Blaine County

2019 Road Construction Standards

Prepared by:

Blaine County Engineer

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SECTION 1 – GENERAL PROVISIONS

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. That all Blaine County road construction shall be in accordance with these Blaine County Road Construction Standards; the approved construction plans as prepared by a Licensed Engineer; and all applicable federal, state, and other local regulations and specifications, the more stringent of any of these shall be the controlling standards and specifications.

1.1.2. Requirements and limitations for fire prevention and protection, public safety and convenience, access for emergency and postal services, utilities property and services, land monuments, lines and grades, access by reviewing officials, cleanup, convenience and sanitary facilities, explosives, right-of-way, and other applicable drawings and specifications.

1.2. RELATED DOCUMENTS

1.2.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Technical Specification sections, apply to work of this section, and approved by the County Engineer, when necessary.

1.2.2. Idaho Standards for Public Works Construction, current edition

1.2.3. ITD "Standard Specifications for Highway Construction," current edition

1.2.4. AASHTO "Guide for the Planning, Design, and Operation of Bicycle Facilities," current edition

1.2.5. Blaine County Road Construction, Subdivision, and Zoning Standards and Ordinances.

1.3. DEFINITIONS

1.3.1. With regard to the construction and interpretation of these Standards, and unless clearly stated otherwise in the project plans, specifications , or reference documents, the following words and phrases shall have the definitions set forth below.

1.3.1.1. **Applicant**: The individual, firm, corporation, or governmental entity desiring to be issued a permit, and upon issuance, the permittee. References to the "Contractor," "Developer," and "permittee," all include within the meaning of each the "Applicant."

1.3.1.2. **Approved Construction Plans**: The official drawings, supplemental drawings, and shop drawings approved by the County Engineer, or exact reproductions thereof, showing location, character, dimensions, and details of the work to be completed.

1.3.1.3. **Contractor**: The individual, firm, corporation, or governmental entity undertaking the work for which an application for permit has been submitted to, and issued by the County.

1.3.1.4. **Contract Documents**: The contract, including any Advertisement for Bids, Instructions to Bidders, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, Notice of Award, Notice to Proceed, Change Orders, Drawings, Specifications, and Addenda.

1.3.1.5. **Or Equal**: In order to establish a basis of quality for some things in the work, certain processes, types of machinery and equipment, or kinds of materials may be mentioned by designating a manufacturer by name, and referring to his brand or model numbers. Such mention is not intended to exclude other processes, equipment, or materials that will meet the designated standards of the particular product specified. If the Contractor desires to use other products as equal thereto, he shall first secure the approval of the Engineer before entering an order. Wherever in the Specifications a manufacturer's name brand or

model is mentioned, it is to be understood that the phrase "or equal" is assumed to follow thereafter, whether in fact, it does or does not.

1.3.1.6. **County**: Blaine County Idaho, 206 1st Avenue South, Hailey, Idaho 83333.

1.3.1.7. **County Engineer**: The Engineer of Blaine County, Idaho, or authorized consulting engineer acting within the authority delegated by the County Commissioners.

1.3.1.8. **County Inspector**: The duly authorized representative of the Blaine County Commissioners or Manager.

1.3.1.9. **Engineer**: An engineer, duly licensed by the State of Idaho, working for the Applicant, or the engineer's authorized agent acting on behalf of, and under the direction of the engineer.

1.3.1.10. **Guarantee**: Work completed under these Standards shall be guaranteed free of defect by the Contractor for a period of two (2) years.

1.3.1.11. **Manager**: The Blaine County Road & Bridge Department Manager.

1.3.1.12. **Record Drawings**: The official drawings, supplemental drawings, and shop drawings, or exact reproductions thereof, showing the location, dimensions, elevations, and details of the work, as completed.

1.3.1.13. **Shop Drawings**: All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the Contractor, manufacturer, supplier, or distributor, which illustrate how specific portions of the work shall be fabricated or installed.

1.3.1.14. **Specifications:** A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship required to complete the work.

1.3.1.15. **Standards**: All pre-approved drawings, details, specifications and test methods of the County, a society, association, or organization, referenced in the Contract Drawings.

1.3.1.16. **Road**: shall include the terms "road," "roadway," "highway," and similar words for access of rights-of-way.

1.3.1.17. **Supplier:** - Any person or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.

1.3.1.18. **Traffic Control:** The management of traffic within the project area including vehicular, pedestrian, bicycle, etc. Traffic control may be accomplished by flagmen or traffic control devices. These devices are, but not limited to: fixed or portable signs, signals, road lights, barricades, guard rails, pavement markings, channelization and other equipment or materials used for the purpose of regulating, warning and guiding traffic. All traffic control shall be governed by the Manual on Uniform Traffic Control Devices (MUTCD).

1.3.1.19. **Work**: All labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the project.

1.3.1.20. **Written Notice**: Any notice to any party of the work, relative to any part of the work, in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the work.

1.4. SUBMITTALS (NOT USED)

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION

3.1. EXAMINATION

3.1.1. Blaine County Road Construction, Subdivision, and Zoning Standards and Ordinances shall control the requirements for location, widths, and maintenance of roads, public and private.

3.1.2. Blaine County recognizes these Standards may not cover all situations that might be encountered. Any supplemental specifications necessary for the proper construction of a specific project shall be provided by the Contractor and approved by the County Engineer, at no expense to the County.

3.1.3. Any reference in these Standards to approvals required by the "Engineer" or to construction techniques or methods requiring "Engineer" approval that have an impact on compliance with County Standards and specifications shall require the approval of the County Engineer, as well as the Project Engineer.

3.1.4. Whenever these specifications refer to any method, product, or material that is manufactured, sold, or distributed by a single source provider, the Contractor may substitute an equivalent method, product, or material, with the approval of the County Engineer.

3.2. RESPONSIBILITIES AND LIMITATIONS

3.2.1. Lines and Grades: The Contractor shall establish lines and grades as necessary for basic layout. All stakes, marks, and other information shall be carefully preserved by the Contractor, and in case of their careless or unnecessary destruction or removal the Contractor, such stakes, marks, and other information will be replaced at no cost to the County.

3.2.2. Utility Markers: The Contractor shall have all utilities marked and protect all utility markers. Any destroyed or damaged markers shall be accurately relocated by the Contractor at the Contractor's expense to the satisfaction of the County, and the utility representative, when applicable.

3.2.3. Land Monuments: The Contractor shall preserve or replace all existing Federal, State, City, County, and Private Land Monuments. Any such monuments which are disturbed or destroyed by the Contractor shall be replaced by a licensed Land Surveyor at the expense of the Contractor.

3.2.4. Access by Officials: Authorized representatives of the County shall, at all times, have access to the Work wherever in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

3.2.5. Fire Prevention and Protection: The Contractor shall perform all work in a fire safe manner. He shall supply and maintain on the site adequate firefighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable local and state fire prevention regulations and where the regulations do not cover, with applicable parts of the National Fire Prevention Standard for safeguarding building construction operations. (NFPA No. 241).

3.2.6. Public Safety and Convenience: All construction shall be scheduled so that a minimum of inconvenience will result to the public. The Contractor shall comply with all rules and regulations of the State of Idaho, Blaine County, and other local jurisdiction authorities regarding the closing of public roads, highways, or trails to public use. No road or trail shall be closed to the public except by express permission of the owner. The Contractor shall conduct the work so as to assure the least possible obstruction to traffic and normal commercial pursuits and protect all obstructions within traveled roadways by approved signs, barricades, and lights where necessary for the safety of the public. The convenience of the general public and residents adjacent to the project, and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner. The Contractor shall use every reasonable precaution to safeguard the

persons and property of the traveling public. The Contractor has the sole responsibility to furnish, place, and maintain those barricades, barriers, lights, flares, danger signals, and watchmen as are necessary to protect the persons and property of the traveling public. All barricades and obstructions shall be protected at night by signal lights which shall be suitably distributed and kept burning from sunset to sunrise. Whenever the Contractor's operations create a hazardous condition, the Contractor shall furnish flagmen and guards as necessary or as ordered by the Manger to give adequate warning to the public of any dangerous conditions to be encountered. Flagmen and guards, while on duty and assigned to give warning to the public, shall wear approved apparel and use red or orange flags which shall be kept clean and in good repair.

3.2.7. Responsibility for Utility Property and Service: At points where the Contractor's operations could cause damage which might result in considerable expense, loss and inconvenience when operations are adjacent to or near telephone, television, power, oil, gas, water, sewer, irrigation, or other private or municipal systems, the operations shall be suspended until all arrangements necessary for the protection thereof have been made by the Contractor. Notify all utility offices that are affected by the construction operation at least 48 hours in advance. Under no circumstances expose any utility without first requesting permission and being granted permission to do so from the effected agency. Once permission has been granted, locate, if necessary and expose all existing underground utilities in advance of the trenching operation. In the event of interruption to domestic water, sewer, storm drain, or to other utility service as a result of accidental breakage, or as a result of being exposed or unsupported, promptly notify the proper authority. Cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval is received. Where irrigation systems are encountered, normal water flow shall not be interrupted unless written approval is received in advance by all parties affected, and a copy of the written approval is provided to the Manager.

3.2.8. Access for Emergency and Postal Services: Whenever the Contractor's operations create a hazardous condition, he shall furnish flagmen and guards as necessary or as ordered by the Manager to give adequate warning to the public of any dangerous conditions to be encountered. Flagmen and guards, while on duty and assigned to give warning to the public, shall wear approved apparel and use red or orange flags which shall be kept clean and in good repair. The Contractor shall leave his night emergency telephone number or numbers with the Sheriff's Office, so that the contact may be made easily at all times in case of barricade and flare trouble or other emergencies. Maintain Postal Service Facilities in accordance with the requirements of the U.S. Post Office Department. Move mailboxes to temporary locations designated by the Post Office Department, and at the completion of the work in each area, replace them in their original location and in a condition satisfactory to the U.S. Post Office Department

3.2.9. Convenience and Sanitary Facilities: The Contractor shall furnish all necessary convenience and sanitary facilities during the course of construction and shall bear all costs thereof. The services include, but are not necessarily limited to: water, sanitary facilities, power and telephone, if applicable, and related services.

3.2.10. Explosives: The use of explosives is not anticipated as part of typical County road projects. If the need for the use of explosives arises, the Contractor shall notify the Manger prior to implementing the use of explosives. In general with regards to the use of explosives, the Contractor shall exercise the utmost care not to endanger life or property. The method of storing and handling explosives and highly inflammable materials shall comply with all Federal, State and local laws and regulations. The Contractor shall be responsible for any damage resulting from the use of explosives. The Contractor shall furnish and erect special signs to warn the public of his blasting operations. Such signs shall be placed at appropriate points within and near the site, and shall be maintained so as to be clearly evident to the public, and if blasting is by means of an electrical detonator, shall include a warning

statement to have radio transmitters turned off. All explosives shall be stored in a secure manner, under lock, in compliance with Federal, State and local laws and regulations, and all such storage places shall be marked clearly "Danger - Explosives."

3.2.11. Right-of-Way: The Contractor shall confine his operations to the limits of the public right-of-way and/or property and easements as furnished by the County, unless the Contractor, at his own expense, obtains the right to use adjacent property, in which case the Contractor shall pay all costs involved in acquiring such rights and for all clean up as required.

3.2.12. Repair of Damage: Immediately repair damage to temporary or permanent work as directed by the Owner. For damage to permanent work qualifying for relief under 3.2.13, this Section, the Manager may direct the Contractor to perform the repair work, or direct others to perform the repair work. The County will pay the Contractor for repair of damaged permanent work only. The County will not pay for delay or disruption caused by damage to, or repairs of, the temporary or permanent work including extended home office overhead, idle equipment, or inefficiency

3.2.13. Relief of Responsibility for Damage by Public Use During Construction: When it is necessary for the public to use the County facility during construction, the Manager will relieve the Contractor of its responsibility for damages to the permanent work caused by the public traffic under the following conditions:

3.2.13.1. The work is in accordance with the plans or approved stage or phase construction plans.

3.2.13.2. The contract requires the Contractor to open the section of roadway to public traffic.

3.2.13.3. The Contractor implements traffic controls in accordance with the approved traffic control plans.

3.2.14. Use of Completed Portions of the Work: The Contractor shall open completed portions of the Work for public use as soon as possible. The Manager will relieve the Contractor of the duty of maintaining and protecting portions of the work that the Engineer has deemed completed in accordance with the Contract Documents. This relief applies to damages caused by public traffic, the elements, or other causes not subject to the Guarantee, but not from damage caused by the Contractor's operations or negligence.

3.2.15. Cleanup: The Contractor shall at all times during the work, keep the premises clean and orderly. The Contractor shall promptly remove all waste materials and rubbish. Upon completion of the work, all materials, equipment, and appurtenances not required, as a part of, or appurtenant to, the completed facility shall be completely removed in accordance with Section – Project Closeout.

3.3. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
General Construction Responsibilities	Incidental to all other Items of work

END OF SECTION

SECTION 2 – MOBILIZATION AND DEMOBILIZATION

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. The work consists of the mobilization and demobilization of the contractor's forces and equipment necessary for performing the work required under the contract. This work 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.

1.2. RELATED DOCUMENTS (NOT USED)

1.3. RELATED SECTIONS (NOT USED)

1.4. SUBMITTALS (NOT USED)

PART 2. PRODUCTS

2.1. MATERIALS (NOT USED)

PART 3. EXECUTION

3.1. EQUIPMENT AND MATERIALS

3.1.1. Mobilization shall include 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 of this Specification.

3.1.2. Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not required or included in the contract from the site. This includes the disassembly; removal; and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract

3.1.3. Access shall be as shown on the drawings, or as agreed up with the Contractor and Manager. If alternate routes are obtained by the contractor, they must be approved by the Manager prior to use. All access routes shall be restored by the Contractor to a condition equal to or better than the condition prior to the commencement of work under this contract.

3.2. CHANGES IN THE WORK

3.2.1. 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.

3.3. METHOD OF MEASUREMENT

3.3.1. Measurement for Mobilization and Demobilization shall be on a Lump Sum basis. 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. This work does not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract. Transportation of any materials incorporated into the permanent works shall not be considered a mobilization item.

3.4. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Mobilization	Lump Sun

END OF SECTION

SECTION 3 – TRAFFIC CONTROL AND SCHEDULING

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Submittal procedures

1.1.2. Construction progress schedules.

1.1.3. Shop drawings

1.1.4. Product data

1.1.5. Samples

1.1.6. Manufacturers' instructions

1.1.7. Manufacturers' certificates

1.2. RELATED SECTIONS

1.2.1. Section – Project Close-out

1.3. SUBMITTAL PROCEDURES

1.3.1. Include three (3) copies of each item in each submittal to the Manager.

1.3.2. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing sheet and detail number(s), and specification section number, as appropriate.

1.3.3. Schedule submittals to expedite the Project, and deliver to the Manager at business address. Coordinate submission of related items.

1.3.4. Identify variations from Contract Documents and Products or system limitations which may be detrimental to successful performance of the completed Work.

1.3.5. Revise and resubmit submittals as required, identify all changes made since previous submittal.

1.3.6. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.4. CONSTRUCTION PROGRESS SCHEDULES

1.4.1. Submit initial schedule at preconstruction conference.

1.4.2. Submit revised schedule bi-weekly, if necessary. Identify changes since previous version.

1.4.3. Show complete sequence of construction by activity, identifying Work of separate contracts.

1.4.4. Indicate estimated percentage of completion for each item of Work at each submission.

1.4.5. Indicate submittal dates required for shop drawings and product data including those furnished by separate contract.

1.5. SHOP DRAWINGS

1.5.1. Submit for review in the form of three (3) opaque reproductions.

1.6. MANUFACTURER'S CERTIFICATES AND DATA SHEETS

1.6.1. Submit to Manager when specified in individual specification Sections, submit manufacturers' certificate to Manager for review, in quantities specified for Product Data.

1.6.2. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

1.6.3. Certificates may be recent or previous test results on material or Product, but must be approved by the Manager.

PART 2. PRODUCTS

2.1. Submit materials data sheets to Manager to indicated compliance with Construction Drawings and Specification, including any "or approved equal" substitutions.

PART 3. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Submittals	Incidental to all other Items of Work where submittals are required

END OF SECTION

SECTION 4 – QUALITY ASSURANCE AND CONTROL

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Quality assurance and control of installation

1.1.2. References

1.1.3. Inspection and testing laboratory services

1.2. RELATED SECTIONS

1.2.1. Section 3 - Submittals.

1.3. QUALITY ASSURANCE AND CONTROL OF INSTALLATION

1.3.1. Monitor quality control over materials, suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

1.3.2. Comply fully with manufacturers' instructions, including each step in sequence.

1.3.3. Contractor shall request clarification from Engineer before proceeding if manufacturers' instructions conflict with Contract Documents.

1.3.4. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.3.5. Perform work by persons qualified to produce workmanship of specified quality.

1.4. REFERENCES

1.4.1. For products or workmanship specified by association, trades, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

1.4.2. Conform to reference standard by date of issue current on date of Contract Documents.

1.4.3. Contractor shall request clarification from Engineer before proceeding if specified reference standards conflict with Contract Documents.

1.4.4. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5. INSPECTION AND TESTING LABORATORY SERVICES

1.5.1. The Contractor is responsible to appoint, employ, and pay for services of an independent firm to perform testing services to ensure the Work complies with project drawings, standards, and specifications. The County reserves the right to appoint, employ, and pay for services of a different independent firm to perform the same testing services.

1.5.2. These independent firms will perform inspections, tests, and other services specified in individual specification sections, and as required by the Engineer.

1.5.3. Testing results and reports will be submitted by these independent firms to the Engineer and the Contractor, indicating observations and results of tests, and indicating compliance or non-compliance with the project drawings, standards, and specifications.

1.5.4. The Contractor will cooperate with these independent firms; furnish samples of materials, design mix, equipment, tools, storage, and assistance, as requested.

1.5.5. The Contractor will notify these independent testing firms and the Engineer 48 hours prior to expected time for operations requiring services.

1.5.6. The Contractor will arrange with these independent testing firms and pay for additional samples and tests required for Contractor's use.

1.5.7. The County reserves the right to employ the Contractor's independent testing firm to confirm any quality control testing completed by the Contractor.

1.5.8. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm according to the Contract Documents, or on instructions by the Engineer, at no additional expense to the County.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION

3.1. INSPECTION: Inspection and/or testing shall be mandatory at the following stages of construction, and the Contractor shall receive inspection approval by the Manager or County Engineer prior to proceeding with other construction work. The designation of the following as mandatory shall not affect other inspection requirements in these Standards.

3.1.1. After clearing, stripping, and grubbing

3.1.2. After placement of any embankment.

3.1.3. After installation of the subbase course.

3.1.4. After installation of the base or leveling course.

3.1.5. After paving.

3.1.6. After fog seal or chip seal application.

3.2. AUTHORITY OF COUNTY ENGINEER:

3.2.1. The County Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed, and as to the rate of progress of the work; all questions which may arise as to the interpretation of the plans and specifications; all questions as to compliance with these standards and specifications.

3.3. AUTHORITY OF THE MANAGER

3.3.1. The Manager is authorized to inspect all work done and all materials furnished. Such inspections may extend to all or any part of the work, and to the preparation, fabrication, or manufacture of the materials to be used, that does not require County Engineer approval. The Manager is not authorized to issue instructions contrary to the plans and specifications, or to act as foreman for the Contractor. However, the Manager shall be authorized to reject work or materials.

3.4. COMPLIANCE WITH PLANS, SPECIFICATIONS AND STANDARDS: All work performed, and all materials furnished, shall be in conformity with the lines, grades, cross-sections, dimensions, and material requirements, including tolerances, shown on the plans or indicated in these Standards. In the event the County Engineer find the materials furnished, work performed, or the finished product, are not in compliance with the plans and

specifications, or have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced, or otherwise corrected by the Contractor at no expense to the County.

3.5. REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK: All work which does not comply with the requirements of the contract or these Standards will be considered unacceptable, unless otherwise determined acceptable per 3.3.this Section. Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause, found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner.

3.6. SOURCE OF SUPPLY AND QUALITY REQUIREMENTS: Materials used on the work shall meet all quality requirements of these specifications. The Manager may approve materials at the source of supply before delivery is started. If after trial, the sources of supply do not produce specified products, the Contractor shall furnish materials from other sources.

3.6.1. Local Material Sources:

3.6.1.1. Possible sources of local materials may be designated on the plans. The quality of material in such deposits will be acceptable in general, but the Contractor shall determine for himself the amount of equipment and work required to produce a material meeting the specifications.

3.6.1.2. When material deposits are not designated in the plans, the Contractor shall provide sources of material acceptable to the County Engineer.

3.6.1.3. Any pits and quarries shall be authorized only in accordance with existing regulations in other applicable ordinances an if so permitted shall be excavated so that water will not collect and stand therein. Site from which material has been removed shall, up completion of the work, be left in a neat and presentable condition.

3.7. GUARANTEE

3.7.1. The Contractor shall guarantee the quality and durability of all work for a period of two (2) years from acceptance from the County of Substantial Completion. The County may require the Contractor to secure a Performance Bond in the amount of 150% of the contract, or estimated, construction cost. Such bond shall be effective throughout the specified guarantee period, as required by the County

3.8. BASIS OF PAYMENT

Pay Item	Basis
Quality Assurance and Control	Incidental to other work items where quality control testing is required. Re-testing required because of Contractor's Work in non-conformance with Contract Documents shall be shall completed as necessary until, and at no additional expense to the County.

END OF SECTION

SECTION 5 – CUTTING AND PATCHING

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. This section includes road cuts for installation and repair of utilities and roadways.

1.2. RELATED DOCUMENTS

1.2.1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Technical Specification sections, apply to work of this section.

1.3. RELATED SECTIONS

1.3.1. Section 3 - Submittals.

1.3.2. Individual product specification sections:

1.3.3. Cutting and patching incidental to work of the section.

1.3.4. Advance notification to other sections of openings required in work of those sections.

1.3.5. Limitations on cutting structural members.

1.4. SUBMITTALS

1.4.1. Submit written request in advance of cutting or alteration which affects:

1.4.1.1. Structural integrity of any element of Project.
1.4.1.2. Integrity of weather exposed or moisture resistant element.
1.4.1.3. Efficiency, maintenance, or safety of any operational element.
1.4.1.4. Visual qualities of sight exposed elements.
1.4.1.5. Adjacent work of County or separate contractor.

1.4.2. Include in request:

1.4.2.1. Identification of Project.
1.4.2.2. Location and description of affected Work.
1.4.2.3. Necessity for cutting or alteration.
1.4.2.4. Description of proposed Work and products to be used.
1.4.2.5. Alternatives to cutting and patching.
1.4.2.6. Effect on work of Owner or separate contractor.
1.4.2.7. Written permission of affected separate contractor.
1.4.2.8. Date and time work will be executed.
1.4.2.9. Product Substitution: For any proposed change in materials

PART 2. PRODUCTS

2.1. MATERIALS

2.1.1. Primary Products: Those required by the project drawings, Standards, and specifications, or for the original installation, when approved by the Engineer. This includes original seed mixes specified for turf areas and plant material for landscaped areas.

PART 3. EXECUTION

3.1. EXAMINATION

3.1.1. County road cutting will only be permitted where boring or pushing methods have been show not feasible.

3.1.2. The Contractor shall have seven (7) calendar days to complete a road crossing, unless otherwise approved by the Manager.

3.1.3. No construction of a road crossing shall be allowed on County roads from November 1 to April 31, except for emergencies when approved by the Manager.

3.1.4. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

3.1.5. After uncovering existing Work, assess conditions affecting performance of work.

3.1.6. Beginning of cutting or patching means acceptance of existing conditions.

3.2. PREPARATION

3.2.1. Notify the Manager and Blaine County Emergency Services at least 48 hours in advance of beginning of any work within the County rights-of-way.

3.2.2. Provide precautionary measures for protection of all utilities, including coordination of efforts with utility owners prior, during, and upon completion of the Work.

3.2.3. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

3.2.4. Provide protection from elements for areas which may be exposed by uncovering work.

3.2.5. Maintain excavations free of water.

3.3. CUTTING

3.3.1. Execute cutting and fitting including excavation and fill to complete the Work.

3.3.2. Uncover work to install improperly sequenced work.

3.3.3. Defective work, or work not conforming to Blaine County Road Construction Standards, shall be removed and replaced as part of Cutting and Patching.

3.3.4. Remove samples of installed work for testing when requested.

3.3.5. Provide openings in the Work for penetration of mechanical and electrical work.

3.3.6. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

3.3.7. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval from the Manager.

3.4. PATCHING

3.4.1. Execute patching to complement adjacent Work. Fit products together to integrate with other Work. Restore work with new products in accordance with requirements of Blaine County Road Construction Standards and project documents

3.4.2. Three-inches (3") of asphalt pavement must be installed with roadway crown to be one-inch (1") higher than existing pavement surrounding cut, to compensate for additional settling. Asphalt placement shall conform to Blaine County Road Construction Standards.

3.4.3. Road shoulders must be blended into existing shoulders.

3.4.4. Execute Work by methods that avoid damage to other Work, and provide appropriate surfaces to receive patching and finishing.

3.4.5. Employ skilled and experienced installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces. Where warrantees for moisture resistant elements are in effect, hire original installer to perform patching.

3.4.6. Exposed water lines, sewer lines, or other utilities, shall not be covered up until approved by the water, sewer, or other utility representative having jurisdiction thereof. Backfill for pipe base and pipe zone shall conform to Blaine County Road Construction Standards.

3.4.7. Fit work neatly to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

3.4.8. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material to full thickness of the penetrated element.

3.4.9. Restore work to standards for original work. Prepare and re-seed turf areas or replace damaged plant materials where disturbed by construction in a manner which will assure healthy growth at the site.

3.4.10. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.5. UTILITIES LOCATIONS

3.5.1. All cable or other installations shall be placed a minimum of eight-feet (8') horizontally from the shoulder of the road, or inner edge of the borrow pit, at a minimum depth of thirty-six inches (36"). An acceptable alternative may be to place cable below the lowest point of the borrow pit at a minimum depth of thirty-six inches (36").

3.5.2. Cable shall be diverted three-feet (3') around the end of culverts.

3.5.3. Pedestal box shall be placed a minimum of twelve-feet (12') from the shoulder of the road, or at the existing fence line, whichever is greater.

3.6. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Cutting and Patching	Incidental to all other Items of Work

END OF SECTION

SECTION 6 – PROJECT CLOSEOUT

PART 1. GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Blaine County Road Construction Standards, reference documents, project drawings, general and supplementary conditions, and other special specifications applied to work of this section.

1.2. DEFINITIONS

1.2.1. Close-out: is hereby defined to include general requirements near the end of contract time, in preparation for final acceptance, final payment, normal termination of Contract, occupancy by County and similar actions evidencing completion of the work.

1.2.2. Time of close-out: is directly related to "Substantial Completion." Therefore, "time of close-out" may be either a single time period of entire work, or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation, if any, shall be applicable to other provisions of this section.

1.2.3. Substantial Completion: That date as certified by the Manager or Engineer when the construction of the Work, or a specified part thereof is sufficiently completed in accordance with these Standards, project drawings, project conditions, project specifications, reference documents, and other contract documents applied to this Work, so that the Work or specified part of the Work can be utilized for the purposes for which it is intended. The guarantee period begins at the time this document is issued.

1.2.4. Final Acceptance: Final Acceptance comes at the end of the guarantee period (two years). The Contractor must have completed all work and repairs to the satisfaction of the Manager before the Final Acceptance. Only after the Final Acceptance can a Performance Bond be released.

1.3. PREREQUISITES TO SUBSTANTIAL COMPLETION

1.3.1. Prior to requesting the Manager's or Engineer's inspection for certification of "Substantial Completion" (for either entire work or portions thereof), complete the following and list known exceptions in request:

1.3.1.1. Include supporting documentation for completion as indicated in these Standards.
1.3.1.2. Obtain and submit releases enabling County's full and unrestricted use of the work and access to services and utilities, including (where required) occupancy permits, operating certificates, and similar releases.
1.3.1.3. Submit record drawings, maintenance manuals, final project photographs, and similar final record information.
1.3.1.4. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Manager.
1.3.1.5. Complete start-up and testing of systems, and instructions of County's operating/maintenance personnel. Discontinue (or changeover) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.
1.3.1.6. Complete final cleaning up requirements, including touch-up painting of marred surfaces.
1.3.1.7. Touch-up and otherwise repair and restore marred exposed finishes.

1.3.2. Inspection Procedures: Upon receipt of Contractor's request, the Manager will either proceed with inspection or advise Contractor of prerequisites not fulfilled. Following initial inspection, the Manager will either prepare Certificate of Substantial Completion, or advise Contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that

work has been substantially completed. Results of completed inspection will form initial punch-list for final acceptance.

1.4. PREREQUISITES TO FINAL ACCEPTANCE

1.4.1. Prior to requesting the Manager's final inspection for certification of final acceptance and final payment, complete the following and list known exceptions (if any) in request:

1.4.1.1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

1.4.1.2. Submit specific warranties, maintenance agreements, operation and maintenance manuals, parts lists, final certifications and similar documents.

1.4.1.3. Submit updated final statement, accounting for additional (final) changes to Contract Sum.

1.4.1.4. Submit certified copy of "As-Built" drawings and the final punch list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed and dated by the Manager.

1.4.1.5. Submit Consent of Surety.

1.4.1.6. Submit final liquidated damages settlement statement, acceptable to County.

1.4.1.7. Revise and submit evidence of final, continuing insurance coverage complying with insurance requirements.

1.4.2. Re-inspection Procedure: Upon receipt of Contractor's notice that the work has been completed, including punch-list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstances, the Manager will re-inspect the work. Upon completion of re-inspection, the Manager will either prepare certificate of final acceptance or advise Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, procedure will be repeated.

1.5. RECORD DOCUMENT SUBMITTALS

1.5.1. General: General submittal requirements are indicated in "Submittals" sections. Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for Manager's reference during normal working hours.

1.5.2. Record Drawings: Maintain a white-print set (blue-line or black-line) of contract drawings and shop drawings in clean, undamaged condition, with mark-up of actual installations which vary substantially from the work as originally shown. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross--reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work. Mark-up new information which is recognized to be of importance to the County, but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work, which would be difficult to measure and record later. Note related change order numbers where applicable. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each sheet.

1.5.3. Record Specifications: Maintain one copy of specifications, including addenda, change orders and similar modifications issued in printed form during construction, and mark-up variations (of substance) in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information on concealed work, or work that cannot otherwise be readily discerned later by direct observation. Note related record drawing information and product data, where applicable. Upon completion of mark-up, submit to the Manager for the County's records.

1.5.4. Record Product Data: Maintain one copy of each product data submittal, and mark-up significant variations in actual work in comparison with submitted information. Include both variations in product as delivered to site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products, or work that cannot be readily discerned later by direct observation. Note related change orders and mark-up of record drawings and specifications. Upon completion of mark-up, submit complete set to the Manager for the County's records.

1.5.5. Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the work. Immediately prior to date(s) of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Manager for the County's records.

PART 2. PRODUCTS (NOT USED)

PART 3. EXECUTION

3.1. FINAL CLEANING

3.1.1. General: General cleaning during progress of work as specified in these Standards. Provide final cleaning of the work, at time indicated, consisting of cleaning each surface or unit of building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:

3.1.1.1. Remove labels which are not required as permanent labels.

3.1.1.2. Remove debris and surface dust from limited-access spaces, trenches, equipment vaults, manholes and similar spaces.

3.1.1.3. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petrochemical spills and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface.

3.1.2. Removal of protection: Except as otherwise indicated or requested by the Manager, remove temporary protection devices and facilities which were installed during the course of the work to protect previously completed work during remainder of construction period.

3.1.3. Compliance: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on County property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

3.1.3.1. Where extra materials of value remaining after completion of associated work have become County property, dispose of these to County's best advantage as directed.

3.1.3.2. Prior to the expiration of the One Year Period of Correction, the County will inspect the work of the project and the contractor shall replace any defective work or materials at no cost to the County.

3.2. BASIS OF PAYMENT

Pay Item	Basis
Project Closeout	Incidental to other all other Work items

END OF SECTION

SECTION 7 – TRAFFIC CONTROL AND SCHEDULING

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. This section includes the work and materials necessary for traffic control and the scheduling of the work so that disruption of traffic on County Roads will be minimized.

1.2. RELATED DOCUMENTS

1.2.1. "Manual on Uniform Traffic Control Devices", published by the U. S. Department of Transportation, Federal Highway Administration.

1.2.2. AASHTO “Guide for the Planning, Design, and Operation of Bicycle Facilities,” current edition

1.2.3. Idaho Standards for Public Works Construction, current edition

1.2.4. ITD Standards, current edition

1.3. RELATED SECTIONS (NOT USED)

1.4. SUBMITTALS (NOT USED)

PART 2. PRODUCTS

2.1. MATERIALS (NOT USED)

PART 3. EXECUTION

3.1. MATERIALS AND WORKMANSHIP

3.1.1. Traffic control devices including signs, barricades, channelization devices and any other item shall conform to the current "Manual on Uniform Traffic Control Devises" (MUTCD). The Contractor shall provide an adequate number of barricades, signs, and workforce to prevent all public access to the portion of the roadway under construction each day. The erection and removal of traffic control devices shall be approved by the Manager.

3.1.2. The Contractor shall provide, erect, and maintain all traffic control devices as required by these specifications, or the Manager, to protect the public during various phases of the work, including road closures, and when abrupt edges are present. Appropriate signs shall be erected; and additional speed advisory signs may be required to protect the public and work areas; Barricades shall be left in place until a particular work operation has been completed and the roadway can be opened to public use.

3.1.3. "Flagger ahead" signs must be provided when Flaggers are required; other signs or devices may be required as necessary for the protection of the work and the safety of the public.

3.1.4. Detour signs and information directing traffic around construction areas, is required when detours are available. Coordinate with the Manager regarding such detours.

3.1.5. Generally, two-way traffic WITHIN THE PUBLIC RIGHT OF WAY must be maintained at all times. One-way traffic with flaggers, or temporary road closures, will be allowed only with prior approval of the Manager, and notification of the Blaine County Emergency Services, as appropriate. A traffic

control plan for one-way traffic with flaggers must be prepared by the Contractor and approved by the Manager prior to implementation.

3.2. SCHEDULING THE WORK

3.2.1. Scheduling of the work in accordance with the Contract Documents is essential to assure the construction is completed in an efficient manner and disturbance to the flow of traffic is minimized. The Contractor must provide the Manger with a detailed schedule and supplemental traffic control plans for review before the construction begins on each subsection of the roadway. Supplemental Conditions may be provided to the Contractor with more detailed information regarding the construction schedule.

3.3. METHOD OF MEASUREMENT

3.3.1. Measurement for traffic control shall be on a Lump Sum basis. The work shall include furnishing, installing, maintaining and removing all posts, signs, barricades, barrels, flexible traffic channelizers, supplemental traffic control and any other incidentals or related work and materials.

3.4. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Construction Traffic Control and Scheduling	Lump Sun

END OF SECTION

SECTION 8 – AGGREGATES

PART 1. GENERAL

1.1. SUMMARY

1.1.1. Section Includes

1.1.1.1. Furnishing and placing one or more courses of aggregate in accordance with these specifications and in reasonable close conformity with the lines, grades, and thicknesses and typical cross-sections show on Construction Drawings, or established by the Engineer.

1.2. RELATED SECTIONS

1.2.1. Section, Excavation & Embankment
1.2.2. Section, Shouldering
1.2.3. Section, Asphalt Paving

1.3. REFERENCES

1.3.1. ASTM C88 Soundness of Aggregate by use of Sodium Sulfate or Magnesium Sulfate
1.3.2. ASTM C117 Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing:
1.3.3. ASTM C131 Los Angeles Abrasion Test
1.3.4. ASTM C136 Method for Sieve Analysis of Fine and Coarse Aggregates.
1.3.5. ASTM C566 Total Moisture Content of Aggregate by Drying,
1.3.6. ASTM C702 Reducing Field Samples of Aggregate to Testing Size,
1.3.7. ASTM D75 Standard Practice for Sampling Aggregates.
1.3.8. ASTM D698 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb. (2.49 Kg) Rammer and 12 inch (304.8 mm) Drop.
1.3.9. ASTM D1556 Test Method for Density of Soil in Place by the Sand-Cone Method.
1.3.10. ASTM D1557 Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10lb. (4.54 Kg) Rammer and 18 inch (457 mm) drop.
1.3.11. ASTM D2049 Test Methods for Moisture Density Relations of Cohesionless Soils Using 10 lb. (4.54 Kg) Rammer and 18 inch (457 mm) drop.
1.3.12. ASTM D2167 Test Method for Density and Unity Weight of Soil in Place by the Rubber Balloon Method.
1.3.13. ASTM D2419 Test Method for Permeability of Soils and Fine Aggregate.
1.3.14. ASTM D2434 Test Method for Permeability of Granular Soils (Constant Head)
1.3.15. ASTM D3017 Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures
1.3.16. ASTM D4318 Determining the Liquid Limits of Soils:
1.3.17. ASTM D5821 Determining the Percentage of Fractured Particles in Coarse Aggregate
1.3.18. ASTM D6938 Test Method for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)

1.4. SUBMITTALS

1.4.1. Submittals shall be provided under Conditions of the Contract and General Provisions. Submit source identification, sieve analysis, sand equivalent worksheets, percent wear test results.
1.4.2. Contractor shall provide current certificate of test data from supplier of each material used.
1.4.3. Materials Source: Submit name of import materials suppliers. Provide materials from same source throughout the work. Change of source requires Engineer approval.
1.4.4. When required in the Contract Documents, submit uncrushed aggregates source with archaeological clearance and reclamation plan.
1.4.5. Materials from approved Idaho Transportation Department materials sources will not require project specific submittals for source quality, unless otherwise specified in the Contract Documents.

PART 2. MATERIALS

2.1. CRUSHED AGGREGATES

2.1.1. Fine and coarse fragments of crushed stone or crushed gravel, which may include sand, finely crushed stone, crusher screenings, or similar filler.

2.1.2. Crushed material consisting of hard, durable particles or fragments of stone, free of flat, elongated, or soft pieces, dirt, or other objectionable materials.

2.1.3. Percent of wear not more than 35 at 500 revolutions.

2.1.3.1. ASTM C131: Los Angeles Abrasion Test

2.1.4. Production requirements:

2.1.4.1. Percentage of fractured particles occurring in the finished material to be uniform and constant.

2.1.4.2. The percentage of aggregate retained on the No. 4 Sieve having at least on fractured face, as determined by ASTM D5821, shall be sixty percent (60%) for untreated base, and seventy-five percent (75%) for treated based and road mix.

2.1.4.3. Material may require screening and/or washing prior to crushing to eliminate excessive fines at no additional cost for pre-screening or washing.

2.1.5. Test course and fine aggregates for soundness

2.1.5.1. ASTM C88: Soundness of Aggregate by use of Sodium Sulfate or Magnesium Sulfate

2.1.5.1.1. Five (5) cycles using sodium sulfate

2.1.5.1.2. Maximum loss shall be less than or equal to twelve percent (12%).

2.1.6. Incorporate all material passing the No. 4 Sieve into the final material, unless the amount of this material must be reduced to meet gradation specifications.

2.1.7. <u>CRUSHED AGGREGATE GRADATION SPECIFICATIONS</u>

2.1.7.1. Gradations for crushed aggregate materials are listed in Table 2.1.G below.

Table 2.1.G – CRUSHED AGGREGATE GRADATIONS

SIEVE SIZE	2" Subbase	3/4" Base	Road Mix
	PERCENT PASSING		
2-½ inch (63.5 mm)	100%		
2 inch (50.8 mm)	90-100%		
1-½ inch (38.1 mm)			
1 inch (25.4 mm)	55-83%	100%	100%
¾ inch (19 mm)		90-100%	97-100%
3/8 inch (9.51 mm)			67-83%
No. 4 (4.76 mm)	30-60%	40-65%	48-68%
No. 8 (2.38 mm)		30-50%	
No. 16 (1.19 mm)			25-42%
No. 30 (.595 mm)	10-25%		
No. 40 (.420 mm)			17-30%
No. 200 (.074 mm)	0-8%	3-9%	12-18%, PI<4 8-12%, PI = 4 to 12

2.1.7.2. Sampling of Aggregates: ASTM D75
2.1.7.3. Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing: ASTM C117
2.1.7.4. Sieve Analysis of Fine and Coarse Aggregates: ASTM C136
2.1.7.5. Reducing Field Samples of Aggregate to Testing Size, ASTM C702
2.1.7.6. Total Moisture Content of Aggregate by Drying, ASTM C566

2.1.8. Allowable percent passing No. 4 Sieve may be adjusted within the range shown in Table 2.2 with additional compensation to the Contractor.

2.1.9. The portion of fine aggregate passing the No. 200 sieve to be less than 60% of that portion passing the No. 40 Sieve.

2.1.10. Liquid limit of fine aggregate passing the No. 40 Sieve less than or equal to 25. Plasticity Index less than or equal to 6.
2.1.10.1. Sampling of Aggregates: ASTM D75
2.1.10.2. Determining the Liquid Limits of Soils: ASTM D4318
2.1.10.3. Determining the Plastic Limit and Plasticity Index of Soils: ASTM D4318

2.1.11. Sand Equivalent greater than or equal to 30. Sand Equivalent not required if less than five percent (5%) passing the No. 200 Sieve, or for aggregate used for cement or lime treated base.
2.1.11.1. Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test: ASTM D2419

2.1.12. Crushed Aggregate Control
2.1.12.1. Consistency checks on percent passing the No. 4 and No. 200 Sieves for samples taken from belt loading hauling equipment, or from the roadway.
2.1.12.2. Variation from the as crushed stockpile average on the No. 4 Sieve not to be greater than plus or minus six percent (+/-6%).
2.1.12.3. Variation from the as crushed stockpile average on the No. 200 Sieve not to be greater than plus or minus three percent (+/-3%).

2.1.13. Crushed Aggregate Acceptance
2.1.13.1. Acceptance tests will include gradation, sand equivalency, and fractured faces.
2.1.13.2. Crushed aggregate acceptance tests will be performed at a frequency of one test per each 1000 tons.
2.1.13.3. Test samples will be obtained in accordance with ASTM D75 from the materials delivered to the project site.

2.1.14. Crushed Aggregate Compaction Test Methods
2.1.14.1. Testing Standards for Moisture Density Relations of Soils using a 5.5 lb. Rammer and 12-inch Drop, ASTM 698
2.1.14.2. Testing Standards for Moisture Density Relations of Soils using a 10 lb. Rammer and 18-inch Drop, ASTM 1557
2.1.14.3. In-place Density and Moisture Content of Soil and Soil-Aggregate Using Nuclear Densometer Method, ASTM D6938

2.1.15. Pipe zone material shall be imported ¾" base, or "road mix" materials, per this specification.

2.2. UNCRUSHED AGGREGATES
2.2.1. Uncrushed, hard, durable gravel or fragments of stone, from an approved source, which may include sand, stone dust, or similar filler material.
2.2.2. Screen out, or crush down, oversize material, to meet gradation requirements.
2.2.3. Percent of wear not more than 50 at 500 revolutions on material retained on the No. 4 Sieve.
2.2.3.1. ASTM C131: Los Angeles Abrasion Test

2.2.4. CRUSHED AGGREGATE GRADATION SPECIFICATIONS

2.2.4.1. Gradations for crushed aggregate materials are listed in Table 2.2.D below.

Table 2.2.D – UNCRUSHED AGGREGATE GRADATIONS

SIEVE SIZE	Pit Run, 6”	3”	Drain Rock, 3”	Pea Gravel	Sand	Filter Sand
	PERCENT PASSING					
6 inch (152.4	100%					
3 inch (76.2 mm)		100%	100%			
1 inch (25.4 mm)			25-60%			
½ inch (12.7 mm)				100%		
3/8 inch (9.51			0-4%	85-100%	100%	100%
No. 4 (4.76 mm)	15-60%	25-60%		10-30%	85-100%	95-100%
No. 8 (2.38 mm)				0-10%		
No. 16 (1.19 mm)				0-5%		45-80%
No. 50 (.297 mm)					40-65%	10-30%
No. 100 (.149					30-50%	2-10%
No. 200 (.074 mm)	0-12%	0-12%	0-2%		2-10%	0-4%
	Sand or gravel (USCS GM, GW, GP, SM, SW, SP) free of shale, clay, friable material and debris		35% minimum air voids, as determined by ASTM C29; washed free of clay, shale and organic matter	Clean, well-graded, washed, river run gravel	Natural river or banks sand, free of silt, clay, loam, friable or soluble materials, or organic matter	

2.2.4.2. Sampling of Aggregates: ASTM D75

2.2.4.3. Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing: ASTM C117

2.2.4.4. Sieve Analysis of Fine and Coarse Aggregates: ASTM C136

2.2.4.5. Reducing Field Samples of Aggregate to Testing Size, ASTM C702

2.2.4.6. Total Moisture Content of Aggregate by Drying, ASTM C566

2.2.5. Allowable percent passing No. 4 Sieve may be adjusted within the range shown in Table 2.4 with additional compensation to the Contractor.

2.2.6. The portion of fine aggregate passing the No. 200 sieve to be less than 60% of that portion passing the No. 40 Sieve.

2.2.7. Liquid limit of fine aggregate passing the No. 40 Sieve less than or equal to 25. Plasticity Index less than or equal to 6.

2.2.7.1. Sampling of Aggregates: ASTM D75

2.2.7.2. Determining the Liquid Limits of Soils: ASTM D4318

2.2.7.3. Determining the Plastic Limit and Plasticity Index of Soils: ASTM D4318

2.2.8. Sand Equivalent greater than or equal to 25. Sand Equivalent not required if less than five percent (5%) passing the No. 200 Sieve.

2.2.8.1. Plastid Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test: ASTM D2419

2.2.9. Trench backfill, except in pipe zone and roadway subbase and base areas, may be considered Pit Run (6”-) for import material, or native material, if accepted by the Engineer.

2.3. MANUFACTURED UNITS
2.3.1. (NOT USED)

2.4. SOURCE QUALITY CONTROL
2.4.1. Material sources shall be approved by the Engineer.
2.4.2. Inspection and testing will be performed according the Contract Document and General Conditions of the Contract.
2.4.3. If tests indicate materials do not meet specified requirements, change of material and retest at no cost to Owner.

PART 3. EXECUTION

3.1. EXAMINATION
3.1.1. (NOT USED)

3.2. PREPARATION
3.2.1. Blade smooth and shape subgrade to specified cross section and grade. Subgrade must be accepted by the Contractor as suitable for the Work of the Project Plans and Documents, and approved by the Project Engineer.
3.2.2. Binder (when required):

3.2.2.1. When added at the crushing plant, must be mixed uniformly without contamination to crushed aggregate base, or uncrushed aggregates.

3.2.2.2. When added on the roadway, must be mixed uniformly without contamination to crushed aggregate base, or uncrushed aggregates, without disturbance to subgrade.
3.2.3. Haul over subgrade, or previously placed lifts, not permitted when detrimental to subgrade or surface.

3.3. STOCKPILING
3.3.1. Load, haul, stockpile, and place material in a manner that minimizes segregation and degradation.
3.3.2. Stockpile materials on site only at locations approved by Owner. Stockpile in sufficient quantities to meet project schedule and requirements.
3.3.3. Separate differing materials with dividers or stockpile apart to prevent mixing.
3.3.4. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.4. PLACEMENT
3.4.1. Crushed Aggregate:
3.4.1.1. Place materials in accordance with the Construction Drawings and these specifications.
3.4.1.2. The maximum compacted thickness of any one layer shall not exceed six inches (6”), unless otherwise indicated in these Contract Documents. When vibrating or other approved types of special compacting equipment are used, the compacted depth of a single layer may be increased to eight inches (8”), or as approved by the Engineer.
3.4.2. Uncrushed Aggregate:
3.4.2.1. Place materials in accordance with the Construction Drawings and these specifications.
3.4.2.2. The maximum compacted thickness of any one layer shall not exceed eight inches (8”) for materials which can be tested by In-place Density and Moisture Content of Soil and Soil-Aggregate Using Nuclear Densometer Method, ASTM D6938, unless otherwise indicated in these Contract Documents. When vibrating or other approved types of special compacting equipment are used, the compacted depth of a single layer may be increased to eight inches (8”), or as approved by the Engineer.
3.4.2.3. For materials up to six-inch (6”) in size, the maximum lift shall be eight inches (8”).
3.4.2.4. For materials from 6” to 18” nominal size, the maximum lift shall be eighteen inches (18”).
3.4.2.5. For materials greater than 18” nominal size, the maximum lift shall not be greater than three feet (3’)

3.5. SHAPING AND COMPACTION

3.5.1. Spread material for each lift for full width and in an approved manner.

3.5.2. Compacted full width with methods and equipment at the Contractor's discretion, but shall be suitable for the Work. In areas too small for rollers, hand compactors may be used.

3.5.3. When lift includes superelevation, compaction pattern should start at bottom of superelevation and work towards the top.

3.5.4. Uniformly apply water over the material in sufficient quantities to maintain near optimum water content and facilitate compaction.

3.5.5. Compaction shall continue until not less than 95% of the maximum density is obtained. Compaction testing will performed as deemed necessary by the Engineer, and documented according to Contract Document requirements. Compaction testing to be completed per ASTM D698.

3.5.6. If the specified density is not attained, the area shall be reworked and/or re-compacted until the density specifications are achieved and documented by additional testing or retesting, as designated in the Contract Documents. Additional testing or retesting is at no cost to the Owner.

3.6. SURFACE SMOOTHNESS

3.6.1. When surface of aggregate is not to be paved:

3.6.1.1. Finished grade at top of aggregate course to be within plus or minus one-half inch (+/- 1/2") of staked elevation.

3.6.1.2. Maximum surface deviation over a ten-foot (10') straight edge placed parallel to centerline shall be one-half inch (1/2"). The algebraic sum of the deviation of two points no more than 30 feet apart shall not exceed two inches (2")

3.6.2. When surface of aggregate is to be paved:

3.6.2.1. Finished grade at top of aggregate course to be within plus or minus three-eighths inch (+/- 3/8") of staked elevation.

3.6.2.2. Maximum surface deviation over a ten-foot (10') straight edge placed parallel to centerline shall be one-half inch (1/2"). The algebraic sum of the deviation of two points no more than 30 feet apart shall not exceed three-quarters inch (3/4")

3.7. SOIL STERILIZER, (when required)

3.7.1. Sterilizer shall be standard, quick-acting, non-selective weed and grass killer, commonly used under roadway/transportation projects (Casoron 4G, for example). Application of the sterilant shall pose no short or long term health threats to the installer or the general public. Submit materials sheets for approval prior to initial application, according to the Contract Documents

3.7.2. Sterilant shall be applied for full width, according to manufacturer's instructions.

PART 4. FIELD QUALITY CONTROL

4.1. No materials shall be place in the snow, or on a soft, muddy, or frozen subgrade.

4.2. Weather: When, in the opinion of the Engineer, the weather is such that satisfactory results cannot be secured, the Contractor shall suspend operations until the weather is favorable.

4.3. Guarantee: The Contractor shall be responsible for any damage or failure resulting from the loss of aggregate material for a period of two-years following completion of construction.

4.4. CLEANUP

4.4.1. After work is completed, the entire area shall be neatly finished and trimmed to lines, grades, and cross-sections shown. Remove stockpiles, and leave area in a clean and neat condition. Grade site surface to prevent free-standing surface water.

PART 5. BASIS OF MEASUREMENT

5.1. Soil Sterilizer: The basis of measurement for Soil Sterilizer shall be by the square yard of area where soil sterilizer is applied. The price shall be full compensation for furnishing all materials; for preparation, mixing, and applying these materials; and for all labor, equipment, tools, test design, cleanup, and incidentals necessary to complete and warrant the project as specified herein.

5.2. Aggregate Materials: The basis of measurement for aggregate materials shall be by the ton of aggregate placed. The price shall be full compensation for furnishing all materials; site preparation, and placement and compaction of these materials; and for all labor, equipment, tools, test design, cleanup, and incidentals necessary to complete and warrant the project as specified herein.

PART 6. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Soil Sterilizer:	Square Yard
Aggregate Materials	Ton

END OF SECTION 3 - AGGREGATES

SECTION 9 – EROSION AND SEDIMENT CONTROL

PART 1. GENERAL

1.1. Section Includes:

1.1.1. This work shall consist of installing fiber wattles and storm drain inlet controls for sediment protection or entrapment of existing culverts, outlets, ditches, channels, slope stabilization, perimeter protection, and any required removal or repair, as shown on the Construction Drawings, or as directed by or established by the Engineer.

1.2. Related Sections

1.2.1. Tree and Plant Protection
1.2.2. Site Clearing
1.2.3. Excavation
1.2.4. Shouldering
1.2.5. Asphalt Paving

1.3. References

1.3.1. Idaho DEQ Storm Water Best Management Practices Catalog
1.3.2. EPA NPDES Construction General Permit
1.3.3. Project SWPPP
1.3.4. Submit under Conditions of the Contract General and Supplemental Conditions.
1.3.5. Contractor to provide current certificate of test data from supplier of each material used.
1.3.6. Materials Source: Submit name of imported materials suppliers. Provide materials from same source throughout the work. Change of source requires Engineer approval.

PART 2. PRODUCTS

2.1. MANUFACTURERS

2.1.1. David R. Mossman Ranch, Inc., Mossman Road, Rte. 2, Box 43, Craigmont, Idaho 83523
2.1.2. Northwest Wattles, Inc., 6952 SR 270, Pullman, WA 99163
2.1.3. American Excelsior Co., North Salt Lake, UT 84054
2.1.4. California Straw Works, 5531 State Ave., Sacramento, CA 95819
2.1.5. RoLanka Coir Products, 155 Andrews Dr., Stockbridge, GA 330281
2.1.6. Filtrex International, 35481 Grafton Eastern Rd., Grafton, OH 44044

2.2. MATERIALS

2.2.1. Fiber Wattles: Fiber Wattles shall consist of certified "noxious weed free" material and be manufactured from natural straw, coir (coconut), composted material, wood fibers, or a combination of; and wrapped in approved biodegradable netting made of natural fiber such as jute, sisal, cotton, hemp, or burlap, with a life expectance of approximately one year. The ends shall be secured tightly with biodegradable twine. Fiber Wattles shall be one of the following products, or an approved equal:

2.2.1.1. "Straw Wattle," David R. Mossman Ranch, Inc.
2.2.1.2. "NW Wattle," Northwest Wattles, Inc.
2.2.1.3. "Silt Boom Logs," American Excelsior Co.
2.2.1.4. "Straw Wattle," California Straw Works
2.2.1.5. "BioD-Watl," Rolanka Coir Products
2.2.1.6. "Filter Soxx," Filtrex International

2.2.2. Geotextile Filter Fabric: Mirafi 140N, or approved substitute.

PART 3. EXECUTION

3.1. WORKMANSHIP

3.1.1. Fiber Wattles: Fiber Wattles shall be installed according to Idaho DEQ Storm Water Best Management Practices Catalog, Section 7, Sediment Collection and Runoff Division, BMP 35, and per manufacturer' instructions, prior to commencement of ground disturbing activities:

3.1.1.1. Fiber wattles can be cut to length and placed around the perimeter of outlets, ditches, or channels to slow runoff velocity and capture sediments.

3.1.1.2. Use fiber wattles in area where the gradient is 3H:1V, or flatter, or the velocity of the storm water runoff is anticipated to be low. The surface area contributing to the runoff should relatively small (less than 5 acres).

3.1.1.3. The fiber wattles shall be staked or anchored according to manufacturer's recommendations. The end of adjacent wattles shall be tightly abutted together, or overlapped approximately 12 inches.

3.1.1.4. When sediment has filled in to overflow behind the fiber wattle, new fiber wattle shall be securely installed, upstream or downstream, as necessary.

3.1.1.5. Fiber wattles shall be left in place after final construction, unless otherwise directed.

3.1.2. Storm Drain Inlet Controls: Storm Drain Inlet Controls will be installed per Idaho DEQ Storm Water Best Management Practices Catalog, BMP 31, prior to commencement of ground disturbing activities:

3.1.2.1. Maintenance of the storm drain inlet controls shall comply with the requirements of the Construction General Permit. That is, clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance of the control is compromised.

3.1.2.2. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, the Contractor must remove the deposited sediment by the end of the following work day when accumulated sediment was discovered.

3.2. FIELD QUALITY CONTROL

3.2.1. Proper installation of the Fiber (or Straw) Wattles is essential to insure the success of the product. Fiber Wattles are designed for low surface flows, not to exceed 1 cfs for small areas.

3.2.2. Fiber Wattles should not be placed directly in the path of high concentrated water flows.

3.2.3. On slopes, wattles should be installed on slope contours with a slight downward angle at the end of the row in order to prevent ponding at the mid-section.

3.2.4. Limited or no slope preparation is needed prior to installation; however fiber wattles should always be installed in the shallow trenches and according to the manufacturer's guidelines.

3.2.5. Running lengths of wattles should be abutted firmly, or overlapped, to ensure there will be no leakage at the abutments.

3.2.6. The wattles should be pinned securely to the ground according to the manufacturer's instructions in order to insure their stability and the success of the installation.

3.2.7. No materials shall be place in the snow, or on a soft, muddy, or frozen subgrade.

3.3. BASIS OF MEASUREMENT

3.3.1. Fiber Wattle: The basis of measurement for Fiber Wattles shall be by the linear feet of fiber wattles installed. The price shall be full compensation for furnishing all materials; for preparation, and installing these materials; and for all labor, equipment, tools, cleanup, and incidentals necessary to complete and warrant the project as specified herein.

3.3.2. Storm Drain Inlet Controls: The basis of measurement for Storm Drain Inlet Controls shall be by each storm drain inlet control installed. The price shall be full compensation for furnishing all materials; site preparation, and placement of these materials; and for all labor, equipment, tools, cleanup, and incidentals necessary to complete and warrant the project as specified herein.

3.4. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Fiber Wattle:	Linear Feet (LF)
Storm Drain Inlet Controls	Each (EA)

END OF SECTION

SECTION 10 – TREE AND PLANT PROTECTION

PART 1. GENERAL

1.1. Section includes:

1.1.1. Section includes requirements for protection of trees, plants, and groundcovers to remain and prevent damage above and below grade.

1.2. Definitions:

1.2.1. Dripline: Outer perimeter of branches of any tree or plant.

1.2.2. Groundcover: Includes but not limited to shrubbery, plants, and lawn.

1.3. Performance Requirements: Prevent damage to groundcover, trees, root systems, soil, bark, foliage, branches, and limbs due to construction activities, including but not limited to:

1.3.1. Soil contamination, erosion, and compaction.

1.3.2. Soil saturation and ponding of water, and construction run-off.

1.3.3. Alteration of grade, stockpiling of soil, debris, and materials.

1.3.4. Damage to soil, roots, bark, trunk, limbs, branches, and foliage.

1.3.5. Prevent cutting, and damage to roots, branches, and bark.

1.3.6. PROTECTION of trees and landscape on the construction site that are to remain is required for keeping the trees and landscape in good health and vitality, as well as protection from physical damage during construction operations. Tree and landscape protection zones are designated on the drawings and shall be installed by the contractor before other work begins on site. These protection zones shall not be trespassed into with machinery or materials during anytime during the construction process without prior approval from the Manager.

1.3.7. COORDINATE PROTECTION procedures and protection zones with the Manager. In general, trees and landscape to remain shall be protected to the drip line or designated protection zone with acceptable barriers as specified herein.

1.4. SUBMITTALS

1.4.1. Procedural proposal for tree and plant protection. Describe methods of protection, and stabilization, provide drawings and supporting documentation as directed.

1.4.2. Condition Inspection: written report and color photographs.

1.5. PROJECT CONDITIONS

1.5.1. Driving and Parking: Not permitted on grass, nor within dripline.

1.5.2. Storage of Materials and Debris: Not permitted within dripline.

1.6. CONSULTING ARBORIST QUALIFICATIONS

1.6.1. Registered with the American Society of Consulting Arborists.

PART 2. PRODUCTS

Not Used

PART 3. EXECUTION

3.1. EXAMINATION

3.1.1. Verification of Conditions: Inspect trees, plants, and groundcovers, document existing conditions prior to installation of protection.

3.1.2. Water trees and plants within Work Limit Line; to maintain healthy condition throughout the Contract period until Substantial Completion.

3.2. EXECUTION

3.2.1. Install protection during initial mobilization at the site, and maintain until substantial completion.

3.2.2. Pruning and cutting of roots, branches, and foliage: Review conditions with Architect and Owner's Arborist prior to need for work, and proceed as directed.

3.2.2.1. Pruning and cutting: Performed with sharp instruments intended for the purpose; do not break nor chop.

3.2.3. Excavation and trenching within drip lines: Permitted where indicated, and at other specifically approved locations. Provide additional protection as recommended by Owner's Arborist.

3.2.4. Tunnel under or around roots by hand digging or boring. Do not cut main lateral roots and tap roots over one inch diameter; cut smaller roots which interfere with installation of new work.

3.2.5. Do not allow exposed roots to be scarred nor to dry out; provide temporary earth cover, or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and backfilled.

3.2.6. Existing Grading: Maintain within dripline of trees unless otherwise indicated and approved.

3.2.7. Provide temporary fence for protection of trees and landscape to remain. Extend fencing ten feet beyond dripline, or as directed by Owner.

3.2.7.1. Install protective fencing prior to construction mobilization and heavy equipment arrival to the site.

3.2.7.2. Prevent entry into protected areas except as authorized in writing by the Owner's maintenance personnel.

3.2.8. CONTROL: Avoid activities causing compaction or contamination of the soil within the protection zone. Do not permit parking, storage, or construction traffic with the barrier. If truck and equipment access to the construction site is required through landscape areas, these routes shall be designated by the Owner's representative and shall be used solely for accessing the construction site. Storage of materials, parking, and lay-down areas shall be restricted to designated areas. Do not store liquids, or powders in locations where spills may flow into root areas. DO NOT mix cement or chemicals within the landscape or construction site areas unless mixing materials are confined by an impermeable barrier or container that restricts access to any part of the soil or landscape. DO NOT rinse out concrete trucks, mixing tubs, chemical bottles, or other construction compounds onto any area where rinse will flow on or in the soil.

3.3. REPAIR AND REPLACEMENT OF PLANTS

3.3.1. Repair trees damaged by construction operations as directed by the Owner. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged trees.

3.3.2. Damaged trees and groundcover: Replace where Owner determines restoration to normal growth pattern is not possible. Plant and maintain as directed.

3.3.2.1. Replacement trees up to 13 inches caliper: Same size as damaged tree, species selected by Architect.

3.3.2.2. Trees over 13 inches caliper: Compensate Owner as determined by consulting arborist.

3.3.2.3. Replacement groundcovers: Same size and quality as damaged, species and as directed.

3.3.3. Where compaction of soil due to construction activity, including compaction of soil due to elevated water content, exceeds the critically limiting bulk density for the soil type in question, the Contractor shall provide measures as directed to reduce soil bulk density to acceptable levels to support normal plant growth.

3.3.4. Where necessary to restore soil to acceptable density, existing trees, plants and groundcovers shall be removed and replaced.

3.4. BASIS OF PAYMENT

Pay Item	Basis
Tree/Plant Protection	Incidental to other work items where tree and plant protection is required

END OF SECTION

SECTION 11 – SITE CLEARING

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Coordinate and provide for underground utility locates

1.1.2. Remove surface debris

1.1.3. Clear site of plant life and grass

1.1.4. Stripping and stockpiling of topsoil prior to seeding

1.1.5. Remove existing site improvement items, as indicated

1.1.6. Demolition and removal of asphaltic and portland cement concrete paving, as indicated

1.1.7. Remove trees and other major vegetation stands, as indicated

1.2. RELATED SECTIONS

1.2.1. Tree and Plant Protection

1.2.2. Excavation

1.2.3. R.A.B.S

1.2.4. Shouldering

1.2.5. Asphalt Paving

1.3. SUBMITTALS (Not Used)

1.4. QUALITY ASSURANCE

1.4.1. Regulatory Requirements:

1.4.1.1. Conform to applicable codes for disposal of debris.

1.5. PROJECT/SITE CONDITIONS

1.5.1. Conduct work to minimize disruption of roads, roads, walks, and adjacent occupied or used facilities. Do not close or obstruct roads, walks or other occupied or used facilities without permission from authorities having jurisdiction. Notify local police and Road Department of intended road closures at least 48 hours in advance of planned closure.

1.6. PREWORK CONFERENCE

1.6.1. Prior to starting work, flag salvage items and vegetation to remain; review flagging on site, and obtain Manager's approval.

1.7. SEQUENCING AND SCHEDULING

1.7.1. Sequence work under General and Supplemental Conditions of the Contract

1.7.2. Coordinate clearing work with utility companies.

PART 2. PRODUCTS (Not Used)

PART 3. EXECUTION

3.1. EXAMINATION (Not Used)

3.2. PREPARATION

3.2.1. Areas to be cleared and stripped shall be:

3.2.1.1. The area of the roadway indicated on the Construction Drawings, for the length of path identified, and as directed by the Manager or Engineer.

3.2.1.2. The area on each side of the roadway to the excavation and embankment slope lines, except where slopes are to be rounded, in which case the area shall extend to the outside limits of slope rounding.

3.2.1.3. Other areas as shown on the plans, or as directed by the Manager.

3.2.2. Protection: Section Tree and Plant Protection. Protect vegetation indicated to remain, and prevent damage to roots, bark, and foliage of this vegetation. Do not stockpile debris and soil within drip-line of tree to remain.

3.2.2.1. Install temporary fencing and guards around vegetation to remain within the area of the project Work.

3.2.3. Salvage Work: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated, or directed.

3.2.4. Asphalt pavement to be removed shall be separated from pavement to remain with a neat vertical saw cut. The final saw cut shall be made just prior to paving or lying pavers to protect the existing pavement to remain and assure a neat line is provided for a clean match with the new pavers or asphalt pavement.

3.3. SITE CLEARING AND GRUBBING

3.3.1. Remove site furnishings, vegetation, improvements, and salvage items as indicated, or as directed by Manager.

3.3.1.1. Completely remove stumps and roots and other debris protruding through the soil.

3.3.1.2. Remove or demolish site utilities as indicated.

3.3.2. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction.

3.3.2.1. Coat cut faces using an approved coating specifically formulated for use on damaged plant tissue.

3.3.2.2. Protect exposed roots with wet burlap until they can be covered with soil.

3.3.3. Strip topsoil to depth encountered; prevent intermingling with underlying subsoil and other contaminants.

3.3.3.1. Remove heavy growths of grass from areas before stripping.

3.3.3.2. Do not strip topsoil from within drip line of trees to remain.

3.3.3.3. Stockpile topsoil in storage piles in approved areas only, cover piles with heavy plastic.

3.3.3.4. Dispose of unsuitable or excess topsoil as waste material.

3.3.3.5. Grubbing within drip line of trees to remain shall be accomplished by hand.

3.4. ASPHALT REMOVAL

3.4.1. Carefully and cleanly remove existing asphalt, leaving as much of the existing base material as possible. Clear existing base material per this Specification. Prepare existing base, including and soft subgrade repair and ¾"(-) leveling course, as indicated in the Construction Documents, by re-compacting to project specifications, if necessary.

3.4.2. Protect adjacent asphalt to remain from damage, and maintain a neat line for a clean match with new asphalt pavement.

3.5. DISPOSAL OF WASTE MATERIALS

3.5.1. Burning on County Property: Burning is NOT permitted on the project site and County property.

3.5.2. Removal from project site and County Property: Remove waste materials and unsuitable and excess topsoil from the project site and County property. Recover or recycle waste materials as provided for in resource recovery plan. Legally dispose of off-site material that cannot be recovered, to an acceptable site.

3.5.3. The Manager has no designated disposal site for excavated or demolition materials. All spoils and demolition materials shall be hauled from the site and disposed of in a legal manner at the Contractor's expense.

3.6. REPAIR AND MAINTENANCE

3.6.1. Fill depressions caused by clearing and grubbing and asphalt removal operations with ¾"(-) crushed aggregate base material except where further excavation or earthwork is indicated. Place fill in horizontal layers not exceeding 6-inch loose depth, and compact to project specifications.

3.6.2. Maintenance of Vegetation to Remain: Contractor shall maintain health of vegetation to remain throughout the course of construction. Contractor shall water trees and vegetation to remain within limits of the work as necessary during operations.

3.6.3. Replace trees which cannot be repaired and restored to full-growth status, as required

3.7. METHOD OF MEASUREMENT

3.7.1. Site Clearing will be measured by the square yard, as noted in the bid documents. Payment shall be considered full compensation for removing, salvaging, and disposing of designated materials within the designated construction area, and retaining and protecting features identified to remain, including full compensation for all materials, labor and equipment necessary for completing the work.

3.7.2. Strip and Store Topsoil will be measured by the square yard of top soil encountered, as noted in the bid documents. Payment shall be considered full compensation for stripping storing, and disposing of unsuitable or excess material within the designated construction area, including full compensation for all materials, labor and equipment necessary for completing the work.

3.7.3. Asphalt Removal will be measured by the square yard. Payment shall be considered full compensation for saw cutting, removing, and disposing of existing asphalt as identified in the bid documents, including all materials, labor, and equipment necessary for completing this work.

3.8. BASIS OF PAYMENT

Pay Item	Basis
Site Clearing	Square Yard
Strip and Store Topsoil	Square Yard
Asphalt Removal	Square Yard

END OF SECTION

SECTION 12 – CATCH BASINS

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. This section covers furnishing and installing the catch basins, frames, grates, concrete collars and other miscellaneous work or materials for a complete installation, as indicated in the Construction Drawings.

PART 2. MATERIALS:

2.1. Concrete – Concrete shall be 5.5 bag minimum mix obtained from a commercial source. Minimum compressive strength shall be 3000 PSI in 28 days. Maximum aggregate size shall be 1.5 inches. Slump shall be four inches maximum. Concrete for collars shall be dyed with lamp black dye so as to match the adjacent asphalt pavement.

2.2. Forms - Forms for exposed surfaces shall be plywood, matched boards, or other approved material. All vertical surfaces shall be formed. Trench walls, large rock, or earth will not be approved form material.

2.3. Reinforcing Steel - Reinforcing steel shall conform to ASTM A-615, Grade 40, deformed bars or as otherwise specifically specified in approved plans.

2.4. Precast Units - At the option of the Contractor, approved precast units may be substituted for cast-in-place units. Precast units shall conform to ASTM C-478. Concrete risers for extensions shall be a maximum of six inches high and of the same quality as the sections. Risers shall be approved by Engineer before installation.

2.5. Mortar - Standard premixed mortar conforming to ASTM C-387, Type S, or proportion one part portland cement to two parts clean, well-graded sand which will pass a 1/8 inch screen. Admixtures may be used not exceeding the following percentages of weight of cement. Hydrated Lime, 10%, Diatomaceous Earth or other inert materials, 5%. Consistency of mortar shall be such that it will readily adhere to the concrete.

2.6. Frame and Grates – ITD Type A grates shall be 24" standard cast iron frame and slotted cover. For ITD Type B grates, the frames and grates shall be made and of steel conforming to ASTM A-36 in accordance with details shown. All connections shall be welded. Welding shall conform to requirements of current code for welding in building construction of the American Welding Society.

PART 3. EXECUTION

3.1. PREPARATION

3.1.1. Construct catch basins in accordance with standard drawings and typical details as shown on the Plans or as approved by the Owner.

3.1.2. All excavation and backfill shall be done in accordance with Section Excavation

3.1.3. Catch basins in paved areas (ITD Type A grate) shall be provided with concrete collars (colored with lamp black dye to match the asphalt pavement, if necessary). In paved areas, the tops of the catch basins shall be held below grade until paving is complete, and then the pavement neatly cut, frames adjusted to grade and concrete collars installed.

3.1.4. The pipes shall be grouted to seal the pipes entering and exiting the catch basin boxes so as to provide a water tight seal between the pipe and the box. The pipes shall be cut off to match the inside edge of the box.

3.2. QUALITY CONTROL:

3.2.1. 1. The Contractor shall notify the Manage a minimum of 24 hours prior to beginning any work covered by this section.

3.3. GUARANTEE:

3.3.1. The Contractor shall be responsible for any failure in concrete structures, grates, or settlement of structures for the guarantee period specified in these Standards.

3.3.2. Repairs or replacement shall be as specified by the County Engineer. Materials shall be as specified by the Manager. Completion of the repairs, as specified, will satisfy the requirement of the guarantee.

3.4. METHOD OF MEASUREMENT:

3.4.1. Measurement and payment for Catch Basins shall be based on a per Each basis as set forth in the bid schedule of items and prices. Payment shall be full compensation for furnishing and installing all materials and any other miscellaneous work or materials for a complete installation, including furnishing and installing a ITD Type A or B frame and grate.

3.5. BASIS OF PAYMENT:

3.5.1. Payment for the work described in this specification shall as follows:

Pay Item	Pay Unit
Catch Basins	Each

END SECTION

SECTION 13 – DRYWELLS

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. This section covers the work necessary to construct drywells for subsurface disposal of stormwater runoff. The work shall be completed in accordance with the details on the Drawings.

1.2. RELATED SECTIONS

1.2.1. Section Excavation

1.2.2. Section Aggregate Materials

PART 2. PRODUCTS

2.1. MATERIALS

2.1.1. Drywell shall consist of 24" perforated ADS N-12 or corrugated metal pipe, 16 gauge minimum wall thickness with 24" standard cast iron frame and cover. Grated cover shall have a minimum open area of one (1) square foot and be designed for an HS-25 loading. A Neenah inlet frame and grate model R-2596 shall be used.

2.1.2. Drain Rock: in accordance with Section Aggregate Materials.

2.1.3. Concrete for concrete collars shall conform with Section 26, Cast-in-place Concrete.

PART 3. EXECUTION

3.1. GENERAL

3.1.1. The drywells shall be constructed in conformance with the detail shown on the Drawings. The frame and grate/or solid covers shall be adjusted to match the finished elevations. All backfill shall be compacted to a minimum of 95% of maximum density. The tops of the drywells shall be held below grade until paving is complete, and then the pavers neatly cut, frames adjusted to grade and concrete collars installed. The drywells shall be protected during construction to prevent soil, gravel or other debris from entering the drywells during construction. The drywells shall be cleaned out, if necessary, after the construction is complete.

3.2. GEOTEXTILE

3.2.1. Once the drywell hole is excavated, line the area with 4 oz minimum (MIRAFI 140N) Geotextile fabric before backfilling with Drain Rock.

3.3. DRAIN ROCK

3.3.1. The drain rock shall be installed so that the aggregate is not contaminated with fines which will slow the percolation rate or plug the drain rock. After the perforated pipe and drain rock are installed, the drain rock shall be completely encapsulated with the 4 oz minimum (MIRAFI 140N) Geotextile fabric before backfilling.

3.4. GUARANTEE

3.4.1. The Contractor shall be responsible for any failure in concrete structures, grates, or settlement of structures for the Guarantee period specified in these Standards.

3.5. MEASUREMENT AND PAYMENT

3.5.1. Measurement and payment for new drywells shall be based on a per each basis, as set forth in the bid schedule of items and prices. Payment shall be full compensation for furnishing and installing all materials and any other miscellaneous work or materials for a complete installation.

PAY ITEM	BASIS
New Drywell	Each

END OF SECTION

SECTION 14 – TRENCH EXCAVATION AND BACKFILL

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Work includes but is not limited to the following:

1.1.1.1. Excavation and backfill of trenches for utilities.

1.2. RELATED SECTIONS

1.2.1. Section - Aggregate Materials

1.2.2. Coordinate related project work specified in other parts of the Project Documents including, but not limited to: electrical, architectural, mechanical, and plumbing.

1.3. REFERENCES

1.3.1. All work to follow recommendation of Soils Report and/or Geotechnical Engineer

1.3.2. ASTM D 698 – Test method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

1.3.3. ASTM D 2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.3.4. ASTM D 3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures in Place by Nuclear Methods (Shallow Depth).

1.4. DEFINITIONS

1.4.1. **Utility**: Any buried pipe, duct, conduit, or cable.

1.5. FIELD MEASUREMENTS

1.5.1. Verify that survey bench mark, control point, and intended elevations for the Work are as shown on Drawings.

PART 2. PRODUCTS

2.1. FILL MATERIALS

2.1.1. Granular Backfill: Section Aggregates.

2.1.2. Coarse Gravel: Section Aggregates.

2.1.3. Sand: Section Aggregates.

2.1.4. Engineered Fill: Section Aggregates.

2.1.5. Soil Materials: Section Aggregates.

2.1.6. Drain Rock: Section Aggregates.

2.2. 3/EXCAVATION

2.2.1. The excavation is unclassified. All excavation of any character shall be accomplished under the appropriate pay item for the type of utility being installed. The Contractor shall make his own estimate of the kind and extent of the various materials which will be encountered in the excavation.

2.3. PIPE BEDDING

2.3.1. Pipe bedding shall be ¾" (-) crushed aggregate or Sand. In-lieu of ¾" (-) crushed aggregate or Sand for pipe bedding, the Contractor shall submit samples of all other materials to be used for pipe bedding for the Engineer's approval before commencing work. For example, bedding material may be obtained by screening the excavated trench material in lieu of importing similar material. All utilities require bedding material.

2.4. WATER FOR BACKFILL

2.4.1. The Contractor shall make all necessary arrangements for a source of potable water during all periods of the work associated with this section.

2.5. GRAVEL FOR FOUNDATION STABILIZATION

2.5.1. Gravel for foundation stabilization shall be clean, Engineered Fill or 2" Coarse Gravel. Engineered Fill shall have a maximum size of material three inches.

PART 3. EXECUTION

3.1. PREPARATION

3.1.1. Identify required lines, levels, contours, and datum locations.

3.1.2. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

3.1.3. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs, etc. not to be disturbed from excavating equipment and vehicular traffic.

3.1.4. Maintain and protect above and below grade utilities which are to remain.

3.1.5. Prior to commencing work, identify obstructions and obtain Manager approval for removal. Obstructions are those items which may be removed and do not require replacement such as, but not limited to, trees, roots, stumps, abandoned structures and debris. Upon notice of such obstructions, the Manager may change trench alignments to avoid obstructions, if possible. If such alignment changes are made, the Contractor's pay shall reflect all additional costs or credits associated with the change.

3.1.6. In areas where the trench alignment crosses existing topsoil, the topsoil shall be removed for the full width of the trench to be excavated. This topsoil may be stockpiled for re-use. Stockpiled topsoil shall not be mixed with the other excavated material. The Contractor shall repair damage to adjacent topsoil caused by trenching operations.

3.1.7. Cut all bituminous and concrete pavements, regardless of the thickness, prior to excavation of the trenches, with an approved pavement saw. The width of the pavement cut shall be equal to the required width of the trench at ground surface plus one foot on each side. Pavement removed shall be hauled from the site, and shall not be used for trench backfill. The Contractor shall protect pavement areas not to be removed.

3.1.8. Cut out soft areas of subgrade not capable of compaction in place. Backfill these areas with material as approved by the Engineer, and compact to a density equal to, or greater than, requirements of subsequent backfill material.

3.2. TRENCHING

3.2.1. Excavate subsoil required for utilities from building to existing or new utilities to the lines and grades as indicated on the Drawings, as established by conventional practice, or as directed by the Engineer.

3.2.2. Cut trenches sufficiently wide to enable installation and allow inspection. Unless special circumstances require otherwise, the bottom of the trench should not be less than twelve inches, nor more than 24 inches, wider than the outside of the utility to be laid. Coordinate excavations near building with building Work. Interfere with 45 degree bearing splay of foundations only as approved by a structural engineer or architect.

3.2.3. The Contractor shall be responsible for adequately shoring, sheeting, and bracing the trench in accordance with appropriate regulations.

3.2.4. Hand trim excavation for all pipe joints and fittings. Remove water and loose materials that interfere with the work.

3.2.5. Remove lumped subsoil, boulders, and rock which will interfere with Work.

3.2.6. Correct areas over excavated by placing and compacting material as approved by the Engineer.

3.2.7. The Contractor should locate the excavated material on the side of the trench, where possible, minimizing damage to existing site features, and keeping open roadways, paths, and walkways, unless otherwise approved. Excess excavated material must be confined to approved working areas, or removed from the site.

3.2.8. The Contractor shall be responsible for promptly removing and disposing of water entering the trench during the time the trench is being prepared for installation of the utility, including completion of backfill of the pipe zone, at no additional cost to the Owner. The Contractor shall dispose of the water in a suitable manner with causing damage to adjacent site features or property. .

3.2.9. Initial trench excavation can first be made to approximately one-inch above finished grade, except where stones, cemented gravel, or unstable conditions occur. However, finished excavation, including bell holes, shall be made just ahead of pipe laying.

3.2.10. Bell holes shall be excavated to sufficient dimensions to positively avoid the bell carry any weight or loading stresses, and so that the pipe shall have a firm bearing of not less than ¾ of the length of the barrel.

3.3. BACKFILL

3.3.1. The bottom of the trench shall be backfilled and tamped with approved bedding material to form a cradle for the pipe. All irregularities in the trench bottom shall be removed by appropriate excavation and backfill.

3.3.2. After the pipe lengths have been jointed, the bell holes and sides of the pipe shall be carefully backfilled with bedding material and thoroughly compacted with approved tampers. Approved bedding material must be placed and compacted to a minimum of six inches above the pipe (top of the pipe zone). Backfill material shall not be pushed into the trench in a manner that allows free fall of the material until at least two feet of cover is provided over the top of the pipe. Each lift in the pipe zone shall be “walked in” and supplemented by slicing with a shovel to ensure that no bridging of material occurs around the pipe.

3.3.3. Upon approval of the Engineer and after the pipe zone is complete, trenches may be backfilled with the material excavated (native material), provided rocks of over eight inches maximum dimension and other deleterious material are removed. No material containing frost or ice shall be used for backfill.

3.3.4. Each lift shall be properly compacted, and the completed trench shall provide a suitable subgrade for the intended finished surface. Trenches in a public right-of-way, under structures, roadways, sidewalks, parking areas, or as directed by the Engineer shall be compacted by means of mechanical tamping. Placement and compaction shall be done in lifts not exceeding twelve inches in thickness. Compaction of these trenches shall be completed to 95% of maximum density, as determined by AASHTO-T99 (Standard Proctor). Sufficient water must be added to dry materials, and aeration of wet materials as needed, shall be utilized to achieve the specified compaction.

3.3.5. Compaction equipment shall be of a suitable type and adequate to obtain specified compaction. The equipment must be approved by the Engineer, and operated in a manner as to deliver the manufacturer's rated compaction effort. Compaction test will be performed as required by the Engineer at the Owner's expense.

3.3.6. In trench areas that do not require pavement, gravel, or mulch surface repair, topsoil and seeding shall be the finished surface. The minimum finished depth of topsoil over such trenches shall be six inches. Approved imported topsoil may be used, as the Owner is aware that suitable topsoil maybe be scare in some trench areas.

3.4. TOLERANCES

3.4.1. Plus or minus one-tenth of a foot (+/- 0.10') from required elevations.

3.5. FIELD QUALITY CONTROL

3.5.1. Compaction testing will be performed in accordance with AASHTO-T99.

3.5.2. If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest at no additional cost to Owner.

3.5.3. Frequency of Tests: As required by the Engineer.

3.6. PROTECTION OF FINISHED WORK

3.6.1. Maintenance of the backfilled trench shall include at no additional expense to the Owner, but not be limited to, the addition of crushed rock backfill material to keep the surface reasonable smooth, free of ruts and potholes, and suitable for normal traffic. Maintain the backfilled trench surface between any two successive or valved sections of pipeline until the following operations have been completed:

3.6.1.1. Valves, valve boxes, services, and hydrants installed,
3.6.1.2. Hydrostatic testing,
3.6.1.3. Sterilization and testing,
3.6.1.4. Clean-up and restoration of all site physical features,
3.6.1.5. Utilities restored to their original condition, or better.

3.6.2. Protect finished Work from damage.

3.7. GUARANTEE

3.7.1. Any settlement noted in backfill, fill, or in structures built over the backfill or fill with the guarantee period in accordance with the Standards will be considered to be a result of improper compaction methods, and shall be corrected at no cost to the County. Structures damaged by settlement shall be restored to the original condition by the Contractor at no cost to the County.

3.8. METHOD OF MEASUREMENT AND BASIS OF PAYMENT

3.8.1. General – Measurement and payment for the work and material required under this section are to be incidental to the price per linear foot for the various sizes and types of pipe or conduits being laid as set forth in the BID PROPOSAL – SCHEDULE OF ITEMS AND PRICES.

END OF SECTION

SECTION 15 – CULVERTS AND STORM DRAINS

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Culvert, storm drain and gravity irrigation pipe materials, installation and testing.

1.2. RELATED SECTIONS

1.2.1. Section – Trench Excavation and Backfill.

1.2.2. Section – Aggregate Materials

1.3. REFERENCES

1.3.1. AASHTO M 036: Corrugated Metal Pipe, Ribbed Pipe and Pipe Arches.

1.3.2. AASHTO M 190: Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches.

1.3.3. AASHTO M 196: Corrugated Aluminum Pipe and Pipe Arches.

1.3.4. AASHTO M 218: Steel Sheet, Zinc-Coated {Galvanized), for Corrugated Steel Pipe.

1.3.5. AASHTO M 252: Corrugated Polyethylene Drainage Tubing, 3 inch to10 inch.

1.3.6. AASHTO M 274: Steel Sheet, Aluminum-Coated {Type 2) for Corrugated Steel Pipe.

1.3.7. AASHTO M 294: Corrugated Polyethylene Pipe, 12 inch to 48 inch.

1.3.8. AASHTO M 304: Polyvinyl Chloride {PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter.

1.3.9. ASTM C 14: Concrete Sewer, Storm Drain, and Culvert Pipe.

1.3.10. ASTM C 76: Reinforced Concrete Pipe.

1.3.11. ASTM C 443: Joints for Circular Concrete Sewer and Culvert Pipe, using Rubber Gaskets.

1.3.12. ASTM C 924: Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.

1.3.13. ASTM D 3034: Type PSM PVC Sewer Pipe and Fittings.

1.3.14. ASTM D 3212: Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

1.3.15. ASTM F 2736: Standard Specification for 6 to 30 in. Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe.

1.3.16. ASTM F 2764: Standard Specification for 30 to 60 in. Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications.

1.3.17. ASTM F 477: Elastomeric Seals for Joining Plastic Pipe.

1.3.18. ASTM F 679: PVC Large Diameter Plastic Gravity Sewer Pipe and Fittings.

1.3.19. ASTM F 794: PVC Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.

1.3.20. ASTM F 1803: Dual wall closed profile PVC sewer pipe sizes 18" to 60".

1.3.21. ASTM F 2736: Polypropylene Corrugated Single Wall and Double Wall Pipe.

1.3.22. ASTM F 2764: Polypropylene Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications.

1.4. SUBMITTALS

1.4.1. Submit shop drawings for materials to be installed or furnished under this section.

1.4.2. Submit manufacturer's certification that pipe and fittings meet or exceed specified requirements including all requested test results and material identification.

1.4.3. Submit manufacturers' installation instructions and maintain copy at the jobsite.

1.5. PROJECT RECORD DOCUMENTS

1.5.1. Accurately record actual locations of constructed culverts and other encountered utilities in relation to existing permanent benchmarks.

1.5.2. Provide copy of record documents to Manager prior to issuance of substantial completion.

1.6. DELIVERY, STORAGE AND HANDLING

1.6.1. Handle and store pipe in a manner which prevents shock, damage or excessive exposure to sunlight and weather.

1.6.2. Protect gasket material from damage, sunlight and contamination until ready for installation in the pipe.

PART 2. MATERIALS

2.1. PIPE SIZE, TYPE AND STRENGTH

2.1.1. If type and strength classifications are not indicated in the Contract Documents, use any of the alternate pipe materials meeting the minimum requirements of this section.

2.1.2. Comply with pipe size, type, and strength classifications indicated in the Contract Documents.

2.1.3. Notify the Engineer if installation conditions such as trench width, depth, soils, and bedding conditions do not match conditions contemplated by the Contract Documents.

2.2. CULVERT, STORM DRAIN AND GRAVITY IRRIGATION PIPE AND FITTINGS

2.2.1. Solid Wall PVC Pipe Sizes 4 inch to 15 inch: ASTM D 3034.
2.2.1.1. Minimum Wall Thickness: SDR 35.
2.2.1.2. Joints: Elastomeric gasket joints with ASTM F 477 elastomeric gaskets.

2.2.2. Solid Wall PVC Pipe Sizes 18 inch to 36 inch: ASTM F 679.
2.2.2.1. Minimum Wall Thickness: T-1 (or T-2 with Engineer approval).

2.2.3. Ribbed PVC Pipe Sizes 8 inch to 48 inch: ASTM F 794, PS46.
2.2.3.1. Minimum Pipe Stiffness: 46 psi.
2.2.3.2. Ribs to be perpendicular to the axis of the pipe, unless otherwise approved by the Engineer.

2.2.4. Large Diameter Closed Profile PVC Pipe Sizes 18 inch to 60 inch: ASTM F 1803.
2.2.4.1. Minimum Pipe Stiffness: 46 psi.

2.2.5. Polyvinyl Chloride Profile Wall Drain Pipe and Fittings, 15 inch to 48 inch: AASHTO M 304.
2.2.5.1. Minimum Pipe Stiffness: Sufficient to accommodate HS-25 traffic loading considering depth of bury, soil conditions, and application.

2.2.6. Corrugated Polyethylene Drainage Tubing, 3 inch to 10 inch: AASHTO M 252.
- 2.2.6.1. Type: S -smooth inner liner, or Type D -smooth inner liner with essentially smooth outer wall with internal supports.
- 2.2.6.2. Minimum Pipe Stiffness: 46 psi.
- 2.2.6.3. Joints: Watertight bell and spigot with ASTM F 477 gaskets.

2.2.7. Corrugated Polyethylene Pipe, 12 inch to 60 inch: AASHTO M 294.
- 2.2.7.1. Type: S-smooth inner liner.
- 2.2.7.2. Minimum Pipe Stiffness: Sufficient to accommodate HS-25 traffic loading considering depth of bury, soil conditions, and application.
- 2.2.7.3. Joints: Watertight bell and spigot with ASTM F 477 gaskets.

2.2.8. Reinforced Concrete Pipe 12 inch to 144 inch: ASTM C 76.
- 2.2.8.1. Minimum Class: As indicated in the Contract Documents.
- 2.2.8.2. Joints: ASTM C 443, Rubber Gasket Joints.
- 2.2.8.3. Liner: Section 506, Plastic Liner.

2.2.9. Non-Reinforced Concrete Pipe- 4 inch to 36 inch: ASTM C 14.
- 2.2.9.1. Minimum Class: Class 3 unless otherwise indicated in the Contract Documents.
- 2.2.9.2. Joints: ASTM C 443, Rubber Gasket Joints.
- 2.2.9.3. Liner: Section 506, Plastic Liner.

2.2.10. Corrugated Galvanized Steel Metal Pipe, Ribbed Pipe and Pipe Arches: AASHTO M 036.
- 2.2.10.1. Type, Thickness and Corrugation: AASHTO M 218 and as indicated in the Contract Documents.
- 2.2.10.2. Exterior Coating: AASHTO M 190, Type A or aluminized Type 2 coating per AASHTO M 274.
- 2.2.10.3. Joints: Consistent with corrugations.

2.2.11. Corrugated Aluminum Pipe and Pipe Arches: AASHTO M 196.
- 2.2.11.1. Type, Thickness and Corrugation: As indicated in the Contract Documents.
- 2.2.11.2. Joints: Consistent with corrugations.

2.2.12. Corrugated Aluminized Steel Pipe and Pipe Arches – AASHTO M 036.
- 2.2.12.1. Type, thickness and corrugation: AASHTO M 274 and as indicated in the Contract Documents.
- 2.2.12.2. Joints: Consistent with corrugations.

2.2.13. Corrugated Polypropylene Pipe: 12 inch to 30 inch: ASTM F 2736.
- 2.2.13.1. Minimum pipe stiffness: 46 psi.
- 2.2.13.2. Joints: Watertight per ASTM D 3212 with ASTM F 477 gaskets.

2.2.14. Triple Wall Polypropylene Pipe: 30 inch to 60 inch: ASTM F 2764.
- 2.2.14.1. Minimum pipe stiffness: 46 psi.
- 2.2.14.2. Joints: Watertight per ASTM D 3212 with ASTM F 477 gaskets.

2.3. COUPLINGS FOR DISSIMILAR PIPE OR TWO PLAIN ENDS OF SIMILAR PIPE

2.3.1. Coupling for Two Pipes of Dissimilar Type or Size: Flex seal couplers made by Mission Clay Products of Corona, California, or approved substitution, providing for a watertight connection, and a consistent pipe invert.

2.3.2. Coupling for Two Pipes Where Factory Bell and Spigot are not Available: Flex seal couplers made by Mission Clay Products of Corona, California, or approved substitution, providing for a watertight connection and a consistent pipe invert.

2.3.3. Coupling of PVC Plain End to PVC Plain End: Bell-by-bell connection.

2.4. GRAVITY IRRIGATION SLIDE GATES AND VALVES

2.4.1. Refer to Project specific details and specifications.

2.5. SOURCE QUALITY CONTROL

2.5.1. Provide test and inspection reports required by the Standard for the pipe and fittings.

2.5.2. Inspect pipe and fittings, markings to verify type, class, thickness and marking information required by the Standard for the pipe and fitting.

PART 3. WORKMANSHIP

3.1. EXAMINATIONS

3.1.1. Verify that excavations are to required alignment and grade and installation meets the requirements of Idaho Department of Environmental Quality – Non-Potable Water Line Separation.

3.1.2. Verify that trench conditions and shoring, sheeting, and bracing protect workers and meet the requirements of OSHA.

3.1.3. Examine pipe and fittings for defects or damage.

3.1.4. Verify pipe, fittings, aggregate, and materials delivered to the site meet the requirements of the Contract Documents.

3.1.5. Verify utility locations, required separation, existing piping locations and structures where connections are to be made prior to beginning work. Notify the Engineer if field conditions are different from the Contract Documents. Allow 4 hours for the Engineer to modify the design, if necessary, unless otherwise specified.

3.2. PIPE INSTALLATION

3.2.1. Prepare trench bottom as required by Section Trench Excavation and Backfill.

3.2.2. Maintain groundwater twelve-inches (12”) below the pipe invert and, if necessary, provide foundation stabilization.

3.2.3. Provide pipe bedding and initial backfill as required by Section Trench Excavation and Backfill.

3.2.4. Install pipe in accordance with the manufacturer's recommendations for the type of pipe specified in the Contract Documents.

3.2.5. For bell and spigot installation, install pipe upgrade with the bell-end upgrade.

3.2.6. Use standard lengths of pipe unless otherwise required for installation of tees, fittings, catch basins, manholes, or culvert inlets and outlets.

3.2.7. Utilize proper tools for cutting and beveling pipe ends and joining pipe. Use manufacturer's recommended tools designed for this task.

3.2.8. Move pipe carefully and prevent damage to pipe and manufactured ends while lowering pipe into trench.

3.2.9. Remove dirt and other foreign material from pipe.

3.2.10. For bell and spigot installation, prepare pipe joint using specified gasket and manufacturer's recommended lubricant. For corrugated piping, provide and install couplings consistent with piping system.

3.2.11. For bell and spigot installation, mark, or verify that pipe ends are marked, to indicate insertion stop position (home). Ensure that pipe is inserted into bell to this mark. Push spigot into bell using methods recommended by the manufacturer. Protect the end of the pipe during "homing" and do not use excessive force that may result in over-assembled joints, dislodged gaskets, or damaged ends. If full entry is not achieved, disassemble and clean the joint and reassemble.

3.2.12. Provide sufficient restraint for the pipe to ensure that joints are held in place while bedding and initial backfill are placed.

3.2.13. Limit joint gap on concrete pipe to less than 5/8 inch for pipe 4 inches through 10 inches, 7/8 inch for pipe 12 inches through 24 inches, and 1 inch for pipe 27 inches and larger.

3.2.14. When pipe installation is not in progress, block and plug the open end of the pipe to prevent creep, uplift or floating and entrance of water or other material into the pipe.

3.2.15. Limit variance of installed pipe from design line and grade to less than 0.02 feet, unless a smaller variance is necessary to prevent a level or negative slope.

3.2.16. Backfill trench as required by Section Trench Excavation and Backfill.

3.3. PLUGS AND PIPE MARKERS

3.3.1. Where indicated in the Contract Documents, furnish and install plugs or caps on pipe ends and stub-outs.

3.3.1.1. Provide shop drawings for plugs and caps on pipelines greater than 8 inches in diameter.

3.3.1.2. Ensure plugs and caps are easily removed and provide a suitable end for making a connection when the pipeline is extended.

3.3.1.3. Fasten or block caps and plugs to ensure no displacement during testing and backfilling.

3.3.2. Furnish and install pipe markers at stub-outs per ISPWC Standard Drawing SD-512- Standard Service Marker.

3.3.3. Provide the Engineer with two working days' notice to allow measurement of the vertical and horizontal location of pipe ends before the pipeline is covered.

3.4. PIPE ANCHORS

3.4.1. Install pipe anchors as required per ISPWC Standard Drawing SD-510- Pipe Anchors.

3.5. TESTING

3.5.1. Perform testing in the presence of the Engineer.

3.5.2. For pipes 24 inches and smaller:

3.5.2.1. Test per ASTM C 924: Standard Practice for Testing Concrete Pipe Sewer Lines by Low Pressure Air Test Method.

3.5.2.2. Visual inspection, pipe cleaning, deflection tests (for flexible pipe) and CCTV are all required per ISPWC Section 501 -Gravity Sewers.

3.5.3. For pipes larger than 24 inches:

3.5.3.1. Test per ISPWC Section 501 -Gravity Sewers.

3.6. MEASUREMENT AND PAYMENT

3.6.1. Work includes all labor, equipment and materials required to complete the work including pipe, fittings, couplings, connections, excavation, pipe bedding, backfill, end bevels, and all appurtenances not itemized in the Bid Schedule. If required and not listed in the Bid Schedule, the following Bid

Items are to be considered incidental to other Bid Items. Surface repair is incidental to this bid item unless otherwise listed in the Bid Schedule.

3.6.2. Storm Drain/Culvert Pipe: By the linear foot for the size, type and class of pipe specified measured along the horizontal centerline through all fittings and structures including flared ends.

ITEM	BASIS
Storm Drain/Culvert	Linear foot (LF)

END OF SECTION

SECTION 16 – EXCAVATION AND EMBANKMENT

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Coordinate and provide for underground utility locates

1.1.2. Cutting, grading, filling and rough contouring the site.

1.1.3. Site excavation and backfilling for subgrade preparation.

1.1.4. Fill under slabs-on-grade and paving.

1.1.5. Removal and disposal of structures or any miscellaneous obstructions that are visible, or are indicated on the plans which encroach upon, or otherwise obstruct the work and for which a separate bid is not taken.

1.1.6. Consolidation and compaction.

1.2. RELATED SECTIONS

1.2.1. Section 8 - Aggregate Materials

1.2.2. Section 18- Asphalt Pavement

1.3. REFERENCES

1.3.1. ASTM D 698 – Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

1.3.2. ASTM D 2922 – Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.3.3. ASTM D 3017 – Test Method for Water Content of soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4. SUBMITTALS

1.4.1. Samples: Submit 10 lb. sample of each type of fill to testing laboratory in airtight containers.

1.4.2. Test Results: Provide current test results for each type fill materials used.

1.4.3. Project Record Documents

1.4.3.1. Submit under SECTION 3- Submittals.

1.4.3.2. Accurately record actual locations of utilities remaining, by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2. PRODUCTS

2.1. MATERIALS

2.1.1. TOPSOIL: Fertile, friable, natural fine sandy loam, very fine sandy loam or silt surface soil with pH rating between 6 and 8, free of: subsoil, stones 1 inch in diameter or larger, clods of hard earth, noxious weeds, roots, sticks, or other existing impurities.

2.1.2. NATIVE SUBSOIL: Excavated material, graded, free of lumps larger than 6 inches, rocks larger than 3 inches, and debris. All suitable material taken from excavation shall be used in the formation of embankment, subgrade, and for backfilling as indicated on the plans, or as directed by the Engineer.

2.1.3. ¾"(-) CRUSHED AGGREGATE BASE (3/4"): As specified in Section 8.

2.1.4. 2"(-) COARSE GRAVEL (2"-): As specified in Section 8.

2.1.5. PIT RUN GRAVEL: As specified in Section 8.

2.1.6. GEOTEXTILE FABRIC: Mirafi 140N, or as approved by the Engineer.

2.1.7. UNSUITABLE MATERIAL: Soft and/or yielding soil, topsoil, or soil that is considered by the Engineer to be damaged.

PART 3. EXECUTION

3.1. EXAMINATION

3.1.1. Verify site conditions are suitable for the proposed Work.

3.1.2. Verify that survey benchmark and/or intended elevations for the Work are as indicated.

3.2. PREPARATION

3.2.1. Identify required lines, levels, contours, and datum. The Contractor shall not proceed beyond the dimensions and elevations established, and no material shall be removed prior to the staking out of the site, if required.

3.2.2. Existing Utilities:

3.2.2.1. Identify known underground, above ground and aerial utilities

3.2.2.2. Stake and flag locations

3.2.2.3. Notify, coordinate, and obtain utility company to remove or relocate utilities

3.2.2.4. Protect above and below grade utilities which are to remain

3.2.3. Materials shall not be wasted without the permission of the Manager or Engineer. The excavation and borrow operations shall be so scheduled that no unauthorized waste of excavation will result.

3.2.4. The Blaine County has no designated disposal site for excavated or demolition materials. All spoils and demolition materials shall be hauled from the site and disposed of in a legal manner at the Contractor's expense.

3.2.5. The Engineer may designate as unsuitable those materials that cannot be properly compacted in embankments. All unsuitable material shall be disposed of as directed. The roadway shall be maintained in such a condition that it will be well-drained at all times.

3.2.6. The Engineer reserves the right to make minor adjustments or revision in lines and grades, if found necessary as the Work progresses, due to unforeseen site conditions resulting in discrepancies in the plans, or to obtain construction satisfactory to the Manager.

3.2.7. Protect benchmarks, fences, and paving, from excavation equipment and vehicular traffic.

3.2.8. Subgrade:

3.2.8.1. In general, compact subgrade to density requirements for subsequent backfill materials

3.2.8.2. Compaction equipment shall be of the size and type capable of obtaining specified compaction.

3.2.8.3. Unsuitable material or damage to the subgrade shall be defined visually on-site at the beginning of construction in a meeting with the Engineer and Contractor. For bidding purposes, damage to the subgrade is when the soil moves, pumps and/or displaces under any type of pressure including foot traffic loads. The Contractor, upon encountering soft and yielding soil, shall not proceed until notifying the Engineer. If the Contractor proceeds, damaged subgrade conditions shall be assumed by the Engineer.

3.3. EXECUTION

3.3.1. Excavation

3.3.1.1. The Contractor shall use tracked equipment and methods during excavation that will protect the stability and structural integrity of the subgrade.

3.3.1.2. Excavate subsoil from areas to be further excavated, or re-graded, including areas of uncontrolled fill, refer to geotechnical report for description, if available. Subgrade shall be excavated and shaped to line, grade, and cross-section shown on the plans. The subgrade shall be compacted to 95% of maximum density as determined by ASTM D-698. In-lieu of density measurements, the subgrade may be proof-rolled to the approval of the Engineer.

3.3.1.2.1. Proof-Rolling: After excavation to the subgrade elevation and prior to placing course gravel, the Contractor shall proof roll the subgrade with a 5-ton smooth drum roller, loaded water truck, or loaded dump truck, as accepted by the Engineer. Immediately notify the Owner and Engineer of unsuitable subgrade material areas, and/or areas not capable of compaction according to these Specifications.

3.3.1.3. If, in the opinion of the Engineer, the Contractor's operations result in damage to, or protection of, the subgrade, the Contractor shall, at his own expense, repair the damaged subgrade by over-excavation of unsuitable material to firm subsoil, line excavation with geotextile fabric, and backfill with Pit Run Gravel. Contractor shall use appropriate equipment to protect damage to the subgrade.

3.3.1.4. The Contractor shall water or aerate subgrade as necessary to obtain optimum moisture content.

3.3.1.5. The Contractor shall remove from the site excess subsoil not being reused and unsuitable material. The Contractor shall stockpile suitable material to be reused in a location that does not disrupt operations of adjacent properties. The Contractor shall protect the stockpiled materials from erosion and sediment transport from away from stockpile.

3.3.2. Backfilling

3.3.2.1. Compaction equipment shall be of the size and type capable of obtaining specified compaction.

3.3.2.2. Fill areas to contours and elevations with unfrozen materials.

3.3.2.3. Crushed Aggregate: Place and compact materials in continuous layers not exceeding six-inches (6") compacted depth, compacted to 95% of maximum dry density.

3.3.2.4. Coarse Gravel: Place and compact materials in continuous layers not exceeding eight-inches (8") compacted depth, compacted to 95% of maximum dry density

3.3.2.5. Pit Run Fill: Place and compact material in continuous layers not exceeding twelve-inch (12") compacted depth, compacted to 95% of maximum dry density.

3.3.2.6. The Contractor shall apply water as necessary to obtain moisture content capable of producing compacted densities in accordance with these specifications.

3.3.3. . Embankment :

3.3.3.1. Embankment shall only be placed after the subsoil foundation has been approved by the Engineer.

3.3.3.2. Fill areas to contours and elevations with unfrozen materials. Place materials utilizing depths indicated on the Drawings. Where embankments are placed on natural slopes steeper than three to one horizontal to vertical (3:1 H:V), horizontal benches shall be constructed as shown on the plans, or as directed by the Engineer, or as suitable with equipment being used.

3.3.3.3. Starting layers shall be placed in the deepest portion of the fill; as placement progresses, layers shall be constructed approximately parallel to the finished grade lines.

3.3.3.4. Crushed Aggregate: Place and compact materials in continuous layers not exceeding six-inches (6") compacted depth, compacted to 95% of maximum dry density

3.3.3.5. Coarse Gravel: Place and compact materials in continuous layers not exceeding eight-inches (8") compacted depth, compacted to 95% of maximum dry density

3.3.3.6. Pit Run Fill: Place and compact material in continuous layers not exceeding twelve-inch (12") compacted depth, compacted to 95% of maximum dry density.

3.3.3.7. Embankment material consisting of gravel or rock which cannot be incorporated in twelve-inch (12") layers shall be placed in layers of such thickness as directed. Layer thickness shall not exceed 18-inches (18") for gravel or 36-inches (36") for rock, unless otherwise permitted. Embankment constructed of rock shall have the voids between larger pieces filled with smaller pieces, rock spalls, or granular material to for a dense, compact embankment.

3.3.3.8. If pipes are to be planned in the embankment, the embankment shall be constructed to an elevation of two-feet (2') above the top of pipe prior to trench excavation for the pipe installation.

3.3.3.9. Maintain optimum moisture content of fill materials to attain required compaction density.

3.3.3.10. If applicable, slope grade away from building as shown on plans.

3.3.3.11. Make grade changes gradual. Blend slope into level areas.

3.3.3.12. Remove surplus fill materials from site.

3.3.3.13. Install filter fabric as indicated on drawings

3.3.3.14. Compact the sub-base under areas to be landscaped to 90% of maximum dry density to a depth of 36" in shrub beds and lawn areas.

3.3.4. Backfill Under Asphalt Pavement and Cast-in-Place Concrete :

3.3.4.1. Backfill under areas of asphalt pavement and concrete pavers as indicated on Drawings with unfrozen fill materials.

3.3.4.2. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

3.3.4.3. Backfill: Place and compact material in equal continuous layers not exceeding 6 inches compacted depth.

3.3.4.4. Employ a placement method that does not disturb or damage other Work.

3.3.4.5. Maintain optimum moisture content of fill materials to attain required compaction density.

3.3.5. Over-Excavation and Backfill for soft subgrade repair

3.3.5.1. Upon approval of the Engineer, the Contractor shall remove soft subgrade areas not capable of compaction, and repair with over-excavation and backfill per this Specification, or as otherwise approved by the Engineer. Payment for repair of soft subgrade area shall be in addition to Excavation Bid Items, and based on calculation of cubic yards of unsuitable material removed.

3.3.5.2. For bidding purposes, areas excavated below subgrade to remove unsuitable material shall be over-excavated to a depth of twelve-inches (12") below identified subgrade elevations, lined with geotextile fabric, and backfilled to subgrade elevations with Pit Run Gravel material, as approved by the Engineer. This backfill shall be compacted to a minimum of 95% of maximum dry density as determined by ASTM D 698 / AASHTO T-99, or comply with Engineer's recommendations.

3.3.6. Tolerances

3.3.6.1. Top Surface of excavated subgrade or backfilling: Plus or minus 0.10 feet (0.10'+/-), or as specified in the section of these specifications covering the work of which excavation is a part.

3.4. FIELD QUALITY CONTROL

3.4.1. Field inspection and testing will be performed by the Engineer or Manager.

3.4.2. Tests and analysis of fill material will be performed in accordance with ASTM D 698.

3.4.3. Compaction testing will be performed in accordance with ASTM D 698, ASTM D 2167, or ASTM D 2922, as directed by the Engineer.

3.4.4. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no additional cost to County.

3.4.5. Frequency of Tests: (1) per 10,000 sq. ft., or as required by Engineer.

3.4.6. Proof-roll compacted fill surfaces under slabs-on-grade and paving with Engineer present.

3.5. PROTECTION

3.5.1. Protect finished work from damage allowing completion of other trades and Project Work.

3.5.2. Prevent displacement or loose soil from falling into excavation, maintain soil stability.

3.5.3. Reshape and re-compact fills subjected to vehicular traffic.

3.5.4. Restore existing improvements damaged during construction to original condition.

3.6. GUARANTEE

3.6.1. The Contractor shall be responsible for all damage that may occur due to settlement of earth or rock fills and structure backfill that results from the Contractor not completing the Work according to these Specifications.

3.7. BASIS OF MEASUREMENT

3.7.1. Excavation and Embankment will be measured by the cubic yard to be placed, or excavated from its original position before removal as determined using the average end area method, or three-dimensional measurements. Measurement shall include all equipment, personnel, and labor for construction associated with excavation, subgrade preparation, and placement and compaction of imported material. This work shall include excavation, haul, placement in embankments, watering, compaction, shaping, and all other incidental work necessary to complete this item.

3.7.2. Over-Excavation of and Backfill of Soft Subgrade will be measured by the cubic yard of material removed from its original position, using the average end area method, or three-dimensional measurements. All subgrade areas requiring over-excavation shall be approved and measured by the Engineer. Payment for over-excavation of unsuitable material and replacement with suitable material shall be considered full compensation for excavating, hauling and disposing of the unsuitable material and furnishing, installing, grading and compacting the imported suitable material, including geotextile fabric, as necessary.

3.8. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Excavation and embankment:	Cubic Yard
Over-Excavation and Backfill of Soft Subgrade	Cubic yards of material removed from its original position

END OF SECTION

SECTION 17 – RECYCLED ASPHALT BASE STABILIZATION (RABS)

PART 1. GENERAL

1.1. SUMMARY

1.1.1. Section Includes

1.1.1.1. This work shall consist of recycling the roadway to the full thickness of existing pavement and a portion of the underlying base in accordance with these specifications, and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans, or as established by the Manager or Engineer.

1.1.2. Definitions

1.1.2.1. RABS: Recycled existing pavement and base material that shall be used for the purpose of grade preparation and control as specified in the plans, or as established by the Manager or Engineer. RABS shall include the work described in this specification, including grading and compaction.

1.1.2.2. RABS Zone: The area and depth of existing pavement, shoulders, and base material to be recycled.

1.1.3. Related Sections:

1.1.3.1. Section 16 - Excavation
1.1.3.2. Section 8 - Aggregate Materials
1.1.3.3. Section 19- Shouldering
1.1.3.4. Section 18 - Asphalt Paving

1.2. REFERENCES

1.2.1. ISPWC Div. 800 Aggregates and Asphalt

1.2.2. AASHTO M320 Standard Specifications for Performance Graded Asphalt Binder

1.2.3. ASTM D 692 - Specification for Course Aggregate for Bituminous Paving Mixtures.

1.2.4. ASTM D 946 - Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.

1.2.5. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics Using Standard Effort – Standard Proctor

1.2.6. ASTM D 2489 – Standard Practice for Estimating Degree of Particle Coating of Bituminous Aggregate Mixtures

1.2.7. ASTM D 4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.3. QUALITY ASSURANCE

1.3.1. Regulatory Requirements

1.3.1.1. Perform work in accordance with the latest edition of the Idaho Standards for Public Works and Construction Standards and these Specifications.

1.3.1.2. Density Tests shall be performed using an uncorrected nuclear gage in accordance with the following standard method:

1.3.1.2.1. In-Place Density of Bituminous Mix Using the Nuclear Moisture Density Gauge, WAQTC TM8 Method B (Direct Transmission only).

1.4. PROJECT / SITE CONDITIONS

1.4.1. WEATHER: Do not place full depth asphalt reclamation materials when the air temperature falls, or is anticipated to fall, below 40 degrees Fahrenheit. Do not perform reclamation in rain, or if rain is anticipated within two hours of completion of the work. The Engineer, upon request from the Contractor and Manager, may waive the temperature requirements. However, all other specified requirements, including compaction, shall be met.

1.4.2. TRAFFIC CONTROL: Control traffic, including construction traffic, to prevent damage to the completed reclamation work until asphalt paving is completed. Limited light traffic may be permitted once the reclaimed material has obtained a stable condition. Repair any damage resulting from traffic. When the approved traffic control plan requires traffic to be detoured to an alternate route, the operational restrictions may be waived at the discretion of the Engineer, provided all other requirements of this specification are met. Access to driveways and approaches within the project limits shall be maintained at all times, except when working directly next to, or within the driveway or approach.

1.4.3. SUBMITTALS: Prior to mobilization, the Contractor shall submit a plan of operations for RABS processing, including traffic control, for review and comment by Owner and Engineer. The Owner's and Engineer's review and comments on the plan do not constitute approval.

1.5. EQUIPMENT

1.5.1. RECLAIMER: Use a self-propelled rotary reclaimer or equivalent machine capable of cutting through existing path materials to a depth of up to sixteen-inches (16") with one pass. Provide equipment capable of pulverizing the existing pavement, base, and subgrade at a minimum width of four-feet (4'). The cutting drum must have the ability to operate at various speeds (rpm), independent of the machines forward travel speed, in order to control oversized material and gradation. Use a machine equipped with a computerized integral liquid proportioning system capable of regulating and monitoring the water application rate relative to the depth of cut, width of cut, and travel speed. Have the water pump on the machine connected by a hose to the supply tanker/distributor, and mechanically or electronically interlocked with the forward movement/ground speed of the machine. Mount the spray bar to allow the water to be injected directly into the cutting drum/mixing chamber. Provide equipment capable of mixing water and the pulverized pavement materials into a homogenous mixture. Keep the cutting drum fully maintained and in good condition at all times throughout the project. Equipment such a road planers or cold-milling machines designed to mill or shred the existing roadway materials rather than crush of fracture is not allowed.

1.5.2. PLACEMENT EQUIPMENT: Motor grader or by another method approved by the Engineer.

1.5.3. COMPACTION EQUIPMENT: Vibratory pad-foot roller for breakdown compaction. Single or Tandem steel drum roller for finish rolling.

PART 2. PRODUCTS

2.1. MATERIALS

Materials shall conform to the requirements specified in the following sections and subsections:

2.1.1. PULVERIZED EXISTING SURFACE: Conform to the following sieve sizes:

SIEVE SIZE	% PASSING (by weight)
1-½-Inch	100

The Contractor shall provide a current sieve analysis of the pulverized existing surface, as requested by the Engineer.

2.1.2. PRIME COAT: (if necessary, see subsection 3.6 Asphalt Paving, and subsection 3.9 Protection, this Specification). Prime coat shall be emulsified asphalt, Type CRS-2, or as directed. If requested, the Contractor will submit certifications to the Engineer of the conformance of the asphalt material.

2.1.3. WATER: The water source shall be as approved by the Engineer. Water shall be reasonably clear and free from oil and other contaminates.

2.1.4. CRUSHED AGGREGATE FOR BASE: ¾" Base, in accordance with Section 8- Aggregates.

PART 3. EXECUTION

3.1. BASE PREPARATION

3.1.1. Prior to pulverization, any vegetation encountered inside the "RABS Zone" shall be stripped and disposed of as unsuitable material, as approved by the Engineer. Payment for this vegetation clearing will be considered incidental to this Specification

3.1.2. The Contractor shall notify the Engineer of any poor quality subbase materials, soft spots, clays, silts, organic materials, or other unsuitable material in the "RABS Zone" that will hinder complying with these Specifications, as soon as they are encountered.

3.2. PULVERIZE EXISTING SURFACE

3.2.1. The entire existing roadway material shall be loosened and pulverized to the width(s) shown on the typical sections, or as indicated by the Manager or Engineer, and to the extent the pulverized material will conform to the specified sieve analysis.

3.2.2. Pulverized material that does not conform to the specified sieved analysis shall be removed and properly disposed of off-site. The Contractor will be required to import ¾"(-) crushed aggregate base material to replace the removed material, if the resulting RABS layer does not meet these Specifications.

3.2.3. The fracture of aggregates shall be kept to a minimum during pulverization and blending.

3.3. BLENDING

3.3.1. The road mix machine shall be a pug-mill type, auger type, or cross-shaft type mixer capable of providing a uniform homogeneous mixture throughout the material to the depth indicated on the typical section, or by the Manager or Engineer.

3.3.2. The pulverized and blended material shall be shaped and rolled where necessary to allow the roadway to be open to traffic (i.e., approaches to businesses and residences). In superelevated curve sections, the Contractor is advised to shape the material to the typical section specified in subsection 3.4 SHAPING AND GRADE CONTROL ,and the material shall be blended to obtain the required depth and width shown on the plans, or approved by the Manager or Engineer.

3.3.3. The road mixing machine shall have provisions for introducing water at the time of blending, through a metering device, or by other methods approved by the Engineer. The water shall be applied by means of controls that will supply the correct quantity of water to produce a completed mixture with uniform moisture content. Leakage of water from equipment will not be permitted. Care shall be exercised to avoid the addition of any excessive water. The percentage of moisture in the RABS layer shall be maintained between four-percent and seven-percent (4%-7%) by weight of compacted material, or as approved by the Engineer.

3.3.4. The resulting mixture shall be uniform; more than one (1) pass of the mixer through the material may be required. If equipment is used that requires more than one (1) pass of the mixer, water distribution on the roadway, as approved, shall be at the time of the final blending pass.

3.3.5. Where called for on the plans, or to meet the indicated material depth, or as directed by the Engineer, the Contractor shall add ¾"(-) crushed aggregate base material, per Section 8 - Aggregates, to the blended RABS layer. The ¾"(-) base material shall be blended with the RABS layer to create a uniform blend throughout the depth of the RABS layer.

3.4. SHAPING AND GRADE CONTROL

3.4.1. The Contractor shall be responsible for continuous grade control and cross slope control including any surveying (blue-topping or wire line control), as required. The Contractor shall furnish all labor, materials, and equipment required to performing the grade control work.

3.4.2. Expected swell of the pulverized material is fifteen- to thirty-percent (15%-30%) prior to compaction.

3.4.3. The cross-slope shall be constructed as shown on the plans, or to match existing where not indicated otherwise. The Contractor shall also make adjustments to the existing path profile to provide a consistent grade and to avoid adding new material or wasting existing material in excess of that allowed in the contract. If necessary, the Contractor shall reestablish the roadway profile and cross-slopes to provide a roadway section that is consistent with the typical section shown on the plans.

3.4.4. Equipment used for shaping and setting of grade shall be capable of automated (either mechanical or electronic) setting of grade and cross-slope angle. The grading operation shall be capable of accounting for the swell, which may leave the finished processed surface above the adjacent surface. All pulverized material not designated in the plans as shoulder material or for removal shall be incorporated into the RABS layer.

3.4.5. The Contractor shall shape and finish the RABS surface without adding new material or wasting existing material. Excess pulverized material meeting the gradation specifications may be used as shoulder material, unless specified otherwise.

3.4.6. Material designated in the plans for removal shall be bladed or otherwise windrowed adjacent to, but outside the limits of, pulverization shown on the typical section. Material shall be disposed of following final shaping to the elevation described above.

3.5. COMPACTING AND FINISHING

3.5.1. After the materials have been satisfactorily blended, a motor grader, mechanical spreader, paver, or grade trimmer of approved type shall shape the mixture. Equipment used for finishing shall be capable of automated setting of grade and cross-slope. The typical section shall be as specified in the Construction Documents, or Standard Drawings.

3.5.2. Compaction methodology to meet compaction specifications shall be the responsibility of the Contractor. In-lieu of other methodology approved by the Engineer, the compaction train shall include at least one rubber tired roller, one vibratory roller, and one vibratory pad-foot soil compactor. The vibratory pad-foot soil compactor and its use shall meet the following requirements:

3.5.2.1. The Contractor shall provide a vibratory pad-foot soil compactor with minimum operating weight of 15 Tons, minimum drum width of 60 inches, and pad height of 3-½ inches. This roller shall be used after the pulverization and blending and prior to shaping and grading. Three complete passes shall be required. Additional passes may be required to achieve compaction. Payment for compaction will be considered incidental to this Specification.

3.5.3. After the materials have been satisfactorily blended, a motor grader, mechanical spreader, paver, or grade trimmer of approved type shall shape the mixture. The typical section shall be as specified in the Construction Documents, or Standard Drawings.

3.5.4. The roller pattern shall be established by using in-place density from an uncorrected nuclear gauge. The required compaction is achieved and final process rolling is defined as when the final roller pass adds no more than 0.5 lb/ft^3 to the previous in-place density. Sufficient additional roller passes shall be made to determine that a "false break" or leveling-off point is not used for compaction density.

3.5.5. The roller pattern shall be reestablished when mixture properties in the processed material change and at a minimum of every 6,000 square yards of finished surface. Additional tests shall be performed where soil conditions have changed, or at the discretion of the Engineer, to ensure that the required compaction is achieved.

3.5.6. The surface shall be kept at appropriate moisture content during the compaction process to facilitate proper compaction. The application of water and/or drying of the material to maintain appropriate moisture content for compaction shall be considered incidental to this Specification, with no additional payment.

3.5.7. Equipment or shared-use roadway traffic may be permitted on the recycled base stabilization when approved by the Engineer. No prime coat of the surface is required, however, tight-blading and rolling, subsequent to final process rolling as defined in subsection 3.5 COMPACTING AND FINISHING, may be required before applying the initial lift of asphalt pavement due to surface deformation, raveling, or other irregularities created by such traffic. At the time of placement of the initial lift of asphalt pavement, the compacted and finished surface shall be free from all loose material. Any additional grading and/or rolling shall be considered incidental to this Specification, with no additional payment.

3.6. ASPHALT PAVING WITHIN 48 HOURS OF COMPLETION OF RABS SURFACE

3.6.1. The Contractor shall pave over the compacted RABS surface within forty eight (48) hours of completion of the RABS layer, unless otherwise approved. Asphalt paving shall be according to Section 18 – Asphalt Pavement.

3.6.1.1. The Contractor shall obtain approval from the Engineer to extend the asphalt paving on the compacted and finished RABS surface beyond 48 hours from completion of the compacting and finishing of the RABS surface. Approval of the extension of this time to complete asphalt paving on the prepped surface may include allowing roadway traffic and equipment on the prepped surface. The Contractor shall demonstrate the ability to keep the compacted and finished RABS surface sufficiently prepped until paving occurs. Failure to keep the RABS surface sufficiently prepped for paving, including maintaining sufficient moisture content of the prepped surface, or preventing excessive moisture in the prepped surface or subgrade, and damage to due to shared-use path traffic on the surface, may result in the County requiring paving to take place within 48 hours of completion of compaction and finishing, or adding a prime-coat to the prepped surface. Any additional grading, rolling, application of water, or application of a prime-coat shall be considered incidental to this Specification with no additional payment.

3.7. TOLERANCES

3.7.1. Grade Control Requirements. The final elevation of the RABS surface shall be in accordance with the profile grades on the plans, or as directed by the Engineer. The final elevations shall minimize wasting existing materials. The RABS surface shall be finished to the elevation required to provide the plan specified cross-slope at the edge of the RABS surface.

3.7.2. Submittals: All materials required to be submitted shall be complete prior to final acceptance.

3.8. FIELD QUALITY CONTROL

3.8.1. INDEPENDENT TESTING: The County may engage the services of a qualified materials testing laboratory to perform acceptance sampling and testing to determine compliance with the project specifications. The Contractor shall cooperate with the testing laboratory to facilitate the taking of required material samples and field-testing. Any testing performed by the County or the County's representatives in no way relieves the Contractor from fulfilling the project specifications.

3.8.2. Frequency of Testing: As a minimum, the following testing frequencies shall apply:

3.8.2.1. The Contractor shall document the existing pavement and existing base material thickness every 0.3 mile. This documentation shall be provided to the Engineer, or the independent testing inspector. The measurements will be spot checked once or more per day as necessary by the Engineer, or the independent testing inspector to ensure that accurate measurements are being made, and that an appropriate blend of RABS material is being achieved.

3.8.2.2. The Contractor shall document the blending thickness every 0.3 mile. This documentation shall be provided to the Engineer, or independent testing inspector, upon request. The measurements will be spot checked once or more per day as necessary by the Engineer, or independent testing inspector, to ensure that accurate measurements are being made.

3.9. PROTECTION

3.9.1. The processed material shall be kept at proper moisture content at all times. If necessary, water equipment shall be of a type that will apply moisture in a fog or mist type application free of pressure on the surface being treated.

3.9.2. The Contractor shall demonstrate the ability to keep the compacted and finished RABS surface sufficiently prepped until paving occurs. Failure to keep the RABS surface sufficiently prepped for paving, including maintaining sufficient moisture content of the prepped surface, or preventing excessive moisture in the prepped surface or subgrade, or damage from roadway traffic and equipment may result in the County requiring paving to take place within 48 hours of completion of compaction and finishing, or adding a prime-coat to the prepped surface.

3.10. SCHEDULE

3.10.1. As indicated in the Construction Documents, or Standard Drawings.

3.11. GUARANTEE

3.11.1. The Contractor shall be responsible for any damage or failure, progressive or total, of the asphalt pavement surfacing for a period of two years following completion of the work. This shall include any deformation of the roadway cross-section or profile.

3.11.2. Replacement or repair of the unsatisfactory areas shall be as specified by the Manager and Engineer. The completion of the repairs, as specified, will satisfy the requirements of the GUARANTEE.

3.12. BASIS OF MEASUREMENT

3.12.1. RABS. Measurement for Recycled Asphalt Base Stabilization (RABS) will be on a square yard basis. Work shall include removal of any vegetation within the RABS Zone and preparation of the roadbed, pulverizing and blending of materials, documentation of existing pavement and processed material thickness, the wetting or drying of the blended material, relaying, grading and shaping of the blended material, compaction of the blended material, finishing the completed surface, and all incidental and related work, materials, and labor.

3.13. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Recycled Asphalt Base Stabilization (RABS):	Square Yard (SY)

END OF SECTION

SECTION 18 – ASPHALT PAVEMENT

PART 1. GENERAL

1.1. SUMMARY

1.1.1. Section Includes:

1.1.1.1. Hot-mix asphaltic concrete paving in accordance with these specifications and in reasonable close conformity with the lines shown in the Contract Documents, or as established by the Manager or Engineer.

1.2. PERFORMANCE REQUIREMENTS

1.2.1. Paving: designed for medium duty commercial vehicles.

1.2.2. Paving: ISPWC Superpave, SP-3, 1/2" gradation, hot-mix asphalt pavement

1.3. RELATED SECTIONS:

1.3.1. Section 16 - Excavation

1.3.2. Section 8 - Aggregate Materials

1.3.3. Section 17 - RABS

1.3.4. Section 19 - Shouldering

1.3.5. Section 7 - Traffic Control Plans

1.4. REFERENCES

1.4.1. ISPWC - Current Edition, Division 800 – Aggregates and Asphalt

1.4.2. ITD Standard Specifications for Highway Construction – Section 405

1.4.3. The Asphalt Institute - Manual MS-4 - The Asphalt Handbook

1.4.4. The Asphalt Institute - Manual MS-13 - Asphalt Surface Treatments for Asphalt Penetration Macadam.

1.4.5. ASTM C 88 – Standard Test Methods for Soundness of Aggregates by Use of Sodium and Magnesium Sulfates

1.4.6. ASTM C 131 – Standard Test for Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

1.4.7. ASTM D 242 – Standard Specification for Mineral Filler for Bituminous Paving Mixtures

1.4.8. ASTM D 692 - Specification for Course Aggregate for Bituminous Paving Mixtures.

1.4.9. ASTM D 946 - Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.

1.4.10. ASTM D 995 – Standard Specification for Mixing Plants for Hot-mixed, Hot-laid Bituminous Paving Mixtures

1.4.11. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics Using Standard Effort – Standard Proctor

1.4.12. ASTM D 2419 – Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate

1.4.13. ASTM D 2489 – Standard Practice for Estimating Degree of Particle Coating of Bituminous Aggregate Mixtures

1.4.14. ASTM D 3381 - Specification for Viscosity-Graded Asphalt Cement for use in Pavement Construction.

1.4.15. ASTM D 3515 - Specification for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

1.4.15.1.1. ASTM D 3786 – Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics – Diaphragm Bursting Strength Tester Method

1.4.15.1.2. ASTM D 4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.4.15.1.3. ASTM D 4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

1.4.15.1.4. ASTM D 4791 – Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregates

1.5. SUBMITTALS

1.5.1. SOURCE APPROVAL: The contractor shall provide the Engineer with proper documentation that the material source(s) to be used for bituminous paving are Idaho Transportation Department approved sources, or independent laboratory test results indicating compliance with project material specifications. Independent test results must be for the proposed stockpile material and less than two years old.

1.5.2. JOB MIX FORMULA: No bituminous mixture shall be produced for this project until a job mix formula (JMF) is approved by the Engineer. The bituminous mixture shall be designed using procedures contained in the Idaho Transportation Department Materials Manual. The submitted job mix formula shall be no more than one year old and contain all required material properties such as gradation, oil type and material source(s). The Contractor may use a mix design that includes the JMP that was previously confirmed by ITD and used on other projects that meets the requirements of this Specification. The job mix formula shall be submitted in writing at least 10 days prior to paving operations and include as minimum the following:

1.5.2.1. Mix design procedures and specifications that complies with the Superpave mixture requirements outlined below.
1.5.2.2. Material source designations
1.5.2.3. Individual stockpile blend percentages and average gradation results
1.5.2.4. Job mix formula target gradation
1.5.2.5. Asphalt type or grade
1.5.2.6. Job mix formula percent of asphalt cement
1.5.2.7. Mixing and compaction temperatures
1.5.2.8. Oil producer's temperature/viscosity curves
1.5.2.9. Plot of the combined gradation on the FHA power 45-gradation curve
1.5.2.10. Graphical plots of unit weight, theoretical maximum density, air voids, voids in mineral aggregates and stability versus asphalt content
1.5.2.11. Percent natural sand/mineral filler
1.5.2.12. Percent fractured faces
1.5.2.13. Percent flat and elongated pieces
1.5.2.14. Anti-strip agent (if required).

1.5.3. SAMPLES: The contractor shall submit samples upon request for job mix formula verification testing. The job mix formula for each mixture shall be in effect until modified in writing by the Engineer. Should a change in sources of materials be made, the Contractor shall notify the Engineer of such changes, and the Engineer must approve a new job mix formula before the new materials are used.

1.5.3.1. Bituminous Material: The Contractor shall furnish vendors certified test reports for each delivery of bituminous material shipped to the project. The vendor certified test report can be used for acceptance or be tested independently by the Engineer.

1.5.3.2. Scale Certifications: Submit to the Engineer, plant scale certifications, and date of last calibration and next due calibration date.

1.5.3.3. Traffic Control Plans: When required, submit to the Engineer approved traffic control plans obtained from the appropriate local agencies and the property owners.

1.5.3.4. Material Submittals: Submit to the Engineer all required product submittals for prime coat, tack coats, anti-strip, etc.

1.5.3.5. Batch Tickets: Submit to the Engineer batch tickets for all loads delivered to the project. The batch tickets shall contain as a minimum:
1.5.3.5.1. Project information
1.5.3.5.2. Job mix formula designation

1.5.3.5.3. Individual load and cumulative tonnage
1.5.3.5.4. Ticket and truck numbers
1.5.3.5.5. Batch time
1.5.3.5.6. Tests performed

1.6. QUALITY ASSURANCE

1.6.1. Regulatory Requirements

1.6.1.1. Perform work in accordance with the latest edition of the Idaho Standards for Public Works and Construction Standards.

1.6.2. Acceptance Test Strip

1.6.2.1. Prior to the start of production paving for the project, the Contractor shall demonstrate conformance to the project specifications by the construction of a test section. The test section shall be constructed over a similar underlying grade or pavement structure as is required for the project. The equipment used in construction of the test section shall be the same as will be used during construction of the project. The test section may be constructed at the project site, or at a location acceptable to the Manager or Engineer that simulates the project site conditions and asphalt placement operations.

1.6.2.2. The County will not make separate payments for construction of the test strips, unless the test strip is accepted as completed project Work.

1.6.2.3. The test section shall be observed, sampled and tested by the County's testing agency. The contractor shall notify the Manager and testing agency a minimum of 48 hours prior to beginning the test section.

1.6.2.4. The placement of the test section shall be observed by the Manager and the County's testing agency, and sampling and testing shall be performed to verify the properties of the job mix formula, mat and joint density, equipment and procedures intended for use on the project.

1.6.2.5. Test section sampling and testing shall include oil content, gradation, air voids, stability, mat and joint density, nuclear gauge calibration, appearance and surface smoothness. No project paving will be performed until test section verification is complete.

1.6.2.6. The test section shall be considered acceptable if all field and laboratory test results, as indicated in Paragraph 1.6.2.4 above, conform to the requirements of the project specifications.

1.6.2.7. If the initial test section should prove to be unacceptable, it shall be removed if located on the project site and the necessary adjustments to the job mix formula, plant operations, placing procedures and/or compaction procedures shall be made. A second test section shall them be placed in order to demonstrate that corrective action is effective. Full production shall not begin until a satisfactory test section has been constructed and accepted in writing by the Manager or Engineer.

1.7. DELIVER, STORAGE, AND HANDLING

1.7.1. Bituminous Mixing Plant:

1.7.1.1. Plants used for the preparation of the bituminous mixtures shall conform to the requirements of ASTM D 995.

1.7.1.2. If required, the Engineer shall have full access, at all times, to all areas of the plant for checking adequacy of equipment, inspecting operation of the plant, verifying weights,

proportions, material properties and monitoring temperatures maintained in the preparation of the mixture.

1.7.2. Hauling Equipment:

1.7.2.1. Trucks used for hauling bituminous mixtures shall have tight, clean and smooth metal beds. To prevent the mixture from adhering to them, the truck bed shall be lightly coated with paraffin oil, lime solution or other approved material

1.7.2.2. The use of solvents such as diesel fuel is prohibited.

1.7.2.3. Each truck shall have a suitable cover to protect the mixture from adverse weather and to maintain temperatures during haul.

1.7.3. Bituminous Pavers:

1.7.3.1. Bituminous pavers shall be self-propelled, with an activated screed, heated as necessary, and shall be capable of spreading and finishing courses of bituminous plant mix material which will meet the specified thickness, smoothness and grade.

1.7.3.2. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface.

1.7.3.3. The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed without segregation.

1.7.3.4. The screed shall effectively produce a finished surface of the required evenness, smoothness and texture without tearing, shoving, or gouging the mixture.

1.7.3.5. If an automatic grade control device is used, the paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line and/or through a system of mechanical sensors or sensor directed mechanisms or devices that will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent.

1.7.4. Rollers:

1.7.4.1. Vibratory, steel wheel and pneumatic-tired type, self-propelled rollers shall be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the mixture.

1.7.4.2. The number, type, and weight of the rollers shall be sufficient to compact the mixture to the required density while it still is in workable condition.

1.7.4.3. The use of equipment that causes excessive crushing of the aggregate will not be permitted.

1.7.4.4. Small, 500 to 1,000 pound vibratory plates will be allowed only in areas where larger rollers cannot access.

1.8. PROJECT / SITE CONDITIONS

1.8.1. WEATHER: The bituminous mixture shall not be placed upon a wet surface or when the surface temperature of the underlying base course is less than 40 degrees Fahrenheit. Ambient air temperature must be at least 50 degrees Fahrenheit and rising prior to initiating pavement placement. Paving may continue above 50 degrees Fahrenheit providing precipitation or other weather conditions do not inhibit the contractor's ability to achieve the product specifications. Once

paving is initiated, continuous asphalt placement will be allowed until the ambient temperature falls below 45 degrees Fahrenheit. The Engineer, upon request from the Contractor and Manager, may waive the temperature requirements. However, all other specified requirements, including compaction, shall be met.

1.8.2. PREPARATION OF UNDERLYING SURFACE: Immediately before placing bituminous mixture, the underlying surface shall be cleaned of all debris and a tack coat shall be applied to all curbs, saw cuts, or overlay surfaces.

1.8.3. CONTRACTOR'S ACCEPTANCE OF UNDERLYING SURFACE: Commencement of asphalt placement, by the Contractor, constitutes acceptance of the underlying surface as suitable for meeting project specifications.

PART 2. PRODUCTS

2.1. MATERIALS

2.1.1. ASPHALT CEMENT: The asphalt cement used shall be in accordance with the current ISPWC Division 810, and the State of Idaho Transportation Department, Division of Highways, Standard Specifications for Highway Construction, Section 702, and the most recent Supplemental Specifications thereto.

2.1.1.1. The grade of asphalt cement to be used shall be PG 58-34.

2.1.1.2. The liquid asphalt content shall be 5.5% to 6.1%, by weight, of the mix. The exact percentage of asphalt in the mix may be fixed by the Engineer based upon preliminary laboratory tests, sieve analysis, grading and character of the aggregate furnished with the specification limits.

2.1.1.2.1. The Contractor will not be allowed any claim for payment for the rejection of any batch or load of resultant mixture which contains an excess or deficient amount of asphalt varying more than 0.4 of 1% from the exact percentages as fixed by the Engineer. The upper limit may be increased if absorptive aggregates are used.

2.1.1.3. Asphalt will be accepted a point of delivery.

2.1.1.4. All asphalt for this project shall be furnished by one supplier, unless otherwise permitted. If a change of asphalt supplier is proposed, mix design testing and verification are required for approval.

2.1.1.5. If requested, the Contractor will submit certifications to the Engineer of the conformance of the asphalt material.

2.1.2. PLANTMIX AGGREGATES: Provide virgin aggregate for mix in a minimum of two separate stockpiles. RAP, if included in the mix, will be in addition to the minimum two separate stockpile requirement. Aggregates shall consist of crushed stone, crushed gravel or crushed slag with or without sand or other inert finely divided mineral aggregate. The portion of materials retained on the No. 4 sieve is coarse aggregate. The portion passing the No. 4 sieve is fine aggregate. And, the portion passing the No. 200 sieve is mineral filler. The aggregate shall meet the ½" gradation requirements of ITD Table Section 703.05-2, and as identified below, unless otherwise submitted by the Contractor and accepted by the Engineer. The Contractor shall provide a current sieve analysis of the proposed aggregate to the Engineer upon request:

SIEVE SIZE	% PASSING (by weight)

¾-Inch	100
½-Inch	92-100
3/8-Inch	82-90
No. 4	53-63
No. 8	35-43 (39.1 restricted)
No. 16	22-30 (23.3 restricted
No. 30	15-23 (16.7 restricted)
No. 50	11-17 (13.7 restricted)
No. 200	3.4-6.4
Sand Equivalent	Not less than 35

The above gradations represent extreme limits, which shall determine the suitability of aggregate for use. The final gradation, as approved by the Engineer, shall not vary from the low (or high) limits on one screen to the high (or low) limits on the adjacent screen

2.1.2.1. Coarse Aggregate:

2.1.2.1.1. Coarse aggregate shall consist of sound, durable particles, free from adherent films that would prevent thorough coating and bonding with the bituminous material and shall be free from organic matter or other deleterious substances.

2.1.2.1.2. The percentage wear shall not be greater than 40 percent when tested in accordance with ASTM C 131.

2.1.2.1.3. The sodium sulfate soundness loss shall not exceed 13 percent, after five cycles, when tested in accordance with ASTM C 88.

2.1.2.1.4. Coarse aggregate shall contain at least 70 percent by weight of individual pieces having two or more fractured faces and 85 percent by weight having at least one fractured face.

2.1.2.1.5. Fractured faces shall be obtained by crushing.

2.1.2.1.6. Aggregate shall not contain more than 8 percent by weight flat or elongated pieces when tested in accordance with ASTM D 4791.

2.1.2.2. Fine Aggregate:

2.1.2.2.1. Fine aggregate shall consist of clean, sound, durable, angular shaped particles produced from crushed stone, slag or gravel that meets the requirements for wear and soundness specified for coarse aggregates.

2.1.2.2.2. The aggregate particles shall be free from coatings of clay, silt, or other objectionable materials and shall contain no clay balls.

2.1.2.2.3. The fine aggregate, including any blended material for the fine aggregate, shall have a plasticity index of not more than 6 and a liquid limit of not more than 25 when tested in accordance with ASTM D 4318.

2.1.2.3. Recycled Asphalt Pavement (RAP):

2.1.2.3.1. Per ISPWC Section 810, Part 2.5. Recycled asphalt paving may be used providing it is properly incorporated into the job mix formula including stockpile oil content data. No more than 17 percent of RAP by weight of the total binder in the plant mix shall be used in the job mix formula. Provide RAP pile certification with job-mix formula, and re-test the RAP pile every 750 tons of RAP produced.

2.1.3. ANTI-STRIPPING AGENT: Use one-half percent (0.5%) approved liquid anti-stripping additive by weight of asphalt. The Contractor shall be responsible for providing information concerning the need for an anti-stripping additive, as determined by an independent laboratory using AASHTO test methods T165 and T182. Independent laboratory testing shall be arranged by the Contractor at no additional expense to the Owner.

2.1.4. CRUSHED AGGREGATE BASE COURSE: Base course shall consist of ¾"(-) crushed aggregate base material (¾"), Section 3- Aggregates.

2.1.5. RECYCLED ASPHALT BASE STABILIZATION (RABS): recycled asphalt roadway to the full thickness of existing pavement and a portion of the underlying base in accordance with Section 17 – Recycled Asphalt Base Stabilization.

2.1.6. TACK COAT: Tack coat shall be liquid asphalt grade SS-1H, and shall conform to the Specifications Series No. 2 (SS-2) of the Asphalt Institute. The rate of application shall be 0.05 gallons per square yard.

2.1.7. NATURAL (NON-MANUFACTURED) SAND: may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. The amount of sand to be added will be adjusted to produce mixtures conforming to the requirements of this specification. The fine aggregate shall not consist of more than 20 percent by weight of total aggregates. The aggregate shall have sand equivalent values of 40 or greater when tested in accordance with ASTM D 2419.

2.1.8. MINERAL FILLER: If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D 242.

2.1.9. BITUMINOUS MATERIALS: Bituminous materials shall conform to all requirements of the applicable ASTM test methods for the type and grade specified in the contract documents.

2.1.10. WOVEN GEOTEXTILE: Woven geotextiles shall have a minimum Mullen Burst Strength of 400 psi (ASTM D 3786) and a grab tensile strength of at least 200 psi (ASTM D 4632).

2.1.11. PRELIMINARY MATERIAL ACCEPTANCE: Prior to delivery of materials to the job site, the contractor shall submit certified test reports to the Engineer for the following materials: Coarse Aggregate, Fine Aggregate and Bituminous Material. The certification(s) shall show the appropriate ASTM test method for each material, the test results and a statement that the material meets the specification requirement. The engineer may request samples for testing, prior to and during construction, to verify the quality of the materials and to insure conformance with the applicable specifications.

2.2. PLANT MIXTURE

2.2.1. A. Composition of Mixture:

2.2.1.1. The bituminous plant-mixed pavement shall be a hot-mix asphalt composed of a mixture of well-graded aggregate, filler if required, and bituminous material. The several aggregate fractions shall be sized, handled in separate size groups and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formulas.

2.2.2. Job Mix Formula (JMF):

2.2.2.1. The bituminous mixture shall be designed using procedures and specifications contained in the Idaho Transportation Department Materials Manual. No bituminous mixture for payment shall be produced for this project until the Engineer has approved a job mix formula.

2.2.2.2. The Job Mix Formula shall be designated in accordance with ISPWC SP-3 Superpave Mix requirements, and shall have the following in-place criteria:

2.2.2.2.1. Percent Air Voids = 4.0% (+/- 1%)
2.2.2.2.2. Percent Voids in Mineral Aggregate, = 14% min.
2.2.2.2.3. Percent Voids filled with Asphalt = 65-75%
2.2.2.2.4. Dust Ration (PCS 39% passing #8 sieve = 0.6-1.2
2.2.2.2.5. % Theo Max Spec. Gravity @ Nini (7 gyrations) = 89% max.
2.2.2.2.6. % Theo Max Spec. Gravity @ Ndes (75 gyrations) = 96% max.
2.2.2.2.7. % Theo Max Spec. Gravity @ Nmax (115 gyrations) = 98% max.
2.2.2.2.8. Minimum Uncompacted Void Content of Fine Aggregate = 40%

2.2.3. Preparation of Bituminous Material:

2.2.3.1. The bituminous material shall be heated in a manner that will avoid local overheating and provide for a continuous supply of the bituminous material at a uniform temperature.

2.2.3.2. The temperature of the bituminous material delivered to the mixer shall conform to the oil producer's temperature/viscosity graph requirements for mixing temperature submitted for the JMF.

2.2.4. Preparation of Aggregates:

2.2.4.1. The aggregates for the mixture shall be heated and dried prior to introduction into the mixer. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates.

2.2.4.2. The temperature of the aggregates and mineral filler shall not exceed the requirements for mixing temperature when asphalt is added.

2.2.4.3. Particular care shall be taken to insure that aggregates obtain a uniform coating and distribution of the aggregate particles in order to produce a mixture of satisfactory workability.

2.2.5. Stockpile Management:

2.2.5.1. The Contractor shall establish procedures for insuring that material does not segregate when taken from stockpiles for loading into the plant.

2.2.6. Preparation of Bituminous Mixture:

2.2.6.1. The aggregate and bituminous material shall be weighed or metered and introduced into the mixer in the amounts specified in the JMF.

2.2.6.2. The combined materials shall be mixed until the aggregate obtains a uniform coating of bitumen and is thoroughly distributed throughout the mixture.

2.2.6.3. Wet mixing time shall be the shortest possible time that will produce that will produce a satisfactory mixture, but not less than 30 seconds for batch plants. The wet mixing time shall be determined by the contractor based on the procedure for determining the percentage of coated partials described in ASTM D 2489.

2.2.6.4. The moisture content of all bituminous mix upon discharge shall not exceed 0.5 percent.

PART 3. EXECUTION

3.1. SUBGRADE AND BASE PREPARATION

3.1.1. Prior to construction of asphalt pavement, the subgrade and base shall be properly constructed and tested.

3.1.1.1. Subgrade: The subgrade surface shall be compacted to a minimum of 92 percent of the maximum dry density as determined by ASTM D 698 (Standard Proctor). In-lieu of density measurements, the subgrade may be proof-rolled to with a loaded water truck or loaded dump truck for acceptance. Soft or unstable areas shall be repaired according the Section 02211 – Excavation of these Specifications. Alternatives methods, such as controlled density fill (CDF), of treating soft or unstable areas may be used upon approval from Engineer. Once the subgrade is prepared, the Contractor accepts the subgrade as suitable for paving operations, and shall protect damage from construction traffic and precipitation.

3.1.1.2. RABS Base Course: RABS base course shall be either RABS material, or a mixture of ¾"(-) crushed aggregate base material and RABS material, at near optimum moisture content and compacted to at least 95 percent of maximum dry density as determined by ASTM D 698 (Standard Proctor), or as determined by break-over compaction patterns. The compacted RABS base course thickness shall not be less than 4.0 inches, or as indicated in the Construction Drawings.

3.1.1.3. 2" Crushed Aggregate Subbase Course: 2" crushed aggregate subbase course shall be2"(-) crushed aggregate coarse gravel material (Section 02227) at near optimum moisture content and compacted to at least 95 percent of maximum dry density as determined by ASTM D 698 (Standard Proctor). The compacted aggregate base course thickness shall not be less than 6.0 inches (6"), or as indicated in the Construction Drawings.

3.1.1.4. ¾" Crushed Aggregate Base Course: Aggregate base course shall be r ¾"(-) crushed aggregate base material (Section 02227) at near optimum moisture content and compacted to at least 95 percent of maximum dry density as determined by ASTM D 698 (Standard Proctor). The compacted aggregate base course thickness shall not be less than 4.0 inches (4"), or as indicated in the Construction Drawings.

3.1.1.5. ¾"(-) Crushed Aggregate Leveling Course: The leveling course shall be ¾"(-) crushed aggregate base material, per Section 02227, placed at near optimum moisture content and placed to a minimum compacted thickness of 1.0 inches (1"), or as indicated in the Construction Documents. Compaction shall be to at least 95 percent of maximum dry density, as determined by ASTM 698 (Standard Proctor).

3.1.2. A tack coat shall be applied to all existing asphaltic and concrete surfaces which will be in contact with new asphaltic pavement. Place asphalt with 24 hours of applying tack coat.

3.2. ASPHALT PLACEMENT

3.2.1. Notify the testing agency and the Manager 48 hours prior to asphalt paving.

3.2.2. The bituminous mixture shall be transported from the plant to the site in vehicles conforming to the requirements of this section. Deliveries shall be scheduled so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Adequate artificial lighting shall be provided when paving at night. Hauling over freshly placed material shall not be permitted until the mixture has been compacted and allowed to cool to atmospheric temperature.

3.2.3. Upon arrival, the mixture shall be placed to the full width by a bituminous paver. The paver shall be self-propelled with an automatic screed operable from a profile "shoe" or "ski" riding on the base surface, or adjoining completed surface. The length and type of the shoe or ski shall be acceptable to the Owner, and capable of compensating for minor variations in the base profile. The speed of the paver shall be regulated to eliminate pulling and tearing of the mat.

3.2.4. The laydown temperature shall be 270-300 degrees Fahrenheit (270°F-300°F). The mixture shall be struck off in a uniform layer of such depth that when the work is completed it shall have the required thickness and conform to grade and contours indicated. Unless otherwise permitted, placement of the mixture shall begin along the centerline of a crowned section or on the high side of areas with one-way slopes. The mixture shall be placed in consecutive adjacent strips as wide as practical. The longitudinal joint in one course shall offset the longitudinal joint of the layer below by at least two feet; however, the joint in the surface course shall be at the centerline of pavement. Transverse joints in one course shall be offset by at least five feet from transverse joints in the previous course. Transverse joints in adjacent lanes shall be offset by at least ten feet. In areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture may be spread and luted by hand with care to reduce segregation. Where mixture is spread by hand, compaction shall occur immediately. Connections to existing surfacing shall be accomplished by cutting back the existing surface to a vertical face to assure positive full depth paving. The vertical face shall be tack coated prior to paving.

3.2.5. After placing, the mixture shall be thoroughly and uniformly compacted by rolling. The surface shall be compacted as soon as possible when the mixture has attained sufficient stability so that rolling does not cause undue displacement, cracking, or shoving and completed the same day the pavement is placed. The sequence of rolling operations and types of roller shall be determined by the Contractor and shall be demonstrated to be sufficient to achieve the specified density. The speed of the rollers shall, at all times be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. To prevent adhesion of the mixture to the rollers, the compactors wheels shall be kept moistened with water, or water with very small quantities of detergent or other approved material. Excess liquid will not be allowed. Any displacement occurring as a result of reversing direction of the roller or from any other cause shall be corrected. Rollers shall not be parked on hot mixture until it has cooled sufficiently to avoid displacement. Sufficient rollers shall be furnished to handle the volume of mixture being placed. Rolling operations shall continue until the surface is of uniform texture and free of roller marks, true to grade and cross section, and the required density is achieved. In areas not accessible to the roller, the mixture shall immediately and thoroughly be compacted with hand compaction equipment. Any mixture that becomes loose, broken, mixed with dirt, containing check cracking, or is in any way defective shall be removed and replaced at the Contractor's expense. Skin patching shall not be allowed. The Contractor shall compact the mix to a density of at least 92% of maximum theoretical density.

3.2.6. The formation of all joints in the path, except at natural breaks in the path, such as roads, structures, and driveways, is discouraged. If the formation of a joint is necessary, the formation of the joint shall be made in such a manner as to insure a continuous bond between courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade. Longitudinal and transverse joints which are irregular, damaged, un-compacted or otherwise defective shall be cut back to expose a clean, sound surface for the full depth of the course. All contact surfaces shall be given a tack coat prior to placing any fresh mixture.

3.2.7. When the rolling of the surface course has been completed and the edges have been compacted, gravel shouldering material, where required, shall be placed against the edges and rolled.

3.2.8. The finished surfaces of the pavement shall not vary more than ¼-inch in 10 feet at the pavement surface. Smoothness shall be evaluated with a 10-foot straight edge. Measurements will be made perpendicular and parallel to the centerline at distances not to exceed 25 feet. When more than 15 percent of the measurements exceed the specified tolerances, the Contractor, at no additional cost the Owner, shall grind or remove the deficient area until tolerance is met, or replace with new material. Skin patching will not be allowed.

3.2.9. The finished and compacted asphalt mat thickness shall not be less than that specified in the drawings. If thickness is not indicated in the drawings, the finished and compacted asphalt mat thickness shall not be less than 2.5 inches (2.5") thick in all pavement locations.

3.3. ASPHALT OVERLAY

3.3.1. PAVEMENT PREPARATION:

3.3.1.1. The Contractor shall clean existing surfaces to receive an asphalt overlay of any loose debris, dust, mud, or other debris that may adversely affect the bond of the new overlay. Oil spots should be removed with wire brushes, or other methods to avoid bleeding through the overlay. See Section 02510 for additional asphalt pavement preparation requirements.

3.3.1.2. Prior to applying the tack coat, the Contractor shall remove any thermoplastic and tape pavement markings, and raised pavement markers, employing adequate controls to not damage the affected pavement. Mechanical scraping of marking to a point where the marking are flush with the existing pavement surface is acceptable.

3.3.1.3. Repair pavement failures and complete crack repair according to Section 20 – Crack Repair prior to asphalt placement.

3.3.1.4. In areas where fabric reinforcement is used, apply liquid asphalt tack to surface according to the manufacturers recommended rate. Install paving fabric according to manufacturer's specifications.

3.3.2. TACK COAT:

3.3.2.1. Immediately prior to paving, a tack coat shall be applied to the cleaned surface at a rate of 0.10-0.20 gallons per square yard (0.10-0.20 gal/s.y.). The Contractor shall apply tack coat only those surfaces to be paved that day.

3.3.2.2. Pools of primer material remaining on the surface after the application shall be removed.

3.3.2.3. All traffic not essential to the Work shall be kept off the tack coat.

3.3.2.4. The Contractor shall take care when applying the tack coat to prohibit the spray from adhering to any objects other than the surface to be paved. The Contractor will be held responsible for removal of tack coat from such objects.

3.3.3. ASPHALT OVERLAY:

3.3.3.1. The thickness of an asphalt overlay shall be between 1.0 inches to 2.25 inches, depending on the existing surface conditions. Roll and compact to project specifications and a tight finish.

3.3.3.2. Asphalt placed adjacent to existing asphalt or concrete shall meet the existing grade without bumps.

3.3.3.3. The Contractor shall arrange paving to provide hot joints wherever possible. Where cold joints are necessary, the Contractor shall square the edge vertically and horizontally. All edges will be "feathered" down to match existing surfaces without creating a bump, as necessary

3.4. TOLERANCES

3.4.1. Material Properties: Field testing of the job mix formula shall conform to the requirements of the Idaho Transportation Department for the class of asphalt approved for the project.

3.4.2. Compaction: Field density shall conform to the following requirements:

3.4.2.1. Mat Density: A minimum of 92 percent of theoretical maximum density.

3.4.2.2. Joint Density: A minimum of 89 percent of theoretical maximum density.

3.4.2.3. In-place density tests shall be performed a minimum distance of 12 inches from joints

3.4.3. Surface Smoothness: Finished pavement surfaces shall not vary more than 0.25 inch in 10.0 feet as measured in accordance with this section.

3.4.4. Thickness: The average measured, compacted mat thickness shall be within 0.20 inches of the specified thickness, with no location greater than +/- 0.25 inches.

3.4.5. Submittals: All materials required to be submitted shall be completed prior to final acceptance.

3.4.6. Penalties: The owner reserves the right to impose an extended warranty period, or to require the removal of asphalt placements that do not meet the project specifications. Joints are discouraged in the path, and asphalt placements that do not meet the project specifications are subject to removal of the entire placement. The contractor must comply with all imposed penalties within 10 days' notice of unsatisfactory asphalt placements.

3.4.7. Accepting Official: The Owner's representative shall inspect the paving, review independent test results and shall notify the Contractor in writing within 14 days of acceptance of asphalt, require additional testing or corrective action required including removal and replacement of paving.

3.5. FIELD QUALITY CONTROL

3.5.1. Independent Testing: The County may engage the services of a qualified materials testing laboratory throughout the project. The materials testing laboratory shall perform acceptance sampling and testing to determine compliance with the project specifications. The Contractor shall cooperate with the testing laboratory to facilitate the taking of required material samples and field-testing. The County reserves the right to complete independent quality control testing of the materials placed by the Contractor to verify any Contractor quality control testing, and may use quality assurance for acceptance of the Work. County testing in no way relieves the Contractor from fulfilling the project specifications. Quality assurance re-testing necessitated by the failure of the quality control testing of materials placed by the Contractor shall be at the Contractor's expense.

3.5.2. Frequency of Testing: As a minimum, the following testing frequencies shall apply:

3.5.2.1. Superpave Volumetrics: Once for test strip, and then as requested by the Engineer.

3.5.2.2. Oil Content: One test each day of placement, or every 800 tons, whichever is greater.

3.5.2.3. Gradation: One test for each oil content test.

3.5.2.4. Density: Test at the commencement of paving operations until an acceptable roller pattern is developed, and at least once for every 300 linear feet of roadway throughout the project.

3.5.2.5. Core in-place asphalt: At least one for every 2000 linear feet of roadway, or as requested by the Engineer. In-place air voids shall be tested with each core.

3.5.2.6. Joint Density: As requested by the Engineer

3.5.2.7. Smoothness: Upon completion of paving operations and prior to opening to traffic.

3.6. PROTECTION

3.6.1. Immediately after placement, protect pavement from mechanical injury for 15 days.

3.7. SCHEDULE

3.7.1. Asphalt pave areas as indicated on the construction drawings, or as directed by the Manager

3.8. GUARANTEE

3.8.1. The Contractor shall be responsible for any damage or failure, progressive or total, of the plantmix surfacing for a period of two years following completion of the work. This shall include any deformation of the roadway cross-section or profile.

3.8.2. Replacement or repair of the unsatisfactory areas shall be as specified by the County. The completion of the repairs, as specified, will satisfy the requirements of the GUARANTEE.

3.9. BASIS OF MEASUREMENT

3.9.1. Subgrade Preparation and Soft Subgrade Repair: Measurement for Subgrade Preparation shall be on a cubic yard of material, as indicated in SECTION 16 - Excavation.

3.9.2. RABS Base Course: Measure for RABS Base Course shall be on a square yard basis, as indicated in Section 17 - RABS. Work shall include removal of any vegetation within the RABS Zone and preparation of the roadbed, pulverizing and blending of materials, documentation of existing pavement and processed material thickness, the wetting or drying of the blended material, relaying, grading and shaping of the blended material, compaction of the blended material, finishing the completed surface, and all incidental and related work, materials, and labor

3.9.3. 2" Aggregate Subbase Course. Measurement for 2" Aggregate Subbase Course shall be on a ton basis. Work shall include hauling, placing, watering, and compacting material, including all incidental and related work, materials, and labor.

3.9.4. ¾"(-) Crushed Aggregate Base Course. Measurement ¾" Crushed Aggregate Base Course shall be on a per ton basis. Work shall include hauling, placing, watering, and compacting material, including all incidental and related work, materials, and labor.

3.9.5. ¾"(-) Crushed Aggregate Leveling Course. Measurement ¾" Crushed Aggregate Leveling Course shall be on a per ton basis. Work shall include hauling, placing, watering, and compacting material, including all incidental and related work, materials, and labor.

3.9.6. Tack Coat: Measurement for Tack Coat shall be on per gallon basis. Work shall include material and application, including all incidental and related work and labor.

3.9.7. Asphalt Pavement . Measurement for Asphalt Pavement shall be on a ton basis at 2.5" compacted depth. Work shall include mixing, hauling, placement, compaction, and materials including all incidental and related work, materials, and labor.

3.9.8. Asphalt Overlay . Measurement for Asphalt Overlay shall be on a per ton basis at 2.0" compacted depth. Work shall include mixing, hauling, placement, compaction, and materials including all incidental and related work, materials, and labor.

3.10. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Subgrade preparation and soft subgrade repair	Cubic Yards (see Section 16)
RABS Base Course	Square Yards (see Section 17)
2" (-) crushed aggregate subbase course	Ton

¾”(-) crushed aggregate base course	Ton
¾”(-) crushed aggregate leveling course	Ton
Tack Coat	Gallons
Asphalt Pavement (compacted depth)	Ton
Asphalt Overlay (compacted depth)	Ton

END OF SECTION

SECTION 19 – SHOULDERING

PART 1. GENERAL

1.1. SUMMARY

1.1.1. Section Includes:

1.1.1.1. This work shall consist of the shaping, grading, and compaction of the excess RABS material and/or imported crushed aggregate for shoulder work, on one side of the roadway, in conformance with the Standard Drawings, Construction Documents, or as directed by the Manager or Engineer.

1.1.2. Definitions:

1.1.2.1. SHOULDERING shall include the work described in this specification with grading required to meet the plans, or direction from the Manager and Engineer.

1.1.3. Related Sections:

1.1.3.1. Section 16 Excavation
1.1.3.2. Section 8 Aggregate Materials
1.1.3.3. Section 17 RABS
1.1.3.4. Section 18 Asphalt Paving

1.2. REFERENCES

1.2.1. ISPWC Div. 800 Aggregates and Asphalt

1.3. QUALITY ASSURANCE

1.3.1. Regulatory Requirements

1.3.1.1. Perform work in accordance with the latest edition of the Idaho Standards for Public Works and Construction Standards and these Construction Documents.

1.3.1.2. Density Tests shall be performed using an uncorrected nuclear gage in accordance with the following Standard method:

1.3.1.2.1. In-Place Density of Bituminous Mix Using the Nuclear Moisture Density Gauge, WAQTC TM8 Method B (Direct Transmission only).

PART 2. PRODUCTS

2.1. MATERIALS

2.1.1. Materials shall conform to the requirements specified in the following sections and subsections:

2.1.1.1. RECYCLED ASPHALT BASE STABILIZATION (RABS.): Material in accordance with Section 17 Recycled Asphalt Base Stabilization.

2.1.1.2. CRUSHED AGGREGATE: ¾"(-) Base material, in accordance with Section 8 - Aggregate Materials.

PART 3. EXECUTION

3.1. WORKMANSHIP

3.1.1. Use excess RABS materials, if available. If additional material is needed, import ¾" Base crushed aggregate material, per Section 8. The resulting mixture shall be uniform and more than one (1) pass of the mixer through the material may be required. If equipment is used that requires more than one (1) pass of the mixer, water distribution on the path as approved shall be at the time of the final blending pass.

3.1.2. Shoulder material will be compacted according to Blaine County Road Construction Standards, Section 8 – Aggregate Materials, or Section 17 – RABS, when RABS is utilized. The shoulder material will be windrowed to approximate shoulder locations adjacent to the roadway. After paving, the windrows will be finish graded and compacted to the full depth of the exposed section of the adjacent roadway

3.1.3. Shoulder material will be graded as shown on plans, as directed by the Engineer, or without such direction at a 2% slope, for approximately two-feet (2') to a grade break. The Contractor will notify the Engineer when slope finishing is limited by right-of-way width, or when the slope may be obstructed by existing roadside fixtures.

3.2. TOLERANCES

3.2.1. Grade Control Requirements. The final elevation of the shoulder surface shall be in accordance with the profile grades on the plans, or as directed by the Engineer. The final elevations shall minimize wasting existing materials. The shoulder surface shall be finished to the elevation required to provide the plan specified cross-slope at the edge of the roadway surface.

3.3. PROTECTION

3.3.1. The shoulder material shall be kept moist at all times, until final placement and compaction. Water equipment shall be of a type that will apply moisture in a fog or mist type application free of pressure on the surface being treated.

3.4. SCHEDULE

3.4.1. As indicated in the Construction Documents, or Standard Drawings.

3.5. GUARANTEE

3.5.1. The Contractor shall be responsible for any damage or failure, progressive or total, of the asphalt pavement surfacing for a period of two years following completion of the work. This shall include any deformation of the roadway cross-section or profile.

3.5.2. Replacement or repair of the unsatisfactory areas shall be as specified by the Manager and Engineer. The completion of the repairs, as specified, will satisfy the requirements of the GUARANTEE.

3.6. BASIS OF MEASUREMENT

3.6.1. SHOULDERING. Measurement for Shouldering will be on a road mile basis, for one-side of the roadway. Work shall include the wetting or drying of the material, relaying, compaction of the mixture, finishing of the completed surface, and all incidental and related work, materials, and labor. Materials and workmanship are subject to inspection and approval before issuance of payment.

Work Item	Unit Measure
SHOULDERING	road mile (one-side)

3.7. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
SHOULDERING:	road mile (MI)

END OF SECTION

SECTION 20 – ASPHALT CRACK REPAIR

PART 1. GENERAL

1.1. DESCRIPTION: The work covered by this specification includes the design, testing, and quality control for this proper production of asphalt pavement surfacing crack fill and sealcoat products and all materials, equipment, and workmanship required for the completion of crack filling and application of an asphalt sealcoat to an existing asphalt concrete pavement. Sealcoats shall be applied in a two-step application process. The completed sealcoat shall leave a homogeneous mat, adhere firmly to the prepared surface, and have a skid-resistant surface texture throughout its service life.

1.2. REFERENCES:

1.2.1. American Society for Testing and Materials (ASTM) C136
1.2.2. American Society for Testing and Materials (ASTM) D36
1.2.3. American Society for Testing and Materials (ASTM) D113
1.2.4. American Society for Testing and Materials (ASTM) D217
1.2.5. `American Society for Testing and Materials (ASTM) D242
1.2.6. American Society for Testing and Materials (ASTM) D244
1.2.7. American Society for Testing and Materials (ASTM) D 3111
1.2.8. American Society for Testing and Materials (ASTM) D5078
1.2.9. American Society for Testing and Materials (ASTM) D5329
1.2.10. American Society for Testing and Materials (ASTM) Manual #9
1.2.11. AASHTO M140 (Anionic); American Society for Testing and Materials (ASTM) D977
1.2.12. AASHTO M208 (Cationic); American Society for Testing and Materials (ASTM) D2397
1.2.13. AASHTO T59; American Society for Testing and Materials (ASTM) D2939
1.2.14. Idaho Standards for Public Works (ISPWC) Section 800
1.2.15. International Slurry Surfacing Association (ISSA) A105-T100
1.2.16. International Slurry Surfacing Association (ISSA) T106

PART 2. MATERIALS

2.1. CRACK SEALANT: Hot applied asphalt self-leveling crack sealant that meet the following specifications, or as approved by the Engineer:

2.1.1. Cone Penetration (77°F ASTM D5329): 50 dmm max
2.1.2. Cone Penetration (397°F ASTM D5329): 15 dmm max
2.1.3. Softening Point (ASTM D36): 205°F min
2.1.4. Flexibility, 1" mandrel, 90° bend, 2 sec. (ASTM D3111): Pass 0°F
2.1.5. Tensile Adhesion, 77°F (ASTM D5329): 500% min
2.1.6. Ductility, 77°F (ASTM D113): 40 cm min
2.1.7. Resilience, 77°F (ASTM D5329): 40% min
2.1.8. Asphalt Compatibility, 140°F, 72 hrs. (ASTM D5329): Pass

PART 3. EXECUTION

3.1. GENERAL:

3.1.1. Schedule: The Contractor will be allowed to conduct his operation on Monday through Thursday of each week. The exact schedule of work will be approved by the Manager before asphalt crack repair begins.

3.1.2. Traffic Control: Contractor will be required to provide and implement an adequate Traffic Control Plan, per the MUTCD requirements, to prevent all public access to the portion roadway under construction, each day. Barricades and/or flaggers shall be left in place until the roadway can be re-

opened to public access. Detour signs and information directing traffic around construction is required, when a detour is implemented.

3.1.3. Load Limits: Contractor must take care to prevent damage to the roadway.

3.1.3.1. Contractor must confine operations to the immediate area of construction.

3.1.3.2. Any damage, ruts, or erosion caused by the Contractor's operations must be repaired to the satisfaction of the Manager.

3.2. MATERIALS STORAGE, INSPECTION, AND TESTING:

3.2.1. The Contractor is responsible for materials storage and handling. The storage site will be available to the Manager and Engineer for inspections and testing. The Contractor shall store materials according to the manufacturer's recommendations.

3.3. CRACK REPAIR:

3.3.1. All cracks shall be thoroughly cleaned of all foreign materials. The crack filler shall be applied according to the manufacturer's recommendations and must be dry to the touch prior to applications of fog seals, sealcoats, or re-opening to public access. Crack filling shall be according to the following:

3.3.2. Cracks in excess of 1/8 inch, but less than 1 inch in width must be sealed prior to application of sealcoat. Such cracks to be sawed out to 3/8" or ½" wide using a Cimline PCS-20 or PCS-30 pavement crack saw with a 3/8" or ½" wide DRC blade, as approved by Manager's inspector, to create an adequate reservoir for the filler and allowing for expansion and contraction of the surface and crack.

3.3.3. Cracks 1" and wider shall be filled with fine aggregate hot, dense graded, asphalt concrete prior to application of sealcoat. Maximum aggregate size shall not exceed 3/8".

3.3.4. Cracks less than 1/8 inch in width shall be filled with multiple applications of sealcoat.

3.3.5. Apply crack filler only when pavement temperature is 40°F, or higher. Hot lancing with Cimline hot rod lance, or equal, is acceptable in areas without build-up of oil, dirt, or other residue. When hot-lancing, use care to not overheat the asphalt and cause separation of the asphalt and aggregate, but allow for sufficient warming and drying of the asphalt crack to ensure necessary adhesion is obtained.

3.3.6. All cracks must be cleaned of all weeds and debris prior to crack sealing with crack filler. Cracks that contain weeds and other live vegetation must be treated with an approved, non-oil based sterilant prior to the application of the crack filler. Submit sterilant material to Owner for approval. Use routers and power brushes as necessary to clean cracks.

3.3.7. Bituminous crack sealer shall be applied according to the manufacturer's recommendations. The properties of the crack filler shall be compatible with the sealcoat. Previously used crack filler products include CRAFCO AR-2, and ELASTOFLEX 650. Submit crack filler materials specifications for approval according to Contract Documents requirements.

3.3.8. Filler melting shall not be in a direct-fired melting unit. The melting unit must be equipped with an agitator, and the filler shall be agitated as soon as possible during the melting process, and continuously during transfer and application process. Avoid agitation while loading blocks of sealant into the melting unit to avoid splashing hot sealant.

3.3.9. All cracks to be dusted with fine sand, or covered with tissue paper immediately after sealing to prevent tracking. Allow crack filler to cure prior to application of sealcoat.

3.4. CLEAN UP:

3.4.1. Wash tools and equipment with water before material has dried. Use diesel fuel if material has hardened, or dispose of tools.

3.4.2. Dispose of waste materials properly.

3.5. MEASUREMENT

3.5.1. The measurement for crack filling shall be linear feet of crack prepped and filled.

3.6. BASIS OF PAYMENT

3.6.1. The basis of payment for crack filling shall be linear feet of crack fill completed. The price shall be full compensation for furnished all materials, tools, equipment, test design and certificates of compliance, cleanup, and incidentals necessary to complete application of crack filler material, surface cleaning, crack routing (if applicable), and disposal of material removed from cracks and the asphalt concrete surface during the cleaning process, and warrant the work as specified herein.

PAY ITEM	PAY BASIS
Crack Filling	linear feet (LF)

END OF SECTION

SECTION 21 – FOG COAT

PART 1. GENERAL

1.1. SECTION INCLUDES:

1.1.1. This work consists of constructing a fog coat, and blotter if required, in accordance with these specifications, and in reasonable conformity to the Contract Documents, or as otherwise established.

1.2. REFERENCES:

1.2.1. "Idaho Department of Transportation Standard Specifications for Highway Construction," (latest edition)

1.2.2. "Idaho Standards for Public Works Construction," (latest edition)

1.2.3. "Specifications for Asphalt Cements and Liquid Asphalts," A sphalt Institute

1.2.4. ASTM or AASHTO Standards

PART 2. MATERIALS

2.1. FOG COAT:

2.1.1. Provide fog coat material that is diluted emulsified asphalt. Determine application rate based on surface absorption.

2.1.2. Mix approximately equal volumes of emulsified asphalt and water before application, unless otherwise specified.

2.1.3. CRS-2R emulsified blend of asphalt, rubber, water, and emulsifiers. The asphalt cement shall be thoroughly blended with a minimum of 1.5 percent (1.5%) total rubber solids

PROPERTY	SPECIFICATIONS		AASHTO TEST NUMBER
	Max.	Min.	
Viscosity, Saybolt Furol @ 50°C, secs	150	400	T59
Storage stability test, 24 hrs, %		1.0	T59
Demulsibility test, %	40		T59
Particle charge test		Positive	T59
Sieve test, %		0.10	T59
Oil distillate by distillation: Oil distillate by volume of emulsion, %		3.0	T59
Residue by evaporation, %	65		T59

Following is Method B:

Test on residue: Penetration, 25°C 100 grams (3.5 oz), 5 secs.	80	150	T59,T49

2.1.4. GILSONITE "GSB-88", as manufactured by Asphalt Systems, Inc., Salt Lake City , Utah, and applied according to manufacturer's instructions.

2.2. BLOTTER

2.2.1. Provide blotter material to meet the requirements of the Contract Documents. The Engineer will determine acceptability of material from Contractor furnished sources at the point of delivery.

PART 3. WORKMANSHIP

3.1. EQUIPMENT:

3.1.1. Equipment for applying fog coat and blotter to meet the requirements for proper installation. The equipment shall be capable of applying the material with a pressure range of 25 to 75 psi.

3.2. APPLICATION OF FOG COAT:

3.2.1. Apply fog coat material with a pressure distributor in a uniform, continuous spread. Ensure the distributor does not exceed 25 mph. Do not exceed the specified asphalt application rate at the junction of the spread overlap. Correct skipped areas or deficiencies.

3.2.2. Obtain the Engineer's approval for the quantities, rate of application and temperature of the fog coat material before applying the fog coat.

3.2.3. Do not apply the fog coat if surface or weather conditions prevent proper construction.

3.2.4. Apply the fog coat so there is the least amount of inconvenience to traffic and to permit one-way traffic without pickup or tracking.

3.2.5. Apply the fog coat on the roadway in the same direction as traffic travels.

3.2.6. Place fog coat over a seal coat within one working day of the completed seal coat, or as conditions allow.

3.3. APPLYING BLOTTER:

3.3.1. If, after applying the fog coat, the fog coat material fails to penetrate and the roadway must be used by traffic, spread blotter at the Engineer approved rate to absorb the excess asphalt. .

3.3.2. Clean surface, as required.

PART 4. METHOD OF MEASUREMENT

4.1. The Engineer will measure acceptably completed work as follows:

4.1.1. Diluted emulsified asphalt by the gallon after dilution, with no correction for temperature.

4.1.2. Blotter by the ton or cubic yard:

PART 5. BASIS OF PAYMENTP

5.1. The County will pay for accepted quantities at the contract unit prices as follows::

Pay Item	Pay Unit
Diluted Emulsified Asphalt for Fog Coat	gal
Blotter	Ton or CY

SECTION 22 – CHIP SEALS

PART 1. GENERAL

1.1. SECTION INCLUDES:

1.1.1. This work is the application of a seal coat of asphalt and a cover coat of crushed aggregate chips to a primed and leveled leveling course or to a plant mix pavement course.

1.2. REFERENCES:

1.2.1. "Idaho Department of Transportation Standard Specifications for Highway Construction," (latest edition)

1.2.2. "Idaho Standards for Public Works Construction," (latest edition)

1.2.3. "Specifications for Asphalt Cements and Liquid Asphalts," Asphalt Institute

1.2.4. ASTM or AASHTO Standards

PART 2. MATERIALS

2.1. ASPHALT EMULSIONS:

2.1.1. CRS-2R emulsified blend of asphalt, rubber, water, and emulsifiers. The asphalt cement shall be thoroughly blended with a minimum of 1.5 percent (1.5%) total rubber solids.

PROPERTY	SPECIFICATIONS		AASHTO TEST NUMBER
	Max.	Min.	
Viscosity, Saybolt Furol @ 50°C, secs	150	400	T59
Storage stability test, 24 hrs, %		1.0	T59
Demulsibility test, %	40		T59
Particle charge test		Positive	T59
Sieve test, %		0.10	T59
Oil distillate by distillation: Oil distillate by volume of emulsion, %		3.0	T59
Residue by evaporation, %	65		T59

Following is Method B:

Test on residue: Penetration, 25°C 100 grams (3.5 oz), 5 secs.	80	150	T59,T49

2.1.1.1. The temperature range for the CRS-2 emulsion shall be 110 - 160 degrees Fahrenheit for spraying. At no time shall the emulsion be allowed to overheat, freeze, or be mishandled in such a manner or to allow the emulsions to separate before or during the spraying application.

2.1.2. "PASS-CR" Cationic Asphalt Emulsion, as manufactured by Asphalt Systems, Inc., Salt Lake City, Utah, and applied according to manufacturer's instructions.

2.2. COVER COAT MATERIAL

2.2.1. The cover coat shall be crushed grade washed aggregate and have one of the following gradations:

SIEVE SIZE	**Urban (3/8")**	**Rural (1/2")**
	PERCENT PASSING	
½ inch	100%	100%
3/8 inch	95% to100%	40% to 90%
No. 4	0% to 6%	0% to 15%
No. 8	0% to 3%	0% to 5%
No. 200	0% to 2.0%	0% to 2.0%

2.2.2. The aggregates for cover coat material shall have a cleanness value of not less than 82 in accordance with ITD T 72: Cleanness of Cover Coat Material

2.2.3. For gravel sources at least 70 percent by weight of the particles retained on the No. 4 sieve to have one fractured face or more as determined by AASHTO TP 61.

2.2.4. Cover coat material not to show a loss of more than 40 in the Los Angeles Abrasion Test, Grading C, unless otherwise specified. When tested in accordance with AASHTO T 182 cover coat material to have a retained asphalt film above 95 percent. Aggregate not meeting this requirement may be used in combination with an anti-strip agent, provided the combination meets the 95 percent requirement.

2.2.5. The cover coat material shall be moistened with water to eliminate or reduce the dust coating of the aggregate.

2.2.6. Temporary stockpiles shall only be placed in approved locations.

2.2.6.1. Remove surplus material from temporary stockpile locations and place in an approved permanent location.

2.2.6.2. Temporary site to be left in an approved condition upon completion of chip seal operations.

PART 3. WORKMANSHIP

3.1. EQUIPMENT:

3.1.1. Asphalt applying equipment to meet requirements for proper applications. The equipment shall be capable of applying the material with a pressure range of 25 to 75 psi.

3.1.2. Rotary broom(s) required. The brooms shall be in good condition and capable of sweeping a path at least 70 inches wide without loosening or displacing embedded materials.

3.1.3. Only pneumatic tire rollers.

3.1.3.1. Roller shall meet the requirements for proper rolling. The pneumatic-tire roller shall be self-propelled and the gross load adjustable to apply 200 to 350 pounds per inch of rolling width as directed. Tire pressure or contact pressure may be specified for pneumatic-tire rollers.

3.1.3.2. Do not operate roller at speeds in excess of 8 mph for the first coverage, nor in excess of 16 mph for subsequent coverages.

3.1.4. Self-propelled aggregate spreader.

3.1.4.1. Supported by at least four wheels equipped with pneumatic tires on two axles.

3.1.4.2. Spreader to be equipped with positive controls so that the aggregate spreader has means of applying the larger cover coat material to the surface ahead of the smaller cover coat material and the required amount of material will be deposited uniformly over the full width required.

3.2. GENERAL CONSTRUCTION REQUIREMENTS:

3.2.1. Unless other permitted, do not apply chip seal before June 15th, or after September 1st.

3.2.2. If chip seals are allowed to be placed on a Friday, or just before a three-day holiday weekend, emergency maintenance procedures must be in place.

3.2.3. Allow newly placed asphalt mixes to cure a minimum of ten days before applying chip seal.

3.2.4. Do not chip seal when wind velocity exceeds 15 mph.

3.2.5. Clean surface with mechanical brooming, as required. Clean with high-pressure water where mechanical brooming is inadequate.

3.2.6. Allow surface to dry completely after cleaning with water before applying asphalt.

3.2.7. Protect all deck drains and expansion joints from chip seal application.

3.2.8. Do not begin applying asphalt until surface has been approved by the Road & Bridge Manager.

3.2.9. Do not apply asphalt when roadway surface or weather conditions would prevent satisfactory construction, generally dry and ambient air temperatures above 60 °F.

3.2.10. Following are minimum pavement surface temperatures for applying indicated grades of asphalt.

3.2.10.1. .RC-MC 250: 60°F and rising.

3.2.10.2. Emulsions: 80°F and rising.

3.2.10.3. RC-MC 800 or 800R: 80°F and rising.

3.2.10.4. RC-MC 3000 or 3000R: 80°F and rising.

3.2.10.5. Do not chip seal when pavement temperatures exceed 140°F.

3.3. APPLYING ASPHALT EMULSION:

3.3.1. Asphalt shall be applied by means of a pressure distributor in a uniform, continuous spread over the section to be treated and within the temperature range specified.

3.3.2. Use the quantity of asphalt per square yard, as directed. Typical application rate is 0.30 gallons per square yard. Adjust application rate as necessary to obtain desire installation.

3.3.2.1. If the texture of the surface is such that asphalt penetrates too rapidly, a preliminary application of from 0.05 to 0.10 gallon per square yard of surface may be required in addition to that required in 3.3.6 above.

3.3.3. A strip of building paper at least three feet (3') in width and with a length equal to that of the spray bar of the distributor plus one-foot (1') shall be used at the beginning of each spread. If the cut off is not positive, the use of paper may be required at the end of each spread. The paper shall be removed and disposed of in a satisfactory manner.

3.3.4. The distributor shall be moving forward at the proper application speed at the time the spray bar is opened. Any skipped areas or deficiencies shall be corrected. Junctions of spreads

shall be carefully made to assure a smooth riding surface.

3.3.5. The distribution of asphalt shall not vary by more than 15-percent (15%) transversely from the average, nor more than 10-percent (10%) longitudinally from the specified rate of application, as determined by Idaho T-80.

3.3.6. The spread of asphalt shall not be more than six-inches (6") wider than the width covered by the cover coat material from the spreading device.

3.3.7. Under no circumstances shall operations proceed in such manner that the asphalt will be allowed to chill, set up, dry, or otherwise impair retention of the cover coat material.

3.3.8. The distributor, when not spreading, shall be parked so that the spray bar or mechanism will not drip on the surface.

3.3.9. The length of spread of asphalt shall not be in excess of that which trucks loaded with cover coat material can immediately cover.

3.4. APPLYING COVER COAT

3.4.1. Immediately following the application of the asphalt, spread cover coat material as designated. Spreading shall be accomplished in such a manner that the tires of the trucks or aggregate spreader at no time contact the uncovered asphalt.

3.4.2. The cover coat shall be applied at a rate of 25 pounds per square yard.

3.4.3. The cover coat materials shall be uniformly spread and shall beuniformlyrolled until no more aggregate can be worked into the surface.

3.4.4. Immediately after the cover coat material is spread, deficient areas shall be covered by additional material. Rolling shall begin immediately behind the spreader and shall be continued until 4 complete coverages are obtained. Rolling shall be completed the same day the seal coat is applied. Any roller speed that displaces or turns cover coat material shall be reduced.

PART 4. QUALITY CONTROL

4.1. Where brooming operations could create dust to the extent air pollution regulations will be violated or create a safety hazard, the surface of the roadway to be swept shall be lightly sprayed with enough water to prevent dust from becoming airborne.

4.2. Seal approaches before sealing adjacent roadway.

4.3. Progress andControl: The Blaine County Road & Bridge Manager shall inspectthe surface after each application and upon approval, subsequent courses shall be applied.

4.4. If asphalt bleeding becomes apparent on the completed chip seal, initiate immediate maintenance and traffic control, a do not continue chip sealing until corrective action has been initiated.

4.5. After the application of the seal coat, the surface shall be maintained for a period of four (4) days, or as directed by the Blaine County Road & Bridge Manager.

4.5.1. Maintenance of the surface shall include the distribution of approved reject material over the surface as directed to absorb any free asphalt.

4.5.2. The maintenance shall be conducted so as not to displace imbedded material.

4.5.3. Excess material shall be swept from the entire surface by means of rotary brooms. In curb and gutter sections, excess material shall be picked up and disposed of as directed.

4.5.4. Remove and properly dispose of material used to protect joints and drains after completion of

chip seal.

4.5.5. Remove all materials spilled into deck drains and expansion joints after completion of chip seal.

PART 5. METHOD OF MEASUREMENT

5.1. The Blaine County Road & Bridge Manager will measure acceptably completed work as follows:

5.1.1. Asphalt emulsion by the gallon, with no correction for temperature.
5.1.2. Cover Coat by the ton or cubic yard:

PART 6. BASIS OF PAYMENT

6.1. Blaine County will pay for accepted quantities at the contract unit prices as follows::

Pay Item	Pay Unit
Asphalt Emulsion for Seal Coat	gallon
Cover Coat	Ton or CY

END SECTION

SECTION 23 – TRAFFIC PAVEMENT MARKINGS

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Pavement marking materials and installation.

1.1.2. Reflectorized thermoplastic pavement markings.

1.2. RELATED SECTIONS

1.2.1. Section 7 – Traffic Control.

1.3. REFERENCES

1.3.1. Manual on Uniform Traffic Control Devices (MUTCD), U.S. Department of Transportation, Federal Highway Administration.

1.3.2. Federal Specifications, TT-P-1952-D.

1.3.3. Idaho Waterborne Traffic Line Paint Specifications.

1.3.4. Federal Specifications, TT-B-1325.

1.3.5. American Society for Testing and Materials (ASTM).

1.4. SUBMITTALS

1.4.1. Submit manufacturer's certification that paint and beads meet or exceed specified requirements.

1.4.2. Submit certified copies of test results on the pre-formed thermoplastic pavement marking material.

1.5. DELIVERY, STORAGE AND HANDLING

1.5.1. Unload, store and load materials in a manner which prevents damage or excessive exposure to sunlight and weather.

1.5.2. Store paint in an area prepared to contain spills and prevent contamination of storm water.

PART 2. MATERIALS

2.1. PAVEMENT PAINT (Waterborne)

2.1.1. Paint to be waterborne with volatile organic compound (VOC) less than150 g/L.

2.1.2. Paint to conform to either the current Idaho Waterborne Traffic Line Paint Specifications or to Federal Specification TT-P-1952-D with the following modifications:
- 2.1.2.1. Viscosity: 80-95 K.U. per ASTM D 562.
- 2.1.2.2. Total Nonvolatile Solids: 75% minimum per ASTM D 2369.
- 2.1.2.3. Scrub Resistance: 1,000 cycles minimum per ASTM D 2486.
- 2.1.2.4. pH: 9.6 S.U. minimum per (ASTM E 70).

2.1.3. Paint Colors: Meet the Federal Test Standard 595 with color chip designations:
- 2.1.3.1. White: 37875.

2.1.3.2. Yellow: 33538.

2.1.4. Note: The Environmental Protection Agency is in the process of limiting volatile organic compounds to 150 grams/liter for road striping paint. This rule will eliminate the use of traditional solvent-borne paints and require waterborne paint.

2.2. GLASS BEADS

2.2.1. Specification: Federal Specification TT-B-1325 (glass spheres) Retro-Reflective, Type I (Low index of Refraction).

2.2.2. Coating: Chemically adherence coated.

2.2.3. Gradation:

Sieve Number	Opening Size (inch)	Percent Passing
18	0.0394	100 min.
20	0.0331	90-100
40	0.0165	10-35
50	0.0117	0-10
60	0.0070	0-5

2.3. THERMOPLASTIC PAVEMENT MARKINGS

2.3.1. Reflective thermoplastic pavement markings material to be pre-formed with a minimum thickness of 60 mils.

2.3.2. Material to be capable of being affixed to non-bleeding bituminous or portland cement concrete pavement by means of a pre-coated adhesive.

2.3.3. Material to be flexible and conform to the typical road pavement surface.

2.3.4. Material to be patchable with minimum surface preparation and are to exhibit no flagging.

2.3.5. Material to be supplied free of cracks.

2.3.6. Material to have true, straight, and unbroken edges. G. Material to be within 3/16 inch of the specified width.

2.3.7. Glass beads must be strongly bonded and not easily removed by traffic wear.

2.3.8. Material must meet the following requirements:

2.3.8.1. Color:

a. White No. 37875 per Fed. Std. 595.

b. Yellow No. 33538 per Fed. Std. 595.

c. Daylight Reflectance 75% (White): ASTM 1347.

d. Daylight Reflectance 45% (Yellow): ASTM 1347.

2.3.8.2. Color Retention: After 500 hours of exposure using a cycle of 8 hours ultra-violet light at 60°C. and 4 hours condensation at 40°C according to ASTM G 53.

a. Daylight Reflectance 70% (White): ASTM 1347

b. Daylight Reflectance 40% (Yellow): ASTM 1347

2.3.8.3. Retroreflectance (White):

a. Observation Angle: 0.2 0.5

Specific Luminance:	550	380

b. Per ASTM D 4061 (White)

2.3.8.4. Retroreflectance (Yellow):

a. Observation Angle:	0.2	0.5
Specific Luminance	410	250

b. Per ASTM D 4061 (Yellow)

2.3.8.5. Wear Index: Less than 10% of beads should be lost by pop out. Predominant failure mode shall be wear down of the beads. Federal test Method 141-6192.1 using a Taber Abrader with CS-17 wheel and2.2 pounds load, inspected after 200 cycles.

2.3.8.6. Adhesion: 1 pound/inch of width 50°,75°, 115°F per ASTM D 1000 and ASTM D 4505.

2.3.8.7. Tensile Strength: 100 psi 6 x 1 inch specimen per ASTM D 638 pull10 to 12 inch/minute@ 78.4 _!3.6°F.

2.3.8.8. Elongation: 75% minimum per ASTM D 638.

2.3.8.9. Skid Resistance: 45 BPN (British Portable Skid Tester) per ASTM E303.

2.4. SOURCE QUALITY CONTROL

2.4.1. Provide test and inspection reports required of the Manufacturer.

2.4.2. Inspect material shipping lists to verify type, class, thickness and marking information required by the Standard for paint and thermoplastic markings.

PART 3. WORKMANSHIP

3.1. EQUIPMENT

3.1.1. Airless spray-type marking equipment, compatible with waterborne paint, and capable of providing a uniform wet film thickness of 15 ± 2 mils.

3.1.2. Equipment for glass bead application must distribute the beads uniformly and at the appropriate application rate according to the speed of the distributing equipment.

3.1.3. Equipment for application of thermoplastic markings must conform to the recommendations of the manufacturer.

3.2. EXAMINATIONS

3.2.1. Verify that pavement preparation work is complete prior to painting operations.

3.2.2. Verify paint delivered to the site meet the requirements of the Contract Documents.

3.2.3. Verify Traffic Control Plan is prepared for painting operation per Section 1010- Construction Traffic Control.

3.2.4. Verify pavement has had cure time exceeding 7 days.

3.2.5. Verify size and dimension of pre-formed thermoplastic markings.

3.3. PAINT APPLICATION

3.3.1. Pavement surface must be clean and thoroughly dry.

3.3.2. Ambient air temperature must be above 50°F.

3.3.3. Paint stripes to be uniform and free of erratic waves.

3.3.4. Width and location of marking to be as designated in the Contract Documents and be within a tolerance of 5%.

3.3.5. Paint stripes must not deviate from the intended alignment by more than2 inches in 100 feet.

3.3.6. Apply paint in accordance with the manufacturer's recommendations.

3.3.7. Apply painted pavement markings (school crosswalk text, RR crossings, tum arrows, etc.) using an approved template.

3.3.8. Mix paint thoroughly prior to application.

3.3.9. Do not thin paint.

3.3.10. Apply paint at a rate of not more than 100 square feet/gallon.

3.3.11. Apply glass beads immediately following the application of paint in such a manner as to provide good adhesion and reflection.

3.3.12. Apply glass beads at a rate of 6 pounds/gallon.

3.3.13. All pavement markings to conform to the MUTCD.

3.3.14. If paint is unagitated for a period greater than 15 minutes, thoroughly agitate until the mixture is homogeneous prior to continuance of application.

3.4. THERMOPLASTIC PAVEMENT MARKING APPLICATION

3.4.1. Properly clean and prepare surface.

3.4.2. Confirm size and dimension of pre-formed marking.

3.4.3. Confirm marking location.

3.4.4. Apply pavement markings in conformance with the manufacturer's recommendations.

PART 4. MEASUREMENT AND PAYMENT

4.1. Use one or more of the following bid items as designated in the Bid Schedule. Include all labor, materials and equipment required to place permanent pavement markings. If not indicated in the Bid Schedule, pavement markings are considered incidental to other bid items.

4.1.1. Painted Pavement Markings:

4.1.1.1.	Painted Pavement Markings, “BUS ONLY”	EACH
4.1.1.2.	Painted Pavement Markings, STOP bar	EACH
4.1.1.3.	Painted Pavement Markings, Crosswalk Striping	EACH
4.1.1.4.	Painted Centerline Double Striping	Linear Feet
4.1.1.5.	Painted Curb with text	Linear Feet
4.1.1.6.	Painted Miscellaneous 4” Pavement Striping	Linear Feet

4.1.2. Thermoplastic Pavement Markings:

4.1.2.1.	Thermoplastic Pavement Markings, “BUS ONLY”	EACH
4.1.2.2.	Thermoplastic Pavement Markings, STOP bar	EACH
4.1.2.3.	Thermoplastic Pavement Markings, Crosswalks	EACH
4.1.2.4.	Thermoplastic Centerline Double Striping	Linear Feet
4.1.2.5.	Thermoplastic Pavement Markings, 12” Bus Lane Striping	Linear Feet

END OF SECTION

SECTION 24 – SELECTIVE DEMOLITION

PART 1. GENERAL

1.1. SUMMARY

1.1.1. This Section includes demolition and removal of the following:
1.1.1.1. Selected portions of a building or structure.
1.1.1.2. Selected site elements.
1.1.1.3. Repair procedures for selective demolition operations.

1.2. DEFINITIONS

1.2.1. **Remove**: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

1.2.2. **Remove and Salvage**: Detach items from existing construction and store and deliver them to the site ready for reuse.

1.2.3. **Remove and Reinstall**: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

1.2.4. **Existing to Remain**: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3. MATERIALS OWNERSHIP

1.3.1. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain on the site property, demolished materials shall become Contractor's property and shall be removed from project site.

1.4. SUBMITTALS

1.4.1. Proposed Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate. Include measures for the following:
1.4.1.1. Dust control.
1.4.1.2. Noise control.

1.4.2. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.

1.4.3. Pre-demolition Photographs or Videotape: Document existing conditions of adjoining construction and site improvements adjacent to demolition operations. Submit photographs and/or videotapes taken in the presence of the County's Representative. Submit before Work begins.

1.4.4. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.5. QUALITY ASSURANCE

1.5.1. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for the Project.

1.5.2. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.5.3. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5.4. Pre demolition Conference: Conduct conference at Project site. Review pre demolition condition documentation.

1.6. PROJECT CONDITIONS

1.6.1. The public will occupy all or portions of buildings immediately adjacent to selective demolition area. Conduct selective demolition so the public's operations will not be disrupted. Provide not less than 72 hours' notice to the Manager and building managers of activities that will affect the building's operations.

1.6.2. Maintain safe access to existing walkways, corridors, and other adjacent occupied or used facilities.

1.6.2.1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

1.6.3. The County assumes no responsibility for condition of areas to be selectively demolished.

1.6.3.1. Conditions existing at time of inspection for bidding purpose will be maintained by the State as far as practical.

1.6.4. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1.6.4.1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the Manager.

1.6.5. Storage or sale of removed items or materials on-site will not be permitted.

1.6.6. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1.6.6.1. Maintain fire-protection facilities in service during selective demolition operations.

1.7. WARRANTY

1.7.1. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2. PRODUCTS

2.1. REPAIR MATERIALS

2.1.1. Use repair materials identical to existing materials.

2.1.1.1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

2.1.1.2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3. EXECUTION

3.1. EXAMINATION

3.1.1. Verify that utilities have been disconnected and capped.

3.1.2. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

3.1.3. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

3.1.4. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to the Manager.

3.2. UTILITY SERVICES

3.2.1. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.

3.2.2. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by the Manager and the authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to the Manager and to authorities having jurisdiction.

3.2.2.1. Provide at least 48 hours' written notice to the Manager and authorities having jurisdiction if shutdown of service is required during changeover.

3.2.3. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.

3.2.3.1. Arrange to shut off indicated utilities with utility companies.

3.2.3.2. If utility services are required to be removed, relocated, or abandoned, provide temporary utilities before proceeding with selective demolition that bypass area of selective demolition and that maintain continuity of service to other parts of building.

3.2.3.3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.2.4. Utility Requirements: Refer to utility authority for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing by the utility authority.

3.3. PREPARATION

3.3.1. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, roads, walks, walkways, and other adjacent occupied and used facilities.

3.3.1.1. Do not close or obstruct roads, walks, walkways, or other adjacent occupied or used facilities without permission from the Manager and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.3.1.2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

3.3.1.3. Protect existing site improvements, appurtenances, and landscaping to remain.

3.3.2. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

3.3.3. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather-tight enclosure for building exterior.

3.3.4. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

3.3.5. Temporary Shoring: Provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4. POLLUTION CONTROLS

3.4.1. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

3.4.1.1. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.

3.4.2. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3.4.2.1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

3.4.3. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.5. SELECTIVE DEMOLITION

3.5.1. General: Demolish and remove existing construction only to the extent required by new construction, including excavation to depth allowing for preparation of the finished surface, as indicated in the Contract Documents. Use methods required to complete the Work within limitations of governing regulations.

3.5.1.1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.

3.5.1.2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3.5.1.3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch portable fire-suppression devices during flame-cutting operations.

3.5.1.4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

3.5.2. Existing Facilities: Comply with building manager's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries and other building facilities during selective demolition operations.

3.5.3. Removed and Salvaged Items:

3.5.3.1. Clean salvaged items.

3.5.3.2. Pack or crate items after cleaning. Identify contents of containers.

3.5.3.3. Store items in a secure area until delivery to the site.

3.5.3.4. Transport items to the Contractor’s storage area.

3.5.3.5. Protect items from damage during transport and storage.

3.5.4. Removed and Reinstalled Items:

3.5.4.1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.

3.5.4.2. Pack or crate items after cleaning and repairing. Identify contents of containers.

3.5.4.3. Protect items from damage during transport and storage.

3.5.4.4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5.5. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Manager, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6. PATCHING AND REPAIRS

3.6.1. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

3.6.2. Patching: Comply with Section 5 - Cutting and Patching."

3.6.3. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

3.6.3.1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.

3.6.4. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.6.5. Floors and Walls: Where walls or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

3.6.6. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7. DISPOSAL OF DEMOLISHED MATERIALS

3.7.1. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

3.7.2. Burning: Do not burn demolished materials.

3.7.3. Disposal: Transport demolished materials off the State's property and legally dispose of them.

3.8. BASIS OF PAYMENT

Pay Item	Basis
Selective Demolition	As identified in the Schedule of Items where Selective Demolition is required.

END OF SECTION

SECTION 25 – FINISHED GRADING

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Final grade topsoil and re-seeding or sod placement.

1.2. RELATED SECTIONS

1.2.1. Section 8 – Aggregate Materials

1.2.2. Section 16 – Excavation

PART 2. PRODUCTS

2.1. MATERIAL

2.1.1. Granular Fill, ¾"(-), per Section 8

2.1.2. Topsoil: Existing on site from areas to be excavated, or imported as required.

2.1.3. Seed Mix: as approved by the Engineer.

2.1.4. Sod: as approved by the Engineer.

PART 3. EXECUTION

3.1. EXAMINATION

3.1.1. Verify substrate base has been contoured and compacted.

3.2. SUBSTRATE PREPARATION

3.2.1. Eliminate uneven areas and low spots.

3.2.2. Remove debris, roots, branches, stones in excess of 3/4 inch in size. Remove subsoil contaminated with petroleum products.

3.2.3. Scarify subgrade to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment is used for hauling and spreading topsoil and has compacted subsoil.

3.3. PLACING TOPSOIL

3.3.1. Place topsoil in areas where seeding is required. Spread evenly existing topsoil stockpiled on site at a consistent minimum depth of 6". Notify Engineer prior to applying topsoil if there is insufficient topsoil from stockpile. Place topsoil in dry weather.

3.3.2. Fine grade topsoil eliminating rough or low areas. Maintain profiles and contour of subgrade.

3.3.3. Remove roots, weeds, rocks and foreign material while spreading.

3.3.4. Manually spread topsoil close to trees to prevent damage.

3.3.5. Lightly compact by rolling placed topsoil.

3.3.6. Leave stockpile area and site clean and raked.

3.4. TOLERANCES

3.4.1. Top of Topsoil: plus or minus 1/2 inch.

3.5. PROTECTION

3.5.1. Protect existing structures, utilities, signs, lawn and trees to remain. See Section 10.

3.6. METHOD OF MEASUREMENT

3.6.1. Topsoil: Measurement for placing topsoil shall be on a square yard basis. Work shall include placing topsoil, including all incidental and related work, materials, and labor.

3.6.2. Seeding or Sod: Measurement for seeding or placing sod shall be on a square yard basis. Work shall include seeding or sod, including all incidental and related work, materials, and labor

3.7. BASIS OF PAYMENT

PAY ITEM	PAY UNIT
Topsoil	Square Yard
Seeding or Sod	Square Yard

END OF SECTION

SECTION 26 – EXTERIOR CAST-IN-PLACE CONCRETE

PART 1. GENERAL

1.1. SECTION INCLUDES

1.1.1. Cast-in-place concrete for exterior walks, patios, stairs, retaining walls, curbs, gutters, and other miscellaneous site features.

1.2. RELATED SECTIONS

1.2.1. Section 8 - Aggregates.

1.3. REFERENCES

1.3.1. ACI 301 -- Structural Concrete for Buildings

1.3.2. ACI 302 -- Guide for Concrete Floor and Slab Construction

1.3.3. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.

1.3.4. ACI 305R - Hot Weather Concreting.

1.3.5. ACI 306R - Cold Weather Concreting.

1.3.6. ACI 308 - Standard Practice for Curing Concrete.

1.3.7. ACI 318 -- Building Code Requirements for Reinforced Concrete.

1.3.8. ACI 347 – Guide to Formwork for Concrete

1.3.9. ASTM A185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

1.3.10. ASTM A497 – Standard Spec. for Steel Welded Wire Reinforcement, Deformed, for Concrete.

1.3.11. ASTM A615 – Standard Spec. for Deformed/Plain Carbon-Steel Bars for Concrete Reinforcement.

1.3.12. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.

1.3.13. ASTM C33 – Standard Specification for Concrete Aggregates.

1.3.14. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

1.3.15. ASTM C42 – Standard Test Method for Obtaining/Testing Drilled Cores of Concrete

1.3.16. ASTM C94 – Standard Specification for Ready-Mixed Concrete

1.3.17. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete

1.3.18. ASTM C 150 - Standard Specification for Portland Cement

1.3.19. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete

1.3.20. ASTM C173 – Standard Test Method of Air Content of Freshly Mixed Concrete-Volumetric Method

1.3.21. ASTM C231 – Standard Test Method of Air Content of Freshly Mixed Concrete-Pressure Method

1.3.22. ASTM C260 – Standard Specification for Air Entraining Admixtures for Concrete

1.3.23. ASTM C309 – Standard Spec. for Liquid Membrane-Forming Compounds for Curing Concrete

1.3.24. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete

1.3.25. ASTM C618 – Standard Spec. for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete

1.3.26. ASTM C881 – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

1.3.27. ASTM C1064 – Std. Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete

1.3.28. ASTM C1116, Standard Specification for Fiber Reinforced Concrete.

1.3.29. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

1.3.30. ASTM D6690 – Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

1.3.31. ASTM E1155 – Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness

1.3.32. Concrete Reinforcing Steel Institute (CRSI) "Placing Reinforcing Bars"

1.3.33. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice"

1.4. SUBMITTALS

1.4.1. General: Submit the following according to Conditions of the Contract and General Provisions:

1.4.2. Laboratory test reports for concrete materials and mix design test, or material certificates in-lieu of material laboratory test reports, when permitted by Engineer. Manufacturer and Contractor shall sign material certificates certifying each material item meets, or exceeds, specified requirements. Provide certification from admixture manufacturers that chloride content complies with specifications.

1.4.3. Product data for proprietary material and items including reinforcement and forming accessories, admixtures, patching compounds, water stops, joint systems, curing compounds, dry-shake finish materials, and others as requested by the Engineer.

1.4.4. Shop drawings for reinforcement detailing, fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 'Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.

1.4.5. Minutes, supplemental information, etc. from the pre-bid conference changing proposed construction from that shown on the construction drawings.

1.4.6. Samples: Submit one 18-inch long sample of expansion/contraction joint material.

1.5. PROJECT RECORD DOCUMENTS

1.5.1. General: Submit the following according to Conditions of the Contract and General Provisions:

1.5.2. Accurately record actual locations of constructed development plan features, embedded utilities, and components concealed from view.

1.6. QUALITY ASSURANCE

1.6.1. Perform Work in accordance with the following codes, specifications, and standards, except where more stringent requirements are indicated on the construction documents:
1.6.1.1. ACI 301, "Specifications for Structure Concrete for Buildings."
1.6.1.2. ACI 318, "Building Code Requirements for Reinforced Concrete."
1.6.1.3. CRSI "Manual of Standard Practice."
1.6.1.4. ACI 305R, "Hot Weather Concreting"
1.6.1.5. ACI 306R, "Cold Weather Concreting

1.6.2. Maintain at least one copy of construction documents, codes, specifications, and standards on site.

1.6.3. Acquire cement and aggregate from same source for all work.

1.6.4. Materials and installed work may require testing and re-testing at any time during progress of the Work. Tests, including re-testing of rejected materials for installed Work, shall be done at Contractor's expense.

1.7. COORDINATION

1.7.1. Pre-construction conference: Conduct conference at project site at least 7 days prior to beginning concrete work. Conduct the meeting to review detailed requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Require representatives of each entity directly concerned with cast-in-place concrete to attend conference, including, but not limited to, the following:

1.7.1.1. Contractor's superintendent
1.7.1.2. Responsible party for field quality control
1.7.1.3. Ready-mix concrete producer
1.7.1.4. Concrete subcontractor

PART 2. PRODUCTS

2.1. FORM MATERIALS

2.1.1. Forms: Plywood, steel, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Forms shall provide continuous, straight, and smooth exposed surfaces. Use straight forms, free of distortion and defects. Furnish in largest practical size to minimize number of joints, and to conform to proposed joint system indicated on drawings.

2.1.2. FORMWORK ACCESSORIES

2.1.2.1. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and spalling of concrete upon removal.

2.1.2.2. Form Release Agent: Provide commercial formulation form release agent with a maximum of
350-g/L volatile organic compounds (VOC's) that will not bond with, stain, absorb moisture from, or adversely affect concrete surfaces. The release agent shall not impair subsequent treatments of concrete surfaces.

2.1.2.3. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete. Provide units that will leave not metal closer than 1-1/2 inches to the plane of the exposed concrete surface. Form ties shall not leave holes larger than one-inch in diameter in the concrete surface when removed.

2.2. REINFORCEMENT

2.2.1. REINFORCEMENT MATERIALS

2.2.1.1. Welded Steel Wire Reinforcement: ASTM A185 or ASTM A497, Deformed Type; in coiled rolls; unfinished.

2.2.1.2. Glass Fiber: Fibers specifically designed to be compatible with the aggressive alkaline environment of portland cement based composites or fibers with a history of successful use in portland cement based composites that has been modified to be compatible with the fiber.

2.2.1.3. Dowels: ASTM A615; 40 ksi yield grade, plain steel.

2.2.1.4. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars.

2.2.2. REINFORCEMENT ACCESSORY MATERIALS

2.2.2.1. Tie Wire: Minimum 16 gage annealed type.

2.2.2.2. Supports for Reinforcement: Includes chairs, bolsters, bar supports, spacers, and other devices for spacing supporting, and fastening reinforcing bars and welded wire fabric in place sized and shaped for strength and support of reinforcement during concrete placement conditions. Use steel wire bar-type supports complying with CRSI specifications. Do not use broken block, brick wood, rocks or other material not specifically made for reinforcing support.

2.2.2.2.1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2.2.2.2.2. For slabs-on-grade and footings, job-site manufactured concrete blocks will be considered equivalent to wire chairs. Use concrete with strength equal to slab or footing concrete.

2.2.2.2.3. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.2.3. REINFORCEMENT FABRICATION

2.2.3.1. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice.

2.2.3.2. Locate reinforcing splices not indicated on drawings, at point of minimum stress.

2.3. CONCRETE MATERIALS

2.3.1. CONCRETE MIX

2.3.1.1. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.

2.3.1.2. Provide concrete to the following criteria. Mix design adjustments may be requested by the Contractor when characteristics of materials, Work conditions, weather, test results, or other circumstances warrant, as accepted by the Engineer: Laboratory test data for revised mix design and strength results must be submitted to, and accepted by, the Engineer before using in Work.

2.3.1.2.1.	Unit	Measurement
2.3.1.2.2.	Compressive Strength (28 day)	3000 psi
2.3.1.2.3.	Slump - Plus or minus 1/2 inch	3 inches.

2.3.1.3. Provide 6% entrained air +/- 1%.

2.3.1.4. Use accelerating admixtures in cold weather only when approved by Engineer. Use of admixtures will not relax cold weather placement requirements.

2.3.1.5. Limit use of fly ash to not exceed 25% of cement content, by weight.

2.3.1.6. Do not use calcium chloride or any admixture containing any chloride ions.

2.3.1.7. Project site mixing is not permitted.

2.3.1.8. Ready-mixed concrete shall comply with ASTM C94, and as specified:

2.3.1.8.1. When air temperature is between 85 degrees Fahrenheit and 90 degrees Fahrenheit, reduce mixing and delivery time from 1-1/2 hours to 75 minutes. When air temperature is above 90 degrees Fahrenheit, reduce mixing and delivery time to 60 minutes.

2.3.1.9. Use set retarding admixtures during hot weather only when approved by Engineer.

2.3.2. CONCRETE MATERIALS

2.3.2.1. Cement: ASTM C150, Type I or Type II– Normal. Cement shall not contain more than 0.60 percent total alkali. Use one brand of cement throughout Work, unless otherwise acceptable to Engineer.

2.3.2.2. Fly Ash: ASTM C618, Type F.

2.3.2.3. Fine and Coarse Aggregates: ASTM C33, and as specified. The maximum size of coarse aggregate shall be one-inch (1"), unless specified otherwise.

2.3.2.3.1. For exposed exterior surfaces, do not use fine or coarse aggregate that contain substances that cause spalling.

2.3.2.3.2. Local aggregates not complying with ASTM C33 that have been shown to produce concrete of adequate strength and durability by special tests, or actual service, may be used when acceptable to Engineer.

2.3.2.3.3. Water: Clean water, not detrimental to concrete, obtained from any source of potable water.

2.3.3. CONCRETE ADMIXTURES

2.3.3.1. General: Provide concrete admixtures that contain not more than 0.1% chloride ions.

2.3.3.2. Air Entrainment Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures. Use air-entrainment admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content as specified.

2.3.3.2.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- Air-Tite, Cormix Construction Chemicals
- Air-Mix or Perma-Air, Euclid Chemical Co.
- Darex AEA or Daravair, W.R. Grace & Co.
- MB-VR or Micro-Air, Master Builders, Inc.
- Sealtight AEA, W.R. Meadows, Inc.
- Sika AER, Sika Corp.

2.3.3.3. Water-Reducing Admixture: ASTM C494, Type A. Use as required for placement and workability. Use in strict compliance with manufacturer's instructions.

2.3.3.3.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- Chemtard, ChemMasters Corp.
- PSI N, Cormix Construction Chemicals
- Eucon WR-75, Euclid Chemical Co.
- WRDA, W.R. Grace & Co.
- Pozzolith Normal or Polyheed, Master Builders, Inc.
- Metco W.R., Metalcrete Industries
- Prokrete-N, Prokrete Industries
- Plastocrete 161, Sika Corp.

2.3.3.4. High-Range Water-Reducing (super-plasticizer) Admixture: ASTM C494, Type F or Type G. Use as required for placement and workability. Use in strict compliance with manufacturer's instructions.

2.3.3.4.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- Super P, Anti-Hydro Co., Inc.
- Cormix 200, Cormix Construction Chemicals
- Eucon 37, Euclid Chemical Co.
- WRDA 19 or Daracem, W.R. Grace & Co.

- Rheobuild or Polyheed, Master Builders, Inc.
- Superslump, Metalcrete Industries
- PSPL, Prokrete Industries
- Sikament 300, Sika Corp.

2.3.3.5. Water-Reducing, Accelerating Admixture: ASTM C494, Type E. Use accelerating admixture in concrete slabs placed at ambient air temperatures below 50 degrees Fahrenheit. Use in strict compliance with manufacturer's instructions.

2.3.3.5.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- Q-Set, Conspect Marketing & Manufacturing Co.
- Lubricon NCA, Cormix Construction Chemicals
- Accelguard 80, Euclid Chemical Co.
- Daraset, W.R. Grace & Co.
- Pozzutec 20, Master Builders, Inc.
- Accel-Set., Metalcrete Industries

2.3.3.6. Water-Reducing, Retarding Admixture: ASTM C494, Type D. Use in strict compliance with manufacturer's instructions.

2.3.3.6.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- PSI-R Plus, Cormix Construction Chemicals
- Eucon Retarder 75, Euclid Chemical Co.
- Daratard-17, W.R. Grace & Co.
- Pozzolith R, Master Builders, Inc.
- Metco W.R., Metalcrete Industries
- Protard, Prokrete Industries
- Plastiment, Sika Corp.

2.3.4. CONCRETE ACCESSORIES

2.3.4.1. Waterstops: Provide bentonite waterstops at construction joints and other joints, as-indicated

2.3.4.1.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

RX 102, American Colloid Co., or approved equal.

2.3.4.2. Water-Based Acrylic Membrane Curing Compound: ASTM C309, Type I, Class B. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.

2.3.4.2.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- Highseal, Conspec Marketing and Manufacturing Co.
- Sealco – VOC, Cormix Construction Chemicals
- Safe Cure and Seal, Dayton Superior Corp.
- Aqua-Cure, Euclid Chemical Co.
- Dress & Seal WB, L&M Construction Chemicals, Inc.
- Masterkure 100W, Master Builders, Inc.

- Vocomp-20, W.R. Meadows, Inc.
- Metcure, Metalcrete Industries
- Stontop CS1, Stonhard, Inc.

2.3.4.3. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

2.3.4.3.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- Aquafilm, Conspec Marketing and Manufacturing Co.
- Eucobar, Euclid Chemical Co.
- E-Con, L&M Construction Chemicals, Inc.
- Confilm, Master Builders, Inc.
- Waterhold, Metalcrete Industries

2.3.4.4. Bonding Agent: Polyvinyl acetate or acrylic base.

2.3.4.4.1. Available Products: Acrylic or Styrene Butadiene, subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- Acrylic Bondcrete, The Burke Co.
- Strongbond, Conspec Marketing and Manufacturing
- Day-Chem Ad Bond, Dayton Superior Corp.
- SBR Latex, Euclid Chemical Co.
- Daraweld C, W.R. Grace & Co.
- Hornweld, A.C. Horn, Inc.
- Everbond, L&M Construction Chemicals, Inc.
- Acryl-Set, Master Builders, Inc.
- Intralok, W.R. Meadows, Inc.
- Acrylpave, Metalcrete Industries
- Sonocrete, Sonneborn-Chemrex
- Stonlock LB2, Stonhard, Inc.
- Strong Bond, Symons Corp.

2.3.4.5. Epoxy Adhesive: ASTM C881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Work requirements.

2.3.4.5.1. Available Products: Subject to compliance with requirements, that may be incorporated in the Work include, but are not limited to:

- Burke Epoxy M.V., The Burke Co.
- Spec-Bond 100, Conspec Marketing and Manufacturing Co.
- Resi-Bond (J-58), Dayton Superior Corp.
- Euco Epoxy System #454 or #620, Euclid Chemical Co.
- Epoxtite Binder 2390, A.C. Horn, Inc.
- Epabond, L&M Construction Chemicals, Inc.
- Concresive Standard Liquid, Master Builders, Inc.
- Rezi-Weld 1000, W.R. Meadows, Inc.
- Metco Hi-Mod Epoxy, Metalcrete Industries

- Sikadur 32 Hi-Mod, Sika Corp.
- Stonset LV5, Stonhard, Inc.
- R-600 Series, Symons Corp.

2.3.4.6. Expansion joint material: "Sealtight Fibre," W.R. Meadows, Inc., conforming to ANSI/ASTM D1751, or approved equal.

2.3.4.7. If hazardous chemicals/particulates are to be used or generated within the project construction area, provide a complete set of Material Safety Data Sheets (MSDSs) to the Engineer.

PART 3. EXECUTION

3.1. EXAMINATION

3.1.1. Verify site conditions are suitable for Work.

3.1.2. Verify lines, levels, and centers before proceeding with Work. Ensure dimensions agree with drawings.

3.1.3. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.1.4. Verify requirements for concrete cover over reinforcement.

3.2. PREPARATION

3.2.1. If applicable, prepare previously placed concrete by cleaning concrete with steel brush and applying bonding agent in accordance with manufacturer's instructions. Use bonding agent where new concrete is placed over existing.

3.2.2. The subgrade shall be brought to a firm, unyielding surface to a width of at least six inches outside the edge of the pavement using compaction methods approved by the Engineer. All soft, spongy, or yielding spots, and all objectionable matter, shall be entirely removed. The space shall be refilled with suitable material and thoroughly compacted. The subgrade shall be thoroughly wet a minimum of 12 hours prior to placing concrete.

3.2.3. Concrete walk shall be constructed on a compacted base of granular fill, as specified in Section 8. The total thickness of the base shall be at least four inches (4") compacted to 95% of the maximum dry density determined in accordance with ASSHTO T99 (Standard Proctor). The base shall be thoroughly wetted prior to placing concrete.

3.2.4. In locations where new concrete is doweled to existing Work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.3. FORMS

3.3.1. Erect and maintain formwork to support loads that might be applied until concrete structure can support such loads. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:

3.3.1.1. Provide Class A tolerances for concrete surfaces exposed to view.

3.3.1.2. Provide Class C tolerances for all other concrete surfaces not noted in 3.3.1.1.

3.3.2. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Bevel work inserts for forming keyways, recesses, and other such forms, for easy removal.

3.3.3. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Locate temporary openings in forms at inconspicuous locations.

3.3.4. Chamfer exposed corners and edges ¾ inch, unless indicated otherwise.

3.3.5. Provide openings in concrete formwork to accommodate work of other trades of Work. Determine size and location of openings from trades providing such items. Accurately place and securely support items built into forms.

3.3.6. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete.

3.3.7. Coat contact surfaces of forms with an approved, non-residual, low-VOC, form-coating compound before placing reinforcement.

3.3.8. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

3.3.8.1. Coat steel forms with a non-staining, rust-preventive material. Rust-stained steel formwork in not acceptable.

3.4. PLACING REINFORCEMENT

3.4.1. Comply with CRSI recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports, and as specified.

3.4.2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

3.4.3. Accurately position support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers subject to approval by Engineer.

3.4.4. Do not use masonry blocks, piles of concrete, or similar means to support and position reinforcing for concrete slabs-on-grade.

3.4.5. Place reinforcement to maintain minimum coverage as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.4.6. Install welded wire reinforcement in lengths as long as practical: Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either directions.

3.5. JOINTS

3.5.1. Locate and install construction joints so they do not impair strength or appearance of the structure, subject to approval by the Engineer.

3.5.2. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicate otherwise.

3.5.3. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

3.5.4. For curbs, place control joints every ten (10) feet, and at the junction of straight curb and radii, and at either end of a driveway, pedestrian drop, or alley section.

3.5.5. Control joints shall be made as called for on the plans, or as approved. For flat work, all panels should be square, or neatly so. The panel length should not exceed 1.5 times the width. The spacing between joints should not exceed thirty (30) times the slab thickness. "L" shaped panels are not permitted. The joint groove should have a depth of ¼ the slab thickness, but not less than one (1) inch. Joints in exterior slabs shall be continuous through control joints.

3.6. INSTALLATION OF EMBEDDED ITEMS

3.6.1. Set and build into formwork anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

3.6.2. For slabs, set edge forms, bulkheads, and intermediate screed strips to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7. PLACING CONCRETE

3.7.1. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

3.7.2. Before placing concrete, inspect and complete formwork installation, reinforcement, and items to be embedded or cast in. Notify other trades in sufficient time to permit installation of their work needing completion before concrete placement. Notify the Engineer at least 24 hours prior to commencement of concrete placement.

3.7.3. Ensure reinforcement, inserts, and embedded parts are not disturbed during concrete placement.

3.7.4. Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.

3.7.5. Deposit concrete continuously, or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes or weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation of concrete materials at its final location.

3.7.6. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches, and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

3.7.6.1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.

3.7.6.2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least six inches (6") into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items, without causing mix to segregate.

3.7.7. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.

3.7.7.1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.

3.7.7.2. Bring slab surfaces to correct level with a straight-edge and strike-off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3.7.7.3. Maintain reinforcing in proper position on chairs during concrete placement.

3.7.7.4. For walks, the concrete shall then be allowed to harden properly before jointing, edging, and brooming is completed. Contraction joints shall be tooled into the concrete ever six feet (6'), shall be ¼ inch minimum depth, and shall be perpendicular to the direction of the walk. All joints shall then be edged with a ¼-inch radius edger and the walk edges shall be tooled with a ½-inch radius edger. After edging and jointing, the concrete shall be smoothed with wood or metal hand floats

3.7.8. Placing Curbs and Gutters: Curbs and gutters shall be finished to line and grade as specified.

3.7.9. Cold-Weather Placement: Comply with provisions of ACI 306, and as follows. Protect concrete work from physical damage, or reduced strength that could be caused by frost, freezing actions, or low temperatures.

3.7.9.1. When air temperature has fallen to, or is expected to fall below, 40 degrees Fahrenheit, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees Fahrenheit, and not more than 80 degrees Fahrenheit, at point of placement.

3.7.9.2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade, on subgrade containing frozen materials, or frosted/frozen metal decking.

3.7.9.3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

3.7.9.4. Maintain concrete on metal deck temperature above 55 degrees Fahrenheit for a minimum period of 48 hours.

3.7.10. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, placement of concrete shall comply with ACI 305, and as specified.

3.7.10.1. Cool materials before mixing to maintain concrete temperature at time of placement below 90 degrees Fahrenheit. Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete mix shall be Contractor's discretion.

3.7.10.2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will exceed the ambient air temperature immediately before embedding concrete.

3.7.10.3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.

3.7.10.4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as accepted by Engineer.

3.7.11. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

3.8. FINISHING

3.8.1. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.

3.8.2. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar

system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

3.8.3. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8.4. Slab Finishes:

3.8.4.1. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.

3.8.4.1.1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

3.8.4.2. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.

3.8.4.2.1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a uniform, smooth, granular texture.

3.8.4.3. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.

3.8.4.3.1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E1155. Grind smooth any surface defects that would telegraph through applied floor covering system

3.8.4.4. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

3.8.4.5. Non-Slip Broom Finish: Apply a non-slip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

3.8.4.5.1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

3.8.5. Curbs: Curb top, front face, and other exposed portions shall be thoroughly floated with a moist wooden float to produce a uniform even surface while the concrete is still green. Remove form marks and other irregularities. Round edges of curb with edger.

3.8.6. Walks: Non-slip broom finish, as indicated in 3.8.4.5, perpendicular to direction of walk.

3.9. CONCRETE CURING AND PROTECTION

3.9.1. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures, and mechanical injury. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull-floating, but before power floating and troweling.

3.9.2. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than seven (7) days.

3.9.3. Curing Methods: Cure concrete by curing compound, by moist curing, or by combining these methods, as approved by the Engineer.

3.9.3.1. Provide moisture curing by:

3.9.3.1.1. Keep concrete surface continuously wet by covering with water.

3.9.3.1.2. Use continuous water-fog spray.

3.9.3.2. Apply curing compound on all exposed concrete as follows:

3.9.3.2.1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within two (2) hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Re-coat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9.3.2.2. Use membrane-curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

3.9.4. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period, or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

3.9.5. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.

3.10. REMOVING FORMS

3.10.1. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the Work, may be removed after cumulatively curing at not less than 50 degrees Fahrenheit for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

3.11. RE-USING FORMS

3.11.1. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material shall not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.

3.11.2. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces, except as accepted by Engineer.

3.12. CONCRETE SURFACE REPAIRS

3.12.1. Allow the Engineer to inspect concrete surfaces immediately upon removal of forms. Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements shall be deemed "defective concrete." The repair or replacement of defective concrete will be determined by

the Engineer. Do not patch, fill, touch-up, or repair exposed concrete except upon express direction of Engineer for each individual area.

3.12.2. When acceptable to the Engineer, repair and patch defective areas with cement mortar, as noted below, immediately after removing forms. Honeycomb areas in back of curbs determined not detrimental to the curb by the Engineer need not be patched.

3.12.2.1. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.

3.12.2.1.1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

3.12.2.1.2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

3.12.3. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.

3.12.3.1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.

3.12.4. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

3.12.4.1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycombs, rock pockets, and other objectionable conditions.

3.12.4.2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.

3.12.4.3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Engineer.

3.12.5. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

3.12.6. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has

dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

3.12.7. Perform structural repairs only with prior approval of Engineer for method and procedure, using specified epoxy adhesive and mortar.

3.12.8. Repair methods not specified above may be used, subject to acceptance of Engineer.

3.13. QUALITY CONTROL TESTING DURING CONSTRUCTION

3.13.1. The Contractor shall employ a testing agency to perform tests and to submit test reports in accordance with ACI 301 and the General Provisions of the Work. Provide free access to work and cooperate with appointed inspectors.

3.13.2. Sampling and testing for quality control during concrete placement shall include the following, unless directed otherwise by the Engineer:

3.13.2.1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94

3.13.2.1.1. Slump: ASTM C143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency appears to have changed.

3.13.2.1.2. Air Content: ASTM C173; volumetric method for lightweight or normal weight concrete; ASTM C231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.

3.13.2.1.3. Concrete Temperature: ASTM C1064; one test hourly when air temperature is 40 degrees Fahrenheit and below, when 80 degrees Fahrenheit and above, and one test for each set of compressive-strength specimens (cylinders) taken.

3.13.2.1.4. Compression Test Specimen (Cylinder): ASTM C31; one set of three standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens, except when field-cured test specimens are required.

3.13.2.1.5. Compressive-Strength Test: ASTM C39; one set for each day's pour exceeding five cubic yards (5 c.y.) plus additional sets for each 50 cubic yards more than the first 25 cubic yards of each concrete class placed in any one day; one specimen tested at 7 days, one tested at 28 days, and one specimen retained in reserve for later testing, if required.

3.13.2.2. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

3.13.2.3. When frequency of testing will provide fewer than five strength tests for any given class of concrete, conduct testing from at least five randomly selected batches, or from each batch if few than five are used.

3.13.2.4. When total quantity of any given class of concrete is less than 50 cubic yards, Engineer may waive strength testing if adequate evidence of satisfactory strength is provided.

3.13.2.5. When strength of field-cured cylinders is than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

3.13.2.6. Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below compressive strength by more than 500 psi.

3.13.3. Test results will be reported in writing to Engineer within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in Work, design compressive

strength at 28 days, concrete mix materials and proportions, compressive breaking strength and type of break for both 7-day and 28-day tests.

3.13.4. Non-destructive Testing: Impact hammer, sonoscope, or other non-destructive devices may be permitted, but shall not be used as the sole basis for acceptance or rejection.

3.13.5. Additional Tests: The testing agency shall make additional tests, as directed by the Engineer, of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the Work. The testing agency may conduct tests to determine adequacy of concrete by cored cylinders, complying with ASTM C42, or by other methods, as approved by Engineer.

3.14. SCHEDULE

3.14.1. Place miscellaneous concrete per construction drawings.

3.15. GUARANTEE

3.15.1. The work shall be guaranteed for the time period outlined in the Conditions of the Contract and General Provisions.

PART 4. METHOD OF MEASUREMENT AND BASIS OF PAYMENT

4.1. Place Miscellaneous Concrete: Measurement and payment for placement of miscellaneous exterior cast-in-place concrete shall be on a per cubic yard basis. For concrete flatwork, measurement and payment may be on a per square yard basis, with depth of concrete specified. For linear concrete work, such as curbs and gutters, measurement and payment may be on a per linear foot basis. Payment shall be full compensation for materials, hauling, and placement of concrete, and all incidental and related work, materials, and labor.

Pay Item	Pay Unit
Place Miscellaneous cast-in-place concrete	cubic yard (cy)
Place cast-in-place concrete flatwork (depth)	square yard (sy)
Place Curb and Gutter cast-in-place concrete	linear foot (lf)

END OF SECTION