed.
10. Control of color and gradation will be by visual inspection.
11. Color:
    a. The color percentages of the boulders shall conform to the following at each site:

Riprap Color	Rock Type	Akokala Creek	Appistoki Creek	Camas Creek	Fish Creek	Ford Creek
Green	Argillite	40%	33%	40%	50%	40%
Red	Argillite or Quartzite	50%	33%	50%	40%	50%
Tan	Limestone	10%	33%	10%	10%	10%

PART 3 - EXECUTION

3.1 STACKED BOULDERS

A. Stacked boulders shall be placed at the locations as shown on the drawings and installed with the following requirements:
   1. Subgrade:
      a. The subgrade to receive each boulder shall be excavated and any unstable material shall be removed.
      b. Subgrade shall be excavated a minimum of 6" to a maximum of 12" behind boulders.
      c. Backfill behind boulders shall be compacted to ninety five percent (95%) Maximum Standard Proctor Density (ASTM D698). Care shall be taken during compaction to avoid disturbing and/or damaging the integrity of the boulder channel edge.
      d. Finished grades and subgrade for boulders shall be determined from the height of each boulder used.

   2. Boulders:
      a. The top of all boulders shall be as indicated on the drawings.
      b. The boulders shall be linearly placed and each row will be stepped back from the layer below.
      c. The boulders shall be carefully picked and arranged so that adjacent rock surfaces match within two (2) inches in top elevation and two (2) inches along the vertical exposed face or channel side of rock.
      d. Boulders shall be placed such that adjacent boulders “touch” each other and voids do not exceed four (4) inches. It is the intent of construction to minimize voids between boulders.
      e. Smaller rocks shall be “chinked in” to fill all voids behind the boulders.
      f. Stacked boulder revetment shall resemble the boulder revetment completed at the Kintla Creek Bridge (photo below).

Stacked Boulder Revetment at Kintla Creek Bridge

END OF SECTION 31 37 17

SECTION 32 12 16 – ASPHALT PAVING

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.

1.2 SUMMARY

A. Section includes hot mix asphalt (HMA) for bridge approaches and tack coat.

B. Related Sections:

1. Section 31 23 10 – Excavation and Backfill

1.3 SUBMITTALS

A. Product Data for the following:

1. Asphalt, aggregate, asphalt binder, asphalt mix design or job mix formula.

B. Asphalt mix design submittal shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations and shall include as a minimum:

1. Percent passing each sieve size.
2. Percent of asphalt binder.
3. Performance graded asphalt binder certified test results and Material Certificate certifying the PG grade, including source and location.
4. Mixing temperature.
5. Compaction temperature.
6. Percent anti-stripping additive.
7. Maximum specific gravity(density) as determined by AASHTO T 209.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphalt concrete Type I

Submit a Montana DOT (MDT) Job Mix Formula (JMF) approved within the past 12 months for approval at least 30 days before production. For each proposed JMF, submit a production certification conforming to state department of transportation specifications and conforming to design parameter (a), (b), or (c) for the type of mix submitted and conforming to design parameter (d) in Table 1.

Table 1

Design Parameters	Specification
(a) Volumetric hot asphalt concrete pavement (AASHTO M 323, AASHTO R35, and AASHTO T 312) Gyratory compaction level Volumetric properties at 0.3 to 3 million ESAL's (AASHTO M323)	 $N_{initial}$ 7, N_{design} 75, N_{max} 115
(b) HVEEM (AASHTO T 246 and AASHTO T 247) Stabilometer, minimum Percent air voids (based on AASHTO T 166, AASHTO T 209 and AASHTO T 269)	 35 3.0 - 5.0
(c) Marshall (AASHTO T 245) Stability, pounds, minimum Flow, 0.01 inches Percent air voids (based on AASHTO T 166, AASHTO T 209 and AASHTO T 269) Compaction, number of blows each end of test specimen	 2000 8 – 14 3.0 – 5.0 75
(d) Moisture susceptibility (AASHTO T 283) Tensile strength ratio, minimum	 0.80

B. Asphalt concrete Type II
   1. Provide a mix composed of crushed stone or gravel and asphalt binder mixed in an approved plant. Use an aggregate gradation and asphalt binder of a quality conforming to those normally used locally by either Federal agencies or MDOT for the type of work being constructed.
   2. Submit the strength, quality, and gradation specifications for the asphalt concrete mix. Include copies of laboratory test reports that demonstrate aggregate, asphalt binder, additive, and mix properties meet Federal, state or local government agency specifications.

C. Aggregates: Furnish hard, durable particles or fragments of crushed stone, crushed slag, or crushed gravel conforming to the following:
   1. Los Angeles abrasion, AASHTO T 96: 35 percent max.
   2. Soundness of aggregate using sodium sulfate,
   3. AASHTO T 104 (5 cycles):
      a. Coarse aggregate: 12 percent loss max.
      b. Fine aggregate: 12 percent loss max.
   4. Fractured faces, ASTM D5821: 90 percent min.
   5. Fine aggregate angularity, AASHTO T 304, Method A: 40.0 percent min.
   6. Flat and elongated particles, ASTM D4791(1:5 ratio, plus ⅜-inch (9.5-mm) sieve, calculated by mass, weighted average): 10 percent max.
   7. Sand equivalent, AASHTO T 176, Alternative Method No. 2, Reference Method: 45 min.
   8. Gradation. Size, grade and combine the aggregate fractions in mix proportions that result in a composite blend conforming to the specified gradation. Nominal maximum size is one sieve size greater than the first sieve to retain more than 10 percent of the combined aggregate. Test according to AASHTO T 27 and AASHTO T 11. Volumetric asphalt concrete aggregate gradation. See below.

Asphalt Concrete Aggregate Gradation

Sieve Size	Nominal Maximum Aggregate Size – Percent Passing	
	Grading Designation	
	½ inch	
	Min.	Max.
3/4 inch	100	
1/2 inch	90	100
3/8 inch	*	90
No. 8	28	58
No. 200	2.0	10.0

9. For the surface course, do not use aggregates known to polish or carbonate aggregates containing less than 25 percent by mass of insoluble residue when tested according to ASTM D3042.

D. Tack Coat
1. Emulsified Asphalt conforming to AASHTO M 140 or AASHTO M 208.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide alternate routes around closed or obstructed traffic ways.

B. Where HMA is placed in areas not retained by curb faces, walls, and other vertical surfaces, the closed edges of the asphalt concrete shall be compacted to meet the same density requirements as the other asphalt surfaces.

C. Where a new asphalt surface joins an existing asphalt surface, tack coat shall be applied to the existing surface at the rate of 0.1 gallons per square yard. Fine building sand shall be swept into the joint to function as filler. Joints shall be trimmed to form near vertical surfaces and neat lines prior to asphalt placement.

D. HMA lifts shall be no more than 2-inches thick. If more than one lift is required, lift thickness shall be adjusted to create equal depth lifts.

3.2 PREPARATION

A. Soil subgrades should be proof-rolled with a loaded dump truck or heavy compactor to verify density. Any areas of yielding subgrade disclosed during this proof-rolling operation should be overexcavated and replaced with a suitable structural fill material.

B. The upper 2 feet of soils underlying pavement section should be compacted to at least 95 percent, and all soils below 2 feet should be compacted to at least 90 percent (based on ASTM D-1557).

C. The subgrade and base course material shall be compacted to at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557).

D. Contractor shall be responsible for protection of the subgrade.

E. Surface preparation
   1. Clean the existing surface of loose material, dirt, or other deleterious material by approved methods. Apply an asphalt tack coat to contact surfaces of pavements, curbs, gutters, manholes, and other structures.

3.3 MILLING

A. Equipment
   1. Milling machine shall meet the following requirements:
      a. Self-propelled.
      b. Sufficient power, traction, and stability to accurately maintain depth of cut.
      c. Capable of removing the pavement thickness to provide profile and cross slope.
      d. Automatic system to control grade elevations by referencing from the existing pavement by means of a ski, matching shoe, or from an independent grade control.
      e. Automatic system to maintain cross slope.
      f. System to effectively limit dust and other particulate matter from escaping removal operations.
      g. Loading system or adequate support equipment to completely recover milled material at removal rate.
      h. Cutting width equal to at least one-third of the lane width.

B. General
   1. Use a longitudinal reference to accurately guide the machine. References may include a curb, edge of pavement, or string attached to the pavement surface. Mill in a longitudinal direction.
   2. Mill the transverse slope to within ¼ inch in 10 feet (6 millimeters in 3 meters) of the required slope. Transition from one transverse slope to another at a uniform rate. Uniformly mill the entire roadway lane width so the cross-section of the new surface forms a straight line.
   3. Transition between different depths of cut at a uniform rate of ½ inch of depth per 10 feet. At the beginning and end of the milling work, construct a smooth transition to the original surface at this rate. Do not leave an exposed vertical edge perpendicular to the direction of travel. When the pavement remains open to traffic, if elevation differences exceeding 3 inches between adjacent lanes are left overnight, sign with "Uneven Lanes" warning signs and provide a 1V:3H fillet.
   4. Mill the surface to conform to 3.9.A.
   5. Use a sweeper immediately behind the milling operations to remove and completely recover loose material. Minimize the escape of dust into the air by misting. Dispose of recovered milled material in a manner consistent with state and local regulations.
   6. Before opening to traffic, patch defects in milled surface according to the CO.

3.4 WEATHER LIMITATIONS

A. Place asphalt concrete mix on a dry, unfrozen surface when the air temperature in the shade is above 35 degrees F and rising. For HMA, conform to Table 2.

Table 2

Compacted Lift Thickness	**< 2 inches**	**2 – 3 inches**
Road Surface Temperature, Degrees F	**Minimum Lay-Down Temperature, Degrees F**	
<35	Do not pave	Do not pave
35 – 39.9	Do not pave	Do not pave
40 – 49.9	Do not pave	285
50 – 59.9	295	280
60 – 69.9	285	275
70 – 70.9	280	270
80 – 89.9	270	265
≥90	265	260

Do not heat the asphalt concrete mix above the temperature specified in the approved asphalt concrete mix design.

3.5 HAULING

A. Use vehicles with tight, clean, and smooth metal beds for hauling asphalt concrete mixes.

B. Coat the beds with an approved material to prevent the asphalt concrete mix from adhering to the beds. Do not use petroleum derivatives or other coating material that contaminates or alters the characteristics of the mix. Drain the bed before loading.

C. Equip each truck with a canvas cover or other suitable material of sufficient size to protect the asphalt concrete mix from the weather. When necessary to maintain temperature, use insulated truck beds and securely fastened covers. Provide access ports or holes for checking temperature of asphalt concrete mix in the truck.

3.6 PLACING AND FINISHING

A. Do not use mixes produced from different plants unless the mixes are produced according to the same JMF, use material from the same sources, and are approved.

B. Place HMA at a temperature conforming to Table 2. Measure temperature of the asphalt concrete mix in the hauling vehicle just before dumping into the spreader or measure it in the windrow immediately before pickup.

C. Place the mix with a paver conforming that meets the following requirements:
   1. Self-contained, power-propelled units with adjustable vibratory screeds with full-width screw augers;

2. Heated for the full width of the screed;
3. Capable of spreading and finishing courses of asphalt concrete mix in widths at least 12 inches than the width of one lane;
    a. Paver for paving asphalt concrete walkways shall be able to pave widths from 9 feet to 13 feet.
4. Equipped with a receiving hopper having sufficient capacity to ensure a uniform spreading operation;
5. Equipped with automatic feed controls, which are properly adjusted to maintain a uniform depth of material ahead of the screed;
6. Operable at forward speeds consistent with satisfactory asphalt concrete mix lay down;
7. Capable of producing a smooth-finished surface without segregating, tearing, shoving, or gouging;
8. Equipped with automatic screed controls with sensors capable of sensing grade from an outside reference line, sensing the transverse slope of the screed, and providing the automatic signals that operate the screed to maintain grade and transverse slope; and
9. Equipped with a screed mounted safety edge device capable of:
    a. Maintaining contact with the road shoulder surface;
    b. Allowing automatic transition to cross roads, driveways, and obstructions; and
    c. Constraining and reducing the volume of the asphalt concrete material head to increase the density of the extruded profile.

D. Control horizontal alignment using a reference line. Automatically control the grade and slope from reference lines, a ski and slope control device, or dual skis. Use skis having a minimum length of 20 feet.

E. In areas where mechanical spreading and finishing is impractical; place and finish the asphalt concrete mix according to 3.5.F.

F. Offset the longitudinal joint of one layer at least 6 inches from the joint in the layer immediately below.

G. Paving in areas not practical for a paver
    1. Spread and finish each course by hand raking, screeding, or by other approved methods.

3.7 COMPACTING

A. Thoroughly and uniformly compact the asphalt surface by rolling. In places inaccessible to rollers, use alternate equipment approved by the CO. Do not cause cracking, shoving or undue displacement.

B. Monitor the compaction process with nuclear density gauges calibrate according to the ASTM D2950 calibration section within 6 months before use. Check the standard and reference on each day of use according to the ASTM D2950 standardization and reference check sections. Compact to at least 91.0 percent of the maximum specific gravity (density) determined in 2.1.A/B.

C. Continue compaction until surface marks are eliminated and cracks are sealed.

3.8 JOINTS, TRIMMING EDGES, AND CLEANUP

A. Make transverse joints vertical to the depth of the new pavement at connections to existing pavements and previously placed lifts. Form transverse joints by cutting back the previous run to expose the full-depth course.

B. Apply an asphalt tack coat to the edge of both transverse and longitudinal joints according to 3.10.

C. Place the asphalt concrete mix as continuously as possible. Do not pass rollers over an unprotected edge of freshly laid asphalt concrete mix.

D. Dispose of material trimmed from the edges and other discarded asphalt concrete mix in a manner consistent with state and local regulations. Asphalt material may be considered hazardous waste. Submit copies of the disposal permits.

3.9 PAVEMENT STRAIGHTEDGE MEASUREMENT

A. Measure the pavement surface using a 10-foot metal straightedge at right angles and parallel to the centerline. Defective areas are deviations between the surface and the bottom of the straightedge in excess of ¼ inches measured between two contacts of the straightedge or deviations in excess of ¼ inches measured at the end of the straightedge.

B. Defective Area Correction
   1. Correct defective areas by one of the following methods:
      a. Milling. Replace the defective area by milling at least one-half the pavement depth and repaving with the approved asphalt concrete mix. Mill per 3.3.
      b. Saw cutting. Replace the defective area by saw cutting and removing the defective area and repaving with the approved asphalt concrete mix. Saw cut and remove the defective area.
      c. Grinding. Use a diamond blade machine to grind off the defective surface area. Provide the manufacturer and model of the equipment to be used. Identify the beginning and ending station of each grind location, the grinding depth, and lateral extent of grinding. Optimize the endpoints of the areas where a grinder is to be applied using ProVAL's Smoothness Assurance function in conjunction with the grinding simulation function. Submit the type of seal to be placed after grinding is completed for approval. Place seals. Limit the grinding depth to 12.5 percent of the design pavement thickness. If grinding in excess of this depth, provide a minimum 1-inch overlay.
   2. Other. Submit a proposal for approval for other correction methods not listed above.

C. Obtain approval before starting corrective work. Allow 7 days for review and approval of correction method proposal.

3.10 TACK COAT

A. Equipment
   1. Asphalt distributor shall have the following:
      a. Heater for uniformly heating the asphalt;

b. Full circulation spray bar adjustable to 15-foot width;
c. Positive controls including tachometer, pressure gauge, volume measuring device, or calibrated tank to uniformly deposit asphalt over the full width within 0.02 gallons per square yard of the required rate; and
d. Thermometer for measuring asphalt temperature in the tank.

B. Surface Preparation
1. Clean the existing surface of loose material, dirt, or other deleterious material by approved methods. When the surface is concrete, remove excess joint and crack filler.

C. Weather Limitations
1. Apply asphalt tack only when the following apply:
a. Surface is dry and unfrozen;
b. Ambient air temperature is above 35 °F and rising; and
c. Weather is not foggy and rainy.

D. Asphalt Application
1. Calibrate asphalt distributors before the start of project and when directed by the CO. Calibrate the spray bar height, check nozzle angle, and verify longitudinal and transverse application rates according to ASTM D2995.
2. Spread building paper on the pavement surface at the beginning and end of each asphalt application so distributor flow is started and stopped on the paper.
3. Apply asphalt uniformly at the optimum application rate determined from the control strip. Do not apply more asphalt than can immediately be covered with aggregate. Correct skipped areas or deficiencies.
4. At the end of each day's production, provide the CO with documentation of calibrations and application rates.
5. Remove and dispose of material spills and associated debris at the end of each shift.
6. When using slow-setting emulsified asphalt, dilute by adding an equal quantity of water to the emulsified asphalt.
7. Apply the asphalt tack coat at a rate of 0.03 to 0.15 gallons per square yard.
8. Apply the asphalt tack coat uniformly and completely by fogging with a hand spray attachment or by another approved method when application with a distributor spray bar is not practical.
9. Squeegee the excess asphalt from the surface. Allow the tacked surfaces to completely cure before placing the covering course. Place the covering course within 4 hours of placing the asphalt tack coat.

3.11 FIELD QUALITY CONTROL TESTING

A. Placement temperature
1. Sample temperature of first load and as determined by the CO thereafter.
2. Sampling shall occur in hauling vehicle before dumping.

B. Density Testing
1. Take nuclear gauge density readings.
a. Density testing shall be in accordance with AASHTO T 166.
b. Sampling frequency shall be one per 15 tons.
c. Sample in-place after compacting.

C. Monitor the compaction process with nuclear density gauges and compact according to:
   1. The lower specification limit is 91.0 percent of the maximum specific gravity (density) determined according to AASHTO T 166 and AASHTO T 209.
   2. The percent compaction will be determined using the average maximum specific gravity (AASHTO T 209) from all samples tested each day.

3.12 QUALITY CONTROL / QUALITY ASSURANCE

A. The contractor is responsible for performing Quality Control monitoring and/or testing. Take samples and perform tests as described in Section 3.11.

END OF SECTION 32 12 16

SECTION 34 01 00 – MAINTENANCE OF TRAFFIC

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.

B. All requirements for maintenance of traffic shall be in accordance with the latest edition of the Manual of Uniform Traffic Control Devices and all reference documents.

1.2 SUMMARY

A. Section includes requirements for maintenance of traffic throughout the Project construction areas.

B. This work consists of controlling and protecting public traffic adjacent to and within the project. See FAR Clause 52.236-13 Accident Prevention.

1.3 QUALITY ASSURANCE

A. Reference Standards:
   1. Manual of Uniform Traffic Control Devices (MUTCD)
   2. National Cooperative Highway Research Program (NCHRP)
      a. NCHRP 350 – Recommended Procedures for the Safety Performance Evaluation of Highway Features
   3. AASHTO Manual for Assessing Safety Hardware (MASH)
   4. American Association of State Highway Transportation Officials (AASHTO)
   5. American Society for Testing and Materials (ASTM)
      a. ASTM A 36 – Standard Specification for Carbon Structural Steel

1.4 SUBMITTALS

A. Traffic Control Plans
   1. Provide a traffic control plan for each bridge location addressing proposed operations and materials to take place a minimum of 30 days prior to beginning the associated construction activities. Address contingencies in the submitted plan. Deviations or modifications from the submitted traffic control plan may be made to address field conditions if approved by the CO. Limit inconvenience to the traveling public as much as practicable and account for the safety of both the traveling public and project personnel.

B. Certification of work zone traffic control devices

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use temporary traffic control devices that meet the testing requirements of the AASHTO Manual for Assessing Safety Hardware (MASH) or NCHRP-350, test level 3. Submit certification of compliance for work zone traffic control devices that certifies each type of traffic control device in use or to be used on the project meets retro-reflectivity and NCHRP-350 or MASH requirements.

B. Use temporary traffic control devices and flagger paddles fabricated with retroreflective sheeting in accordance with the following table:

Traffic Control Device	Specification	Type
Any sign size on portable mounts; signs mounted on single posts (sign faces up to 40 sf); signs mounted on two posts (sign faces up to 59.9 sf); signs mounted on barricades (sign faces up to 20 sf); Barricade; Portable Barricade; Portable vertical panels; and all other work zone sign faces (e.g. flag person paddles, pilot car signs, etc.)	ASTM D4956	XI, X, IX, VIII, VII or VI
Hinged flexible guide posts 36" height and all cones and tubular markers	ASTM D4956	III or V
Plastic drums	ASTM D4956	IV or higher

C. Drums, Cones, and Tubular Markers - Use drums, cones, 42-inch cones, and tubular markers that are plastic and predominantly orange. Use drums and 42-inch cones that have alternating stripes, two orange and two white with orange on top, that are retroreflective and equal width.

D. Signs - Use the same sign sheeting material for each sign face on any sign installation. If hinged signs are used, ensure that the hinge does not block any part of the sign message. Permanent sign posts that meet MASH or NCHRP - 350, test level 3 may be used as approved by the CO. Use surfaced, four-sided (S4S), untreated timber for sign posts.

E. Sign Panels – Construct Sign Panels of either:
1. Plywood. At least 2 in, medium density, exterior grade B-B, overlaid fir plywood sheets meeting the requirements of the Product Standards PS1-95 for construction and industrial plywood published by the U.S. Department of Commerce.
2. Aluminum. Sheet aluminum 0.125-inches or 0.080-inches thick. Aluminum alloy in accordance with the Aluminum Association alloy AA5052-H38 or AA60061-T6. Other materials meeting MASH or NCHRP-350.

F. Backing Angles – Use sign panels backed with 2in x 2in x 3/16 in galvanized steel or aluminum backing angles and mounted to the post with 2in x 2in x 3/16 in galvanized steel clip or aluminum angles except that sign panels 48 in x 60 in or smaller may be backed as follows:

G. Aluminum panels 0.080 in thick and backed with metal backing angles or 2 in × 4 in dimensional lumber.
1. Aluminum panels 0.125 in thick and unbacked.
2. Plywood panels 2 in thick and unbacked

Use galvanized bolts, locknuts, and washers that meet the requirements of ASTM A153 or ASTM B633. Miscellaneous, to attach the sign panels to the backing members. Use locknuts that have a fiber or nylon insert. Use elevator bolts with heads flush with the surface of the sign panel.

H. Striping Paint and Glass Beads - Use commercially manufactured yellow or white highway striping paint for temporary pavement markings, and apply it without dilution. Make the painted pavement markings reflective by dropping or spraying glass beads onto the wet paint. Use retroreflective beads that meet the requirements of AASHTO M 247, Type I.

I. Flags - Use flags 24 in square, except on signs use flags 16 in square or larger. Use flags with weighted corners or reinforcing to keep the flag extended away from the post. Do not use mesh flags.

J. Portable Plastic Water Filled Barrier - Use portable, longitudinal, crashworthy plastic barrier that meets the following requirements:

1. MASH or NCHRP-350, test level 3.
2. Approximate dimensions of 78 in × 21 in × 32 in (length × width × height).
3. White and orange striped in accordance with the MUTCD.
4. Provide a crashworthy end terminal, or barrier that acts as its own crashworthy end treatment, or flare barrier outside the clear zone.

K. Temporary concrete Barrier and End Treatment - Provide temporary concrete barrier and terminals meeting the requirements of the contract. If the barrier is to remain the property of the contractor and does not have to connect to state furnished barrier, it is acceptable to furnish another temporary concrete barrier type meeting the requirements of MASH or NCHRP-350, test level TL-3 with a maximum dynamic deflection of 4 ft. Furnish FHWA letter of acceptance for the barrier type and connection detail and evidence of maximum dynamic deflection to the Contracting Officer. Provide crashworthy terminals where terminated within the clear zone or flare outside clear zone.

Use class B concrete in accordance with the following requirements:

Nominal Maximum Aggregate size: 1 ½ - ¾ inch
Cementitious Materials Content: 580 lbs/yd max.
Minimum Required Compressive Strength, 28-day: 4000 psi
Water/Cement Ratio: 0.42 max.
Maximum Target Value for Slump: 6-inches
Slump Tolerance: + 1 ½ to -2 inches
Required Air Content: 5.0% - 8.5%

and incorporate grade 40 reinforcing steel. Finish with an ordinary surface and with a 1-inch [25 mm] chamfer on corners. Use anchor pins, connecting pins, and other miscellaneous hardware that meet or exceed the requirements of ASTM A 36. Coat exposed steel with one coat of shop primer, applied at a minimum wet thickness of 3 mil.

Use bidirectional delineators that match the color of the adjacent edge line pavement stripe. Attach delineators to the barrier and terminal in accordance with the manufacturer's recommendations.

L. Sequential Chevron - Use portable, wheel-mounted units that meet the requirements of the MUTCD and provide or are capable of all the following:

1. A 48 in × 96 in panel.
2. Flash in both the left and right directional modes.
3. An automatic dimmer switch for reducing the nighttime illumination level by 50 percent or other levels as needed.
4. A manual override backup switch.

Replace units that are not reliable or do not provide the necessary constant light source.

Maintain sequential chevrons in working order at all times. Chevrons may be powered by a generator on site, utility power, or solar power. Ensure that the power source is able to maintain constant operation. Generator power will be allowed only as approved by the CO.

M. Portable Message Sign Panel. Portable message sign panel shall be furnished as a device fully self contained on a portable trailer, capable of being licensed for normal highway travel, and shall include leveling and stabilization jacks. The panel shall display a minimum of three eight character lines. The panel shall be a dot matrix type with an LED legend on a flat black background. LED signs shall have a pre-default message that activates before a power failure. The sign shall be solar powered with independent back up battery power. The sign shall be capable of 360 degrees rotation and shall be able to be elevated to a height of at least five feet above the ground measured at the bottom of the sign. The sign shall be visible from one half mile under both day and night conditions. The message shall be legible from a minimum of 750 feet. The sign shall automatically adjust its light source to meet the legibility requirements during the hours of darkness. The sign enclosure shall be weather tight and provide a clear polycarbonate front cover.

Solar powered message signs shall be capable of operating continuously for 10 days without any sun. All instrumentation and controls shall be contained in a lockable enclosure. The sign shall be capable of changing and displaying sign messages and other sign features such as flash rates, moving arrows, etc.

Each sign shall also conform to the following:

1. In addition to the onboard solar power operation with battery back-up, each sign shall be capable of operating on a hard wire, 100-110 VAC, external power source.
2. All electrical wiring, including connectors and switch controls necessary to enable all required sign functions shall be provided with each sign.
3. Each sign shall be furnished with an operating and parts manual, wiring diagrams, and trouble-shooting guide.
4. The portable message sign shall be capable of maintaining all required operations under Montana mountain-winter weather conditions.
5. Each sign shall be furnished with an attached license plate and mounting bracket.
6. Each sign shall be wired with a 7-prong male electric plug for the brake light wiring system.

N. Portable Traffic Signal System. Portable traffic signal system shall be furnished as a device self-contained on a portable trailer, capable of being licensed for normal highway travel. Portable traffic signal system shall provide a battery power supply with a solar powered charging system and include a backup power source and automatic transfer switches. Signal lamps shall be 12” diameter LED.

O. Submit request for substitution in accordance with Section 01 25 13.

PART 3 - EXECUTION

3.1 ACCOMODATION TRAFFIC DURING WORK

A. Accommodate traffic according to the MUTCD, approved contract traffic control plan, and this Section. Perform work in a manner that ensures the safety and convenience of the public and the natural environment. Accommodate public traffic on roads adjacent to and with the project until the project is accepted.

B. If traffic or workers may be affected, do not begin work until the necessary construction traffic control devices are in place and approved by the CO.

C. When placing, maintaining, and removing traffic control devices, provide the traffic control necessary for the safety of the public and the workers, at no additional cost to the government.

D. Schedule work to minimize the number and duration of required traffic control set-ups. Whenever possible, sequence work operations so that traffic control can be removed at night to allow full use of the roadway.

E. Installation constitutes acceptance of substrates and responsibility for system performance.

3.2 MAINTAINING ROADWAYS DURING WORK

A. Construct and remove roads as required by the approved traffic control plan.

B. Snow removal to facilitate the work is the Contractor’s responsibility. Snow removal to provide public access is the responsibility of the maintaining agency and will be performed at the maintaining agency’s discretion. Allow the maintaining agency access to perform snow removal.

C. On roadways open to the public, minimize dust on roadways so that visibility and air quality are not affected and a hazardous condition is not created. Dust control shall apply to project areas, staging areas, roadways between project areas and staging areas, and as determined by the CO.

D. Remove accumulations of soil and other material from traveled way.

E. Do not allow water to pond on the traveled way.

F. Maintain the roadway, detours, and diversions in a safe and acceptable condition. If corrective action is required and the corrective actions is not taken immediately, the condition may be corrected and the cost of corrective action deducted from monies due the Contractor.

G. Prior to leaving the work site at the end of the day, review the site with the CO and document all the Traffic Control devices are in place and functional as per the approved traffic control plan.

H. Completely cover or remove existing traffic control devices conflicting with construction traffic control, as approved by the CO, and return them to their previous locations, as necessary, at the completion of the work. Ensure the method of cover does not damage or puncture the existing

sign. Remove construction traffic control devices during seasonal suspensions and when not in use or needed.

3.3 MAINTAINING ROADWAYS DURING NON-WORK PERIODS

A. Maintain roadways and traffic control for public traffic during periods when work is not in progress except for bridge sites that have full closures which restrict public access.

3.4 LIMITATIONS ON CONSTRUCTION OPERATIONS

A. When the roadway is open to public traffic, restrict operations as follows:
   1. Operate equipment in the direction of traffic, where practical.
   2. Provide minimum lane widths of 10 feet. Use barricades, drums, or other acceptable devices to delineate traffic lanes through areas where the edge of pavement or intended path has been obliterated by construction operations.
   3. Store unused traffic control devices at staging areas as shown on the plans or as approved by the Contracting Officer.
   4. Park equipment in approved staging areas as shown on the plans or as approved by the Contracting Officer.
   5. Provide parking areas for employee's personal vehicles in approved areas.
   6. Provide uninterrupted two-way communications between flaggers and also between flaggers and pilot cars unless flaggers are able to see each other and communicate. Use communications devices approved by the CO. Citizen band radios are unacceptable. Make communications devices available to the CO as necessary.
   7. Where switching traffic to complete lane, provide adequate personnel and equipment to set or relocate traffic control devices.
   8. Limit construction-caused delays to public traffic to a maximum of 15 minutes per passage through the project or as approved by CO.
   9. Maintain existing guardrails, barriers, and bridge railings until removal is necessary for construction. Use a temporary barrier or appropriate channelizing devices while the guardrails and bridge rails are absent. Install permanent barriers, guardrails, and bridge rails as soon as possible to minimize risk to the public.

3.5 NIGHTTIME OPERATIONS

A. Perform construction operations during the hours of daylight (one-half hour after sunrise to one-half hour before sunset). Night work will not be permitted.

B. For overnight lane closures with no active construction operations, utilize portable traffic signal system. Use of power from private parties to power the temporary signal system shall not be allowed. Verify that the line of sight visibility in the field meets sight distance standards. If a system shutdown occurs, planned or unplanned, the contractor should provide flaggers to control traffic until the portable traffic signal systems are functioning correctly. Periodically review the portable signal system to document its maintenance. Record inspection dates and conditions observed in the project records.

3.6 TRAFFIC CONTROL SUPERVISOR

A. Provide a traffic control supervisor. Furnish the traffic control supervisor's name, address, and 24-hour telephone numbers at the preconstruction conference. During the contract, including periods of suspensions and work stoppages, perform the following:

1. Implement the approved traffic control plan.
2. Coordinate traffic control operations, including those of subcontractors and suppliers.
3. Ensure the condition, position, and applicability of traffic control devices in use.
4. Immediately correct traffic control deficiencies.
5. Coordinate traffic control maintenance operations with the CO.
6. Coordinate and ensure that traffic control devices are furnished, installed, maintained, removed, stored, replaced, relocated and cleaned as required by the CO. Ensure unused traffic control devices are properly handled and stored.
7. Conduct weekly traffic safety meetings for construction workers and invite the CO to these weekly meetings.
8. Submit a weekly certification that inspections and reviews were conducted and that the traffic control devices meet contract requirements. Include the number and types of devices in use. Report with the weekly certification, changes or corrective actions taken to ensure the safe passage of public traffic through the project.
9. Inspect traffic control devices, including those in staging, storage, material sources and disposal areas as follows:
    a. Daily during daylight hours when daylight work is being performed
    b. Daily during hours of darkness when nighttime work is being performed
    c. Weekly during:
        1) Daylight hours and hours of darkness when work is suspended for periods of more than one week, except when the project has been shut down for the winter
    d. Additional inspections, day or night, as directed by the CO
    e. Submit reports of inspections in an acceptable format within 2 days.
10. Temporary flagging assistance is not permitted by the dedicated Traffic Control supervisor.

END OF SECTION 34 01 00