REQUEST FOR BIDS

FOR

LETCHER COUNTY, KENTUCKY

EMERGENCY WATERSHED PROTECTION

STREAMBANK STABILIZATION

PEACE VALLEY ROAD

DSR-21-05-23-5076-019

PROPOSAL DUE ON 11/11/2026

NO LATER THAN 2:00 PM EST

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LETCHER COUNTY, KENTUCKY
EWP STREAMBANK STABILIZATION
DSR-21-05-23-5076-019

I. PURPOSE:

Letcher County (hereafter referred to as "County") is soliciting bids from experienced contractors to provide Streambank Stabilization services near Peace Valley Road as part of the USDA Natural Resources Conservation Service's (NRCS) Environmental Watershed Protection (EWP) Program, according to NRCS Standard Practices and Specifications and Construction Plans, attached or referenced in Appendices A and B.

The work consists of clearing designated areas by the removal and disposal of trees, logs, stumps, shrubs, brush, and rubbish, and the shaping of the channel.

The work for this project also involves installing steel rail walls and gabion baskets. The planned work will stabilize the channel to lessen flooding hazards in rural areas.

The purpose of this work is to reduce risks to agricultural resources or civil infrastructure by removing obstructions that hinder channel flow or sediment transport in order to restore flow capacity and direction, prevent excessive bank erosion by eddies or redirection of flow, and reduce the undesirable formation of bars and/or minimize blockages by debris.

II. SCHEDULE

A. PRE-BID OPTIONAL SITE VISIT: **TBA Date and Time**

B. BID SUBMISSION DEADLINE: **Wednesday, November 11, 2026 at 2:00 PM EST**

C. PUBLIC BID OPENING: **Wednesday, November 11, 2026 at 3:00 PM EST**

D. **in the Judge Executive's Office**

E. MEETING FOR AWARD: **Monday, November 16, 2026 at 10:00 AM during a special call Fiscal Court meeting.**

F. CURRENT WORK COMPLETE DEADLINE: December 13, 2026
Deadline may be extended to February 2027 depending on extension approval.

III. POINT OF CONTACT:

Points of contact for this Bid: Please copy all contacts on emails.

Terry Adams, Judge: judgeadams@letchercounty.ky.gov

ER Assist Grant Manager: ky-letcher@erassist.com

IV. GENERAL TERMS & INFORMATION:

A. Bids and all required documents must be submitted online to the DFS Procurement Portal (hereinafter "DFS Portal" or "Portal") at dfs.bonfirehub.com no later than **November 11, 2026 at 2:00 PM EST**.

B. Submittals received after the closing time will not be accepted. Multiple submittals from the same entity will not be accepted. Submission is electronic only through the DFS Portal. Hard copy bids or offers by telephone, fax, or email will not be accepted.

C. All proposers are encouraged to attend an **optional Pre-Bid Meeting and Site Visit scheduled for a to-be-announced date and time** at the Letcher County Fiscal Court, 156 Main St STE 107, Whitesburg, KY 41858. No synopsis or summary of the meeting will be provided.

D. Addenda regarding this RFP will be posted to the DFS Portal at dfs.bonfirehub.com. Proposers are responsible for obtaining addenda and are advised to check the website frequently.

E. Questions regarding this RFP are to be submitted to dfs.bonfirehub.com. For questions regarding portal registration or navigation, please email: procurement@erassist.com.

F. All bids must be properly certified by the entity bidding for the work and signed by an officer, director or owner that has authority to bind and commit the Contractor to perform said work and services.

G. Work shall be bid by unit price and all prices shall be all-inclusive and shall include all work required to complete the scope of work according to the Standards, Specifications, and Construction Plans in Appendices A and B, including but not limited to vegetating disturbed areas, traffic control, mobilization and demobilization, contractor quality control, and pollution control measures.

H. Prices offered in the Cost Bid Form by contractor shall be all inclusive and in accordance with the NRCS Standards and Specifications attached in Appendix A and shall not be increased or changed for any reason other than changes requested or approved by Letcher County.

I. The County of Letcher reserves the right to request additional information for any and all prices offered in the Cost Bid Form, including but not limited to a comprehensive breakdown of prices offered.

J. The following forms are provided in this RFP for reference. Proposers must review each form and enter their response as directed in the Portal's Required Information section. The confirmation or declaration statement for each form for which a response is required is provided in a gray box at the bottom of each form in this document. All responses must be true and accurate and shall be considered the equivalent of a legally-binding electronic signature.

1. Attachment 1: Bid Certification and Cost Bid Form
2. Attachment 2: NON-COLLUSION DECLARATION
3. Attachment 3: CERTIFICATION REGARDING LOBBYING
4. Attachment 4: FORM 200.321 AFFIRMATIVE STEPS
5. Attachment 5: CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY and VOLUNTARY EXCLUSION
6. Attachment 6: CONFLICT/NON-CONFLICT OF INTEREST STATEMENT
7. Attachment 7: DRUG-FREE WORKPLACE AFFIDAVIT

K. Costs of preparation of a response to this request for bids are solely those of the proposers. The County assumes no responsibility for any such costs incurred by the proposer. The proposer also agrees that the County bears no responsibility for any costs associated with any administrative or judicial proceedings resulting from the solicitation process.

L. Bids will be opened publicly prior to the award meeting on November 11, 2026 at 3:00 PM in the Judge Executive's Office.

M. Award is scheduled to occur at a special call of the Letcher County Fiscal Court, 156 Main St STE 107, Whitesburg, KY 41858 on **November 16, 2026 at 10:00 AM EST**.

N. Successful bidders must provide insurance policies showing proof of liability coverage, auto coverage and workers compensation.

O. Successful bidders, assigns, subcontractors must be compliant with all applicable Federal, State and Local laws.

P. The successful bidder must submit invoices to erassist.com/submit/dsr019. This submission form will not be available until the contract is fully executed. Invoices and work complete photos will no longer be accepted through email.

Q. The County has the right to cancel a solicitation at any time prior to approval of the award by the County.

R. The County of Letcher reserves the right to accept or reject any and all bids, in addition, the County reserves the right to accept multiple bids and award work per location or per line item.

V. PROJECT SCOPE

A. All work shall be performed as detailed or referenced in the attached NRCS National Conservation Practice Standards and Specifications and Job Sheets attached hereto in Appendices A and B. The work consists of (1) channel clearing - designated areas by the removal and disposal of trees, logs, stumps, shrubs, brush, and rubbish and the shaping of the channel, (2) Rail Wall installation - work consists of furnishing, fabricating, and erecting metalwork, including the metal parts and fasteners of the composite structures, (3) Gabions and Gabion Mattresses - The work consists of furnishing, assembling, and installing rock-filled wire-mesh gabions and gabion mattresses, (4) pollution control - work consists of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air from construction activities, (5) seeding and mulching - work consists of preparing the area for treatment; furnishing and placing seed, sprigs, mulch, fertilizer, inoculant, lime, and other soil amendments; and anchoring mulch in designated areas as specified.

B. Access points for each site are at the coordinates provided (where the stream meets the road) any additional or special instructions regarding site access will be provided at the Pre-Bid meetings.

C. All assigned work shall be performed at the specified location(s) and within the site parameters as determined by NRCS and provided below and in Appendix B. This project contains the following three (3) sites; each having a site ID that correlates to the project map in Appendix B consisting of a number and a letter.

1. Site 1 : 37.175722, -82.836789
    i. Stabilize approximately 120 LF of embankment with Gabions
2. Site 3 : 37.175551, -82.837970
    i. Stabilize approximately 36 LF of embankment with Steel Rail Wall
3. Site 4 : 37.17460237451559, -82.83951541295177
    i. Clear approximately 300 LF of channel of all debris (300 LF)

Attachment 1: Certification and Cost Bid Form

Proposing Certification: I have carefully examined the Request for Bids and any other documents accompanying or made a part of this Request for Bids.

I hereby propose to furnish the goods or services specified in the Request for Bids at the rates quoted in my Bid. I agree that my Bid will remain in effect for a period of up to one hundred eighty (180) days.

I agree to abide by all conditions of this Bid and understand that a background investigation may be conducted prior to award.

I certify that all information contained in this Bid is truthful to the best of my knowledge and belief. I further certify that I am duly authorized to submit this Bid on behalf of the Proposer as its act and deed and that the Proposer is ready, willing and able to perform if awarded the Contract.

I certify this Bid is made without prior understanding, agreement, connection, discussion, or collusion with any other person, firm or corporation submitting a Bid for the same product or service. I further certify that no officer, employee or agent of County or of any other Proposer has a financial interest in this Bid. I further certify that the undersigned executed this Proposer's Certification with full knowledge and understanding of the matters therein contained and was duly authorized to do so.

DFS Portal Confirmation / Declaration:

By completing and submitting the Cost Bid Form, you are certifying all of the above as well as the prices and data entered in the Cost Bid Form in the DFS Portal. The following Cost Bid Form is provided for reference only.

Attachment 1: Certification and Cost Bid Form

SAMPLE COST PROPOSAL FORM

Emergency Watershed Protection Program - Letcher County

DSR # 21-05-23-5076-019

The prices offered shall be "all-inclusive", and shall not be increased or changed for any reason other than changes requested or approved by the County and shall conform to the NRCS Standards & Specifications.
Breakdown of costs will be required upon request by the County or NRCS.
This is a Sample Cost Bid Form ONLY. Actual bid prices shall be entered in the Portal. This form is not required but can be submitted. In the case of price discrepancies, the prices in the Portal will prevail.

ITEM #	Work/Material	Unit	Qty	Unit Rate	Proposed Cost (extended)
1	Channel Clearing and Shaping	LF	300		
2	Seeding and Mulching	Lump Sum	1		
3	Mobilization and Demobilization	Lump Sum	1		
4	Drainfill, KY DOH #2 Stone	TON	28.1		
5	Rock Riprap, KYDOH Class III Channel Liner	TON	45		
6	Rock Riprap, Class II, Rail Steel Backfill	TON	51		
7	Gabions, 1' Reno Mattresses	CY	28		
8	Gabions	CY	64		
9	Steel, Railroad Rail Piling, 15'	LF	60		
10	Steel, Railroad Rail Piling, 16'	LF	112		
11	Steel, Guard Rail Lagging	SF	460		
12	Grouting	CY	1.8		
			Total Cost		

Attachment 2: NON-COLLUSION DECLARATION

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder.

All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price of any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the applicable laws that the foregoing is true and correct.

DFS Portal Confirmation / Declaration:
Do you confirm that you have read the Non-Collusion declaration and therefore declare under penalty of perjury under the applicable laws that the Non-Collusion Declaration is true and correct? (Y/N)

Attachment 3: CERTIFICATION REGARDING LOBBYING

The undersigned certifies that, to the best of their knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instruction.

3. The undersigned shall require that the language of this certification be included in the award document for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31 U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

DFS Portal Confirmation / Declaration:

Do you, the Contractor, confirm that you have read the Certification Regarding Lobbying form and certify or affirm the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any. (True/False)

Attachment 4: FORM 200.321 AFFIRMATIVE STEPS

CONTRACTING WITH SMALL AND MINORITY BUSINESSES, WOMEN'S BUSINESS ENTERPRISES, AND LABOR SURPLUS AREA FIRMS §200.321

The County is required to take all necessary affirmative steps to assure that minority business, women's business enterprises, and labor surplus area firms are used when possible. If contractor uses subcontractors, they are also required to take the following affirmative steps:

1. Placing qualified enterprises on solicitation lists.
2. Assuring that enterprises are solicited whenever they are potential sources.
3. Dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by enterprises.
4. Establishing delivery schedules, where the requirement permits, which encourage participation by enterprises.
5. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

DFS Portal Confirmation / Declaration:
Do you confirm that you have read the 200.321 Affirmative Steps Confirmation and agree to take the listed affirmative steps when using subcontractors. (Y/N)

Attachment 5: CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY and VOLUNTARY EXCLUSION

Neither the entity or its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation by any federal department or agency.

DFS Portal Confirmation / Declaration:

Do you confirm that neither the entity nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation by any federal department or agency? (Y/N)

Attachment 6: CONFLICT/NON-CONFLICT OF INTEREST STATEMENT

To the best of our knowledge the bidder has no potential conflict of interest due to any other clients, contracts, or property interest for this project. [SELECT YES IF TRUE]

OR

The bidder, by attachment, submits information which may be a potential conflict of interest due to other clients, contracts, or property interest for this project. [SELECT NO IF TRUE & UPLOAD DOCUMENTATION]

Failure to answer appropriately may result in disqualification of your bid.

DFS Portal Confirmation / Declaration:
Do you confirm that to the best of your knowledge the undersigned proposer has no potential conflict of interest due to any other clients, contracts, or property interest for this project? (Y/N)

If answered no, documentation must be uploaded containing information regarding what may be a potential conflict of interest due to other clients, contracts, or property interest for this project.

Attachment 7: DRUG-FREE WORKPLACE AFFIDAVIT

The undersigned certifies that the responding firm has taken steps to :

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are proposed, a copy of the drug- free workplace statement.
4. In the statement specified in drug-free workplace statement, notify the employees that as a condition of working on the commodities or contractual services that are under bid the employee will abide by the terms of the statement and will notify the employer of any conviction of or plea of guilty or nolo contendere to any violation of any controlled substance law of the United States or any state for a violation occurring in the workplace no later than five (5) days after such conviction.
5. Impose a sanction on or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community by any employee who is so convicted.
6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

I certify that this firm complies fully with the above requirements.

DFS Portal Confirmation / Declaration:

Do you confirm that you have read the Drug-Free Workplace Affidavit and certify that the responding company complies fully with the listed requirements? (Y/N)

- *Upload the contractor's Drug Free Workplace Policy*

APPENDIX A

NRCS Construction & Material Specifications

5076 Letcher - DSR 21 05 23 5076 019 – Peace Valley Road

EMERGENCY WATERSHED PROTECTION (EWP) STREAMBANK STABLIZATION PROJECT
with the cooperation of the
Letcher COUNTY FISCAL COURT, Letcher COUNTY, KENTUCKY
and the
NATURAL RESOURCES CONSERVATION SERVICE (NRCS)

CONSTRUCTION and MATERIAL SPECIFICATIONS



LIST OF APPLICABLE SPECIFICATIONS

Specifications

- NRCS National Construction Specification 4, Channel Clearing and Shaping
- NRCS National Construction Specification 5, Pollution Control
- NRCS National Construction Specification 6, Seeding, Sprigging, and Mulching
- NRCS National Construction Specification 8, Mobilization and Demobilization
- NRCS National Construction Specification 9, Traffic Control
- NRCS National Construction Specification 11, Removal of Water
- NRCS National Construction Specification 21, Excavation
- NRCS National Construction Specification 23, Earthfill
- NRCS National Construction Specification 24, Drainfill
- NRCS National Construction Specification 61, Rock riprap
- NRCS National Construction Specification 64, Gabions and Gabion Mattresses
- NRCS National Construction Specification 81, Metal Fabrication and Installation
- NRCS National Construction Specification 94, Contractor Quality Control
- NRCS National Construction Specification 95, Geotextile
- NRCS Kentucky Construction Specification 414, Concrete Grouting

MATERIAL SPECIFICATIONS

- NRCS National Material Specification 521, Aggregates for Drainfill and Filters
- NRCS National Material Specification 522, Aggregates for Portland Cement Concrete
- NRCS National Material Specification 523, Rock for Riprap
- NRCS National Material Specification 531, Portland Cement
- NRCS National Material Specification 592, Geotextile

CONSTRUCTION DRAWINGS

Peace Valley Rd 5076-019 UTM sheets 1 through 8

Construction Specification 4 — Channel Clearing and Snagging

Title 210 - Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of clearing designated areas by the removal and disposal of trees, logs, stumps, shrubs, brush, and rubbish and the shaping of the channel.

B. Protection of Existing Vegetation

1. Protect trees and other vegetation designated to remain undisturbed from damage throughout the duration of the construction period. Any damages resulting from the contractor's operations or neglect must be repaired by the contractor.
2. Earthfill, stockpiling of materials, vehicle or equipment parking, and excessive foot or vehicle traffic must not be allowed within the drip line of vegetation designated to remain in place. Vegetation damaged by any of these or similar actions must be replaced with viable vegetation of the same species, similar condition, and like size unless otherwise approved by the contracting officer.
3. Any cuts, skins, scrapes, or bruises to the bark of the vegetation must be carefully trimmed and local nursery-accepted procedures must be used to seal damaged bark.
4. Any limbs or branches 0.5 inch or larger in diameter that are broken, severed, or otherwise seriously damaged during construction must be cut off at the base of the damaged limb or branch, flush with the adjacent limb or tree trunk.
5. All roots 1 inch or larger in diameter that are cut, broken, or otherwise severed during channel shaping must have the ends smoothly cut perpendicular to the root. Roots exposed during channel shaping operations must be covered with moist soil as soon as possible to prevent them from drying out.

C. Marking

1. The limits of the areas to be cleared and shaped are marked by stakes, flags, paint, tree markings, or other suitable methods or as specified in Section H of this specification or will be shown on the drawings. Trees to remain standing, undisturbed, and uninjured are designated by special markings.

D. Clearing

1. Trees and other vegetation marked for clearing must be cut off as near the ground surface as conventional tools and equipment normally permit. All trees not

marked for preservation and all snags, logs, brush, shrubs, stumps, and rubbish must be cleared from within the area limits identified.

E. Disposal

1. Dispose of all woody material, vegetation, and rubbish resulting from clearing from designated areas at the locations and in a manner shown on the drawings or as specified in Section H of this specification.

F. Shaping

1. Shape the channel bottom and side slopes as shown on the drawings. The resulting shaped channel surface must be reasonably smooth. Remove and dispose material excavated during the channel-shaping operation from the channel as specified in Section H of this specification.

G. Measurement and Payment

1. Method 1. For items of work for which specific unit prices are established by the contract, the designated cleared and shaped area is measured and area is determined to the nearest 0.1 acre. Payment for clearing and shaping is made at the contract unit price for the item and constitutes full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the satisfactory completion of the work.
2. Method 2. For items of work for which specific unit prices are established by the contract, the length of the cleared and shaped channel designated is measured to the nearest 100 feet. Payment for clearing and shaping is made at the contract unit price for the item and constitutes full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the satisfactory performance of the work.
3. Method 3. For items of work for which specific unit prices are established by the contract, the cleared and shaped areas is measured, and area is determined to the nearest 0.1 acre. The designated cleared and shaped areas is determined from the measured width at representative sections and the distance between the sections. Payment for clearing and shaping is made at the contract unit price for the item and constitutes full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the satisfactory completion of the work.
4. Method 4. For items of work for which specific lump sum prices are established by the contract, the extent of clearing and shaping is not measured or determined for payment. Payment for clearing and shaping is made at the contract lump sum price for the item and constitutes full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the satisfactory completion of the work.
5. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which

it is made subsidiary. Such items and items to which they have been made subsidiary are identified in Section H of this specification.

H. Items of Work and Construction Details

H. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Bid Item 1, Channel Clearing and Shaping

1) This item consists of all work necessary to remove and dispose of accumulated sediment, woody debris and any man-made debris as necessary to restore pre-storm flow capacity.

2) In Section B, Protection of Existing Vegetation:

   a. Trimming or treatment of cuts, scrapes or bruises to bark or limbs is not required.

   b. Limbs or branches 3 inches or larger in diameter that are broken, severed, or otherwise seriously damaged during construction shall be cut off at the base of the damaged limb or branch flush with the adjacent limb or tree trunk.

3) In Section C, Marking, the upstream and downstream extents for channel clearing and shaping will be located by either paint markings on the adjacent roadway, or survey flags as deemed appropriate by site conditions. Trees to remain standing or to otherwise not be disturbed during construction will be marked with paint of survey ribbon.

4) In Section D, Clearing, tree clearing/removal:

   a. The removal or adverse impacts to all existing trees, shrubs or other native vegetation shall be avoided and minimized to the extent possible. In general, trees and shrub removal should be targeted for removal only when they inhibit construction, cause a safety hazard within the work limits, or are already felled, severely dislodged or down.

   b. Trees that exhibit exfoliating bark characteristics such as shell and shagbark hickories, white oak species; or dead and dying trees with exfoliating bark, broken tree tops, splintered or split areas; trees with cavities or hollowed areas shall not be removed unless (a) above applies.

   c. When possible and feasible all required tree removal shall occur between November 15th and March 31st and will not require NRCS State Biologist prior approval. Tree removal from April 1 to November 14th will require prior approval from the NRCS State Biologist and be marked for retention or removal by an NRCS representative. Trees and shrubs less than 3 inches in diameter may be removed any time of year.

   d. If the construction activity occurs in proximity to a known Indiana and/or northern long-eared bat maternity colony or hibernaculum area, any tree removal will require prior approval from the NRCS State Biologist (regardless of time of year) and be marked for removal or retention by an NRCS representative prior to implementation.

   e. NRCS will designate any needed ingress and egress, access points, or work areas in woodland and mark trees for removal or retention by an NRCS representative prior to construction.

   f. If additional tree removal is required during construction, all the criteria listed above is required.

g. NRCS inspectors will ensure that sponsors and contractors adhere to the above requirements by inspecting the site prior to any work and by making site visits every day or every other day once work has commenced.

5) In Section D, Clearing, stream debris removal/clearing:
   a. The use of construction equipment, green concrete, pesticides or other pollutants including fuel and oil products within flowing streams or natural waterbodies during construction activities is prohibited. Plan and install appropriate measures to minimize sediment and turbidity during construction or debris removal.
   b. During construction activities, appropriate measures shall be implemented to ensure that the transport of excess nutrients, sediments, pesticides or toxic substances to streams, wetlands and adjacent waterbodies does not occur.
   c. Construction activities along the streams and within riparian corridors will be performed only to the minimum level needed to effectively extract targeted debris from the stream. Tree removal must be performed as outlined above (4).
   d. Man-made or natural debris of salvageable value to sponsor or landowner shall be moved, disposed of, or secured in a manner agreeable to sponsor, landowner, Insurance provider, contractor and as determined by the Government Representative. Examples would be marketable timber or damaged autos.
   e. Man-made debris dislodged from blockage removal shall be secured and removed from the work area.

6) In Section E, Disposal, manmade debris as removed will be disposed of at an approved landfill. Sediment and woody debris will be disposed of at a location of the project sponsor's discretion. This disposal area will be outside of the 100 year flood plain. Burning of woody debris on-site will not be permitted.
7) In Section F, Shaping, areas disturbed during the removal process, including banks and access routes, shall be regraded to slopes and grades that are consistent with the surrounding area.
8) In Section G, Measurement and Payment, Method 2 shall apply. Such payment shall constitute full payment for related subsidiary items:
   a) Construction Specification 5, Pollution Control
   b) Construction Specification 9, Traffic Control
   c) Construction Specification 94, Contractor Quality Control

Construction Specification 5 — Pollution Control

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air from construction activities.
2. The following BioPreferred® product categories are applicable to this specification:
    a. Mulch and compost materials
    b. Erosion control materials
    c. Fertilizers
    d. Dust suppressants
    e. Agricultural spray adjuvants

B. Material

1. Silt fence conform to the requirement of Materials Specification 592, Geotextile. All other material furnished meet the requirements of the material specifications listed in Section G of this specification.
2. Erosion and Sediment Control Measures and Works. The measures and works includes, but are not limited to, the following:
    a. Staging of Earthwork Activities. Scheduling the excavation and moving of soil materials to minimize the size of areas disturbed and unprotected from erosion for the shortest reasonable time.
    b. Seeding. Seeding to protect disturbed areas occur as soon as reasonably possible following completion of that earthwork activity.
    c. Mulching. Mulching to provide temporary protection of the soil surface from erosion.
    d. Diversions. Diversions to divert water from work areas and to collect water from work areas for treatment and safe disposition. These are temporary and must be removed and the area restored to its near-original condition when the diversions are no longer required or when permanent measures are installed.
    e. Stream Crossings. Culverts or bridges where equipment must cross streams. These are temporary must and be removed and the area restored to its near-original condition when the crossings are no longer required or when permanent measures are installed.
    f. Sediment Basins. Sediment basins for collecting, settling, and eliminating sediment from eroding areas that impact properties and streams below the

construction sites. These basins are temporary and must be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

g. Sediment Filters. Straw bale filters or geotextile sediment fences for trapping sediment from areas with limited runoff. Sediment filters must be properly anchored to prevent erosion under or around them. Silt fences must be installed and maintained in accordance with ASTM D6462. These filters are temporary and must be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

h. Waterways. Waterways for the safe disposal of runoff from fields, diversions, and other structures or measures. These works are temporary and must be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

i. Other. Additional protection measures as specified in Section G of this specification or required by the federal, state, or local government.

C. Chemical Pollution

1. The contractor must provide watertight tanks or barrels or construct a sump sealed with plastic sheets to collect and temporarily contain chemical pollutants, such as drained lubricating or transmission fluids, grease, soaps, concrete mixer wash water, or asphalt, produced as a by-product from the construction activities. Dispose of pollutants in accordance with appropriate state and federal regulations. At the completion of the construction work, remove tanks, barrels, and sumps and restore the area to its original condition as specified in Section H of this specification. Sump removal must be conducted without causing pollution.

2. Sanitary facilities, such as chemical toilets, and septic tanks must not be located next to live streams, wells, or springs. They must be located at a distance sufficient to prevent contamination of any water source. At the completion of construction activities, facilities must be disposed of without causing pollution as specified in Section H of this specification.

D. Air Pollution

1. The burning of brush or slash and the disposal of other materials must adhere to state and local regulations.

2. Fire prevention measures must be taken to prevent the start or spreading of wildfires that may result from project activities. Firebreaks or guards must be constructed and maintained at locations shown on the drawings.

3. All public access or haul roads used by the contractor during construction of the project must be sprinkled or otherwise treated to fully suppress dust. All dust control methods must ensure safe construction operations at all times. If chemical dust suppressants are applied, the material must be a commercially available product specifically designed for dust suppression, and the application must follow the manufacturer's requirements and recommendations. A copy of the product data sheet and manufacturer's recommended application procedures must be provided to the engineer 5 working days before the first application.

E. Maintenance, Removal, and Restoration

1. All pollution-control measures and temporary works must be adequately maintained in a functional condition for the duration of the construction period. Remove all temporary measures and restore the site to near-original condition.

F. Measurement and Payment

1. Method 1. For items of work for which specific unit prices are established in the contract, each item is measured to the nearest unit applicable. Payment for each item is made at the contract unit price for that item. For water or chemical suppressant items used for dust control for which items of work are established in Section H of this specification, measurement for payment will not include water or chemical suppressants that are used inappropriately or excessively. Such payment will constitute full compensation for the completion of the work.
2. Method 2. For items of work for which lump-sum prices are established in the contract, payment is made as the work proceeds and is supported by invoices presented by the contractor that reflect actual costs. If the total of all progress payments is less than the lump-sum contract price for this item, the balance remaining for this item will be included in the final contract payment. Payment of the lump-sum contract price will constitute full compensation for completion of the work.
3. Method 3. For items of work for which lump-sum prices are established in the contract, payment will be prorated and provided in equal amounts on each monthly progress payment estimate. The number of months used for prorating must be the number estimated to complete the work as outlined in the contractor's approved construction schedule. The final month's prorate amount will be provided with the final contract payment. Payment as described will constitute full compensation for completion of the work.
4. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items, and the items to which they are made subsidiary, are identified in Section H of this specification.

G. Items of Work and Construction Details

G. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Subsidiary Item, Pollution Control

1) This item shall consist of all the work necessary to control erosion and sediment pollution, chemical pollution and air pollution.

2) This item also consists of removal of water including but not limited to general dewatering, pumping, diversion and temporary embankments to exclude water from all work sites.

3) The Contractor's scheduling shall be made in a manner that will reduce adverse environmental effects. Construction scheduling shall be revised when significant pollution can result due to his planned construction schedule.

4) The Contractor shall perform work in a manner that will reduce erosion and minimize sediments and other pollutants to the water and streams and create a minimum of air pollution consistent with standard construction operations.

5) To the maximum extent practicable, all in-stream work under this contract shall be performed during conditions of low flow.

6) Measures shall be taken to prevent and control spills of fuels, lubricants, or other materials used in construction from entering the stream, drainage way, or water body.

7) Should evidence of stream use or jurisdictional wetland impairment and/ or violations of water quality standards occur as a result of this activity either from a spill or other forms of water pollution the Kentucky Division of Water shall be notified immediately and physical, chemical, or biological examination of the water course shall be conducted and reported. In such case(s), additional facilities or alternative measures may be required.

8) In Section D, Air Pollution, as necessary to control dust, water or other dust suppressors shall be applied to prevent excessively dusty conditions along haul and access roads.

9) In Section F, Measurement and Payment, no method shall apply. Full compensation for the completion of this item of work shall be included in the payment for:

a) Bid Item 5, Rock Riprap, Class III Channel Liner.

b) Bid Item 6, Rock Riprap, Class II, Rail Steel Backfill

c) Bid Item 7, Gabions, 1' Reno Mattresses

d) Bid Item 8, Gabions

e) Bid Item 9, Steel, Railroad Rail Piling, 15'

f) Bid Item 10, Steel, Railroad Rail Piling, 16'

g) Bid Item 11, Steel, Guard Rail Lagging

h) Bid Item 12, Grouting

Construction Specification 6 — Seeding, Sprigging, and Mulching

Title 210 - Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of preparing the area for treatment; furnishing and placing seed, sprigs, mulch, fertilizer, inoculant, lime, and other soil amendments; and anchoring mulch in designated areas as specified.
2. The following BioPreferred® product categories are applicable to this specification:
    a. Mulch and compost materials
    b. Erosion control materials
    c. Fertilizers
    d. Agricultural spray adjuvants

B. Material

1. Seed.
    a. All seed must conform to the current rules and regulations of the state where it is being used and must be from the latest crop available. It must meet or exceed the standard for purity and germination listed in Section G.
    b. Seed must be labeled in accordance with the state laws and the U.S. Department of Agriculture rules and regulations under the Federal Seed Act in effect on the date of invitations for bids. Bag tag figures are evidence of purity and germination. No seed will be accepted with a test date of more than 9 months before the delivery date to the site.
    c. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be accepted. The percent of noxious weed seed allowable must be as defined in the current state laws relating to agricultural seeds. Each type of seed must be delivered in separate sealed containers and fully tagged unless an exception is granted in writing by the contracting officer.
2. Fertilizer. Unless otherwise specified, the fertilizer must be a commercial-grade fertilizer. It must meet the standard for grade and quality specified by state law. Where fertilizer is furnished from bulk storage, the contractor must furnish a supplier's certification of analysis and weight. When required by the contract, a representative sample of the fertilizer must be furnished to the contracting officer for chemical analysis.

3. Inoculants. The inoculant for treating legume seeds must be a pure culture of nitrogen-fixing bacteria prepared specifically for the species and must not be used later than the date indicated on the container or as otherwise specified. A mixing medium, as recommended by the manufacturer, must be used to bond the inoculant to the seed. Two times the amount of the inoculant recommended by the manufacturer must be used (unless seed is applied using a hydraulic seeder; then four times the amount must be used). Seed must be sown within 24 hours of treatment and must not remain in the hydraulic seeder longer than 4 hours.
4. Lime and Other Soil Amendments. Lime must consist of standard ground agriculture limestone or approved equivalent. Standard ground agriculture limestone is defined as ground limestone meeting current requirements of the state's Department of Agriculture. Other soil amendments must meet quality criteria and application requirements specified in Section G.
5. Mulch Tackifiers. Asphalt emulsion tackifiers must conform to the requirements of ASTM D977, Specification for Emulsified Asphalt. The emulsified asphalt may be rapid setting, medium setting, or slow setting. Non-asphaltic tackifiers required because of environmental considerations must be as specified in Section G.
6. Straw Mulch Material. Straw mulch must consist of wheat, barley, oat or rye straw, hay, grass cut from native grasses, or other plants as specified in Section G. The mulch material must be air-dried reasonably light in color and must not be musty, moldy, caked, or otherwise of low quality. The use of mulch that contains noxious weeds is not permitted. The contractor must provide a method satisfactory to the contracting officer for determining weight of mulch furnished.
7. Other Mulch Materials. Mulching materials, such as wood cellulose fiber mulch, mulch tackifiers, synthetic fiber mulch, netting, and mesh may be required for specialized locations and conditions. These materials, when specified, must be accompanied by the manufacturer's recommendations for methods of application.

C. Seeding Mixtures, Sod, Sprigs, and Dates of Planting

1. The application rate per acre for seed mixtures, sprigs, or sod and the date of seeding or planting must be as shown on the plans or as specified in Section G.

D. Seedbed Preparation and Treatment

1. Dress areas to be treated to a smooth, firm surface. On sites where equipment can operate on slopes safely, adequately loosen and smooth the seedbed (4 to 6 inches deep). Depending on soil and moisture conditions, disking, cultipacking, or both, may be necessary to properly prepare a seedbed. Where equipment cannot operate safely, prepare the seedbed by methods like scarifying, providing a roughened soil surface by hand so that broadcast seed will remain in place.
2. If seeding is to be accomplished immediately following construction operations, seedbed preparation may not be required except on a compacted, polished, or freshly cut soil surface.

3. Rocks larger than 6 inches in diameter, trash, weeds, and other debris that will interfere with seeding or maintenance operations must be removed or disposed of as specified in Section G.
4. Discontinue seedbed preparation when soil moisture conditions are not suitable for the preparation of a satisfactory seedbed as determined by the responsible engineer.

E. Seeding, Sprigging, Fertilizing, Mulching, and Stabilizing

1. Perform all seeding or sprigging operations in such a manner that the seed or sprigs are applied in the specified quantities uniformly in the designated areas. The method and rate of seed application must be as specified in Section G. Unless otherwise specified, seeding or sprigging must be accomplished within 2 days after final grading is completed and approved.
2. Apply fertilizer, lime, and other soil amendments as specified in Section G. When specified, the fertilizer and soil amendments must be thoroughly incorporated into the soil immediately following surface application.
3. The rate, amount, and kind of mulching or mesh must be as specified in Section G. Apply mulches uniformly to the designated areas. They must be applied to areas seeded not later than 2 working days after seeding has been performed. Stabilize straw mulch material within 24 hours of application using a mulch crimper or equivalent anchoring tool or by a suitable tackifier. When the mulch crimper or equivalent anchoring tool is used, it must have straight blades and be the type manufactured expressly for and capable of firmly punching the mulch into the soil. Where the equipment can be safely operated, it must be operated on the contour. Use hand methods where equipment cannot safely operate to perform the work required.
4. Apply the tackifier uniformly over the mulch material at the specified rate or inject it into the mulch material as it is being applied. Stabilizing materials like mesh or netting must be applied smoothly but loosely on the designated areas. The edges of these materials must be buried or securely anchored using spikes or staples as specified in Section G.
5. The contractor must maintain the mesh or netting areas until all work under the contract has been completed and accepted. Maintenance must consist of the repair of areas damaged by water erosion, wind, fire, or other causes. Such areas must be repaired to reestablish the intended condition and to the design lines and grades required by the contract. The areas must be re-fertilized, reseeded, and re-mulched before the new application of the mesh or netting.

F. Measurement and Payment

1. Method 1. For items of work for which specific unit prices are established in the contract, each area treated is measured as specified in Section G and area is calculated to the nearest 0.1 acre. Payment for treatment is made at the contract unit price for the designated treatment, which will constitute full compensation for completion of the work.

a. When specified as an item of work, mesh or netting is measured to the nearest square yard of surface area covered and accepted. Payment is made at the contract unit price and will constitute full compensation for completion of the work.

2. Method 2. For items of work for which specific lump-sum prices are established in the contract, the quantity of work will not be measured for payment. Payment for this item is made at the contract lump-sum price for the item and will constitute full compensation for the completion of the work.

3. Method 3. For items of work for which lump-sum prices are established in the contract, payment is made as the work proceeds. Progress payments will be determined as specified in Section G. Payment of the lump-sum contract price will constitute full compensation for completion of the work.

4. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section G.

G. Items of Work and Construction Details

G. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Bid Item 2, Seeding and Mulching

1) This item shall consist of the application of seed and fertilizer on all areas disturbed by construction. All necessary grading and filling of rills and gullies shall be incidental to seedbed preparation.

2) In Section B, Materials, no agricultural lime is required.

3) In Section B, Materials, no fertilizer is required.

4) In Section B, Materials. Small grain straw may be used for mulch applied at a rate of two tons per acre. Hydro seeding mulch may be used, follow manufactures recommended application rates.

5) In Section C, Seeding Mixtures, Sod, Sprigs, and Date of Planting, the designated areas will be seeded in accordance with the following:

Species	Minimum % Purity	Minimum % Germination	* Seeding Rates - lbs/acre [Pure Live Seed (PLS)] 03/01 to 10/31	11/01 to 02/28
Tall Fescue (KY-31) *(festuca arundinacea)*	96	80	50	75
Annual Ryegrass *(lolium multiflorum)*	90	70	10	0
Winter Wheat *(triticum aestivum)*	90	80	0	90

* Seeding Rates (lbs/acre) = PLS x 10000 / % Purity x % Germination

6) In Section D, Seedbed Preparation and Treatment, the areas to be seeded and mulched will be scarified either by machine or by providing a roughened soil surface by hand raking.

7) In Section F, Measurement and Payment, Method 2 will apply.

Construction Specification 8 — Mobilization and Demobilization

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the mobilization and demobilization of the contractor's forces and equipment necessary for performing the work required under the contract. It does not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract. Mobilization will not be considered as work in fulfilling the contract requirements for commencement of work.

B. Equipment and Material

1. Mobilization includes all activities and associated costs for transportation of contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor's operations at the site; premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable; and other items specified in Section D of this specification.
2. Demobilization includes all activities and costs for transportation of personnel, equipment, and supplies not required or included in the contract from the site, including the disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.
3. This work includes mobilization and demobilization required by the contract at the time of award. If additional mobilization and demobilization activities and costs are required during the performance of the contract as a result of changed, deleted, or added items of work for which the contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the item or items of work changed or added.

C. Payment

1. Payment will be made as the work proceeds after presentation of paid invoices or documentation of direct costs by the contractor showing specific mobilization and demobilization costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump-sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price for mobilization and demobilization will constitute full compensation for completion of the work.

2. Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

D. Items of Work and Construction Details

D. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Bid Item 3, Mobilization and Demobilization

1) This item shall consist of the Mobilization and Demobilization of the Contractor's forces and equipment necessary for performing the work required under the contract.

Construction Specification 9 — Traffic Control

Title 210 – Engineering
Part 642 – Specifications
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of establishing traffic control and maintaining safe, convenient use of public roads and right of way.

B. Traffic and Access

1. The contractor's operations must cause no unnecessary inconvenience to the public. Maintain the public right of way at all times unless interruption is authorized by proper local authority. Contractor's authorized closing or detour plans must be provided to the engineer for approval.
2. Provide and maintain safe and adequate access to all public protection devices and to all critical utility-control locations. Facility access must be continuous and unobstructed unless otherwise approved.

C. Storage of Equipment and Material in Public Streets

1. Construction materials and equipment must not be stored or parked on public streets, roads, or highways. During any material or equipment loading or unloading activities that may temporarily interfere with traffic, an acceptable detour must be provided for the duration of the activity. Any associated expense for this activity is the responsibility of the contractor.
2. Excavated material, including suitable material that is intended for adjacent trench backfill or other earth backfill as specified in Section E of this specification, must not be stored on public streets, roads, or highways that remain in service for the public. Any waiver of this requirement must be obtained from the proper local authority and approved by the engineer. All excess and unsuitable material must be removed from the site as soon as possible. Remove any spillage from roadways before they are used by the public.

D. Street Closures, Detours, and Barricades

1. The contractor must comply with the requirements of all applicable, responsible units of government for closure of any street, road, or highway. The contractor must provide the required barriers, guards, lights, signs, temporary bridges, and flaggers and inform the public of any detours and construction hazards by the most suitable means available, such as local newspapers or radio stations. The contractor is also responsible for compliance with additional public safety requirements that may arise during construction. The contractor must furnish,

install, and, upon completion of the work, promptly remove all signs, warning devices, and other materials used in the performance of this work.

2. Unless otherwise specified, the contractor must notify, in writing, the fire chief, police chief, county sheriff, state patrol, schools that operate school buses, or any other government official as appropriate no less than 7 days before closing, partly closing, or reopening any street, road, or highway.
3. Unless otherwise specified, the contractor must furnish to the engineer a written plan showing the proposed method of signing, barricading for traffic control, and safety for street detours and closures.
4. All temporary detours will be maintained to ensure use of public rights of way is provided in a safe manner. This may include dust control, grading, and graveling as required in Section G of this specification.

E. General and Specific References

1. All signs, signals, barricades, use of flaggers, and other traffic control and public safety devices must conform to the general requirements set forth in the Manual of Uniform Traffic Control Devices (MUTCD) and the latest edition of Standard Highway Signs and Standard Alphabets for Highway Signs and OSHA Construction Industry Standards (29 CFR Part 1926), Subpart G, Signs, Signals, and Barricades, unless otherwise specified in Section G of this specification.

F. Measurement and Payment

1. For items of work for which specific lump-sum prices are established in the contract, payment for the work is made at the contract lump-sum price. Progress payments will be made based upon the percentage of estimated total time that traffic control will be required unless otherwise specified in Section G of this specification. Payment will constitute full compensation for all flaggers, labor, materials, equipment, and other items necessary and incidental to completion of the work.
2. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in Section G of this specification.

G. Items of Work and Construction Details

G. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Subsidiary Item, Traffic Control

1) This item shall consist of all traffic control measures as needed to install the works of improvements as planned.
2) In Section F, Measurement and Payment, no method will apply. Full compensation for the completion of this item will be included in the payment for:

a) Bid Item 5, Rock Riprap, Class III Channel Liner.

b) Bid Item 6, Rock Riprap, Class II, Rail Steel Backfill

c) Bid Item 7, Gabions, 1’ Reno Mattresses

d) Bid Item 8, Gabions

e) Bid Item 9, Steel, Railroad Rail Piling, 15’

f) Bid Item 10, Steel, Railroad Rail Piling, 16’

g) Bid Item 11, Steel, Guard Rail Lagging

h) Bid Item 12, Grouting

Construction Specification 11 — Removal of Water

Tile 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the removal of surface water and ground water as necessary to perform the construction required by the contract in accordance with the specifications. It must include: (1) constructing, installing, building, and maintaining all necessary temporary water containment facilities, channels, and diversions; (2) furnishing, installing, and operating all necessary pumps, piping, and other facilities and equipment; and (3) removing all such temporary works and equipment after their intended function is no longer required.

B. Diverting Surface Water

1. The contractor must install, maintain, and operate all cofferdams, channels, flumes, sumps, and all other temporary diversion and protective works needed to divert streamflow and other surface water through or around the construction site. Control of surface water must be continuous during the period that damage to construction work could occur. Unless otherwise specified or approved, the diversion outlet must be into the same drainageway that the water would have reached before being diverted.
2. The contractor must furnish the contracting officer, in writing, a proposed plan for diverting surface water before beginning any construction activities for which a diversion is required, unless waived in Section H of this specification. Acceptance of this plan or the waiving of the plan requirement will not relieve the contractor of the responsibilities related to this activity during the process of completing the work as specified.

C. Dewatering the Construction Site

1. Foundations, cutoff trenches, and all other parts of the construction site must be dewatered and kept free of standing water and muddy conditions as necessary for the proper execution of the work. The contractor must furnish, install, operate, and maintain all drains, sumps, pumps, casings, well points, and all other equipment required to properly dewater the site as specified. Dewatering systems that cause a loss of soil fines from the foundation areas will not be permitted.
2. The contractor must furnish the contracting officer, in writing, a proposed plan for dewatering before commencing with any construction activity for which dewatering may be required unless waived in Section H of this specification.

Acceptance of this plan or the waiving of the plan requirement will not relieve the contractor of the responsibilities for completing the specified work.

D. Dewatering Borrow Areas

1. The contractor must maintain all borrow areas free of surface water or otherwise provide for timely and effective removal of surface and subsurface water that accumulates within the borrow area unless waived in Section H of this specification. Process borrow material as necessary to achieve proper and uniform moisture content at the time of placement.
2. If pumping to dewater borrow areas is included as a bid item of work in the bid schedule, equip each pump discharge pipe with a water meter. The meter must be such that the measured quantity of water is accurate within 3 percent of the true quantity. The contractor must provide necessary support to perform accuracy tests of the water meter when requested by the contracting officer.

E. Erosion and Pollution Control

1. Removal of water from the construction site, including the borrow areas, must be accomplished so that erosion and the transporting of sediment and other pollutants are minimized. Dewatering activities must be accomplished in a manner that the water table water quality is not altered. Pollution control activities must not conflict with the requirements of Construction Specification 5, Pollution Control, if it is a part of this contract.

F. Removal of Temporary Works

1. When temporary works are no longer needed, the contractor must remove and return the area to a condition similar to that which existed before construction. Areas where temporary works were located must be graded for sightly appearance and proper functioning and access to the installed works of improvement and may not obstruct natural surface waterflows. The contractor must exercise extreme care during the removal stages to minimize the loss of soil sediment and debris that was trapped during construction.
2. Pipes, casings, and any other material used to dewater the site must be removed from temporary wells. Fill the wells to ground level with clean gravel or other suitable material approved by the contracting officer. The contractor must exercise extreme care to prevent pollution of the ground water by these actions.

G. Measurement and Payment

1. Method 1.
   a. Items of work listed in the bid schedule for removal of water, diverting surface water, and dewatering construction sites and borrow areas are paid for at the contract lump-sum prices. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.
2. Method 2.

a. Items of work listed in the bid schedule for removal of water, diverting surface water, dewatering construction sites, and dewatering borrow areas are paid for at the contract lump-sum prices. Such payment will constitute full compensation for furnishing, installing, operating, and maintaining the necessary trenches, drains, sumps, pumps, piping, and for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work. The exception is that additional payment for pumping to dewater borrow areas and the removal of water will be made as described in the following paragraph.

b. If pumping to dewater borrow areas is a contract bid item, payment is made at the contract unit price, which must be the price per 1,000 gallons shown in the bid schedule. Such payment will constitute full compensation for pumping only. Compensation for equipment, preparation, and other costs associated with pumping is included in the lump-sum payment for removal of water or the lump-sum payment for dewatering the borrow areas. Payment is made only for pumping that is necessary to dewater borrow areas that cannot be effectively drained by gravity or that must have the water table lowered to be usable as a suitable borrow source. Pumping for other purposes will not be included for payment under this item.

3. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the contract line item to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section H of this specification.

H. Items of Work and Construction Details

H. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Subsidiary Item, Removal of Water

1) This item consists of removal of water including but not limited to general dewatering, pumping, diversion and temporary embankments to exclude water from all work sites in order to perform the necessary work as shown on the drawings or as located during construction.

2) In Section B, Diverting Surface Water, a written plan for diverting surface water is not required.

3) In Section C, Dewatering the Construction Site, a written plan is not required.

4) In Section G, Measurement and Payment, no method will apply. Full compensation for the completion of this item will be included in the payment for:

a) Bid Item 5, Rock Riprap, Class III Channel Liner.

b) Bid Item 6, Rock Riprap, Class II, Rail Steel Backfill

c) Bid Item 7, Gabions, 1’ Reno Mattresses

d) Bid Item 8, Gabions

e) Bid Item 9, Steel, Railroad Rail Piling, 15’

f) Bid Item 10, Steel, Railroad Rail Piling, 16’

g) Bid Item 11, Steel, Guard Rail Lagging

h) Bid Item 12, Grouting

Construction Specification 21 — Excavation

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the excavation required by the drawings and specifications, as well as the disposal of the excavated materials.

B. Classification

1. Excavation is classified as common excavation, rock excavation, or unclassified excavation in accordance with the following definitions.
2. Common excavation is defined as the excavation of all materials that (1) can be excavated, transported, and unloaded using heavy ripping equipment and wheel tractor-scrapers with pusher tractors or (2) can be excavated and dumped into place or loaded onto hauling equipment by excavators having a rated capacity of 1 cubic yard or larger and equipped with attachments (shovel, bucket, backhoe, dragline, or clam shell) appropriate to the material type, character, and nature of the materials.
3. Rock excavation is defined as the excavation of all hard, compacted, or cemented materials that require blasting or the use of ripping and excavating equipment larger than defined for common excavation. The excavation and removal of isolated boulders or rock fragments larger than 1 cubic yard encountered in materials otherwise conforming to the definition of common excavation must be classified as rock excavation. The presence of isolated boulders or rock fragments larger than 1 cubic yard is not in itself sufficient cause to change the classification of the surrounding material.
    a. For the purpose of these classifications, the following definitions apply:
        (1) Heavy ripping equipment is a rear-mounted, heavy-duty, single-tooth, ripping attachment mounted on a track-type tractor having a power rating of at least 250-flywheel horsepower, unless otherwise specified in Section J.
        (2) A wheel tractor-scraper is a self-loading (not elevating) and unloading scraper having a struck-bowl capacity of at least 12 cubic yards.
        (3) A pusher tractor is a track-type tractor having a power rating of at least 250-flywheel horsepower equipped with appropriate attachments.

4. Unclassified excavation is defined as the excavation of all materials encountered, including rock materials, regardless of their nature or the manner in which they are removed.

C. Blasting

1. The transportation, handling, storage, and use of dynamite and other explosives must be directed and supervised by someone of proven experience and ability who is authorized and qualified to conduct blasting operations.
2. Blasting must be done in a manner that prevents damage to the work or unnecessary fracturing of the underlying rock materials. It must conform to any special requirements in Section J of this specification. When specified in Section J, the contractor must furnish the engineer, in writing, a blasting plan before blasting operations begin.

D. Use of Excavated Material

1. Method 1. To the extent they are needed, all suitable material from the specified excavations must be used in the construction of required permanent earthfill or rockfill. The suitability of material for specific purposes is determined by the engineer. The contractor must not waste or otherwise dispose of suitable excavated material.
2. Method 2. Suitable material from the specified excavations may be used in the construction of required earthfill or rockfill. The suitability of material for specific purposes is determined by the engineer.

E. Disposal of Waste Materials

1. Method 1. All surplus or unsuitable excavated materials are designated as waste and must be disposed of at the locations shown on the drawings.
2. Method 2. All surplus or unsuitable excavated materials are designated as waste and disposed of by the contractor at chosen sites away from the site of the work. The disposal must be in an environmentally acceptable manner that does not violate local rules and regulations.

F. Excavation Limits

3. Excavations must comply with the Occupational Safety and Health Administration Construction Industry Standards Subpart P, Excavations, Trenching, and Shoring (29 CFR pt. 1926). All excavations must be completed and maintained in a safe and stable condition throughout the total construction phase. Structure and trench excavations must be completed to the specified elevations and to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work. Excavations outside the lines and limits shown on the drawings or specified herein are required to meet safety requirements and must be the responsibility of the contractor in constructing and maintaining a safe, stable excavation.

G. Borrow Excavation

1. When the quantities of suitable material obtained from specified excavations are insufficient to construct the specified earthfills and earth backfills, obtain additional material from the designated borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas are as specified in Section J or as approved by the engineer.
2. Borrow pits must be excavated and finally dressed to blend with the existing topography. They are sloped to prevent ponding and to provide drainage.

H. Over Excavation

1. Correct excavation in rock beyond the specified lines and grades by filling the resulting voids with Portland Cement concrete. Materials and mix proportions must be approved by the engineer. Concrete that will be exposed to the atmosphere when construction is completed must meet the requirements of concrete selected for use under Construction Specification 31, Concrete for Major Structures, or 32, Structure Concrete, as appropriate.
2. Concrete that will be permanently covered must contain not less than five bags of cement per cubic yard. The concrete must be placed and cured as specified by the engineer.
3. Correct excavation in earth beyond the specified lines and grades by filling the resulting voids with approved compacted earthfill. The exception to this is that if the earth will become the subgrade for riprap, rockfill, sand or gravel bedding, or drainfill, the voids may be filled with material conforming to the specifications for the riprap, rockfill, bedding, or drainfill. Before correcting an over excavation condition, the contractor must review the planned corrective action with the engineer and obtain approval of the corrective measures.

I. Measurement and Payment

1. Unit Price Methods. For items of work for which specific unit prices are established in the contract, the volume of each type and class of excavation within the specified pay limits is measured and computed to the nearest cubic yard by the method of average cross-sectional end areas or by methods outlined in Section J of this specification. Regardless of quantities excavated, the measurement for payment is made to the specified pay limits except when excavation outside the specified lines and grades directed by the engineer to remove unsuitable material is included. Excavation required because unsuitable conditions result from the contractor's improper construction operations, as determined by the engineer, is not included for measurement and payment.
2. Method 1. The pay limits are as designated on the drawings.
3. Method 2. The pay limits are defined as follows:
    a. The upper limit is the original ground surface as it existed before the start of construction operations, unless excavation is performed within areas designated for previous excavation or earthfill; then the upper limit is the modified ground surface resulting from the specified previous excavation or earthfill.

b. The lower and lateral limits are the neat lines and grades shown on the drawings.

4. Method 3. The pay limits are defined as follows:
   a. The upper limit is the original ground surface as it existed before the start of construction operations, unless excavation is performed within areas designated for previous excavation or earthfill; then the upper limit is the modified ground surface resulting from the specified previous excavation or earthfill.
   b. The lower and lateral limits is the true surface of the completed excavation as directed by the engineer.
5. Method 4. The pay limits are defined as follows:
   a. The upper limit is the original ground surface as it existed before the start of construction operations, unless excavation is performed within areas designated for previous excavation or earthfill; then the upper limit is the modified ground surface resulting from the specified previous excavation or earthfill.
   b. The lower limit is at the bottom surface of the proposed structure.
   c. The lateral limits are 18 inches outside of the outside surface of the proposed structure or are the vertical planes 18 inches outside of and parallel to the footings, whichever gives the larger pay quantity, except as provided in paragraph d below.
   d. For trapezoidal channel linings or similar structures that are to be supported by the sides of the excavation without intervening forms, the lateral limits are at the underside of the proposed lining or structure.
   e. For the purposes of the definitions in paragraphs b, c, and d above, any specified bedding or drainfill directly beneath or beside the structure will be considered to be a part of the structure.
6. All Methods. The following provisions apply to all methods of measurement and payment.
   a. Payment for each type and class of excavation is made at the contract unit price for that type and class of excavation. Such payment will constitute full compensation for all labor, materials, equipment, and other items necessary and incidental to the performance of the work with the exception that extra payment for backfilling over excavation will be made in accordance with the following provisions.
   b. Payment for backfilling over excavation, as specified in Section H of this specification, is made only if the excavation outside specified lines and grades is directed by the engineer to remove unsuitable material and the unsuitable condition is not a result of the contractor's improper construction operations as determined by the engineer.
   c. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section J of this specification.

J. Items of Work and Construction Details

J. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Subsidiary Item, Excavation

1) This item consists of the excavation necessary to install the works of improvements as detailed on the drawings and as staked by NRCS during construction.

2) In Section B, Classification, excavation to be performed is classified as unclassified excavation.

3) In Section C, Blasting, blasting is not required.

4) In Section D, Use of Excavated Materials, Method 1 will apply.

5) In Section E, Disposal of Waste Materials, Method 2 will apply.

6) In Section I, Measurement and Payment, no method will apply. Full compensation for the completion of this item will be included in the payment for:

a) Bid Item 5, Rock Riprap, Class III Channel Liner.

b) Bid Item 6, Rock Riprap, Class II, Rail Steel Backfill

c) Bid Item 7, Gabions, 1' Reno Mattresses

d) Bid Item 8, Gabions

e) Bid Item 9, Steel, Railroad Rail Piling, 15'

f) Bid Item 10, Steel, Railroad Rail Piling, 16'

g) Bid Item 11, Steel, Guard Rail Lagging

h) Bid Item 12, Grouting

Construction Specification 23 — Earthfill

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the construction of earth embankments, other earthfills, and earth backfills required by the drawings and specifications.
2. Earthfill is composed of natural earth materials that can be placed and compacted by construction equipment operated conventionally.
3. Earth backfill is composed of natural earth material placed and compacted in confined spaces or adjacent to structures (including pipes) by hand tamping, manually directed power tampers or vibrating plates, or their equivalent.

B. Material

1. All fill material must be obtained from required excavations and designated borrow areas. The selection, blending, routing, and disposition of material in the various fills must be subject to approval by the engineer.
2. Fill materials must contain no frozen soil, sod, brush, roots, or other perishable material. Rock particles larger than the maximum size specified for each type of fill must be removed prior to compaction of the fill.
3. The types of material used in the various fills must be as listed and described in the specifications and drawings.

C. Foundation preparation

1. Foundations for earthfill must be stripped to remove vegetation and other unsuitable material or must be excavated as specified.
2. Except as otherwise specified, earth foundation surfaces must be graded to remove surface irregularities and must be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material must be controlled as specified for the earthfill and the surface material of the foundation must be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.
3. Earth abutment surfaces must be free of loose, uncompacted earth in excess of 2 inches in depth normal to the slope and must be at such a moisture content that the earthfill can be compacted against them to produce a good bond between the fill and the abutments.
4. Rock foundation and abutment surfaces must be cleared of all loose material by hand or other effective means and must be free of standing water when fill is

placed upon them. Occasional rock outcrops in earth foundations for earthfill, except in dams and other structures designed to restrain the movement of water, must not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

5. Foundation and abutment surfaces must be no steeper than one horizontal to one vertical unless otherwise specified. Test pits or other cavities must be filled with compacted earthfill conforming to the specifications for the earthfill to be placed upon the foundation.

D. Placement

1. Earthfill must not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the engineer. Earthfill must not be placed upon a frozen surface nor have snow, ice, or frozen material incorporated in the earthfill matrix.
2. Earthfill must be placed in approximately horizontal layers. The thickness of each layer before compaction must not exceed the maximum thickness specified in section J or shown on the drawings. Materials placed by dumping in piles or windrows must be spread uniformly without exceeding the specified thickness before being compacted.
3. Hand-compacted earth backfill must be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of earth backfill compacted by manually directed power tampers.
4. Place earth backfill in a manner that prevents damage to the structures and allows the structures to assume the loads from the earth backfill gradually and uniformly. The height of the earth backfill adjacent to a structure must be increased at approximately the same rate on all sides of the structure.
5. Meet the following additional requirements for earthfill and earth backfill in dams, levees, and other structures designed to restrain the movement of water.
    a. The distribution of materials throughout each zone must be essentially uniform and the earthfill free from lenses, pockets, streaks, or layers of material differing substantially in texture, moisture content, or gradation from the surrounding material. Zone earthfills must be constructed concurrently unless otherwise specified.
    b. Scarified the surface of each layer parallel to the axis of the fill to at minimum a depth of 2 inches before the next layer is placed.
    c. The top surface of embankments must be maintained approximately level during construction with two exceptions: a crown or cross-slope of about 2 percent must be maintained to ensure effective drainage, or as otherwise specified for drainfill or sectional zones.
    d. Construct dam embankments in continuous layers from abutment to abutment except where openings to facilitate construction or to allow the passage of streamflow during construction are specifically authorized in the contract.

e. Embankments built at different levels as described under paragraphs c or d above must be constructed so that the slope of the bonding surfaces between embankments in place and embankments to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place must be stripped of all material not meeting the requirements of this specification and must be scarified, moistened, and recompacted when the new earthfill is placed against it. This ensures a good bond with the new earthfill and obtains the specified moisture content and density at the contact of the in-place and new earthfills.

E. Control of moisture content

1. During placement and compaction of earthfill and earth backfill, the moisture content of the material being placed must be maintained within the specified range.
2. The application of water to the earthfill material must be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the material after placement on the earthfill, if necessary. Obtain a uniform moisture distribution by disking.
3. Material that is too wet when deposited on the earthfill must either be removed or dried to the specified moisture content prior to compaction.
4. If the top surface of the preceding layer of compacted earthfill or a foundation or abutment surface in the contact zone with the earthfill becomes too dry to permit suitable bond, it must either be removed or scarified and moistened by sprinkling to an acceptable moisture content before placement of the next layer of earthfill.

F. Compaction

1. Earthfill. Earthfill must be compacted according to the following requirements for the class of compaction specified:
   a. Class A compaction. Compact each layer of earthfill as necessary to provide the density of the earthfill matrix not less than the minimum density specified in Section J or identified on the drawings. The earthfill matrix is defined as the portion of the earthfill material finer than the maximum particle size allowed in the reference compaction test method specified (ASTM D698 or ASTM D1557).
   b. Class B compaction. Compact each layer of earthfill to a mass density not less than the minimum density specified.
   c. Class C compaction. Compact each layer of earthfill by the specified number of passes of the type and weight of roller or other equipment specified or by an equivalent approved method. Each pass must consist of at least one passage of the roller wheel or drum over the entire surface of the layer.
2. Earth backfill. Compact earth backfill adjacent to structures to a density equivalent to that of the surrounding in-place earth material or adjacent required earthfill or earth backfill. Compaction must be accomplished by hand tamping or manually directed power tampers, plate vibrators, walk-behind, miniature, or self-

propelled rollers. Unless otherwise specified, heavy equipment, including backhoe-mounted power tampers or vibrating compactors, and manually directed vibrating rollers must not be operated within 3 feet of any structure. Towed or self-propelled vibrating rollers must not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist is not permitted.

3. Heavy Equipment. The passage of heavy equipment will not be allowed:
   a. Over cast-in-place conduits within 14 days after placement of the concrete
   b. Over cradled or bedded precast conduits within 7 days after placement of the concrete cradle or bedding
   c. Over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or 3 feet, whichever is greater, except as may be specified in Section J.
4. Compacting adjacent to structures. Compacting of earth backfill adjacent to structures must not be started until the concrete has attained the strength specified in Section J for this purpose. The strength is determined by compression testing of test cylinders cast by the contractor's quality control personnel for this purpose and cured at the worksite in the manner specified in ASTM C31 for determining when a structure may be put into service.
5. Placement Interval Against Concrete. When the required strength of the concrete is not specified as described above, compaction of earth backfill adjacent to structures must not be started until the following time intervals shown in figure 23-1 have elapsed after placement of the concrete.

Figure 23-1 Time interval before placing backfill

Structure	Time interval (days)
Vertical or near-vertical walls with earth loading on one side only	14
Walls backfilled on both sides simultaneously	7
Conduits and spillway risers, cast-in-place (with inside forms in place)	7
Conduits and spillway risers, cast-in-place (inside forms removed)	14
Conduits, pre-cast, cradled	2
Conduits, pre-cast, bedded	1
Cantilever outlet bents (backfilled both sides simultaneously)	3

G. Reworking or removal and replacement of defective earthfill

1. Earthfill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content, or otherwise not conforming to the requirements of the specifications must be reworked to meet the requirements or removed and replaced by acceptable earthfill. The replacement earthfill and the foundation, abutment, and earthfill surfaces upon which it is placed must conform to all requirements of this

specification for foundation preparation, approval, placement, moisture control, and compaction.

H. Testing

1. During the course of the work, the contractor must perform quality control tests, as applicable, to identify earthfill and earth backfill materials; determine the reference maximum density and optimum moisture content; and document that the moisture content of material at the time of compaction and the density of earthfill and earth backfill in place conform to the requirements of this specification.
2. Determining Reference Maximum Density and Optimum Moisture Content. For Class A compaction, the reference maximum density and optimum moisture content must be determined in accordance with the compaction test and method specified on the drawings or in section J.
3. Documenting Specification Conformance. In-place densities of earthfill and earth backfill requiring Class A compaction must be measured in accordance with ASTM D1556, D2167, D2937, D6938, or D8167. Moisture contents of earthfill and earth backfill at the time of compaction must be measured in accordance with ASTM D2216, D4643, or D6938. Values of moisture content determined by ASTM D2216 are considered the true value of the soil moisture. Values of moisture content determined by ASTM D4643 or D6938 must be verified by comparison to values obtained by ASTM D2216. Values of in-place density and moisture content determined by these tests must be compared to the minimum density and moisture content range specified on the drawings or in Section J.
4. Correction for Oversize Particles. If the materials to be used for earthfill or earth backfill contain more than 5 percent by dry weight of oversize rock particles (particles larger than those allowed in the specified compaction test and method), corrections for oversize particles must be made using the appropriate procedures explained in ASTM D4718.

I. Measurement and payment

1. Unit Price Methods. For items of work for which specific unit prices are established in the contract, the volume of each type and compaction class of earthfill and earth backfill within the specified zone boundaries and pay limits is measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Unless otherwise specified in Section J, no deduction in volume is made for embedded items such as, but not limited to, conduits, inlet structures, outlet structures, embankment drains, sand diaphragm and outlet, and their appurtenances.
2. Pay Limits. The pay limits must be as defined below, with the further provision that earthfill required to fill voids resulting from over excavation of the foundation, outside the specified lines and grades, will be included in the measurement for payment only under the following conditions:

a. Where such over excavation to remove unsuitable material is directed by the engineer
b. Where the unsuitable condition is not a result of the contractor's improper construction operations as determined by the engineer.

3. Beyond Specified Lines and Grades. Earthfill beyond the specified lines and grades to backfill excavation required for compliance with OSHA requirements will be considered subsidiary to the earthfill bid items.
4. Method 1. The pay limits must be as designated on the drawings.
5. Method 2. The pay limits must be the measured surface of the foundation when approved for placement of the earthfill and the specified neat lines of the earthfill surface.
6. Method 3. The pay limits must be the measured surface of the foundation when approved for placement of the earthfill and the measured surface of the completed earthfill.
7. Method 4. The pay limits must be the specified pay limits for excavation and the specified neat lines of the earthfill surface.
8. Method 5. The pay limits must be the specified pay limits for excavation and the measured surface of the completed earthfill.
9. Method 6. Payment for each type and compaction class of earthfill and earth backfill is made at the contract unit price for that type and compaction class of earthfill. Such payment will constitute full compensation for all labor, material, equipment, and other items necessary and incidental to the performance of the work.
10. Method 7. Payment for each type and compaction class of earthfill and earth backfill is made at the contract unit price for that type and compaction class of earthfill. Such payment will constitute full compensation for all labor, material, equipment, and other items necessary and incidental to the performance of the work except furnishing, transporting, and applying water to the foundation and earthfill material. Water applied to the foundation and earthfill material is measured and payment made as specified in Construction Specification 10.
11. All methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section J of this specification.

J. Items of work and construction details

J. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Subsidiary Item, Earthfill

1) This item consists of the earthfill necessary to install the works of improvements as detailed on the drawings and as staked by NRCS during construction.

2) In Section D, Placement, the thickness of each layer of earthfill before compaction will be 9 inches.

3) In Section F, Compaction, earthfill will be placed in accordance with the requirements of Class C compaction. Compact each successive lift by "tamping" with the placement machine bucket or tracking over the entire lift area with the placement machine.

4) In Section H, Testing, no method is required.

5) In Section I, Measurement and Payment, no method will apply. Full compensation for the completion of this item will be included in the payment for:

a) Bid Item 5, Rock Riprap, Class III Channel Liner.

b) Bid Item 6, Rock Riprap, Class II, Rail Steel Backfill

c) Bid Item 7, Gabions, 1' Reno Mattresses

d) Bid Item 8, Gabions

e) Bid Item 9, Steel, Railroad Rail Piling, 15'

f) Bid Item 10, Steel, Railroad Rail Piling, 16'

g) Bid Item 11, Steel, Guard Rail Lagging

h) Bid Item 12, Grouting

Construction Specification 24 — Drainfill

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of furnishing, placing, and compacting drainfill required in the construction of structure drainage systems.

B. Material

1. Method 1. Drainfill material must conform to the requirements of Material Specification 521, Aggregates for Drainfill and Filters. At a minimum of 30 days before delivery of materials to the site, the contractor must inform the engineer, in writing, of the source(s) from which drainfill material will be obtained. The contractor must provide the engineer free access to the source(s) for the purpose of obtaining samples for testing.
2. Method 2. Drainfill material must be sand, gravel, or crushed stone (or mixtures thereof) obtained from the specified sources. Select the material as necessary to avoid the inclusion of organic matter, clay balls, excessive fine particles, or other substances that would interfere with its free-draining properties.

C. Base Preparation

1. Foundation surface and trenches must be clean and free of organic matter, loose soil, foreign substances, and standing water when the drainfill is placed. Earth surfaces upon or against which drainfill will be placed must not be scarified.

D. Placement

1. Drainfill must not be placed until the subgrade has been inspected and approved by the engineer. Drainfill must not be placed over or around pipe or drain tile until the installation of the pipe or tile has been inspected and approved.
2. Place drainfill uniformly in layers not exceeding 12 inches in thickness before compaction. When compaction is accomplished by manually controlled equipment, the layers must not exceed 8 inches in thickness. Place the material to avoid segregation of particle sizes and to ensure the continuity and integrity of all zones. No foreign material must be allowed to become intermixed with or otherwise contaminate the drainfill.
3. Traffic must not be permitted to cross over drains at random. Equipment cross overs must be maintained and the number and location of such cross overs must be established and approved before beginning drainfill placement. Each cross over must be cleaned of all contaminating material and must be inspected and approved by the engineer before the placement of additional drainfill material.

4. Any damage to the foundation surface, trench sides, or bottom occurring during placement of drainfill must be repaired before drainfill placement is continued.
5. The upper surface of drainfill constructed concurrently with adjacent zones of earthfill must be maintained at a minimum elevation of 1 foot above the upper surface of adjacent earthfill.
6. Place drainfill over and around pipe or drain tile to avoid any displacement in line or grade of the pipe or tile.
7. Drainfill must not be placed adjacent to structures until the concrete has attained the strength specified in Section I of this specification. Determine the strength by compression testing of concrete test cylinders cast and field cured at the project site in accordance with ASTM C31 for determining when a structure may be placed into service.
8. When the required strength of the concrete is not specified as described above, placement of drainfill adjacent to concrete structures must not commence until the time intervals specified in figure 24-1 have elapsed following placement of the concrete.

Figure 24-1 Elapsed Time Before Fill Can be Place Near Concrete Structures

Structure Type	Time Interval (Days)
Vertical or near-vertical wall with earth loading on one side only (retaining walls and counterforts)	14
Walls backfilled on both sides simultaneously	7
Conduits and galleries, cast-in-place (with inside forms in place)	7
(inside forms removed)	14
Conduits, precast, cradled	2
Conduits, precast, bedded	1
Cantilever outlet bents backfilled on both sides simultaneously	3

E. Control of Moisture

1. Control the moisture content of drainfill material as specified in Section I of this specification. When additional water is required, apply it in a manner to avoid excessive wetting to adjacent earthfill. Except as specified in Section I of this specification, control of moisture content will not be required.

F. Compaction

1. All Items. Compact drainfill according to the following requirements for the class of compaction specified. A pass in this section is defined as at least one complete coverage of the roller wheel, tire, or drum over the entire surface for each layer.
2. Class A Compaction. For drainfill materials with more than 70 percent passing the 3/4-inch sieve, compact each layer of drainfill to the minimum dry density specified in Section I of this specification as determined by ASTM D698. For drainfill materials with 70 percent or less passing the 3/4-inch sieve, compact each layer of drainfill to a relative density of not less than 70 percent as determined by ASTM D4254.

3. Class I Compaction. Compact each layer of drainfill by making a minimum of two passes over the entire surface with a steel drum vibrating roller weighing at least 5 tons and exerting a vertical vibrating force of not less than 20,000 pounds at a minimum frequency of 1,200 times per minute or by an approved equivalent method.
4. Class II Compaction. Compact each layer of drainfill by one of the following methods or by an approved equivalent method.
    a. A minimum of two passes over the entire surface with a pneumatic-tired roller exerting a minimum pressure of 75 pounds per square inch.
    b. A minimum of four passes over the entire surface with the track of a crawler-type tractor weighing at least 20 tons.
    c. Controlled movement of the hauling equipment so that the entire surface is traversed by not less than one tread track of the loaded hauling equipment.
5. Class III Compaction. No compaction will be required beyond that resulting from the placing and spreading operations.
6. Class I and II. When compaction other than Class III compaction is specified, material placed in trenches or other locations inaccessible to heavy equipment must be compacted by manually controlled pneumatic or vibrating tampers as specified in Section I of this specification.
7. Heavy Equipment Limits. Heavy equipment must not be operated within 2 feet of any structure. Vibrating rollers must not be operated within 5 feet of any structure. Compaction by means of drop weights operating from cranes, hoists, or similar equipment will not be permitted.

G. Testing

1. The contractor must conduct such tests as necessary to verify that the drainfill material and the in-place drainfill meets the specification requirements.
2. The engineer must be granted access to perform such tests as are required to verify that the drainfill materials and the drainfill in place meets the requirements of the specifications. These tests are not intended to provide the contractor with information needed to ensure that the materials and workmanship meet the specification requirements. These verification tests will not relieve the contractor of the responsibility of performing required tests for that purpose.

H. Measurement and Payment

1. Method 1.
    a. For items of work for which specific unit prices are established in the contract, the volume of drainfill within the neat lines shown on the drawings are measured and computed to the nearest cubic yard. Where the engineer directs placement of drainfill outside the neat lines to replace unsuitable foundation material, the volume of such drainfill is included. The volume included is only to the extent that the unsuitable condition is not a result of the contractor's improper construction operation as determined by the engineer.

b. Payment for drainfill is made at the contract unit price for each type of drainfill, complete and in place. Except as otherwise specified in Section I of this specification, such payment will constitute full compensation for all labor, equipment, material, and other items necessary and incidental to the performance of the work.

2. Method 2. For items of work for which specific unit prices are established in the contract, the quantity of drainfill placed within the specified limits is computed to the nearest 0.1 ton by actual weight. Where the engineer directs placement of drainfill outside the neat lines to replace unsuitable foundation material, the weight of such drainfill is included. The weight included is only to the extent that the unsuitable condition is not a result of the contractor's improper construction operation as determined by the engineer.

3. Exceptions. Payment for drainfill is made at the contract unit price for each type of drainfill, complete and in place. Except as otherwise specified in Section I of this specification, such payment will constitute full compensation for all labor, equipment, material, and other items necessary and incidental to the performance of the work.

4. All Methods. Compensation for any item of work described in the contract but not included in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section I of this specification.

I. Items of Work and Construction Details

I. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Bid Item 4, Drainfill, KY DOH #2 Stone

1) This item shall consist of furnishing and placing the KY DOH #2 Stone as backfill behind the installed gabions.
2) In Section B, Material, Method 2 will apply. Drainfill used as backfill will be supplied from an approved KY DOH source.
3) In Section D, Placement, no compaction is required other than that resulting from placement.
4) In Section E, Control of moisture content, control of moisture content will not be required.
5) In Section F, Compaction, Class III Compaction is required.
6) In Section H, Measurement and Payment, Method 2 will apply.

Construction Specification 61 — Rock Riprap

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of the construction of rock riprap revetments and blankets, including filter or bedding where specified.

B. Material

1. Rock riprap must conform to the requirements of Material Specification 523, Rock for Riprap, or, if so specified, must be obtained from designated sources. It must be free from dirt, clay, sand, rock fines, and other material not meeting the required gradation limits.
2. At least 30 days before rock is delivered from other than designated sources, the contractor must designate in writing the source from which rock material will be obtained and provide information satisfactory to the contracting officer that the material meets contract requirements. The contractor must provide the responsible engineer free access to the source for the purpose of obtaining samples for testing. The size and grading of the rock must be as specified in section H.
3. Rock from approved sources must be excavated, selected, and processed to meet the specified quality and grading requirements at the time the rock is installed.
4. Based on a specific gravity of 2.65 (typical of limestone and dolomite) and assuming the individual rock is shaped midway between a sphere and a cube, typical size/weight relationships are given in figure 61-1:

Figure 61-1 Typical riprap size/weight relationship

Sieve Size of Rock	Approx. Weight of Rock	Weight of Test Pile
16 inches	300 pounds	6,000 pounds
11 inches	100 pounds	2,000 pounds
6 inches	15 pounds	300 pounds

5. When specified in section H or when it is necessary to verify the gradation of the rock riprap, a particle size analysis must be performed in accordance with ASTM D5519, Test Method A or B. The analysis must be performed at the worksite on a test pile of representative rock. The mass of the test pile must be at least 20 times the mass of the largest rock in the pile. The results of the test are compared to the gradation required for the project. Test pile results that do not meet the construction specifications must be cause for the rock to be rejected. The test pile that meets contract requirements must be left on the jobsite as a sample for visual comparison. The test pile must be used as part of the last rock riprap to be placed.

6. Filter or bedding aggregates, when required, must conform to Material Specification 521, Aggregates for Drainfill and Filters, unless otherwise specified. Geotextiles must conform to Material Specification 592, Geotextile.

C. Subgrade preparation

1. The subgrade surface on which the rock riprap, filter, bedding, or geotextile is to be placed must be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it must consist of approved material and conform to the requirements of the specified class of earthfill.
2. Rock riprap, filter, bedding, or geotextile must not be placed until the foundation preparation is completed and the subgrade surface has been inspected and approved.

D. Equipment-placed rock riprap

1. The rock riprap must be placed by equipment on the surface and to the depth specified. It must be installed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying material. The rock for riprap must be delivered and placed in a manner that ensures the riprap in place is reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. Some hand placing may be required to provide a neat and uniform surface.
2. Rock riprap must be placed in a manner to prevent damage to structures. Hand placing is required as necessary to prevent damage to any new and existing structures.

E. Hand-placed rock riprap

1. The rock riprap must be placed by hand on the surface and to the depth specified. It must be securely bedded with the larger rocks firmly in contact one to another without bridging. Spaces between the larger rocks must be filled with smaller rocks and spalls. Smaller rocks must not be grouped as a substitute for larger rock. Flat slab rock must be laid on its vertical edge except where it is laid like paving stone and the thickness of the rock equals the specified depth of the riprap course.

F. Filter or bedding

1. When the contract specifies filter, bedding, or geotextile beneath the rock riprap, the designated material must be placed on the prepared subgrade surface as specified. Compaction of filter or bedding aggregate is not required, but the surface of such material must be finished reasonably smooth and free of mounds, dips, or windrows.

G. Measurement and payment

1. Method 1.
    a. For items of work for which specific unit prices are established in the contract, the quantity of each type of rock riprap placed within the specified limits is

computed to the nearest ton by actual weight. The volume of each type of filter or bedding aggregate is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. For each load of rock riprap placed as specified, the contractor must furnish to the responsible engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

b. Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

2. Method 2.

a. For items of work for which specific unit prices are established in the contract, the quantity of each type of rock riprap placed within the specified limits is computed to the nearest 0.1 ton by actual weight. The quantity of each type of filter or bedding aggregate delivered and placed within the specified limits is computed to the nearest 0.1 ton. For each load of rock riprap placed as specified, the contractor must furnish to the engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton. For each load of filter or bedding aggregate, the contractor must furnish to the responsible engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

b. Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

3. Method 3.

a. For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap and filter or bedding aggregate is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.

b. Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

4. Method 4.

a. For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap, including filter and bedding aggregate, is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.

b. Payment is made at the contract unit price for each type of rock riprap, including filter and bedding. Such payment is considered full compensation for completion of the work.

5. Method 5.

a. For items of work for which specific unit prices are established by the contract, the quantity of each type of rock riprap placed within the specified limits is computed to the nearest ton by actual weight. For each load of rock for riprap placed as specified, the contractor must furnish to the responsible

engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

b. Payment is made at the contract unit price for each type of rock riprap, and includes compensation for any aggregate or geotextile installed as specified for filter or bedding. Such payment is considered full compensation for completion of the work.

6. Method 6.

a. For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.

b. Payment is made at the contract unit price for each type of rock riprap and includes compensation for any aggregate or geotextile installed as specified for filter or bedding. Such payment is considered full compensation for completion of the work.

7. All methods.

a. The following provision applies to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section H.

b. No separate payment is made for testing the gradation of the test pile. Compensation for testing is included in the appropriate bid item for riprap.

H. Items of work and construction details

H. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Subsidiary Item, Rock Riprap, Class II

(1) This item shall consist of furnishing and placing Rock Riprap, Class II Channel Lining as gabion basket rock to install works of improvements as shown on the plans and as flagged in the field by the engineer during construction.

(2) In Section B, Material, rock riprap gradation will meet the requirements of KY DOH Class II channel lining.

(3) In Section B, Material, Rock riprap will be furnished from a KY DOH approved aggregate source.

(4) In Section E, Hand Placed Rock Riprap, hand placement will be required to move the riprap into final position within the gabions. The maximum height of drop when placing the rock riprap will be five feet.

(5) In Section F, Filter or bedding, Geotextile is required.

(6) In Section G, Measurement and payment, no method will apply. Full compensation for the furnishing and placing of this item will be included in the payment for:

(a) Bid Item 7, Gabions, 1' Reno Mattresses

(b) Bid Item 8, Gabions

b) Bid Item 5, Rock Riprap, Class III Channel Liner

1) This item consists of furnishing and placing Rock Riprap, Class III Channel Lining as streambank protection as detailed on the drawings and as flagged in the field by the engineer during construction.

2) In Section B, Material, rock riprap will meet the gradation requirements of KY DOH Class III Channel Liner.

3) In Section B, Material, Rock riprap will be furnished from a KY DOH approved aggregate source.

4) In Section G, Measurement and Payment, Method 2 will apply. Such payment will constitute full compensation for related subsidiary items:

a. Construction Specification 5, Pollution Control

b. Construction Specification 9, Traffic Control

c. Construction Specification 11, Removal of Water

d. Construction Specification 21, Excavation

e. Construction Specification 23, Earthfill

f. Construction Specification 94, Contractor Quality Control

g. Construction Specification 95, Geotextile

c) Bid Item 6, Rock Riprap, Class II, Rail Steel Backfill

1) This item consists of furnishing and placing Rock Riprap, Class II Channel Lining as Grouted Steel Rail Wall (GSRW) backfill.

2) In Section B, Material, rock riprap will meet the gradation requirements of KY DOH Class II Channel Liner.

3) In Section B, Material, Rock riprap will be furnished from a KY DOH approved aggregate source.

4) In Section G, Measurement and Payment, Method 2 will apply. Such payment will constitute full compensation for related subsidiary items:

   a. Construction Specification 5, Pollution Control

   b. Construction Specification 9, Traffic Control

   c. Construction Specification 11, Removal of Water

   d. Construction Specification 21, Excavation

   e. Construction Specification 23, Earthfill

   f. Construction Specification 94, Contractor Quality Control

   g. Construction Specification 95, Geotextile

Construction Specification 64 — Gabions and Gabion Mattresses

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of furnishing, assembling, and installing rock-filled wire-mesh gabions and gabion mattresses. Gabions are at least 12 inches high. Gabion mattresses are no more than 12 inches high.

B. Material Types

1. Gabions and gabion mattresses consist of rectangular wire mesh formed containers filled with rock. Gabions must conform to one of the following types. The wire coating must be as specified in section G.

    a. Twisted-mesh.
        (1) Nonraveling, double twisted, hexagonal wire mesh consisting of two wires twisted together in two 180-degree turns. Twisted-mesh, fasteners, and stiffeners must conform to the requirements of ASTM A975.
        (2) Lacing wire is the standard fastener for twisted-mesh gabions and gabion mattresses. Ring fasteners may be used and must be made of stainless steel. Ring fasteners must provide the minimum strength per lineal foot that is specified in ASTM A975 for gabions and gabion mattresses.
    b. Welded mesh.
        (1) Welded mesh with a uniform square or rectangular pattern and a resistance weld at each intersection. Welded mesh and stiffeners must conform to the requirements of ASTM A974 with the exception that welded-mesh may be delivered in component form, either rolled or stacked, for assembly at the jobsite.
        (2) Spiral binders are the standard fastener for welded-mesh gabions and gabion mattresses. Spiral binders must conform to the requirements of ASTM A974. Alternate fasteners for use with welded-mesh gabions and gabion mattresses, such as ring fasteners or lacing wire, must be formed from wire meeting the same quality and coating thickness requirements as specified for the gabions and gabion mattresses. Ring fasteners must be made of stainless steel. Standard fasteners and alternate fasteners must provide the minimum strength per lineal foot that is specified in section G.

2. Rock must conform to the quality requirements in Material Specification 523, Rock for Riprap, unless otherwise specified in Section G. At least 85 percent of

the rock particles (by weight) must be within the predominant rock size range shown in figure 64.1.

Figure 64.1 - Predominant Rock Size Range by Gabion Size

Gabion Basket or Mattress Height	Predominant Rock size (in)	Minimum Rock Dimension (in)	Maximum Rock Dimension (in)
12-, 18-, or 36-inch basket	4 to 8	4	8
6-, 9-, or 12-inch mattress	3 to 6	3	6

3. At least 30 days before delivery to the site, the contractor must inform the engineer in writing of the source from which the rock will be obtained. The test data and other information by which the material was determined by the contractor to meet the requirements of this specification must be included. The contractor must provide the engineer free access to the source for the purpose of obtaining samples for testing and source approval.
4. Bedding or filter material, when specified, must meet the gradation shown on the plans or as specified in section G. The requirements of Material Specification 521, Aggregates for Drainfill and Filters. Geotextile, when specified, must conform to the requirements specified in section G and in Material Specification 592, Geotextile.

C. Foundation Preparation

1. The foundation on which the gabions and gabion mattresses are to be placed must be cut or filled and graded to the lines and grades shown on the drawings. Surface irregularities, loose material, vegetation, and all foreign matter must be removed from the foundation. When fill is required, it must consist of material conforming to the requirements specified in section G. Fill must be compacted as specified in section G. Gabions, gabion mattresses, and bedding or specified geotextiles may not be placed until the foundation preparation is completed, inspected by the responsible engineer, and verified by the engineer to meet the requirements of this specification.
2. Compaction of bedding or filter material is required as specified in section G. The surface of the finished material must be to grade and free of mounds, dips, or windrows. Geotextile must be installed in accordance with the requirements of Construction Specification 95.

D. Assembly and Placement

1. Where a gabion or gabion mattress unit must be modified, welded-mesh panels may be cut to fit. Twisted-mesh panels may be folded and neatly wired but must not be cut.
2. Assembly.
   a. Use ring-type fasteners or lacing wire for the assembly and placement of twisted-mesh panels. Wrap the lacing wire with alternating single and double

half-hitches at 4- to 6-inch intervals and secure by tying a double half-hitch at each end. Use spiral or ring type fasteners for the assembly and placement of welded-mesh panels. Where spiral fasteners are used, crimp the ends to secure the spirals in place. Where ring type fasteners are used, install the fasteners at a maximum spacing of 6 inches.

b. Interior diaphragms are required where any inside dimension exceeds 3 feet. Use the same type fasteners and fastening procedures to install interior diaphragms and lids as used in the panel assembly. Diaphragms are installed to ensure that no open intervals are present that exceed 3 feet.

3. Placement.

a. Place the empty gabions or gabion mattresses on the foundation and use lacing wire to connect all adjacent gabions along the top, bottom, and vertical edges. Wrap the wire with alternating single and double half-hitches at 4- to 6-inch intervals. Unless otherwise specified in section G, lacing wire is the only fastener allowed for connecting twisted-mesh gabions. Welded-mesh gabions and gabion mattresses may be connected with spiral fasteners, ring-type fasteners, or lacing wire. Where spiral fasteners are used, crimp the ends to secure the spirals in place. Where ring-type fasteners are used, install the fasteners at a maximum spacing of 6 inches. Lacing wire may be used as needed to supplement the interconnection of welded mesh gabions and the closing of lids.

b. Connect each layer of gabions and gabion mattresses to the underlying layer of gabions along the front, back, and sides. Stagger the vertical and horizontal joints between the gabions of adjacent rows and layers by at least one-fourth of a cell length.

E. Filling Operation

1. Twisted-mesh.

a. After adjacent empty twisted-mesh units are set to line and grade and common sides properly connected, they must be placed in straight line and stretched to remove any kinks from the mesh and gain a uniform alignment. Units may be staked to maintain the established proper alignment before the rock is placed. No stakes may be placed through geotextile material. Fasteners must be attached during the filling operation as needed to preserve the strength and shape of the structure.

b. Internal connecting crosstie wires must be placed in each unrestrained gabion and gabion mattress unit of more than 18 inches in height, including units left temporarily unrestrained. Two internal connecting wires must be placed concurrently with rock placement at each 12-inch interval of depth. These crossties must be evenly spaced along the front face and connected to the back face. All crosstie wires must be looped around two mesh openings and each wire end must be secured by a minimum of five 180-degree twists around itself after looping.

2. Welded-mesh.

a. Welded-mesh units do not require stretching. Units may be staked to maintain the established proper alignment before the rock is placed. No stakes may be placed through geotextile material. Fasteners must be attached during the filling operation as needed to preserve the strength and shape of the structure.
b. Internal crossties or stiffeners must be placed in each unrestrained gabion and gabion mattress unit of more than 18 inches in height, including units left temporarily unrestrained. Crossties or stiffeners must be placed concurrently with rock placement at each 12-inch interval of depth. They must be placed across the corners of the gabions (at 12 inches from the corners) providing diagonal bracing. Lacing wire or preformed hooked wire stiffeners may be used.

3. Twisted and welded-mesh.

a. The gabions and gabion mattresses must be carefully filled with rock in a manner that will ensure alignment, avoid bulges, and provide a compact mass that minimizes voids. Machine placement requires supplementing with hand work to ensure the desired results. The units or cells in any row must be filled in stages so that the depth of rock placed in any one cell does not exceed the depth of rock in any adjoining cell by more than 12 inches. Along the exposed faces, the outer layer of stone must be carefully placed and arranged by hand to ensure a neat, compact placement with a uniform appearance.
b. The last layer of rock must be uniformly leveled to the top edges of the cells. Lids must be stretched tight over the rock filling. The use of crowbars or other single point leverage bars for lid closing is prohibited as they may damage the baskets. The lid must be stretched until it meets the perimeter edges of the front and end panels. The gabion lid must then be secured to the sides, ends, and diaphragms with lacing wire, spiral binders, or approved alternate fasteners. Lacing wire must be wrapped with alternating single and double half-hitches at 4- to 6-inch intervals. Where spiral fasteners are used, crimp the ends to secure the spirals in place.

4. All Styles. Any damage to the wire or coatings during assembly, placement, and or filling must be repaired promptly in accordance with the manufacturer's recommendations or replaced with undamaged gabion basket materials.

F. Measurement and Payment

1. Method 1. For items of work for which specific unit prices are established in the contract, the volume of rock is measured within the neat lines of the gabion structure and computed to the nearest cubic yard. Payment for gabions is made at the contract unit price and includes the wire mesh and rock. Such payment is considered full compensation for all labor, material, equipment, and other items necessary and incidental to completion of the work.

2. Method 2. For items of work for which specific unit prices are established in the contract, the volume of the gabions is measured within the neat lines of the gabion structure and computed to the nearest cubic yard. Payment for the gabions is made at the contract unit price and includes the wire mesh, rock, and specified bedding material or geotextile. Such payment is considered full compensation for all labor,

material, equipment, and other items necessary and incidental to the completion of the work.

3. Method 3. For items of work for which specific unit prices are established in the contract, the surface area is measured within the neat lines of the gabion mattress structure and computed to the nearest square yard. Payment for the gabion mattress is made at the contract unit price and includes the wire mesh and rock. Such payment is considered full compensation for all labor, material, equipment, and other items necessary and incidental to the completion of the work.

4. Method 4. For items of work for which specific unit prices are established in the contract, the surface area is measured within the neat lines of the gabion mattress structure and computed to the nearest square yard. Payment for the gabion mattress is made at the contract unit price and includes the wire mesh, rock, and specified bedding material or geotextile. Such payment is considered full compensation for all labor, material, equipment, and other items necessary and incidental to the completion of the work.

5. All Methods. The following provisions apply to all methods of measurement and payment. Unless otherwise specified in section G, no deduction in volume is made for any void or embedded item (e.g., a pipe passing through a gabion wall). Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Each item and the items to which they are made subsidiary are identified in section G of this specification.

G. Items of Work and Construction Details

G. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Bid Item 7, Gabions, 1' Reno Mattresses &
Bid Item 8, Gabions

(1) These items shall consist of furnishing and placing Maccaferri or equivalent twisted-mesh wire Gabions and Gabion Mattresses including rock riprap filling to the lines and grades shown on the drawings and as determined during construction. The contractor is required to work with the gabion manufacturer's representative to determine the exact quantity and sizes of baskets required to achieve the design wall section(s) shown in the drawings. The use of welded mesh gabions is prohibited.

(2) In Section B, Material Types, basket wire coating shall be twisted mesh, Maccaferri PoliMac™ or equivalent.

(3) In Section B, Material Types, rock riprap for gabion filling shall be KY DOH approved, Class II Channel Lining.

(4) In Section B, Material Types, Class I non-woven Geotextile conforming to Material Specification 592, Geotextile, shall be used and placed as shown on the drawings.

(5) In Section C, Foundation Preparation, distribute stream gravel to form a level foundation grade beneath gravel supported walls. Bedrock supported walls shall be founded a minimum of 6 inches below top of rock the full width of Reno Mattresses. Bedrock shall be hoe rammed or jack hammered as necessary to remove bedded rock down to form a level foundation as shown on drawings.

(6) In Section D, Assembly and Placement, lacing wire or high tensile ring-type fasteners installed according to the gabion manufacturers recommendations shall be the only approved method of assembling twisted-mesh wire gabions. Where ring-type fasteners are used in placement and connecting of adjoining gabions, install the fasteners at a maximum spacing of 4 inches, in accordance with the drawings.

(7) In Section F, Measurement and Payment, Method 2 will apply. Items subsidiary to this bid item are:

a) Construction Specification 5, Pollution Control
b) Construction Specification 9, Traffic Control
c) Construction Specification 11, Removal of Water
d) Construction Specification 21, Excavation
e) Construction Specification 61, Rock Riprap, Class II
f) Construction Specification 95, Geotextile

Construction Specification 81 — Metal Fabrication and Installation

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of furnishing, fabricating, and erecting metalwork, including the metal parts and fasteners of the composite structures.

B. Material

1. Unless otherwise specified, material must conform to the requirements of Material Specification 581, Metal. Steel must be of structural quality unless otherwise specified. Castings must be thoroughly cleaned and subjected to careful inspection before installation. Finished surfaces must be smooth and true to ensure proper fit. Galvanizing must conform to the requirements of Material Specification 582, Galvanizing.

C. Fabrication

1. Fabrication of structural steel must conform to the requirements of the American Institute of Steel Construction's Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (Riveted, Bolted and Arc-Welded Construction).
2. Fabrication of structural aluminum must conform to the requirements in the Aluminum Design Manual available from the Aluminum Association.

D. Erection

1. Install the frame of metal structures true and plumb. Place temporary bracing wherever necessary to resist all loads to which the structure may be subjected, including those applied by the installation and operation of equipment. Such bracing must be left in place as long as necessary for safety.
2. As erection progresses, the work must be securely bolted up or welded to resist all dead load, wind, and erection stresses. The contractor must furnish such installation, assisting with bolts, nuts, and washers as required.
3. No riveting or welding must be performed until the structure is stiffened and properly aligned.
4. Rivets driven in the field must be heated and driven with the same care as those driven in the shop.

5. Perform all field welding in conformance to the requirements for shop fabrication except those that apply to shop conditions only.

E. Protective Coatings

1. Items to be galvanized must be completely fabricated for field assembly before the application of the zinc coatings. Galvanized items must not be cut, welded, or drilled after the zinc coating is applied.
2. Items to be painted must be painted in conformance to the requirements of Construction Specification 82 for the specified paint systems.

F. Measurement and Payment

1. Method 1. The work is not measured. Payment for metal fabrication and installation is made at the contract lump-sum price in the contract. Such payment constitutes full compensation for all labor, equipment, material, and other items necessary and incidental to the completion of the work, including connectors and appurtenances such as rivets, bolts, nuts, pins, studs, washers, hangers, and weld metal.
2. Method 2. The weight of metal installed complete in place is determined to the nearest pound. Unless otherwise specified, the weight of metal must be computed by the method specified in the American Institute of Steel Construction's Code of Standard Practice for Steel Buildings and Bridges, Section 3, except that the following unit weights may also be used, as appropriate, as the basis of computation:

Figure 81-1 Typical Unit Weight of Various Metals

Material	Unit Weight (lb/ft^3)
Aluminum alloy	173
Bronze or copper alloy	536
Iron, malleable	470
Iron, wrought	487

Payment for furnishing, fabricating, and installing metalwork is made at the contract unit price for the specified types of labor, material, equipment, and all other items necessary and incidental to the completion of the work.

3. Method 3. The work is not measured. Payment for furnishing, fabricating, and installing each item of metalwork is made at the contract price for that item. Such payment constitutes full compensation for all labor, equipment, material, and other items necessary and incidental to the completion of the work, including connectors and appurtenances such as rivets, bolts, nuts, pins, studs, washers, hangers, and weld metal.
4. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section G of this specification.

G. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Bid Item 9, Steel, Railroad Rail Piling, 15' &
Bid Item 10, Steel, Railroad Rail Piling, 16'

(1) These items shall consist of furnishing and placing steel piling as shown on the drawings and as determined during construction.

(2) In Section B, Material, steel piling shall be used railroad rails with a minimum nominal weight of 130 pounds per yard shall be used. All rails shall be straight and structurally sound. Rails shall not be spliced.

(3) In Section D, Erection, the railroad rails shall be installed in drilled sockets into bedrock. Each hole shall serve as a sounding for the rail installed into it. The drilled socket shall be of adequate size to allow free insertion of the railroad rail but shall be no more than 12 inches diameter.

(4) In Section D, Erection, after each hole is filled, the steel piling shall immediately be installed with the flanges positioned perpendicular to the direction of the slope failure. The drilled auger hole shall then be backfilled with concrete grout. The hole shall be free from auger tailings or other material before grouting.

(5) In Section F, Measurement and Payment, no method will apply. Payment shall be by the nearest linear foot of rail piling installed. Such Payment shall constitute full compensation for the related subsidiary items.

(6) Items subsidiary to these bid items are:

(a) Construction Specification 5, Pollution Control
(b) Construction Specification 11, Removal of Water
(c) Construction Specification 9, Traffic Control
(d) Construction Specification 21, Excavation
(e) Construction Specification 94, Contractor Quality Control

b) Bid Item 11, Steel, Guard Rail Lagging

(1) This item shall consist of furnishing and placing the steel lagging as shown on the drawings and as determined during construction.
(2) In Section B, Material, steel lagging shall consist of used steel "W" beam- single faced guardrail as specified in Kentucky Department of Highways Standards Specifications for Road and Bridge Construction, section 814.
(3) In Section D, Erection, steel lagging shall extend two feet below existing channel bottom unless solid rock is encountered, then steel lagging shall extend to solid rock only.
(4) In Section D, Erection. The steel lagging shall be attached to the piling before any backfilling with a maximum of a 1-inch vertical gap between steel lagging. In addition, each adjacent horizontal section of steel lagging shall overlap a

minimum of 6-inches.

(5) In Section F, Measurement and Payment, no method will apply. Payment shall be by the nearest square foot (SF) of wall face installed, not including the required overlaps. Such Payment shall constitute full compensation for the related subsidiary items.

(6) Items subsidiary to this bid item are:
   (a) Construction Specification 9, Traffic Control
   (b) Construction Specification 21, Excavation
   (c) Construction Specification 94, Contractor Quality Control
   (d) Construction Specification 95, Geotextile

Construction Specification 94 — Contractor Quality Control

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. The work consists of developing, implementing, and maintaining a quality control system to ensure that the specified quality is achieved for all materials and work performed.

B. Equipment and Materials

1. Equipment and material used for quality control must be of the quality and condition required to meet the test specifications cited in the contract. Testing equipment must be properly adjusted and calibrated at the start of operations with the calibration maintained at the frequency specified. Records of equipment calibration tests must be available to the engineer at all times. Equipment must be operated and maintained by qualified operators as prescribed in the manufacturer's operating instructions, the references specified, and as specified in Section J of this specification. All equipment and materials used in performing quality control testing must be as prescribed by the test standards referenced in the contract or in Section J.
2. Handle and operate all equipment and materials in a safe and proper manner and comply with all applicable regulations pertaining to their use, operation, handling, storage, and transportation.

C. Quality Control System

1. Method 1. The contractor must develop, implement, and maintain a system of quality control to provide the specified material testing and verification of material quality before use. The system activities must include procedures to verify adequacy of completed work, initiate corrective action to be taken, and document the final results. The identification of the quality control personnel and their duties and authorities must be submitted to the contracting officer in writing within 15 calendar days after notice of award.
2. Method 2. The contractor must develop, implement, and maintain a system adequate to achieve the specified quality of all work performed, material incorporated, and equipment furnished before use. The system established must be documented in a written plan developed by the contractor and approved by the contracting officer. Include in the system activities the material testing and inspection needed to verify the adequacy of completed work and procedures to be followed when corrective action is required. Daily records to substantiate the

conduct of the system must be maintained by the contractor. The quality control plan must cover all aspects of quality control and must address, at a minimum, all specified testing and inspection requirements. Provide the plan consistent with the planned performance in the contractor's approved construction schedule. Identify in the plan the contractor's onsite quality control manager and provide an organizational listing of all quality control personnel and their specific duties. The written plan must be submitted to the contracting officer within 15 calendar days after notice of award. The contractor must not proceed with any construction activity that requires inspection until the written plan is approved by the contracting officer.

3. All Methods. The quality control system must include, but not be limited to, a rigorous examination of construction material, processes, and operation, including testing of material and examination of manufacturer's certifications as required, to verify that work meets contract requirements and is performed competently.

D. Quality Control Personnel

1. Method 1. Quality control activities must be accomplished by competent personnel. A competent person is one who is experienced and capable of identifying, evaluating, and documenting that materials and processes being used will result in work that complies with the contract. This person also has authority to take prompt action to remove, replace, or correct such work or products not in compliance. Off-site testing laboratories must be certified or inspected by a nationally recognized entity. The contractor must submit to the contracting officer for approval laboratory certification or inspection information. The contractor must submit to the contracting officer for approval the names, qualifications, authorities, certifications, and availability of the competent personnel who will perform the quality control activities.
2. Method 2. Quality control activities must be accomplished by competent personnel who are separate and apart from line supervision and report directly to management. A competent person is experienced and capable of identifying, evaluating, and documenting that material and processes being used will result in work that complies with the contract. This person has authorization to take prompt action to remove, replace, or correct such work or products not in compliance. Off-site testing laboratories must be certified or inspected by a nationally recognized entity. The contractor must submit to the contracting officer for approval laboratory certification or inspection information. The contractor must submit to the contracting officer for approval the names, qualifications, authorities, certifications, and availability of the competent personnel who will perform the quality control activities.

E. Post-award Conference

1. The contractor must meet with the contracting officer before any work begins and discuss the contractor's quality control system. The contracting officer and the contractor must develop a mutual understanding regarding the quality control system including procedures for correcting quality control issues.

F. Records

1. The contractor's quality control records must document both acceptable and deficient features of the work and corrective actions taken. All records must be on forms approved by the contracting officer, be legible, and be dated and signed by the competent person creating the record.
2. Unless otherwise specified in Section J of this specification, records must include:
    a. Documentation of shop drawings including date submitted to and date approved by the contracting officer, results of examinations, need for changes or modifications (if any), manufacturer's recommendations and certifications (if any), and signature of the authorized examiner.
    b. Documentation of material delivered including quantity, storage location, and results of quality control examinations and tests.
    c. Type, number, date, time, and name of individual performing quality control activities.
    d. The material or item inspected and tested, the location and extent of such material or item, and a description of conditions observed and test results obtained during the quality control activity.
    e. The determination that the material or item met the contract provisions and documentation that the engineer was notified.
    f. For deficient work, the nature of the defects, specifications not met, corrective action taken, and results of quality control activities on the corrected material or item.

G. Reporting Results

1. The results of contractor's quality control inspections and tests must be communicated to the engineer immediately upon completion of the inspection or test. Unless otherwise specified in Section J, the original plus one copy of all records, inspections, tests performed, and material testing reports must be submitted to the engineer within 1 working day of completion. The original plus one copy of documentation of material delivered must be submitted to the engineer before the material is used.

H. Access

1. The contracting officer and the engineer must be given free access to all testing equipment, facilities, sites, and related records for the duration of the contract.

I. Payment

1. Method 1.
    a. For items of work for which lump sum prices are established in the contract, payment is made as the work proceeds after presentation by the contractor of invoices showing related costs and evidence of charges by suppliers, subcontractors, and others for furnishing supplies and work performed. If the total of such payments is less than the lump sum contract price for this item, the remaining balance is included in the final contract payment. Payment of

the lump sum contract price constitutes full compensation for completion of the work.

b. Payment is not made under this item for the purchase cost of material and equipment having a residual value.

2. Method 2.

a. For items of work for which lump sum prices are established in the contract, payment is prorated and paid in equal amounts on each monthly estimate. The number of months used for prorating must be the number estimated to complete the work. The final month's prorate amount is made with the final payment. Payment as described above constitutes full compensation for completion of the work.

b. Payment is not made under this item for the purchase cost of material and equipment having a residual value.

3. All Methods. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section J.

J. Items of Work and Construction Details

J. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Subsidiary Item, Contractor Quality Control

1) This item shall include all labor, equipment, materials and other items necessary and incidental to developing, implementing, and maintaining a quality control system to ensure that the specified quality is achieved for all materials and work performed under this contract.

2) This item will also include all surveying and calculations required to keep installed work level, plumb and proper with proper foundation as shown on the drawings.

3) In Section C, Quality Control System, Method 1 will apply

4) In Section D, Quality Control Personnel, Method 1 will apply.

5) In Section F, Records, weather, nonworking days, work installed, and any other pertinent information will be recorded in a job diary by the contractors designated Quality Control Representative.

6) In Section I, Measurement and Payment, no method will apply. Full compensation for the completion of this item will be included in the payment for:

a) Bid Item 5, Rock Riprap, Class III Channel Liner.

b) Bid Item 6, Rock Riprap, Class II, Rail Steel Backfill

c) Bid Item 7, Gabions, 1’ Reno Mattresses

d) Bid Item 8, Gabions

e) Bid Item 9, Steel, Railroad Rail Piling, 15’

f) Bid Item 10, Steel, Railroad Rail Piling, 16’

g) Bid Item 11, Steel, Guard Rail Lagging

h) Bid Item 12, Grouting

Construction Specification 95 — Geotextile

Title 210 – Engineering
Part 642 – Specifications for Construction Contracts
Subpart B – National Construction Specifications
June 2024

A. Scope

1. This work consists of furnishing all material, equipment, and labor necessary for the installation of geotextiles.

B. Quality

1. Geotextiles must conform to the requirements of Material Specification 592 and this specification.

C. Storage

1. Before use, store the geotextile in a clean, dry location out of direct sunlight, not subject to extremes of either hot or cold temperatures, and with the manufacturer's protective cover undisturbed. Receiving, storage, and handling at the jobsite must be in accordance with the requirements listed in ASTM D4873.

D. Surface preparation

1. The surface on which the geotextile is to be placed must be graded to the neat lines and grades as shown on the drawings. The surface must be reasonably smooth and free of loose rock and clods, holes, depressions, projections, muddy conditions, and standing or flowing water (unless otherwise specified in section G of this specification).

E. Placement

1. Before the geotextile is placed, the soil surface will be reviewed for quality assurance of the design and construction. Place the geotextile on the approved prepared surface at the locations and in accordance with the details shown on the drawings and specified in section G of this specification. It must be unrolled along the placement area and loosely laid, without stretching, in such a manner that it conforms to the surface irregularities when material or gabions are placed on or against it. The geotextile may be folded and overlapped to permit proper placement in designated areas.
2. Method 1.
    a. Join the geotextile by machine sewing using thread material meeting the chemical requirements for the geotextile fibers or yarn. Thread must be polypropylene, polyester, or Kevlar™ aramid thread unless a specific thread type is specified. The thread must consist of two parallel stitched rows at a

spacing of about 1 inch and must not cross (except for any required re-stitching). The stitching must be a lock-type stitch. Each row of stitching must be located a minimum of 2 inches from the geotextile edge. Unless otherwise specified, the seam tensile strength as measured according to ASTM D4884 must be a minimum of 90 percent of the geotextile tensile strength in the weakest principal direction as measured according to ASTM D4632.

b. The geotextile must be temporarily secured during placement of overlying material to prevent slippage, folding, wrinkling, or other displacement of the geotextile. Unless otherwise specified, methods of securing must not cause punctures, tears, or other openings to be formed in the geotextile.

3. Method 2.

   a. Join the geotextile by overlapping a minimum of 18 inches (unless otherwise specified) and secured against the underlying foundation material. Securing pins, approved and provided by the geotextile manufacturer, must be placed along the edge of the panel or roll material to adequately hold it in place during installation. Pins must be steel or fiberglass formed as a U, L, or T shape or must contain ears to prevent total penetration through the geotextile. Provide steel washers on all but the U-shaped pins. The upstream or upslope geotextile must overlap the abutting downslope geotextile. At vertical laps, securing pins must be inserted through the bottom layers along a line through approximately the midpoint of the overlap. At horizontal laps and across slope labs, securing must be inserted through the bottom layer only. Securing pins must be placed along a line about 2 inches in from the edge of the placed geotextile at intervals not to exceed 12 feet unless otherwise specified. Install additional pins as necessary and where appropriate to prevent any undue slippage or movement of the geotextile. The use of securing pins will be held to the minimum necessary. Pins are to remain in place unless otherwise specified.

   b. Should the geotextile be torn or punctured or the overlaps or sewn joint disturbed as evidenced by visible geotextile damage, subgrade pumping, intrusion, or grade distortion, the backfill around the damaged or displaced area must be removed and restored to the original approved condition. The repair must consist of a patch of the same type of geotextile being used and overlaying the existing geotextile. When the geotextile seams are required to be sewn, extend the overlay patch a minimum of 1 foot beyond the edge of any damaged area and join by sewing as required for the original geotextile except that the sewing must be a minimum of 6 inches from the edge of the damaged geotextile. Geotextile panels joined by overlap must have the patch extend a minimum of 2 feet from the edge of any damaged area.

4. Place geotextile in accordance with the following applicable specification according to the use indicated in section G:

   a. Slope protection. The geotextile must not be placed until it can be anchored and protected with the specified covering within 48 hours or protected from exposure to ultraviolet light. In no case may material be dropped on uncovered geotextile from a height of more than 3 feet.

b. Subsurface drains. The geotextile must not be placed until drainfill or other material can be used to provide cover within the same working day. Drainfill material must be placed in a manner that prevents damage to the geotextile. In no case may material be dropped on uncovered geotextile from a height of more than 5 feet.

c. Road stabilization. The geotextile must be unrolled in a direction parallel to the roadway centerline in a loose manner permitting conformation to the surface irregularities when the roadway fill material is placed on its surface. In no case may material be dropped on uncovered geotextile from a height of more than 5 feet. Unless otherwise specified, the minimum overlap of geotextile panels joined without sewing must be 24 inches. The geotextile may be temporarily secured with pins recommended or provided by the manufacturer, but they must be removed before the permanent covering material is placed.

F. Measurement and payment

1. Method 1. For items of work for which specific unit prices are established in the contract, the quantity of geotextile for each type placed within the specified limits is determined to the nearest specified unit by measurements of the covered surfaces only, disregarding that required for anchorage, seams, and overlaps. Payment is made at the contract unit price. Such payment constitutes full compensation for the completion of the work.

2. Method 2. For items of work for which specific unit prices are established in the contract, the quantity of geotextile for each type placed with the specified limits is determined to the nearest specified unit by computing the area of the actual roll size or partial roll size installed. The computed area will include the amount required for overlap, seams, and anchorage as specified. Payment is made at the contract unit price. Such payment constitutes full compensation for the completion of the work.

3. Method 3. For items of work for which specific lump sum prices are established in the contract, the quantity of geotextile is not measured for payment. Payment for geotextiles is made at the contract lump sum price and constitutes full compensation for the completion of the work.

4. All Methods. The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section G of this specification.

G. Items of work and construction details

G. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details are:

a) Subsidiary Item, Geotextile

1) This item shall consist of furnishing and placing the non-woven geotextile fabric as shown on the drawings and as determined during construction.

2) In Section B, Quality, geotextile shall be non-woven, needle punched, class I geotextile, in accordance with Material Specification 592, "Geotextile".

3) In Section E, Placement, Method 2 will apply. Geotextile shall be rolled perpendicular to the wall as a continuous piece down the construction slope and along the wall, as shown on the drawings. In addition, geotextile overlaps shall be placed in a "shingle" fashion with the downstream end on top of the upstream end on the next section of geotextile.

4) In Section E, Placement, the use of geotextile is for Slope protection.

5) In Section I, Measurement and Payment, no method will apply. Full compensation for the completion of this item will be included in the payment for:

   a) Bid Item 5, Rock Riprap, Class III Channel Liner

   b) Bid Item 7, Gabions, 1' Reno Mattresses

   c) Bid Item 8, Gabions

   d) Bid Item 11, Steel, Guard Rail Lagging

Construction Specification 414—Grouting

1. Scope
The work consists of pumping grout into the annulus of 9-to-12-inch diameter vertically drilled holes with railroad rails centered inside them with water-cement grout for the full depth of the hole; and includes furnishing of all materials, labor, and equipment as described and specified.

2. Material
Portland Cement—Portland cement shall conform to the requirements of Material Specification 531, Portland Cement, and may be Type I, II or III. If the cement contains lumps or foreign material that would clog the grouting equipment or interfere with grout pumping, it shall be screened through a 100-mesh screen. Cement shall be furnished in bags (94 lb) unless special equipment is provided for storing, handling, and weighing bulk cement.

Water—Water used shall be clean and free from injurious amounts of oil, acid, organic matter, or other deleterious substances.

Storage and supply—A sufficient quantity of all materials shall be on hand to ensure that grouting operations will not be interrupted or delayed. Materials shall be stored and protected at all times and at all locations so that the quality of the materials is maintained.

3. Equipment
All equipment shall be of a type and capacity and in condition to perform the work described.

Grouting equipment—The equipment shall be capable of thoroughly mixing cement and water to produce grout of uniform texture and consistency by the circulation mixing method.

> ***Mixing tank—***A mixing tank shall be furnished with a minimum 55 gallon holding capacity and shall be free of contaminants and debris and excess damage.
>
> ***Pumps—***Grout pumps shall be Moyno or Diaphragm type. The pump capacity shall be adequate to thoroughly mix the grout by circulation. The outflow shall pass through a No. 16 wire mesh screen if the grout contains particles or foreign matter that would interfere with its proper flow into the annulus.
>
> ***Hoses, valves, and fittings—***Hoses, valves, and fittings shall be compatible with the pump being used.

4. Grouting
Composition—Grout shall consist of a mixture of Portland cement and water. **A minimum of 5.2 gallons of water up to a maximum of 8 gallons of water is required for each 94-lb sack of Portland cement used to batch the grout.**

Grout shall be placed at the bottom of the drilled hole using a small-diameter pipe (tremie or grout pipe). Grout head shall be maintained over the lower end of the tremie pipe until top of grout elevation has been reached per the drawings.

Freshly grouted holes must be monitored for drop and loss into adjacently drilled holes and/or ground voids and adjustments made as necessary to correct and prevent.

A soil berm, straw bale/plastic berm, or other equivalent method shall be used (if necessary) during tremie grouting for stream pollution control measures.

5. Cleanup
After grouting is completed, the contractor shall remove the grouting equipment and all related parts, equipment, and supplies from the site. The cleanup includes unused materials and waste.

6. Measurement and payment
For items of work for which specific unit prices or lump sum prices are established in the contract, measurement and payment for grouting is made as described below in Section 7. Such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to the completion of the work.

Subsidiary items—Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 7 of this specification.

7. Items of work and construction details
The items of work to be performed in conformance with this specification and construction details are:

(A) Bid Item 12, Grouting

(1) This item shall consist of pumping grout into the annulus of 9-to-12-inch diameter vertically drilled holes with railroad rails centered inside them with water-cement grout for the full depth of the hole.

(2) Cement: This item shall also consist of furnishing and supplying cement to batch grout used to backfill drilled holes with railroad rails inserted in them.

(3) Water: This item shall also consist of furnishing and supplying water to batch grout used to backfill drilled holes with railroad rails inserted in them.

(4) Grout placed is measured to the nearest 0.1 cubic yard (CY). Payment for placing grout is made at the contract unit price, which includes compensation for handling all materials for the purpose of mixing and placing grout. Payment is not made for grout otherwise wasted because of actions of contractor.

(5) Items subsidiary to this bid item are:

(a) Construction Specification 5, Pollution Control

(b) Construction Specification 9, Traffic Control

(c) Construction Specification 11, Removal of Water

(d) Construction Specification 21, Excavation

(e) Construction Specification 23, Earthfill

(f) Construction Specification 94, Contractor Quality Control

Part 642 – Specifications

Chapter 3 – National Standard Material Specifications

Material Specification 521—Aggregates for Drainfill and Filters

A. Scope

This specification covers the quality of mineral aggregates for the construction of drainfill and filters.

B. Quality

(1) Drainfill and filter aggregates shall be sand, gravel, or crushed stone or mixtures thereof. Aggregates shall be composed of clean, hard, durable, mineral particles free from organic matter, clay balls, soft particles, or other substances that would interfere with the free-draining properties of the aggregates.
(2) Coarse aggregate may be crushed limestone or other material that has limestone particles included. Aggregates from crushed limestone shall be thoroughly washed and screened to remove limestone dust, limestone fines, and fine soil particles. Limestone shall not be used for fine aggregates except in combination with other material, such that not more than 5 percent of the portion finer than the No. 4 sieve shall be limestone.
(3) Aggregates shall be tested for soundness according to ASTM C88 and shall have a weighted average loss in 5 cycles of not more than 12 percent when sodium sulfate is used or 18 percent when magnesium sulfate is used.

C. Grading

Drainfill and filter aggregates shall conform to the specified grading limits after being placed or after being compacted when compaction is specified. Grading shall be determined by ASTM C136. The percentage of material finer than the No. 200 sieve shall be determined by the method in ASTM C117.

D. Storing and Handling

Drainfill and filter aggregates shall be stored and handled by methods that prevent segregation of particle sizes or contamination by mixing with other material.

Part 642 – Specifications

Chapter 3 – National Standard Material Specifications

Material Specification 522—Aggregates for Portland Cement Concrete

A. Scope

This specification covers the quality of fine aggregate and coarse aggregate for use in the manufacture of Portland cement concrete.

B. Quality

Aggregate shall conform to the requirements of ASTM C33 for the specified sizes. Aggregates that fail to meet any requirement may be accepted only when either:

(i) The specified alternate conditions of acceptance can be proven before the aggregates are used on the job and within a period such that no work under the contract will be delayed by the requirements of such proof or,

(ii) The specification for concrete expressly contains a provision of special mix requirements to compensate for the effects of the deficiencies.

C. Reactivity with alkalies

(1) The potential reactivity of aggregates with the alkalies in cement shall be evaluated by petrographic examination as per ASTM C295, or by the results of previous tests or service records of concrete made from similar aggregates from the same source. The standards for evaluating potential reactivity shall be as described in ASTM C1778

(2) Aggregates indicated by any of the above to be potentially reactive shall not be used except under one of the following conditions:

(i) Applicable test results of mortar bar tests made according to ASTM Method C 1567 are available which indicate an expansion of less than 0.10 percent at 16 days.

(ii) The concrete mixture complies with the appropriate testing procedures and mitigations measures established in ASTM C1778.

(iii) Concrete made from similar aggregates from the same source has been demonstrated to be sound after 3 years or more of service under conditions of exposure to moisture and weather similar to those anticipated for the concrete under these specifications.

(3) Aggregates indicated to be potentially reactive, but within acceptable limits as determined by mortar bar test results or service records, shall be used only with low alkali cement, containing less than 0.60 percent alkalies expressed as sodium oxide.

D. Sulfur in Aggregate

(1) There is currently not an ASTM standard on the acceptable level of sulfur in concrete aggregate.

(2) To prevent concrete cracking from iron sulfide expansion, perform petrographic testing per ASTM C295 and use the following limits for sulfur (S) in aggregate based on the American Concrete Institute Technical Paper 113-M31 and the Concrete Society BS EN 12620:

(i) When S is less than 0.1 percent, the aggregate is acceptable.

(ii) When S is between 0.1 and 1.0 percent, perform further testing to determine if iron sulfide minerals such as pyrrhotite, gypsum, pyrite, or marcasite are present:

- If the additional testing shows pyrrhotite, gypsum, pyrite, or marcasite are present, reject the aggregate and use an acceptable aggregate.

- If the additional testing shows pyrrhotite, gypsum, pyrite, or marcasite are not present, the aggregate is acceptable.

(iii) Aggregate with S greater than 1 percent is not acceptable.

E. Storing and Handling

Aggregates of each class and size shall be stored and handled by methods that prevent segregation of particles sizes or contamination by intermixing with other material.

Part 642 – Specifications

Chapter 3 – National Standard Material Specifications

Material Specification 523—Rock for Riprap

A. Scope

This specification covers the quality of rock to be used in the construction of rock riprap.

B. Quality

(1) Individual rock fragments must be dense, sound, and free from cracks, seams, and other defects conducive to accelerated weathering. Except as otherwise specified, the rock fragments must be angular to subrounded. The least dimension of an individual rock fragment must be not less than one-third the greatest dimension of the fragment. ASTM D4992 provides guidance on selecting rock from a source.

(2) Except as otherwise provided, the rock must be tested and must have the following properties:

(i) Rock type 1

- Bulk specific gravity (saturated surface-dry basis)—Not less than 2.5 when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Absorption—Not more than 2 percent when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Soundness—The weight loss in 5 cycles must not be more than 10 percent when sodium sulfate is used or more than 15 percent when magnesium sulfate is used.

(ii) Rock type 2

- Bulk specific gravity (saturated surface-dry basis)—Not less than 2.5 when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Absorption—Not more than 2 percent when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Soundness—The weight loss in 5 cycles must be not more than 20 percent when sodium sulfate is used or more than 25 percent when magnesium sulfate is used.

(iii) Rock type 3

- Bulk specific gravity (saturated surface-dry basis)—Not less than 2.3 when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Absorption—Not more than 4 percent when tested in accordance with ASTM D6473 on samples prepared as described for soundness testing.
- Soundness—The weight loss in 5 cycles must be not more than 20 percent when sodium sulfate is used or more than 25 percent when magnesium sulfate is used.

C. Methods of Soundness Testing

(1) Rock cube soundness—

(i) The sodium or magnesium sulfate soundness test for all rock types (1, 2, or 3) must be performed on a test sample of 5,000 ± 300 grams of rock fragments, reasonably uniform in size and cubical in shape, and weighing, after sampling, about 100 grams each. They must be obtained from rock samples that are representative of the total rock mass, as noted in ASTM D4992, and that have been sawed into slabs as described in ASTM

D5121. The samples must further be reduced in size by sawing the slabs into cubical blocks. The thickness of the slabs and the size of the sawed fragments must be determined by the size of the available test apparatus and as necessary to provide, after sawing, the approximate 100-gram samples. The cubes must undergo five cycles of soundness testing in accordance with ASTM C88.

(ii) Internal defects may cause some of the cubes to break during the sawing process or during the initial soaking period. Do not test any of the cubes that break during this preparatory process. Such breakage, including an approximation of the percentage of cubes that break, must be noted in the test report.

(iii) After the sample has been dried following completion of the final test cycle and washed to remove the sodium sulfate or magnesium sulfate, the loss of weight must be determined by subtracting from the original weight of the sample the final weight of all fragments that have not broken into three or more fragments.

(iv) The test report must show the percentage loss of the weight and the results of the qualitative examination.

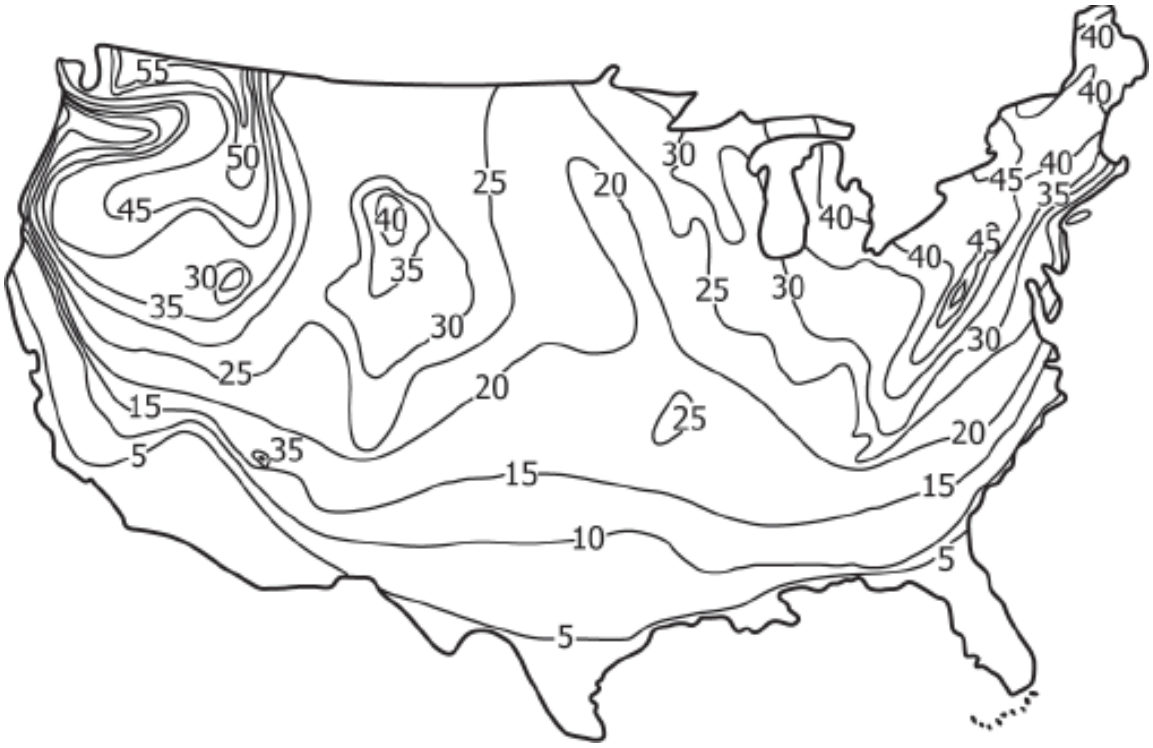
(2) Rock slab soundness—

(i) When specified, the rock must also be tested in accordance with ASTM D5240. Deterioration of more than 25 percent of the number of blocks must be cause for rejection of rock from this source. Rock must also meet the requirements for average percent weight loss stated below.

(ii) For projects located north of the Number 20 Freeze-Thaw Severity Index Isoline (fig. 523–1 below), unless otherwise specified, the average percent weight loss for Rock Type 1 must not exceed 20 percent when sodium sulfate is used or 25 percent when magnesium sulfate is used. For Rock Types 2 and 3, the average percent weight loss must not exceed 25 percent for sodium sulfate soundness or 30 percent for magnesium sulfate soundness.

(iii) For projects located south of the Number 20 Freeze-Thaw Severity Index Isoline, unless otherwise specified, the average percent weight loss for Rock Type 1 must not exceed 30 percent when sodium sulfate is used or 38 percent when magnesium sulfate is used. For Rock Types 2 and 3, the average percent weight loss must not exceed 38 percent for sodium sulfate soundness or 45 percent for magnesium sulfate soundness.

Figure 523–1 Isoline Map of the Freeze-Thaw Severity Index for Contiguous 48 United States (map is from ASTM D5312)



D. Field Durability Inspection

(1) Rock that fails to meet the material requirements stated above (if specified), may be accepted only if similar rock from the same source has been demonstrated to be sound after 5 years or more of service under conditions of weather, wetting and drying, and erosive forces similar to those anticipated for the rock to be installed under this specification.

(2) A rock source may be rejected if the rock from that source deteriorates in less than 5 years under similar use and exposure conditions expected for the rock to be installed under this specification, even though it meets the testing requirements stated above.

(3) Deterioration is defined as the loss of more than one-quarter of the original rock volume, or severe cracking that would cause a block to split. Measurements of deterioration are taken from linear or surface area particle counts to determine the percentage of deteriorated blocks. Deterioration of more than 25 percent of the pieces must be cause for rejection of rock from the source.

E. Grading

The rock must conform to the specified grading limits after it has been placed within the matrix of the rock riprap. Grading tests must be performed, as necessary, according to ASTM D5519, Method A, B, or C, as applicable.

Part 642 – Specifications

Chapter 3 – National Standard Material Specifications

Material Specification 531—Portland Cement

A. Scope

This specification covers the quality of Portland cement.

B. Quality

(1) Portland cement shall conform to the requirements of ASTM C150 for the specific types of cement such as Type I, IA, II, IIA, II(MH), II(MH)A, III, IIIA, IV, and V Portland cement.
(2) Type IS Portland blast-furnace slag cement, Type IP Portland-pozzolan cement, or Type IL Portland-limestone cement shall conform to the requirements of ASTM C595 and may be used unless prohibited by the specifications.
(3) When air-entraining cement is required, the contractor shall furnish the manufacturer's written statement providing the source, amount, and brand name of the air-entraining component.

C. Storage at the Construction Site

Cement shall be stored and always protected from weather, dampness, or other destructive elements. Cement that is partly hydrated or otherwise damaged will not be accepted.

Part 642 – Specifications

Chapter 3 – National Standard Material Specifications

Material Specification 592—Geotextile

A. Scope

This specification covers the quality of geotextile, including geotextile for temporary silt fence.

B. General Requirements

(1) Fibers (threads and yarns) used in the manufacture of geotextile must consist of synthetic polymers composed of a minimum of 85 percent by weight polypropylene, polyester, polyamide, polyethylene, polyolefin, or polyvinylidene-chloride. The fiber must be formed into a stable network of filaments retaining dimensional stability relative to each other. The geotextile must be free of defects, such as holes, tears, and abrasions. The geotextile must be free of any chemical treatment or coating that significantly reduces its porosity. Fibers must contain stabilizers, inhibitors, or both to enhance resistance to ultraviolet light. Geotextile other than for temporary silt fence must conform to the requirements in Figure 592-1 or 592-2, as applicable. Geotextile for temporary silt fence must conform to ASTM D6461.

(2) Thread used for factory or field sewing must be of a color contrasting to the color of the fabric and made of high-strength polypropylene, polyester, or polyamide material. It must be as resistant to ultraviolet light as the geotextile being sewn.

C. Classification

(1) There are two geotextile classifications, woven and nonwoven. Geotextile for temporary silt fence may be either woven or nonwoven. Silt film woven geotextile may not be used except for temporary silt fence.

(2) Woven geotextiles are made from fabric that is formed by the uniform and regular interweaving of the threads or yarns in two directions. Woven fabrics must be manufactured from monofilament yarn formed into a uniform pattern with distinct and measurable openings, retaining their position relative to each other. The fabric must have a selvedge edge or otherwise be finished to prevent unraveling.

(3) Nonwoven geotextiles are made from fabric that is formed by a random placement of threads in a mat and bonded by needle punching, heat bonding, or resin bonding. Nonwoven geotextiles must have distinct but variable small openings, retaining their position relative to each other when bonded. The use of heat- or resin-bonded nonwovens is restricted as specified in note 2 of Figure 592-2.

D. Sampling and Testing

The geotextile must conform to Figure 592-1 or 592-2 or ASTM D6461, as applicable, for the product type shown on the label. Documentation described in either (i) or (ii) below is required to verify the product meets the specified requirements:

(i) Product properties as listed in the latest edition of the "Specifiers Guide," Geosynthetics (Industrial Fabrics Association International, 1801 County Road B, West Roseville, MN 55113-4061 or at http://www.geosindex.com), and that represent average roll values, are acceptable.

(ii) Test data from the geotextile production run for each of the specified tests listed in Figure 592-1 or 592-2 or ASTM D6461, as applicable.

E. Shipping and Storage

Each roll of geotextile must be labeled or tagged to clearly identify the brand, class, and individual production run in accordance with ASTM D4873. The geotextile must be shipped and transported in rolls wrapped with a cover for protection from moisture, dust, dirt, debris, and ultraviolet light. The cover must be maintained undisturbed to the maximum extent possible before placement.

Figure 592-1 Requirements for Woven Geotextiles [1/]

Property	Test method	Class I	Class II	Class III	Class IV
Grab tensile strength (lb)	ASTM D4632	247 minimum	180 minimum	180 minimum	315
Elongation at failure (%)	ASTM D4632	<50	<50	<50	<50
Trapezoidal tear strength (lb)	ASTM D4533	90 minimum	67 minimum	67 minimum	112 minimum
Puncture strength (lb)	ASTM D6241	495 minimum	371 minimum	371 minimum	618 minimum
Ultraviolet stability (% retained strength)	ASTM D4355	50 minimum	50 minimum	50 minimum	70 minimum
Permittivity (sec^{-1})	ASTM D4491	as specified			
Apparent opening size (AOS) [2/]	ASTM D4751	as specified			
Percent open area (POA) (%)	USACE [3/]CWO-02215-86	as specified			

[1/] All values are minimum average roll values (MARV) in the weakest principal direction, unless otherwise noted.

[2/] Maximum average roll value.

[3/] Note: CWO is a USACE reference.

Figure 592-2 Requirements for Non-Woven Geotextiles [1/]

Property	Test method	Class I [2/]	Class II [2/]	Class III [2/]	Class IV [2/]
Grab tensile strength (lb)	ASTM D4632 grab test	202 minimum	157 minimum	112 minimum	202 minimum
Elongation at failure (%)	ASTM D4632	50 minimum	50 minimum	50 minimum	50 minimum
Trapezoidal tear strength (lb)	ASTM D4533	79 minimum	56 minimum	40 minimum	79 minimum
Puncture strength (lb)	ASTM D6241	433 minimum	309 minimum	223 minimum	433 minimum
Ultraviolet light (% retained strength)	ASTM D4355	50 minimum	50 minimum	50 minimum	50 minimum
Permittivity sec^{-1}	ASTM D4491	0.70 minimum or as specified			
Apparent opening size (AOS) (mm) [3/]	ASTM D4751	0.22 maximum or as specified			

[1/] All values are minimum average roll values (MARV) in the weakest principal direction, unless otherwise noted.

[2/] Needle punched geotextiles may be used for all classes. Heat-bonded or resin-bonded geotextiles may be used for class IV only.

[3/] Maximum average roll value.

APPENDIX B

Drawing Sets

5076 Letcher – Peace Valley Road Emergency Watershed Protection (EWP)

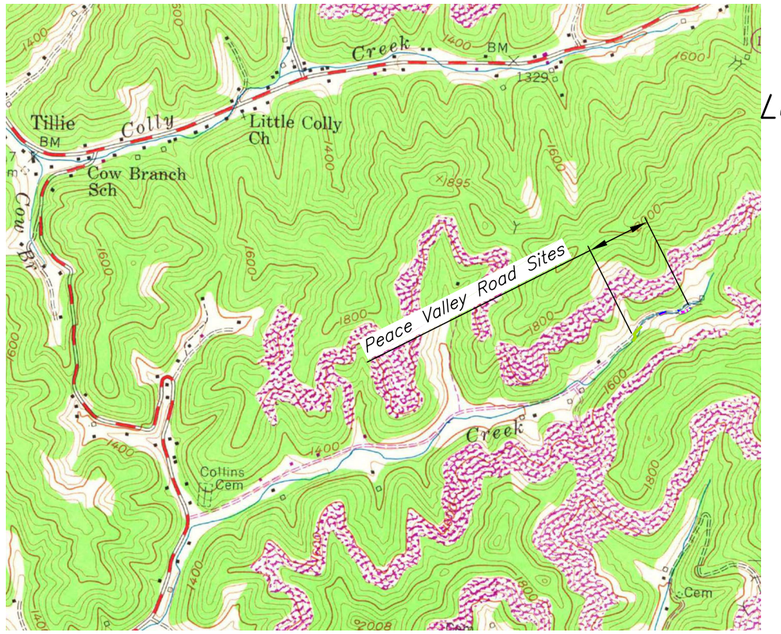
Streambank Stabilization

with the cooperation of the

Letcher County Fiscal Court; Whitesburg, Kentucky

and the

Natural Resources Conservation Service

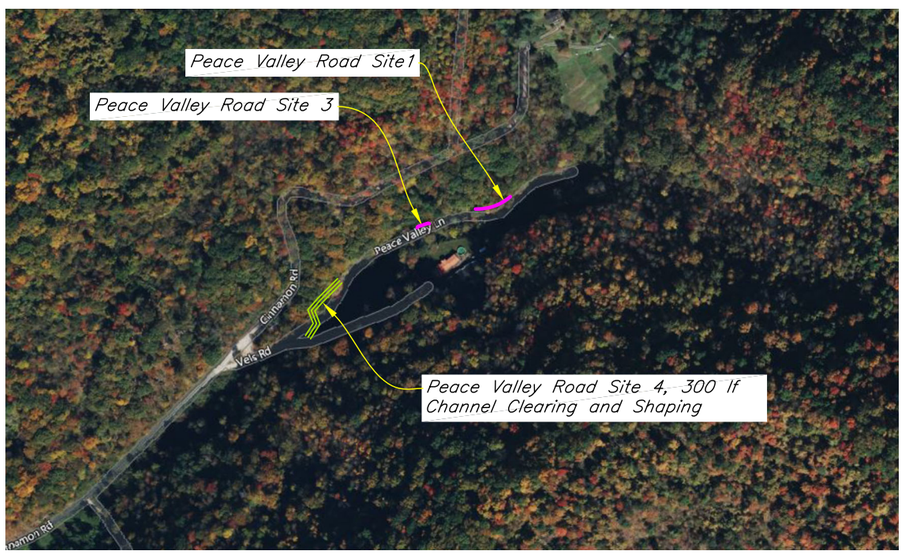


2000 0 2000 4000 6000

Scale in Feet

Vicinity Map

scale: 1" = 2,000'



500 0 500 1000 1500

Scale in Feet

Plan Map

scale: 1" = 500'

DRAWING INDEX

SHEET	DESCRIPTION
1	Cover Sheet – Vicinity & Site Maps
2	Site 1 Details
3	Site 3 Details
4	Gabion Details
5	Reno Mattress Details
6	Earthen Debris Removal Details
7	Woody or Manmade Debris Removal Details
8	Notes, Quantities and additional Grouted Steel Rail Wall (GSRW) Details

DESIGN DATA: JOB CLASS V

SCOTT SCHNEIDER Date: 2024.10.14 13:51:27 -04'00'

DESIGN APPROVED BY: DATE

AS BUILT DRAWINGS (IN RED)

_____ _____(BY)

_____ _____DATE

THIS PROJECT IS COMPLETE TO NRCS REQUIREMENTS TO THE BEST OF MY PROFESSIONAL KNOWLEDGE.

_____ _____(BY)

_____ _____DATE

Kentucky811 Know what's below. 811 before you dig.

Note: All utilities are the responsibility of the landowner and contractor. Call 811 or visit Kentucky811.org at least 2 full working days before excavation work begins. Some utilities are not part of the Kentucky 811 system. This does not relieve the landowner of the responsibility for them.

	Date
Designed K. Reed	9/24
Drawn K. Reed	9/24
Checked S. Schneider	10/24
Approved S. Schneider	10/24

DSR 21-05-23-5076-019
Peace Valley Road
COVER SHEET
Letcher County, Kentucky

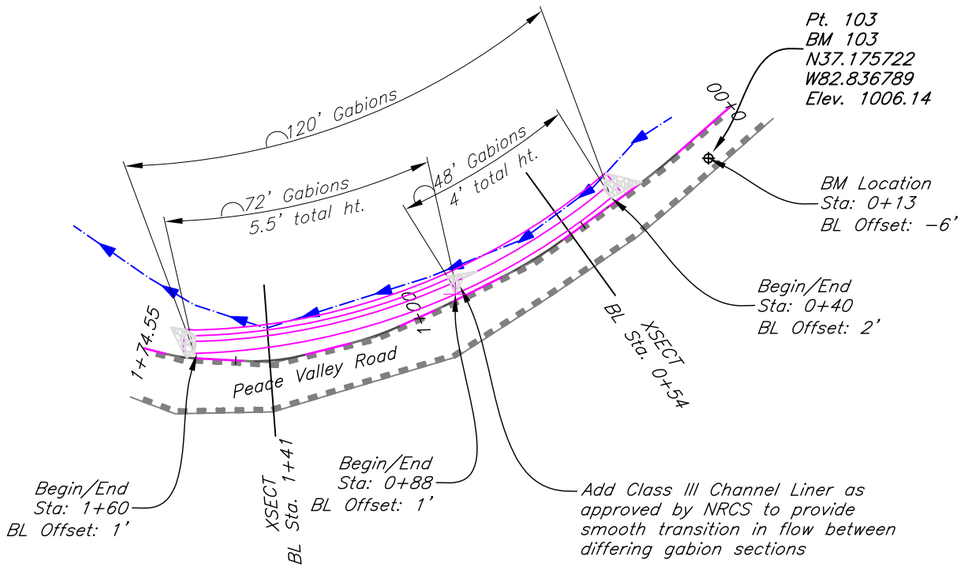
United States Department of Agriculture
USDA
Natural Resources Conservation Service

File No. Peace Valley Rd 5076-019 UTM.dwg

Drawing No. .

9/27/24 11:59 AM

Sheet 1 of 8

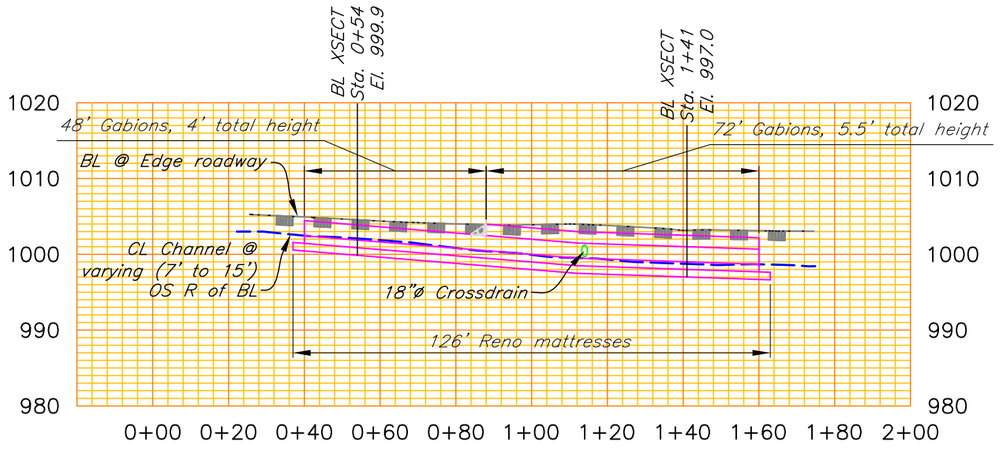


Peace Valley Road Site 1
Existing Site and Plan Map
scale: 1" = 40'

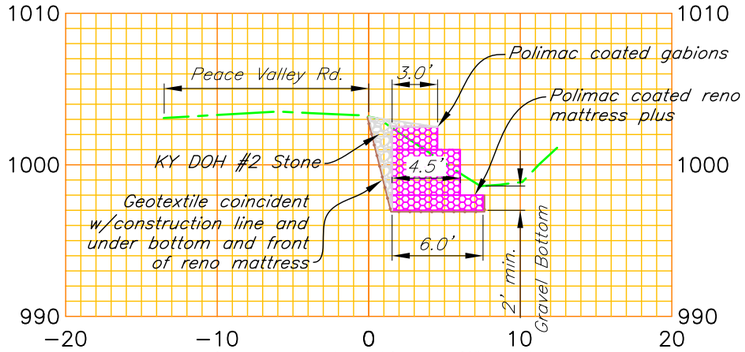


Site 1 – Photo looking downstream along impacted reach.

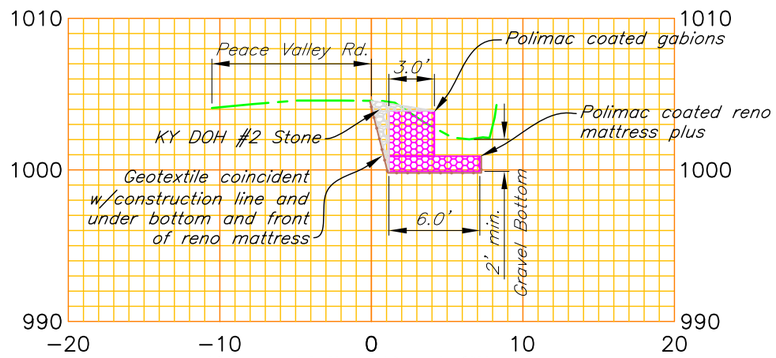
Notes:
1. Cut and fold baskets at top to match roadway elevation, if needed. Removal of top gabion basket is warranted when folding and cutting of top basket is not feasible to accommodate field conditions/edge of road elevation.
2. Extend the cross drain through the gabions with the same type pipe or better material. The added pipe shall be of a length to extend past the face of the stabilization material and shall be provided as needed by the sponsor. Install pipe in accordance with manufacturer's recommendations. Follow the gabion manufacturer's recommendations for cutting or folding gabion baskets to accommodate existing culverts/pipes extending through the wall. If a pipe can fit within a gabion basket face, it is acceptable to "X" cut gabion basket at pipe locations, bend steel mesh into inner side of gabion, insert pipe through, and use lacing wire around circle edges of steel mesh to fasten down tightly.
3. In the event that bedrock is encountered before the planned reno mattress subgrade is achieved, the bedrock will be excavated to a minimum depth of 6" for the mattress subgrade.
4. KY DOH #2 Stone will be used as backfill or top of gabion basket cap if necessary to accommodate field conditions/edge of road elevation.



Peace Valley Road Site 1 PROFILE



Peace Valley Road Site 1
BL Cross Section Sta. 1+41
Typical Detail, BL Sta. 0+88 to 1+60



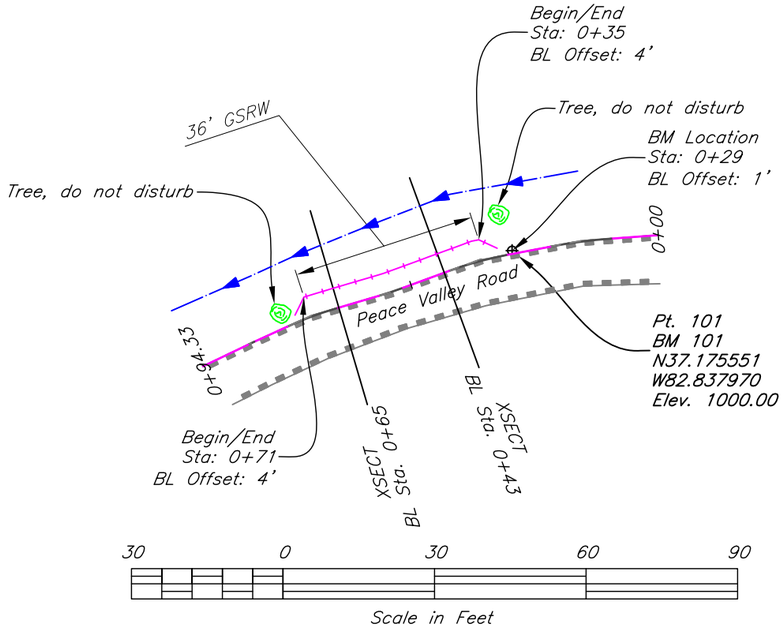
Peace Valley Road Site 1
BL Cross Section Sta. 0+54
Typical Detail, BL Sta. 0+40 to 0+88

		Date
Designed	K. Reed	9/24
Drawn	K. Reed	9/24
Checked	S. Schneider	10/24
Approved	S. Schneider	10/24

DSR 21-05-23-5076-019
Peace Valley Road
SITE 1 DETAILS
Letcher County, Kentucky

United States Department of Agriculture
Natural Resources Conservation Service

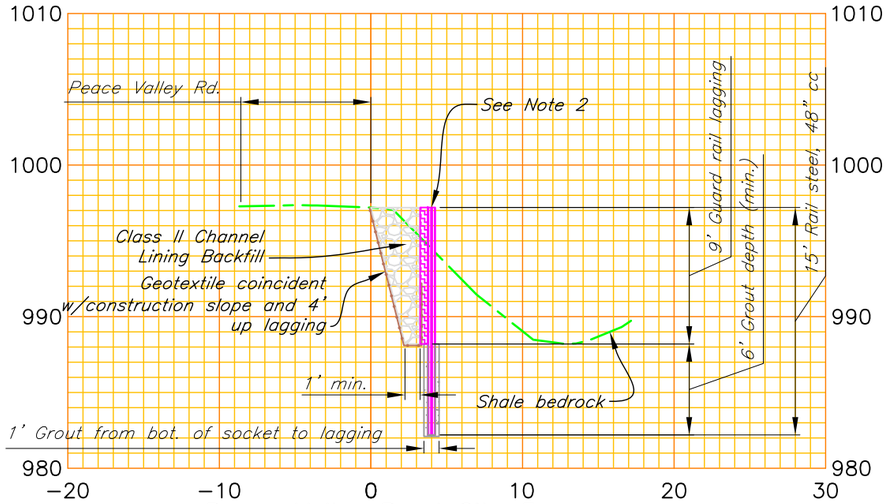
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Sheet 2 of 8



Peace Valley Road Site 3
Existing Site and Plan Map
scale: 1" = 30'



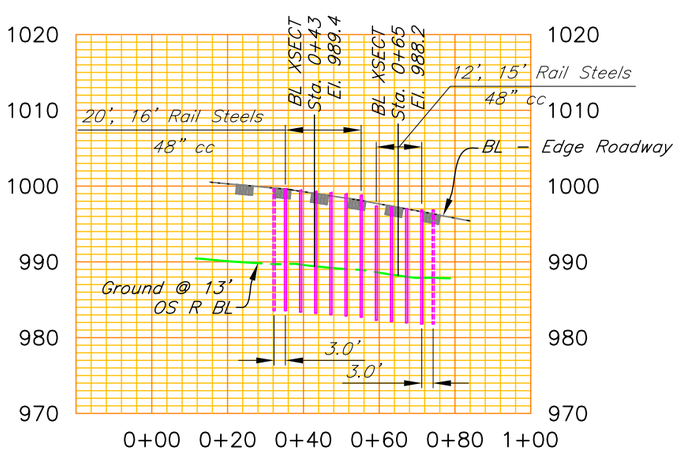
Site 3 – Photo looking downstream. Note tree toward top left in photo that is depicted in plan map at left, at the downstream extent of the planned GSRW.



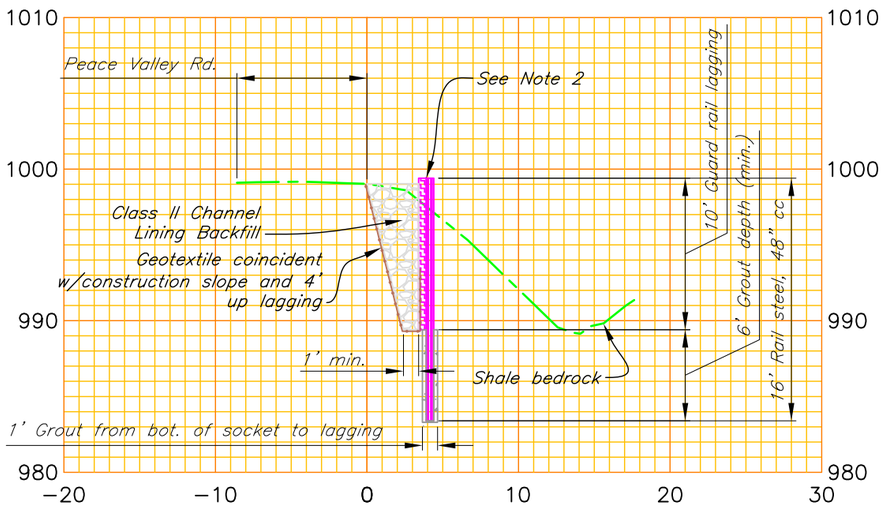
Peace Valley Road Site 3
BL Cross Section Sta. 0+65
Typical Detail, BL Sta. 0+59 to 0+71

Notes:

1. *See additional Grouted Steel Rail Wall (GSRW) Details on Sheet 8.*
2. *The depth of each drill socket will be increased as necessary to a depth at which the top elevation of the installed rail steel piling will be at the elevation of the adjacent roadway shoulder.*



Peace Valley Road Site 3 PROFILE



Peace Valley Road Site 3
BL Cross Section Sta. 0+43
Typical Detail, BL Sta. 0+35 to 0+55

		Date
Designed	K. Reed	9/24
Drawn	K. Reed	9/24
Checked	S. Schneider	10/24
Approved	S. Schneider	10/24

DSR 21-05-23-5076-019
Peace Valley Road
SITE 3 DETAILS
Letcher County, Kentucky

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Peace Valley Rd 5076-019 UTM.dwg
Drawing No.
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Sheet *3* of *8*

ASSEMBLY PROCESS FOR MACCAFERRI GABION

UNPACKING & ASSEMBLY PROCESS

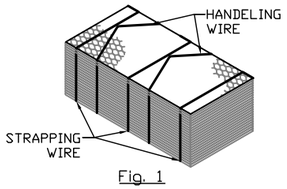


Fig. 1

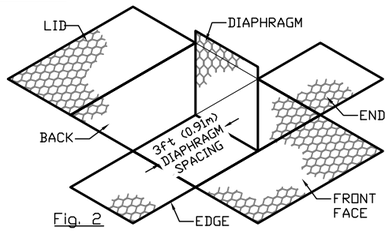
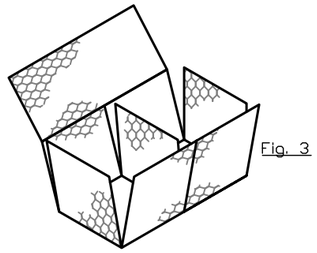


Fig. 2


Fig. 3

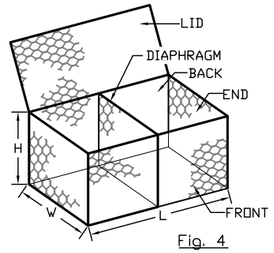
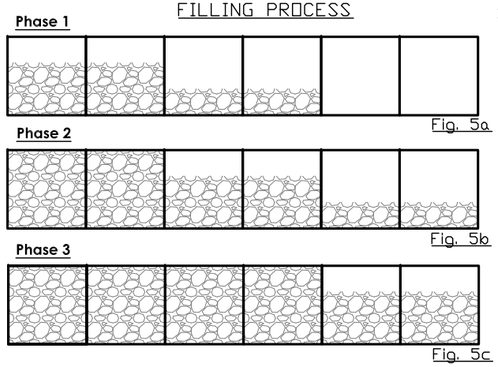


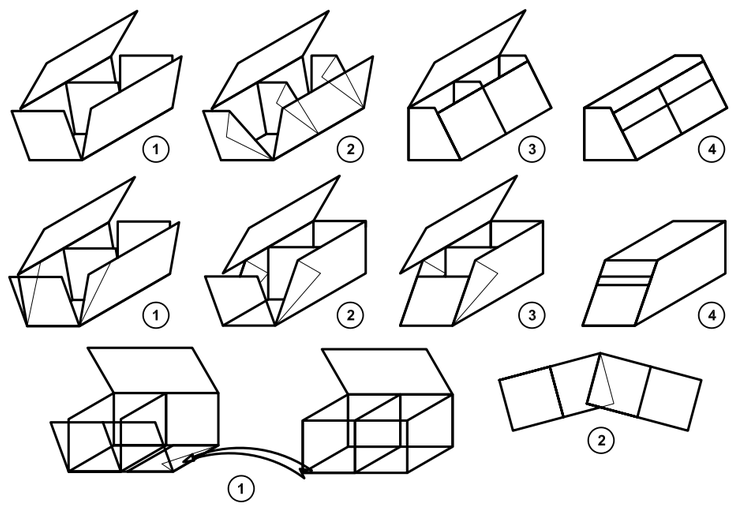
Fig. 4

1. MACCAFERRI GABIONS ARE DELIVERED TO THE JOB SITE IN BUNDLES. THEY ARE COMPRESSED AND STRAPPED IN THE FACTORY FOR EASIER SHIPPING AND HANDELING (FIG. 1).
2. OPEN AND UNFOLD THE GABIONS ONE BY ONE ON A FLAT, HARD SURFACE. ELIMINATE ALL FOLDS DUE TO THE PACKAGING (FIG. 2).
3. PULL UP THE SIDES AND THE DIAPHRAGMS TO FORM AN OPEN BOX. BE SURE THE TOP OF THE FACE AND THE SIDE ARE AT THE SAME LEVEL (FIG.3).
4. FOLD BY HAND THE END OF THE REINFORCING WIRE OF THE MAIN UNIT AND THE DIAPHRAGMS ALLOWING THE GABION TO STAND BY ITSELF (FIG.4).

FILLING PROCESS



FOLDING PROCESS



REINFORCING DETAIL

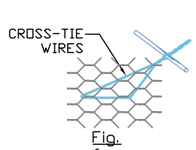


Fig. 6a

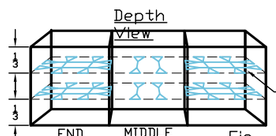


Fig. 6b

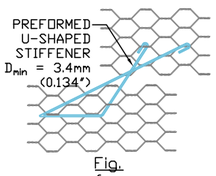


Fig. 6c

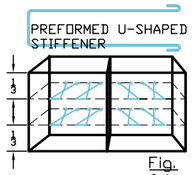


Fig. 6d

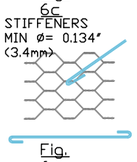
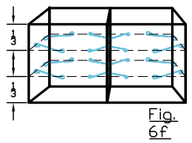


Fig. 6e


Fig. 6f

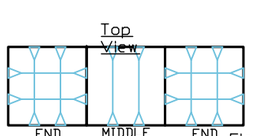


Fig. 7a

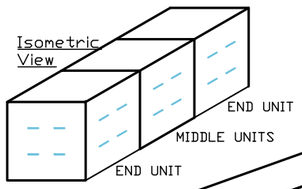


Fig. 7b

CONNECTION TECHNIQUES

EDGES ARE JOINED TOGETHER, USING THE APPROPRIATE LACING TECHNIQUES.
MANUAL: CONTINUOUS WIRE LOOPED TIGHTLY AROUND EVERY OTHER MESH OPENING, ALTERNATING SINGLE AND DOUBLE LOOPS (FIG. 8A).
MECHANICAL: USING A PNEUMATIC OR HAND POWER TOOL, EMPLOYING STAINLESS STEEL "C" SHAPED FASTENERS. FOR CONTINUITY AND STRENGTH, THE RECOMMENDED SPACING IS MAX 4 in. (100 mm) (FIG 8B).

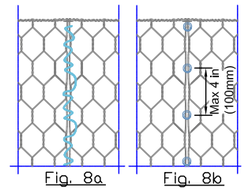
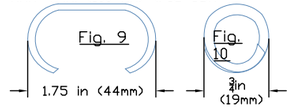


Fig. 8a
Fig. 8b



1. RING FASTENER Ø= 1.75in (44mm) OPEN AND 3/4in (19mm) CLOSED.
2. RING FASTENER HAS 170 Kg/mm² BREAKING LOAD.
3. RING FASTENER WIRE Ø= 0.120in (3mm).

LID CLOSER


Fig. 12

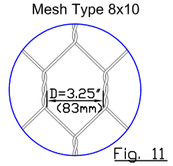
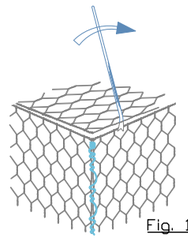
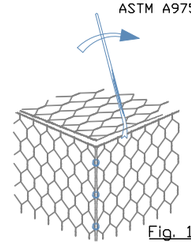
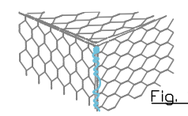


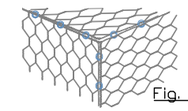
Fig. 11

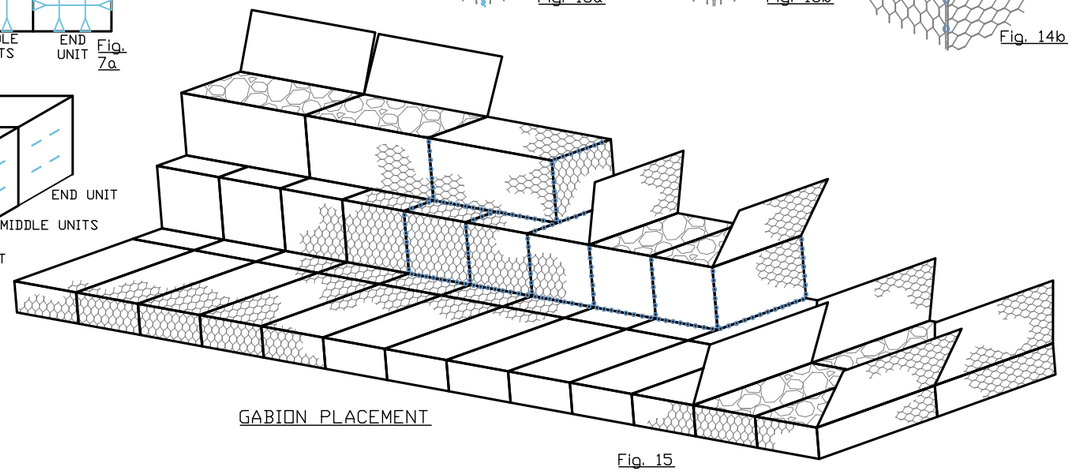
THE TOLERANCE OF THE MESH OPENING "D", (THE DISTANCE BETWEEN THE AXIS'S OF TWO PARALLEL TWISTS) IS ACCORDING TO ASTM A975.


Fig. 13a


Fig. 13b


Fig. 14a


Fig. 14b


GABION PLACEMENT
Fig. 15

Date
Designed K. Reed 9/24
Drawn K. Reed 9/24
Checked S. Schneider 10/24
Approved S. Schneider 10/24

DSR 21-05-23-5076-019
Peace Valley Road
GABION DETAILS
Letcher County, Kentucky

United States Department of Agriculture
Natural Resources Conservation Service

File No.
Peace Valley Rd 5076-019 UTM.dwg
Drawing No.
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Sheet 4 of 8

ASSEMBLY PROCESS FOR MACCAFERRI RENO MATTRESS

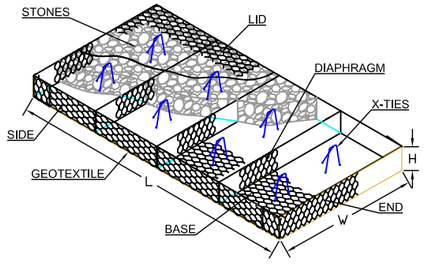


Fig.1

INSTALLATION NOTES:

1. AFTER ASSEMBLY, THE MATTRESSES ARE PLACED IN THEIR PROPER LOCATION AND SECURELY ATTACHED TO ADJACENT UNITS.
2. FOR STRUCTURAL INTEGRITY, ALL ADJOINING EMPTY UNITS SHOULD BE CONNECTED BY MEANS OF LACING WIRE OR RING FASTENERS ALONG ALL THE EDGES OF THEIR CONTACT SURFACES.
3. WHERE MATTRESSES ARE TO PLACED ON STEEP SLOPES, THE MATTRESS SHOULD BE LAID WITH THE WIDTH PERPENDICULAR TO THE SLOPE, EXCEPT FOR VERY SMALL DITCHES.
4. MATTRESS SHOULD BE PLACED AND SECURELY ATTACHED WHILE EMPTY.
5. MATTRESSES CAN CONFORM TO BENDS UP TO A RADIUS OF 60-70ft WITHOUT ALTERATION, AND PLACED TO THE REQUIRED CURVATURE FOR FILLING.
6. MATTRESSES MAY BE CUT TO FORM CURVES OR BEVELS.
7. LEVEL OFF THE FILL 1in ABOVE THE TOP OF MESH TO ALLOW FOR SETTLEMENT.
8. INSTALL 1 X-TIE/SY AND SECURE BETWEEN THE TOP AND BOTTOM MESH OF THE RENO MATTRESSES PLUS.
9. MAKE SURE THE TOP EDGES OF THE DIAPHRAGMS ARE EXPOSED.
10. LAY THE LID DOWN, PULL THE EDGES OF THE PANELS TO BE CONNECTED TOGETHER WHERE NECESSARY USING AN APPROPRIATE TOOL AS A LID CLOSER.
11. THE LIDS SHALL BE TIGHTLY LACED ALONG ALL EDGES, ENDS AND DIAPHRAGMS IN THE SAME MANNER AS ASSEMBLING .
12. ADJACENT LIDS MAY BE SECURELY ATTACHED SIMULTANEOUSLY.
13. SECURELY ATTACHED THE LIDS TO THE ENDS OF THE MATTRESSES AND THEN SECURELY ATTACH THEM TO THE SIDES, AND DIAPHRAGMS, USING ALTERNATE DOUBLE AND SINGLE LOOPS, OR RING FASTENERS.
14. IN CASES WHERE NUMBER OF ADJACENT BASES ARE TO BE COVERED AT ONE TIME, ROLLS OF MESH CAN BE USED IN PLACE OF INDIVIDUAL UNIT SIZE LIDS.
15. THE ACTUAL NUMBER AND PLACEMENT OF STAKES SHALL BE DETERMINED BY THE ENGINEER.
16. RING FASTENERS CAN BE USED INSTEAD OF, OR TO COMPLEMENT, LACING WIRE.
17. SPACING OF THE RINGS SHALL NOT EXCEED 6in.
18. GEOTEXTILE SHALL BE PLACED UNDER ENTIRE LENGTH OF RENO MATTRESS AND GABIONS.

CONNECTION TECHNIQUES

EDGES ARE JOINED TOGETHER, USING THE APPROPRIATE LACING TECHNIQUES.
MANUAL: CONTINUOUS WIRE LOOPED TIGHTLY AROUND EVERY OTHER MESH OPENING, ALTERNATING SINGLE AND DOUBLE LOOPS (FIG. 6A).
MECHANICAL: USING A PNEUMATIC OR HAND POWER TOOL, EMPLOYING STAINLESS STEEL "C" SHAPED FASTENERS. FOR CONTINUITY AND STRENGTH, THE RECOMMENDED SPACING IS MAX 6in (150mm) (FIG. 6B).

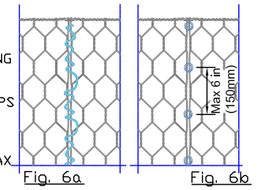


Fig. 6a Fig. 6b

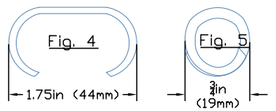


Fig. 4 Fig. 5

1. RING FASTENER ø= 1.75in (44mm) OPEN AND 3/8in (19mm) CLOSED.
2. RING FASTENER HAS 170 Kg/mm² BREAKING LOAD.
3. RING FASTENER WIRE ø= 0.120in (3mm).

Mesh Type 6x8

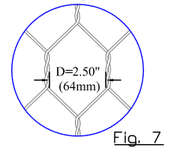


Fig. 7

THE TOLERANCE OF THE MESH OPENING 'D', (THE DISTANCE BETWEEN THE AXIS'S OF TWO PARALLEL TWISTS) IS ACCORDING TO ASTM A975.

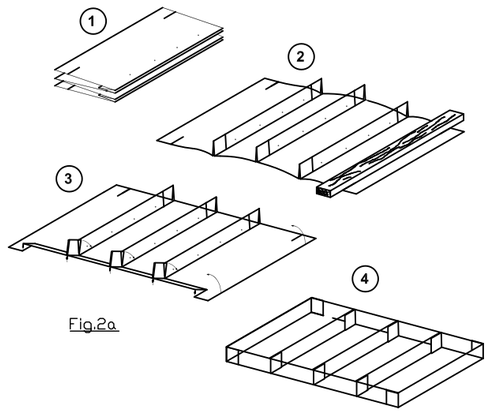


Fig.2a

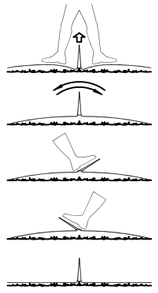


Fig.2b



Fig.2c – X-TIE

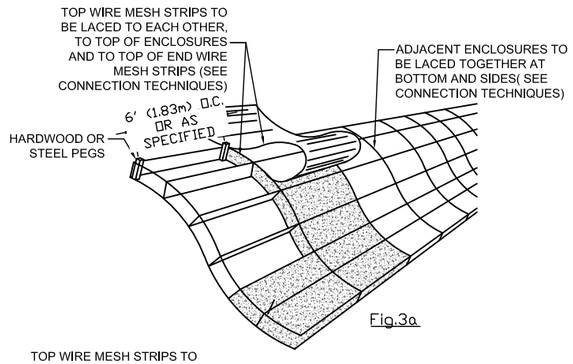


Fig.3a

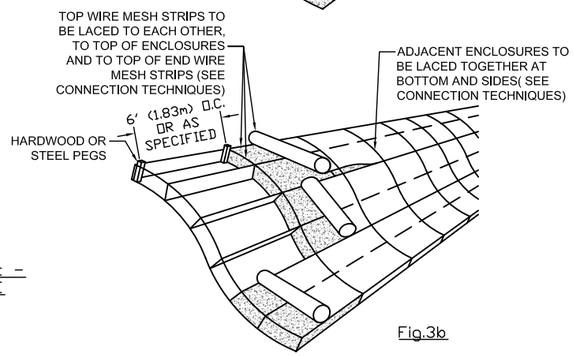
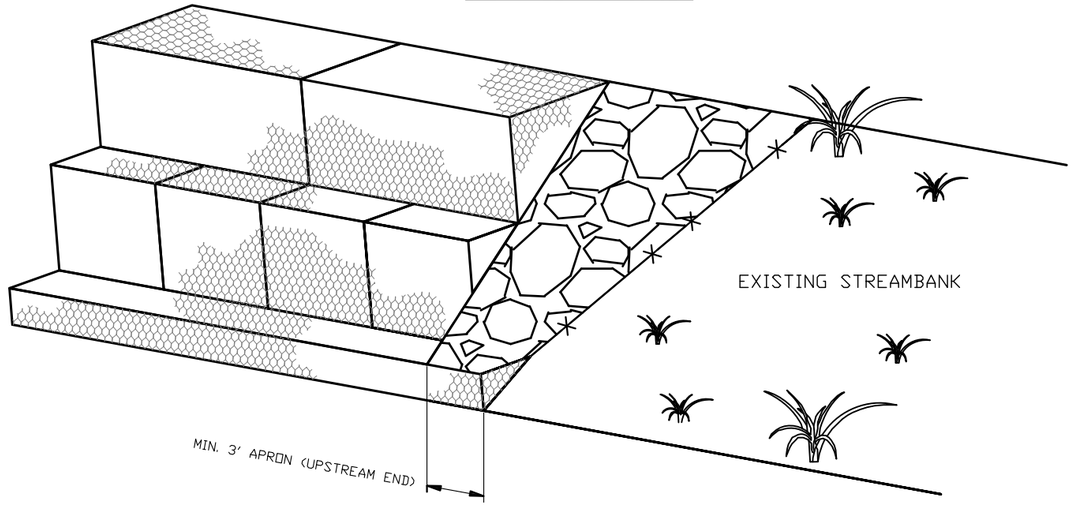


Fig.3b

END WALL TRANSITION



Designed	K. Reed
Drawn	K. Reed
Checked	S. Schneider
Approved	S. Schneider
Date	9/24 / 9/24 / 10/24 / 10/24

DSR 21-05-23-5076-019
Peace Valley Road
RENO MATTRESS DETAILS
Letcher County, Kentucky

United States Department of Agriculture
Natural Resources Conservation Service

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Peace Valley Rd 5076-019 UTM.dwg
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EARTHEN DEBRIS REMOVAL DETAILS:

1. CLEAN OUT LIMITS WILL BE AS DETAILED ON THIS SHEET, SHOWN ON DRAWINGS AND AS DETERMINED BY NRCS REPRESENTATIVES DURING CONSTRUCTION. CLEAN OUT ACTIVITIES ARE TO INCLUDE THE REMOVAL OF NOTICEABLE CONCENTRATED ACCUMULATIONS OF EARTHEN DEBRIS CONSISTING OF SEDIMENT, GRAVEL, ROCK AND OTHER EARTHEN DEBRIS CAUSING BLOCKAGE OF FLOW WITHIN THE IDENTIFIED REACH. OTHER RANDOM SITES OF EARTHEN DEBRIS ARE SCATTERED THROUGHOUT THE IDENTIFIED REACH THAT ARE TO BE REMOVED.

2. EARTHEN DEBRIS WILL NOT BE REMOVED BELOW THE "PRE–STORM" GROUND LINE, BOTTOM OF CULVERTS AND TOP OF BRIDGE PIER FOOTERS.

3. REMOVE EARTHEN DEBRIS TO ORIGINAL GRADES AND SHAPE TO ALLOW FOR POSITIVE DRAINAGE.

4. DURABLE STONE WITHIN WORK LIMITS WITH A DIAMETER GREATER THAN 12" MAY BE PLACED IN RECENT SCOUR HOLES AND ERODED HOLES IN BANK PROVIDING THAT THE CHANNEL FLOW IS NOT CONSTRICTED.

5. EARTHEN DEBRIS AND SEDIMENT FROM STREAM FLOW AND EARTHEN SLIDES WILL BE REMOVED AS DETERMINED BY NRCS REPRESENTATIVES DURING CONSTRUCTION.

6. WHEN EARTHEN DEBRIS REMOVAL OCCURS ADJACENT TO OR IN CLOSE PROXIMITY TO AN EXISTING BRIDGE OR CULVERT, EXTREME CARE SHOULD BE TAKEN NOT TO DISTURB ANY COMPONENT OF THE BRIDGE SPAN, BRIDGE ABUTMENTS, OR BRIDGE PIERS. ANY DAMAGE TO THE BRIDGES, CULVERTS, OR OTHER STRUCTURES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SPONSOR.

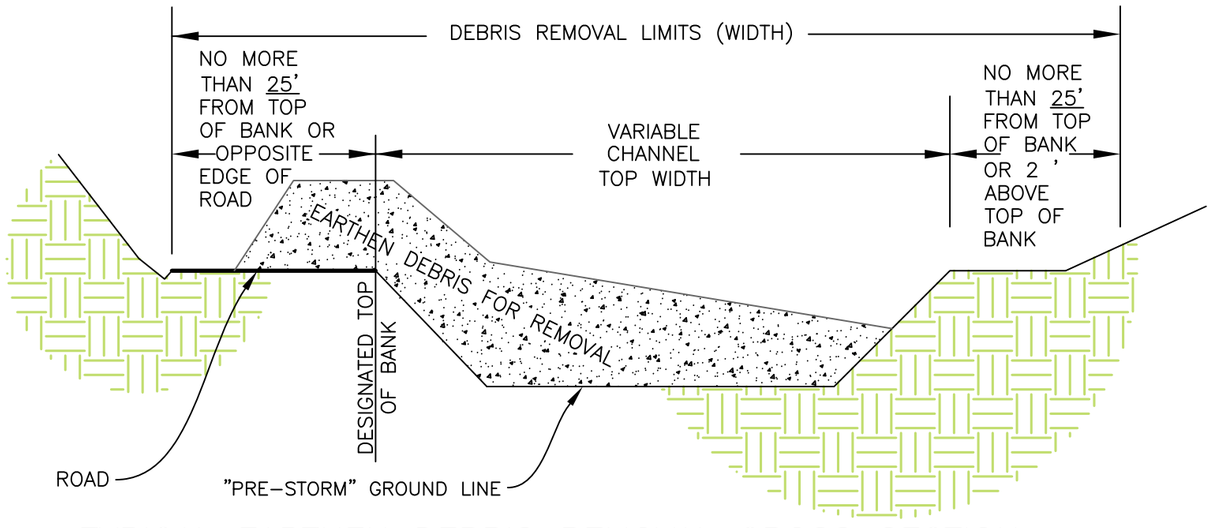
7. EARTHEN DEBRIS WILL BE REMOVED BY THE "ONE STEP" REMOVAL PROCESS. HEAVY EQUIPMENT WILL OPERATE FROM THE TOP OF THE BANK AS MUCH AS POSSIBLE TO MINIMIZE ENVIRONMENTAL DAMAGES AND HELP PREVENT FUTURE EROSION AND NOT BE POSITIONED IN THE CHANNEL DURING EARTHEN DEBRIS REMOVAL.

8. IN NO CASE SHALL EARTHEN DEBRIS BE DISPOSED OF AT OR BELOW THE 100–YEAR FLOODPLAIN. EARTHEN DEBRIS WILL BE HAULED TO A DISPOSAL SITE DESIGNATED BY A SPONSOR OR AS SHOWN ON THE DRAWINGS, AND APPROVED BY A GOVERNMENT REPRESENTATIVE.

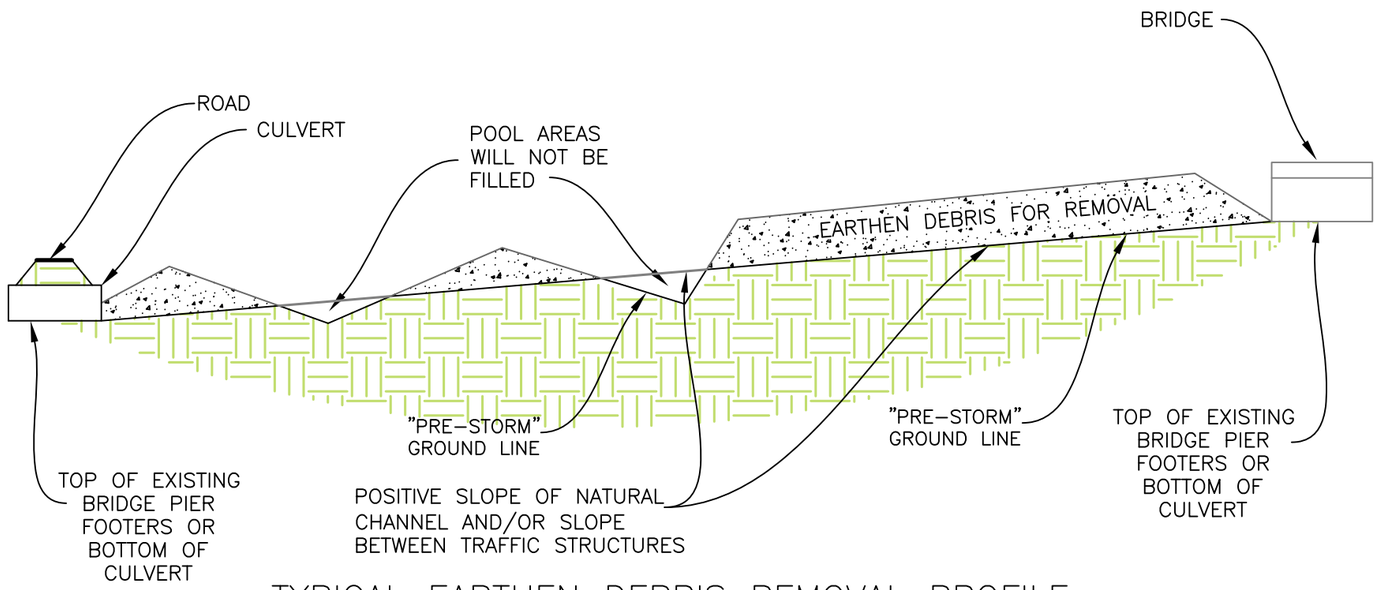
9. ACCESS ROADS THROUGH WOODLAND WILL BE THE MINIMUM WIDTH THAT ALLOWS NEEDED EQUIPMENT TO SAFELY PASS TO THE WORK AREA.

10. APPLY VEGETATIVE TREATMENT TO ALL AREAS DISTURBED DURING CONSTRUCTION IN ACCORDANCE WITH CONSTRUCTION SPECIFICATION 6.

APPROXIMATELY 300 LF OF EARTHEN DEBRIS FOR REMOVAL IN CHANNEL, CULVERT ENTRANCES, BRIDGE ENTRANCES AND FLOODWAYS AS NEEDED AND OR MARKED IN FIELD. See Sheet 7 for additional detail.



TYPICAL EARTHEN DEBRIS REMOVAL CROSS SECTION



TYPICAL EARTHEN DEBRIS REMOVAL PROFILE

NTS

		Date
Designed	K. Reed	9/24
Drawn	K. Reed	9/24
Checked	S. Schneider	10/24
Approved	S. Schneider	10/24

DSR 21–05–23–5076–019
Peace Valley Road
EARTHEN DEBRIS REMOVAL DETAILS
Letcher County, Kentucky

United States Department of Agriculture
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WOODY AND MAN MADE DEBRIS REMOVAL DETAILS:

1. CLEAN OUT LIMITS WILL BE AS DETAILED ON THIS SHEET AND AS DETERMINED BY NRCS REPRESENTATIVES. CLEAN OUT ACTIVITIES ARE TO INCLUDE THE REMOVAL OF NOTICEABLE CONCENTRATED ACCUMULATIONS OF UPROOTED TREES, TREE TRUNKS, TREE LIMBS, BEAVER DAMS AND OTHER MANMADE OR WOODY DEBRIS CAUSING BLOCKAGE OF FLOW WITHIN THE IDENTIFIED REACH(S). THERE ARE ALSO OTHER RANDOM TREES AND WOODY DEBRIS SCATTERED THROUGHOUT THE IDENTIFIED REACH THAT ARE TO BE REMOVED.

2. TREES AND SHRUB REMOVAL SHOULD BE TARGETED FOR REMOVAL ONLY WHEN THEY INHIBIT CONSTRUCTION, CAUSE A SAFETY HAZARD WITHIN THE WORK LIMITS, OR ARE ALREADY FELLED, SEVERELY DISLODGED OR DOWN.

3. CARE SHOULD BE TAKEN NOT TO REMOVE OR DAMAGE LIVE AND ROOTED TREES AND MINIMIZE THE STRIPPING OF ALL VEGETATION FROM THE BANKS DURING THE REMOVAL PROCESS. SEE CONSTRUCTION SPECIFICATION 4 FOR INDIANA BAT TREE REMOVAL REQUIREMENTS.

4. EVERY EFFORT WILL BE MADE TO KEEP ROOT BALLS ALONG CREEK BANKS WHERE A GREATER RISK FOR STREAM FLOW EROSION OCCURS. IF POSSIBLE CUT OFF ROOT BALL, LEAVE NO MORE THAN 24" OF STUMP, FLIP ROOT BALL IN TO ROOT BALL SOCKET AND PRESS IN WITH EQUIPMENT.

5. HEAVY EQUIPMENT WILL OPERATE FROM THE TOP OF THE BANK AND NOT BE ALLOWED TO WORK IN THE CHANNEL TO MINIMIZE ENVIRONMENTAL DAMAGES AND HELP PREVENT FUTURE EROSION.

6. ACCESS ROADS THROUGH WOODLAND WILL BE THE MINIMUM WIDTH THAT ALLOWS NEEDED EQUIPMENT TO SAFELY PASS TO THE WORK AREA.

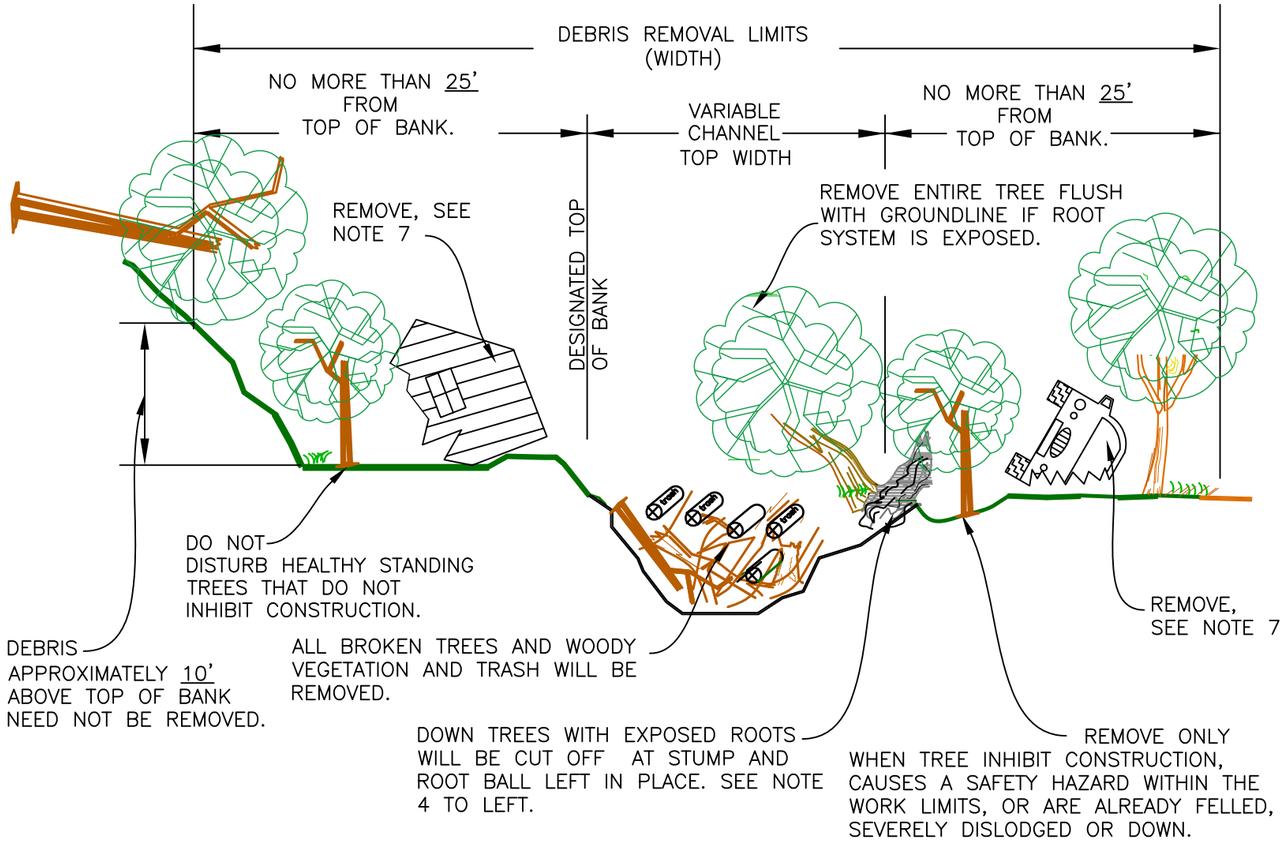
7. ANY MAN-MADE MATERIAL OR NATURAL MATERIAL OF SALVAGEABLE VALUE TO SPONSOR OR LANDOWNER WILL BE MOVED, DISPOSED OF, OR SECURED IN A MANNER AGREEABLE TO SPONSOR, LANDOWNER, GOVERNMENT REPRESENTATIVE, INSURANCE PROVIDER AND CONTRACTOR. EXAMPLES WOULD BE MARKETABLE TIMBER OR DAMAGED AUTOS.

8. APPLY VEGETATIVE TREATMENT TO ALL AREAS DISTURBED DURING CONSTRUCTION IN ACCORDANCE WITH CONSTRUCTION SPECIFICATION 6.

9. WOODY DEBRIS REMOVED FROM THE REACH WILL BE HAULED TO A DISPOSAL SITE DESIGNATED BY THE SPONSOR OR AS SHOWN ON THE DRAWINGS, AND APPROVED BY A GOVERNMENT REPRESENTATIVE. IF WOODY DEBRIS IS BURNED ON SITE, IT WILL BE DONE IN ACCORDANCE WITH ALL LOCAL AND STATE BURN REGULATIONS. NO BURNING IN CHANNEL WILL TAKE PLACE.

10. MAN-MADE DEBRIS, TRASH AND HAZARDOUS DEBRIS REMOVED FROM THE REACH WILL BE DISPOSED IN A DESIGNATED LANDFILL SITE OR OTHER METHOD AS DETERMINED BY LOCAL SOLID WASTE COORDINATOR AND ABOVE OF THE 100-YEAR FLOODPLAIN.

APPROXIMATELY 300 LF OF WOODY AND MAN MADE DEBRIS FOR REMOVAL IN CHANNEL, CULVERT ENTRANCES, BRIDGE ENTRANCES AND FLOODWAYS AS NEEDED AND OR MARKED IN FIELD.



TYPICAL WOODY AND MAN MADE DEBRIS REMOVAL CROSS SECTION

11. BRIDGE/CULVERT DEBRIS REMOVAL. WHEN DEBRIS REMOVAL OCCURS ADJACENT TO OR IN CLOSE PROXIMITY TO AN EXISTING BRIDGE OR CULVERT, EXTREME CARE SHOULD BE TAKEN NOT TO DISTURB ANY COMPONENT OF THE BRIDGE SPAN, BRIDGE ABUTMENTS, OR BRIDGE PIERS. ANY DAMAGE TO THE BRIDGES, CULVERTS, OR OTHER STRUCTURES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SPONSOR.

12, FOR EARTHEN DEBRIS REMOVAL SEE SHEET ON EARTHEN DEBRIS REMOVAL.



Site 4 - photo showing general condition of the stream channel.

NTS

Designed	K. Reed	Date 9/24
Drawn	K. Reed	9/24
Checked	S. Schneider	10/24
Approved	S. Schneider	10/24

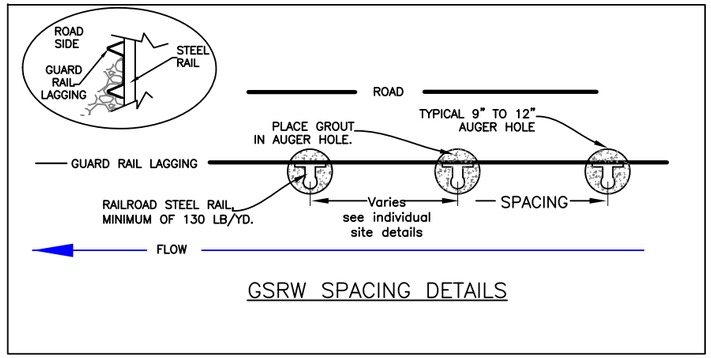
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Peace Valley Road
WOODY OR MANMADE DEBRIS REM. DET.
Letcher County, Kentucky

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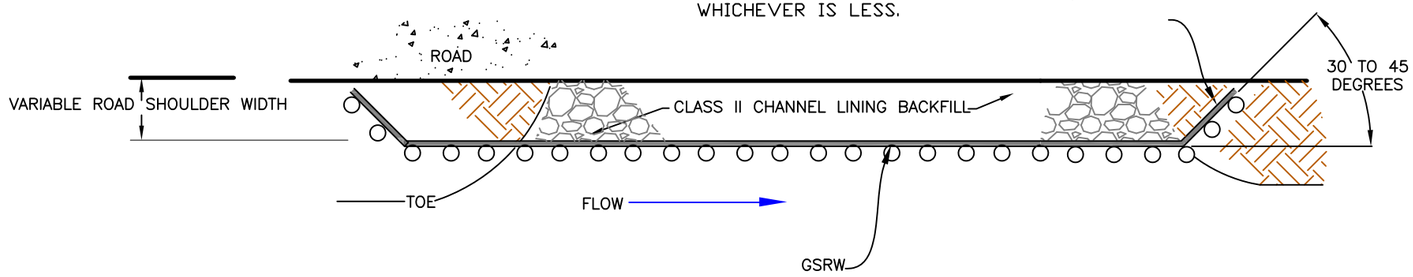
Notes:

1. *Any access roads (whether on public or private property) damaged during construction will be restored to pre-construction conditions or better.*
2. *Any fences or other improvements removed and/or damaged during construction shall be restored to a condition equal to or better than their pre-existing condition.*
3. *Soil compacted as a result of construction operations shall be loosened to a depth of 6" below surface and re-graded to blend with existing ground and to a slope promoting positive drainage.*
4. *Any work performed in or adjacent to the stream will be completed without having the construction equipment within flowing water. Any woody debris or sediment removed from within the channel flow area will be removed by the "one step" removal process.*
5. *All materials obtained from the specified sub-grade preparations and/or sediment/debris removal operations shall be wasted off site in accordance with all local, state and federal regulations and as approved by the NRCS representative assigned to the site.*
6. *Any man made debris removed from the site(s), such as tires, building materials, abandoned pipe and etc., shall be disposed of at an approved landfill. The contractor will be responsible for any landfill tipping fees.*
7. *All cross drains encountered in stabilization reaches shall be extended through the rail wall lagging, gabions and/or loose rock riprap with the same type pipe or better material. The added pipe shall be of a length to extend past the face of the stabilization material and shall be provided as needed by the sponsor.*
8. *The contractor shall maintain the cleanliness of impacted roadways during construction in a manner that dust is suppressed and mud does not accumulate.*
9. *All work shall be completed in a professional and conscientious manner toward protecting all waters of the US, in providing a safe working environment for employees, in providing an acceptable environment for residences within the area (e. g., noise pollution, air pollution, etc.) and maintaining traffic control in accordance with applicable Kentucky Department of Highways publications concerning traffic control in work zones and safety in general.*



GSRW SPACING DETAILS

TERMINATE WALL AT AN ANGLE BETWEEN 30 AND 45 DEGREES INTO STABLE SLOP AT ENDS OF WALL. INSTALL GUARD RAIL LAGGING TO TOPOF ROCK OR 2' BELOW STREAMBED, WHICHEVER IS LESS.



GSRW – TYPICAL OF END DETAILS

GROUTED STEEL RAIL WALL (GSRW)
TYPICAL DETAILS
SEE SITE SHEETS FOR SPACING, RAIL LENGTH AND GSRW ENDS

NOT TO SCALE (NTS)

List of Estimated Quantities

Site	Begin Sta.	End Sta.	Channel Clearing and Shaping (LF)	Rock Riprap, Class III Channel Liner (tons)	Rock Riprap, Class II Channel Liner, Gabion Rock (tons)	Rock Riprap, Class II, GSRW Backfill (tons)	Gabions, 1' Reno Mattresses* (CY)	Gabions* (CY)	KY DOH #2 Stone Backfill (tons)	15' Rail Steel (ea)	16' Rail Steel (ea)	Guard Rail Lagging (sf)	Concrete Grout (cy)	Geotextile (SY)
Site 1, Reach 1	*0+40*	*0+88*		*0*	*41*		*11.3*	*16*	*8.3*					*74*
Site 1, Reach 2	*0+88*	*1+60*		*0*	*97*		*16.7*	*48*	*19.8*					*119*
Site 3, Reach 1	*0+35*	*0+55*		*30*		*32*					*7*	*280*	*1.1*	*46*
Site 3, Reach 2	*0+59*	*0+71*		*15*		*19*				*4*		*180*	*0.7*	*31*
Site 4			*300*											
Totals			*300*	*45*	*138*	*51*	*28.0*	*64*	*28.1*	*4*	*7*	*460*	*1.8*	*270*

**For estimating purposes only. Actual number of gabion baskets to be determined by manufacturer.*

		Date
Designed	K. Reed	9/24
Drawn	K. Reed	9/24
Checked	S. Schneider	10/24
Approved	S. Schneider	10/24

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