Montana Fish, Wildlife & Parks

SPECIFICATIONS FOR WORK
SPECIAL PROVISIONS

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1. PROJECT DESCRIPTION

The Project involves construction work associated with:

Three Mile WMA 2022 Wheelbarrow Creek Bridge and Road Project
Fish, Wildlife & Parks (FWP) project # 7551307
Located near Florence in Ravalli, MT

The project generally includes grading 1.7 Miles of road, install new bridge at Wheelbarrow creek crossing, install 18" CMP. Remove and dispose of 2 culverts at locations shown on the plans, and incidentals.

PROJECT RELATED CONTACTS

Owner:
Montana FWP
1420 E. Sixth Ave.
PO Box 200701
Helena, MT 59620-0701

FWP Project Representative:
Jamie Mongoven, P.E.
FWP Project Manager
1522 9th Avenue
Helena, MT 59620
406-841-4011 (wk)
406-439-4502 (cell)
406-841-4004 (fax)

2. SITE INSPECTION

All Bidders should satisfy themselves as to the construction conditions by personal examination of the site described in this document. Bidders are encouraged to make any investigations necessary to assess the nature of the construction and the difficulties to be encountered, see General Conditions, Article 3.

3. SOILS INFORMATION

Geotechnical investigation work has not been done for this Project. It is the responsibility of the Bidders to conduct all investigations and determine the soil type and digging conditions that may be encountered with this Project prior to bid preparation, see General Conditions, Article 3.
Geotechnical investigation work has been completed for this Project. It is the responsibility of the Bidders to review and interpret all investigations, findings, and reports made part of this contract prior to bid preparation, see General Conditions, Article 3.

4. PROJECT REPRESENTATIVE, INSPECTIONS, AND TESTING

The Contractor's work will be periodically tested and observed to ensure compliance with the Contract Documents. Complete payment will not be made until the Contractor has demonstrated that the work is complete and has been performed as required. If the Project Representative detects a discrepancy between the work and the requirements of the Contract Documents at any time, up to and including final inspection, such work will not be completely paid for until the Contractor has corrected the deficiency, see General Conditions, Article 9.

The Project Representative will periodically monitor the construction of work to determine if the work is being performed in accordance with the contract requirements. The Project Representative does not have the authority or means to control the Contractor's methods of construction. It is, therefore, the Contractor's responsibility to utilize all methods, equipment, personnel, and other means necessary to assure that the work is installed in compliance with the Drawings and Specifications, and laws and regulations applicable to the work. Any discrepancies noted shall be brought to the Contractor's attention, who shall immediately correct the discrepancy. Failure of the Project Representative to detect a discrepancy will not relieve the Contractor of his ultimate responsibility to perform the work as required, see General Conditions, Article 3.

The Contractor shall inspect the work as it is being performed. Any deviation from the Contract requirements shall be immediately corrected. Prior to any scheduled observation by the Project Representative, the Contractor shall again inspect the work and certify to the Project Representative that he has inspected the work and it meets the requirements of the Contract Documents. The Project Representative may require uncovering of work to verify the work was installed according to the contract documents, see General Conditions, Article 12.

The work will be subject to review by the Project Representative. The results of all such observations, and all contract administration, shall be directed to the Contractor only through the Project Representative.

4.1 Services Required by the Contractor. The Contractor shall provide the following services:

a. Any field surveys to establish locations, elevations, and alignments as stipulated on the Contract Documents. FWP reserves the right to set preliminary construction staking for the project. The Contractor is responsible to notify FWP for any construction staking discrepancies.

b. Preparation and certification of all required shop drawings and submittals as described in the General Conditions, Article 3.

c. All testing requiring the services of a laboratory to determine compliance with the Contract Documents shall be performed by an independent commercial testing laboratory acceptable to the Project Representative. The laboratory shall be staffed with experienced technicians properly equipped, and fully qualified to perform the tests in accordance with the specified standards.

d. Preparation and submittal of a construction schedule, including submittals, see General Conditions, Article 3. The schedule shall be updated as required, as defined in the Contract Documents.

e. All Quality Control testing as required by the Contractor's internal policies.

f. All Quality Assurance testing and/or re-testing as stated in the Contract Documents, see General Conditions, Article 13.

4.2 Services Provided by the Owner. The Owner shall provide the following services at no cost to the Contractor except as required for retests as defined in the Contract Documents.

a. The Project Representative may check compaction of backfill and surfacing courses using laboratory testing submittal information supplied by the Contractor. These tests are to determine if compaction requirements are being fulfilled in accordance with the Contract Documents. It is ultimately the responsibility of the Contractor to ensure that this level of compaction is constant and met in all locations.

b. Any additional Quality Assurance testing deemed appropriate by the Owner, at the Owner's expense.

5. ENGINEERING INTERPRETATIONS

Timely Engineering decisions on construction activities or results have an important bearing on the Contractor's schedule. When engineering interpretation affects a plan design or specifications change, it should be realized that more than 24 hours may be required to gain the necessary Owner participation in the decision process including time for formal work directive, or change order preparation as required.

6. REJECTED WORK

Any defective work or nonconforming materials or equipment that may be discovered at any time prior to the expiration of the warranty period, shall be removed and replaced with work or materials conforming to the provisions of the Contract Documents, see General Conditions, Article 12. Failure on the part of the Project Representative to condemn or reject bad or inferior work, or to note nonconforming materials or equipment on the Contractors submittals, shall not be construed to imply acceptance of such work. The Owner shall reserve and retain all its rights and remedies at law against the Contractor and its Surety for correction of any and all latent defects discovered after the guarantee period (MCA 27-2-208).

Only the Project Representative will have the authority to reject work which does not conform to the Contract Documents.

7. UTILITIES

The exact locations of existing utilities that may conflict with the work are not precisely known. It shall be the Contractor's responsibility to contact the owners of the respective utilities and arrange for field location services. **One Call Locators, 1-800-424-5555**

The Contract Documents may show utility locations based on limited field observation and information provided to the Project Representative by others. **The Project Representative cannot guarantee their accuracy.** The Contractor shall immediately notify the Project Representative of any discrepancies with utility locations as shown on the Contract Drawings and/or their bury depths

that may in any way affect the intent of construction as scoped in these specifications.

There will be no separate payment for exploratory excavation required to locate underground utilities.

7.1 Notification. The Contractor shall contact, in writing, all public and private utility companies that may have utilities encountered during excavation. The notification includes the following information:

a. The nature of the work that the Contractor will be performing.
b. The time, date and location that the Contractor will be performing work that may conflict with the utility.
c. The nature of work that the utility will be required to perform such as moving a power pole, supporting a pole or underground cable, etc.
d. Requests for field location and identification of utilities.

A copy of the letter of notification shall be provided to the Project Representative. During the course of construction, the Contractor shall keep the utility companies notified of any change in schedule, or nature of work that differs from the original notification.

7.2 Identification. All utilities that may conflict with the work shall be the Contractor's responsibility to locate before any excavation is performed. Field markings provided by the utility companies shall be preserved by the Contractor until actual excavation commences. All utility locations on the Drawings should be considered approximate and should be verified in the field by the Contractor. The Contractor shall also be responsible for locating all utilities that are not located on the Drawings.

Utilities are depicted on the Contract Documents in accordance with their achieved “Quality Levels,” as defined in the American Society of Civil Engineer’s Document, ASCE 38, “Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data.” Reliance upon these data for risk management purposes during bidding does not relieve the Contractor, or Utility Owner from following all applicable utility damage prevention statutes, policies, and/or procedures during construction. It is important that the Contractor investigates and understands the scope of work between the project Owner and Engineer regarding scope of limits of the utility investigations leading to these utility depictions. Definitions of Quality Levels are described as follows:

a. "QUALITY LEVEL A" – (QLA): LOCATING THROUGH EXCAVATION. QLA data are highly accurate and are obtained by surveying an exposed utility. As such, both horizontal and vertical data are recorded. Survey accuracies are typically set at 15mm (1/2-inch) vertically, and to project survey standards horizontally (typically the same as for topography features), although these survey accuracies and precisions are generally left to the owner to specify in a scope of work. In addition to the applicable standard of care and any other additional standards imposed by commercial indemnity clauses, the accuracy of these location data is also typically guaranteed. Other data typically characterized include material type, surface elevation,

utility size/capacity, outside dimensions, and configurations, soil type, and utility condition.

b. "QUALITY LEVEL B" – (QLB): DESIGNATING. QLB information is obtained through the application of appropriate surface geophysical methods to identify the existence and approximate horizontal location of utilities (a utility's "designation") within the project limits, followed by survey, mapping, and professional review of that designation. Underground utilities are identified by interpretation of received signals generated either actively or passively, and through correlating these received signals with visible objects (QLC) and record data (QLD) to determine function. Designated utilities that can't be identified are labeled as "unknowns." Although approximate has no accuracy associated with it, generally the locations are within inches rather than feet. The more utility congested the area or the deeper the utilities, the less likely it is that the designations will achieve that accuracy. These designations are then surveyed to project accuracies and precisions, typically third-order accuracy similar to other topography features. Note that surveying existing one-call marks does not lead to QLB data, since the genesis of the marks was not under the direct responsible charge of the professional certifying the QLB depictions, and one-call generally does not address unknown utilities, privately owned utilities, utilities without records, abandoned utilities, and so on. Nor does the professional have knowledge of the field technician's qualifications, training, and level of effort.

c. "QUALITY LEVEL C" – (QLC): SURFACE VISIBLE FEATURE SURVEY. QLC builds upon the QLD information by adding an independent detailed topography site survey for surface-visible appurtenances of subsurface utilities including but not limited to fire hydrants, valves, risers, and manholes. Professional judgment is used to correlate the QLD data to the surveyed features, thus increasing the reliability of both utility location and existence. It is a function of the professional to determine when records and features do not agree and resolve discrepancies. This may be accomplished by depiction of a utility line at quality level D, effectively bypassing or disregarding (but still depicting) a surveyed structure of unknown origin. Additional resolution may result from consultation with utility owners.

d. "QUALITY LEVEL D" – (QLD): EXISTING RECORDS RESEARCH. QLD is the most basic level of information. Information is obtained from the review and documentation of existing utility records, verbal accounts, and/or one-call markings (to determine the existence of major active utilities and their approximate locations).

7.3 Removal or Relocation of Utilities. All electric power, street lighting, gas, telephone,

and television utilities that require relocation will be the responsibility of the utility owner. A request for extending the specified contract time will be considered if utility owners cause delays.

7.4 Public Utilities. Water, sewer, storm drainage, and other utilities owned and operated by the public entities shall, unless otherwise specifically requested by the utility owner, be removed, relocated, supported or adjusted as required by the Contractor at the Contractor's expense. All such work shall be in accordance with these Contract Documents, or the Owner's Standard Specifications or written instructions when the work involved is not covered by these Specifications.

7.5 Other Utilities. Utilities owned and operated by private individuals, railroads, school districts, associations, or other entities not covered in these Special Provisions shall, unless otherwise specifically requested by the utility owner, be removed, relocated, supported or adjusted as required by the Contractor at the Contractor's expense. All work shall be in accordance with the utility owner's directions, or by methods recognized as being the standard of the industry when directions are not given by the owner of the utility.

7.6 Damage to Utilities and Private Property. The Contractor shall protect all utilities and private property and shall be solely responsible for any damage resulting from his construction activities. The Contractor shall hold the Owner and Project Representative harmless from all actions resulting from his failure to properly protect utilities and private property. All damage to utilities shall be repaired at the Contractor's expense to the full satisfaction of the owner of the damaged utility or property. The Contractor shall provide the Owner with a letter from the owner of the damaged utility or property stating that it has been repaired to the utility owner's full satisfaction.

7.7 Structures. The Contractor shall exercise every precaution to prevent damage to existing buildings or structures in the vicinity of his work. In the event of such damages, he shall repair them to the satisfaction of the owner of the damaged structure at no cost to the Owner.

7.8 Overhead Utilities. The Contractor shall use extreme caution to avoid a conflict, contact, or damage to overhead utilities, such as power lines, streetlights, telephone lines, television lines, poles, or other appurtenances during the course of construction of this project.

7.9 Buried Gas Lines. The Contractor shall provide some means of overhead support for buried gas lines exposed during trenching to prevent rupture in case of trench caving.

7.10 Pavement Removal. Where trench excavation or structure excavation requires the removal of curb and gutter, concrete sidewalks, or asphalt or concrete pavement, the pavement or concrete shall be cut in a straight line parallel to the edge of the excavation by use of a spade-bitted air hammer, concrete saw, colter wheel, or similar approved equipment to obtain a straight, square clean break. Pavement cuts shall be 2 feet wider than the actual trench opening.

7.11 Survey Markers and Monuments. The Contractor shall use every care and pre-

caution to protect and not disturb any survey marker or monuments, such as those that might be located at lot or block corners, property pins, intersection of street monuments or addition line demarcation. Such protection includes markings with flagged high lath and close supervision. No monuments shall be disturbed without prior approval of the Project Representative. Any survey marker or monument disturbed by the Contractor during the construction of the project shall be replaced at no cost to the Owner by a licensed land surveyor.

7.12 Temporary Utilities. The Contractor shall provide all temporary electrical, lighting, telephone, heating, cooling, ventilating, water, sanitary, fire protection, and other utilities and services necessary for the performance of the work. All fees, charges, and other costs associated therewith shall be paid for by the Contractor.

8. CONSTRUCTION SAFETY

The Contractor shall be solely and completely responsible for conditions of the jobsite, including safety of all persons (including employees and subcontractors) and property during performance of the work. This requirement shall apply continuously and not be limited to normal working hours. Safety provisions shall conform to U.S. Department of Labor (OSHA), and all other applicable federal, state, county, and local laws, ordinances, codes, and regulations. Where any of these are in conflict, the more stringent requirement shall be followed. The Contractor's failure to thoroughly familiarize himself with the aforementioned safety provisions shall not relieve them from compliance with the obligations and penalties set forth therein, see General Conditions, Article 10.

9. CONSTRUCTION LIMITS AND AREAS OF DISTURBANCE

9.1 Construction Limits. Where construction easements or property lines, are not specifically called out on the Contract Documents, limit the construction disturbance to ten (10) feet, when measured from the edge of the slope stake grading, or to the adjacent property line, whichever is less. Disturbance and equipment access beyond this limit is not allowed without the written approval of both the Project Representative and the Owner of the affected property. If so approved, disturbance beyond construction limits shall meet all requirements imposed by the landowner; this includes existing roads used and/or improved as well as the construction of new access roads. Special construction, reclamation, or post-construction reclamation or other closure provisions required by the landowner on access roads beyond the construction limits shall be performed by the Contractor at no additional cost to the Owner.

9.2 Areas of Disturbances. Approved areas of disturbance are those areas disturbed by construction activities within the construction limits and along designated or approved access routes. Such areas may require reclamation and revegetation operations, including grading to the original contours, top soiling with salvaged or imported topsoil, seeding, fertilizing, and mulching as specified herein. Other areas that are disturbed by the Contractor's activities outside of the limits noted above will be considered as site damage or unapproved areas of disturbance, see General Conditions, Articles 3 and 10. This includes areas selected by the Contractor outside the defined construction limits for mobilization, offices, equipment, or material storage.

10. DECONTAMINATE CONSTRUCTION EQUIPMENT

Power wash all construction equipment that have been previously operated off of paved or gravel roadways entering the project site to prevent the spread of noxious weeds and aquatic invasive species. This applies to all FWP projects, whether or not individual construction permits specifically address cleaning of equipment.

11. TREE PROTECTION AND PRESERVATION

The Contractor and the Owner shall individually inspect all trees within the project construction limits prior to construction. The Owner shall determine which trees are to be removed and which trees are to be preserved. Construction of the grading, utilities and various roadway facilities must not significantly damage the trees root system or hinder it's chances for survival. Reasonable variations from the Contract Documents, as directed by the Project Representative, may be employed to ensure the survival of trees.

12. CONSTRUCTION SURVEYS

The Contractor will be responsible for all layout and construction staking utilizing the Project Representative's existing control and coordinate data for the project. Dimensions and elevations indicated in layout of work shall be verified by the Contractor. Discrepancies between Drawings, Specifications, and existing conditions shall be referred to the Project Representative for adjustment before work is performed. The Project Representative may set location and grade stakes prior to construction; however, it is ultimately the responsibility of the Contractor to check and verify all construction staking for the project.

Existing survey control (horizontal and vertical) has been set for use in the design and ultimately the construction of these improvements. A listing of the coordinates and vertical elevation for each of these control points may be included in the project drawings.

The Contractor will be responsible for preserving and protecting the survey control until proper referencing by the Contractor has been completed. Any survey control obliterated, removed, or otherwise lost during construction will be replaced at the Contractor's expense.

Contractor shall be aware of property pins and survey monuments. Damage to these pins will require replacement of such by a registered land surveyor at no cost to the owner.

The Contractor shall provide construction staking from the Contractor's layouts and the control points. Contractor's construction staking includes at a minimum:

1. Slope stakes located at critical points as determined by the Project Representative.
2. Blue tops every longitudinally and transversely for subgrade and crushed base to verify finish grading of course.
3. Location and grade stakes for drainage features and retaining walls.
4. Location stakes for roadside safety items, permanent and temporary traffic control, and misc. items as determined by the Project Representative.

Original field notes, computations and other records take by the Contractor for the purpose of quantity and progress surveys shall be furnished promptly to the Project Representative and shall be used to the extent necessary in determining the proper amount of payment due to the Contractor.

13. MATERIAL SOURCES AND CONSTRUCTION WATER

The Contractor shall be responsible for locating all necessary material sources, including aggregates, earthen borrow and water necessary to complete the work. The Contractor shall be responsible for meeting all transportation and environmental regulations as well as paying any royalties. The Contractor shall provide the Project Representative with written approvals of landowners from whom materials are to be obtained, prior to approval.

The Contractor may use materials from any source, providing the materials have been tested through representative samples and will meet the Specifications.

Water for compaction efforts shall be supplied by the Contractor.

14. MATERIALS SALVAGE AND DISPOSAL

Notify the Owner for any material salvaged from the project site not identified in the Contract Documents. The Owner reserves the right to maintain salvaged material at the project site, compensate the Contractor for relocation of salvaged material, or agreed compensation to Owner for material salvaged by the Contractor.

Haul and waste all waste material to a legal site and obey all state, county, and local disposal restrictions and regulations.

15. STORED MATERIALS

Contractor shall use an approved storage area for materials. Materials and/or equipment purchased by the Contractor may be compensated on a monthly basis. For compensation, provide the Project Representative invoices for said materials, shop drawings and/or submittals for approval, and applicable insurance coverage, see General Conditions, Article 9.

16. STAGING AND STOCKPILING AREA

Contractor shall use staging and stockpiling sites for to facilitate the project as approved by the Owner. Contract Documents may show approved staging and stockpiling locations. Notify Owner within 24 hours for approval of staging and stockpiling sites not shown on the Contract Drawings.

17. SECURITY

The Contractor shall provide all security measures necessary to assure the protection of equipment, materials in storage, completed work, and the project in general.

18. CLEANUP

Cleanup for each item of work shall be fully completed and accepted before the item is considered final. If the Contractor fails to perform cleanup within a timely manner the Owner reserves the right to withhold final payment.

19. ACCESS DURING CONSTRUCTION

Provide emergency access at all times within the project throughout the construction period.

20. CONSTRUCTION TRAFFIC CONTROL

The Contractor is responsible for providing safe construction and work zones within the project limits by implementing the rules, regulations, and practices of the Manual on Uniform Traffic Control Devices, current edition.

21. SANITARY FACILITIES

Provide on-site toilet facilities for employees of Contractor and Sub-Contractors and maintain in a sanitary condition.

22. CONTRACT CLOSEOUT

The Contractor's Superintendent shall maintain at the project site, a "Record Set of Drawings" showing field changes, as-built elevations, unusual conditions encountered during construction, and such other data as required to provide the Owner with an accurate "as constructed" set of record drawings. The Contractor shall furnish the "Record Set" to the Project Representative following the Final Inspection of the Project.

The Contractor's final payment will not be processed until the "Record Set" of drawings are received and approved by the Project Representative.

23. MEASUREMENT AND PAYMENT

Review these Contract Documents for additional Measurement and Payment specifications for definitions. Quantities are listed on the Bid Proposal for Payment Items. Additional material quantities, volumes, and measurements may be shown on the Contract Document drawings and/or specifications.

Unit Price quantities and measurements shown on the Bid Proposal are for bidding and contract purpose only. Quantities and measurements supplied, completed for the project, and verified by the Project Representative shall determine payment. Each unit price will be deemed to include an amount considered by the Contractor to be adequate to cover Contractor's overhead and profit for each bid item.

The Owner or Contractor may make a Claim for an adjustment in Contract Unit Price if the quantity of any item of Unit Price Work performed by the Contractor differs materially and/or significantly (increase or decrease by 50%) from the estimated quantity indicated on the Bid Proposal.

Lump sum bid item quantities will not be measured. Payment for the lump sum bid proposal items will be paid in full amount listed on the Bid Proposal when accepted by the Project Representative, unless specified otherwise.

STANDARD CONSTRUCTION SPECIFICATIONS FOR

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SECTION 101.00: ABBREVIATIONS

Whenever in these Specifications or in other Contract Documents, the following terms, or pronouns in place of them, are used, the intent and meaning shall be interpreted as follows. Reference to a specific standard or specification shall mean the latest edition or amendment in effect on the date of Invitation to Bid.

AA--Aluminum Association
AAN--American Association of Nurserymen
AASHTO--American Association of State Highway and Transportation Officials
ACI--American Concrete Institute
AGC--Associated General Contractors of America
AI--Asphalt Institute
AIA--American Institute of Architects
AISC--American Institute of Steel Construction
AISI--American Iron and Steel Institute
AITC--American Institute of Timber Construction
ANSI--American National Standards Institute
APA--American Plywood Association
API--America Petroleum Institute
ASA--American Society of Agronomy, Inc.
ASCE--American Society of Civil Engineers
ASHRAE--American Society of Heating, Refrigerating and Air Conditioning Engineers
ASLA--American Society of Landscape Architects
ASME--American Society of Mechanical Engineers
ASPA--American Sod Producers Association
ASTM--American Society for Testing and Material
AWPA--American Wood Preservers Association
AWS--American Welding Society
CLFMI--Chain Link Fence Manufacturers Institute
CRSI--Concrete Reinforcing Steel Institute
CS--Commercial Standard issued by U.S. Department of Commerce
DEMA--Diesel Engine Manufacturers Association
EJMA--Expansion Joint Manufacturers Association
EPA--Environmental Protection Agency
FED. SPEC. or FS--Federal Specifications
FHWA--Federal Highway Administration
FPR--Federal Procurement Regulations System
FSS--Federal Specifications and Standards
GSA--General Services Administration
IEEE--Institute of Electrical and Electronic Engineers
IES--Illuminating Engineering Society
IMSA--International Municipal Signal Association
ITE--Institute of Traffic Engineers
MCA--Montana Code Annotated
MDOH--Montana Department of Highways
MIL--Military Specifications
MSHA--Mine Safety and Health Administration
MUTCD--Manual on Uniform Traffic Control Devices
NBFU--National Board of Fire Underwriters
NBS--National Bureau of Standards

NEC--National Electric Code
NEMA--National Electrical Manufacturers Association
NESC--National Electrical Safety Code
NFPA--(Fire)--National Fire Protection Association
NFPA--(Forest)--National Forest Products Association
NSWMA--National Solid Wastes Management Association
NWMA--National Woodwork Manufacturers Association
OSHA--Occupational Safety and Health Act
PCA--Portland Cement Association
PCI--Prestressed Concrete Institute
PS--Product Standard issued by the U.S. Department of Commerce
RIS--Redwood Inspection Service
SAE--Society of Automotive Engineers
SDI--(Deck)--Steel Deck Institute
SDI--(Door)--Steel Door Institute
SJI--Steel Joist Institute
SMACNA--Sheet Metal and Air Conditioning Contractors' National Association
SSPC--Steel Structures Painting Council
SSSA--Soil Science Society of America, Inc.
TAS--Technical Aid Series
UL--Underwriter's Laboratories, Inc.
USASI--United States of America Standards Institute
USDA--United States Department of Agriculture
WASHTO--Western Association of State Highway Transportation Officials
WCLIB--West Coast Lumber Inspection Bureau
WWPA--Western Wood Products Association

SUBSECTION 201.00: CLEARING AND GRUBBING

201.01GENERAL

A. DESCRIPTION - This work shall consist of clearing, grubbing, removing, burning, burying, and otherwise disposing of vegetation and debris within the clearing limits as designated on the Drawings and by the Engineer. Vegetation and objects designated to remain shall be preserved free from injury and defacement.

If any evidence of aboriginal activity or occupation is encountered, the Contractor shall immediately stop work and notify the Engineer, who shall contact the proper state authorities for an assessment of the significance of the resource.

The work shall be classified as follows:

1. Clearing. Clearing shall consist of the felling of trees and disposal of stumps, brush, windfalls, logs, limbs, sticks, piles of sawdust, rubbish, debris, vegetation, and other objectionable matter existing within the clearing limits or that interfere with excavation and embankment.

2. Grubbing. Grubbing shall consist of the removal and disposal of roots, stumps, stubs, rock, roots, debris, and other objectionable matter from the grubbing limits.

3. Clearing and Grubbing. Clearing and grubbing shall consist of performing both clearing and grubbing as set forth above.

4. Disposal. Disposal shall consist of removing, burning, burying, or otherwise disposing of the refuse accumulations from clearing, grubbing, or clearing and grubbing operations. The refuse resulting from these operations shall be disposed of in the same manner as debris described in Subsection 502.00, Debris and Structure Removal.

201.02MATERIALS

Not applicable.

201.03CONSTRUCTION REQUIREMENTS

A. GENERAL - Clearing, grubbing, or clearing and grubbing shall be done at times and in a manner that the surrounding vegetation, adjacent property, and anything designated to remain shall not be damaged. Dragging, piling, disposing of debris, and other work that may be injurious to vegetation shall be confined to areas that carry no vegetation or that will be covered by embankments or disturbed by excavations.

Vegetation adjacent to streams, ponds, or lakes shall be preserved and protected from injury unless the vegetation conflicts with construction operations and is designated by the Engineer to be removed. If any vegetation designated to be preserved becomes damaged or destroyed by the Contractor, it shall be replaced to the satisfaction of the Engineer at no cost to the Owner.

The Engineer will designate trees, shrubs, plants, or other objects that are to remain. The Contractor shall preserve all objects so designated.

The Contractor shall not injure trees, shrubbery, vines, plants, grasses, and other vegetation growing outside of the slope limits of excavation and embankment. The Contractor shall paint all cut or scarred surfaces of trees or shrubs selected for retention. The paint shall be an approved asphaltum base paint prepared especially for tree surgery.

Where scour is likely to occur, resulting from clearing or grubbing conducted in advance of excavation work, temporary erosion control setting basins shall be constructed prior to any scour occurring.

B. CLEARING - All areas within the neat lines of cut or fill areas shall constitute the clearing limits.

Unless specifically designated to be saved, all trees, stumps, brush, windfalls, logs, and other objectionable matter occurring within clearing limits shall be cut off and disposed of. All stumps within the clearing limits and all trees, the stumps of which are not to be grubbed, shall be cut not more than the diameter of the stump, and in any instance not more than 12 inches, above the ground.

The refuse resulting from the clearing operation shall be removed, as specified in Subsection 502.00, Debris and Structure Removal, to a location designated by the Engineer, or, if no site is specified, then the Contractor shall secure a waste site. The Contractor shall not burn on the site unless he has obtained permission as specified in Subsection 502.00, Debris and Structure Removal. In all cases, the authority to burn shall not relieve the Contractor in any way from damages which may result from his operations. In no case shall any material be left on the project, shoved onto abutting private properties, or be buried in embankments or trenches on the project.

C. GRUBBING - All areas within the neat lines of cuts, and all areas to be covered by embankments less than 3 feet in height shall constitute the grubbing limits.

All stumps, roots, logs, or other timber more than 3 inches in diameter, and all brush, matted roots, rock, and other debris within the grubbing limits not suitable for roadway foundation shall be pulled or otherwise removed to a depth of not less than 6 inches below the original ground or 12 inches below roadway subgrade.

All material resulting from the grubbing operations shall be disposed of as specified in Subsection 502.00, Debris and Structure Removal. All depressions below subgrade, or below the final surface of the ground resulting from the grubbing operations shall be backfilled with suitable material as specified in the Subsection 202.00, Excavation and Embankment.

D. CLEARING AND GRUBBING - Clearing and grubbing shall be done in accordance with the provisions of B and C above.

SUBSECTION 203.00: PROVIDING AND/OR STOCKPILING BACKFILL MATERIALS

203.01GENERAL

A. DESCRIPTION - This work shall consist of furnishing, producing and hauling backfill materials including specified additives in accordance with these Specifications. An area on site for stockpiling backfill material may be utilized, upon approval of the Engineer. Materials at the source of supply are subject to the Engineer's approval before delivery of the materials to the project.

B. RECLAMATION REQUIREMENTS - All areas used by the Contractor as a material source shall be reclaimed by the Contractor in accordance with an approved Reclamation Plan. The Reclamation Plan shall provide for a finished materials pit site that blends with the adjacent landscape.

The Contractor shall comply with the pertinent statutes relating to open cut mining (Title 82, CH. 4, Part 4); hard rock mining (Title 82, CH. 4, Part 3); water quality (Title 72, CH. 5); stream bank preservation (Title 87, CH. 5, Part 5 and Title 75, CH. 5); and all other Federal, State and local statutes that apply.

Final responsibility for administration of the Open Cut Mining Act and the Hard Rock Mining Act rests with the Department of State Lands. Therefore, all reclamation plans and reclamation work are subject to review and approval by personnel of the Department of State Lands. The Contractor shall comply with all directives and instructions issued by the Department of State Lands with regard to reclamation work.

The Contractor shall furnish the Engineer with copies of all authorizations, plans/and or permits necessary to comply with this provision.

No extra compensation will be considered or allowed by reason of the conditions of this provision, as it shall be considered necessary and incidental to the completion of the work.

203.02MATERIALS

All backfill shall be as specified in the pertinent subsection or Special Provisions. The Contractor shall provide all testing required, at no cost to the Owner, for approval of any materials source prior to delivery of the materials to the site. Such testing shall be done by an approved testing laboratory. Gradation analysis, moisture-density relationship, and specific gravity tests are required.

203.03CONSTRUCTION REQUIREMENTS

The source pit and storage area shall be cleared of weeds, roots, stumps, rocks and other contaminating matter. The cleared matter shall be disposed of or leveled in accordance with Subsection 502.00, Debris and Structure Removal, and Subsection 220.00, Waste Pile Disposal, or otherwise described in the Special Provisions. Sites shall occupy a minimum area.

Equipment or methods that cause segregation, degradation or contamination of the material shall not be used, when delivering materials from the source pit or storage area.

SUBSECTION 320.00: FERTILIZING AND SEEDING

320.01GENERAL

A. DESCRIPTION - This work shall consist of ground surface preparation; furnishing, applying and incorporating fertilizer into the soil; executing Summer Erosion Control Procedure; furnishing and planting seed; mowing; tracking; and cleanup. The work includes permanent seeding.

B. CERTIFICATIONS

1. Indigenous Seed. Defined by MCA 80-5-101(4):

"Indigenous seeds include the seeds of those plants that are naturally adapted to an area where the intended use is for revegetation of disturbed sites. These species include grasses, forbs, shrubs and legumes."

The Contractor must supply the Engineer with all seed bag tags and a certification from the supplier stating that the seed complies with the Federal Seed Act and the Montana Seed Laws (MCA 80-5-101 through 305).

2. Fertilizer. Fertilizer shall be delivered in standard size bags of the manufacturer showing weight analysis and manufacturer's name, or in bulk quantities accompanied with written certifications from the manufacturer stating that the fertilizer supplied complies with applicable specifications.

320.02MATERIALS

A. INDIGENOUS SEED - All seed shall comply with and be labeled in accordance with the Montana Seed Law. MCA 80-5-104(2) states...

"Indigenous seeds, as defined in 80-5-101, in amounts of 1 pound or more, whether in package or bulk, must be labeled with the following information "

(a) . . . the statement "Labeled only for reclamation purposes";

(b) . . . lot number or other distinguishing mark;

(c) . . . the common name, genus, species and subspecies, when applicable, including the name of each kind of seed present in excess of 5%. When two or more kinds of seed are named on the label the label shall specify the percentage of each. When only one kind of seed is present in excess of 5% and no variety name or type designation is shown, the percentage must apply to seed of the kind named. If the name of the variety is given, the name may be associated with the name of the kind. The percentage in this case may be shown as "pure seed" and must apply only to seed of the variety named;

(d) state or county of origin;

(e) the approximate percentage of viable seed, together with the date of test. When labeling mixtures, the percentage viability of each kind shall be stated;

(f) the approximate percentage by weight of pure seed, meaning the freedom of seed from inert matter and from other seeds;

(g) the approximate percentage by weight of sand, dirt, broken seeds, sticks, chaff and other inert matter;

(h) the approximate total percentage by weight of other seeds;

(i) the name and approximate number of each kind of species of prohibited and restricted noxious weed seeds occurring per pound of seed;

(j) the full name and address of the person, firm or corporation selling the seed.

As listed in the Montana Seed Law, seed shall contain no "PROHIBITED" noxious weed seed. The seed shall contain no "RESTRICTED" noxious weed seed in excess of the maximum numbers per pound as specified by MCA 80-5-105 or as specified by the appropriate County Weed Board, whichever is more stringent.

The number of seed allowed per pound, for all other noxious weed seeds shown on the "restricted list" will be zero.

Seed shall be grown in the North American continent above 41 degrees north latitude. Known varieties whose origin is above the 41st parallel but grown below are acceptable. All seed shall be a standard grade adapted to Montana conditions. Seed which has become wet, moldy or otherwise damaged will not be accepted.

Calculations of pure "live seed" may be made on the basis of either a germination test or a tetrazolium test in addition to the purity analysis. Seed shall be applied on a pure "live seed" basis. The quantity of pure "live seed" in a 100 lb. container shall be determined by the formula: 100 multiplied by germination percentage and this product multiplied by the purity percentage. (For example, if the seed is 85% pure and test 90% germination, then a 100 lb. container would contain 76.5 lbs. of pure "live seed".)

When legumes are seeded, inoculants specified by the Special Provisions shall be used.

B. FERTILIZER - Fertilizer shall be a soluble commercial carrier of available plant food element or combination thereof. The fertilizer to be used on the project shall supply the quantities of available chemical elements stipulated in the Special Provisions or on the Drawings. The fertilizer shall be in uniform composition and in good condition for application by suitable equipment. It shall be labeled with the manufacturer's guaranteed analysis as governed by applicable fertilizer laws. Any fertilizer which becomes contaminated or damaged, making it unsuitable for use, will not be accepted.

C. WATER - Water used for seeding shall be of irrigation quality and free of impurities that would be detrimental to plant growth.

320.03CONSTRUCTION METHODS

A. GENERAL - Areas to be seeded and fertilized shall be completed, in reasonable conformity, to specified line and grade prior to seeding and fertilizing and approved by the Engineer.

Slopes and areas finished during the period of October 15 through April 30 or May 20, depending on seeding zone, shall be topsoiled and permanently seeded within this time period. The Contractor must obtain Engineer permission to commence topsoil placement and seeding operations. Slopes and areas finished during the period May 1 through October 14 shall be topsoiled in accordance with Subsection 310.00, Cover Soil, and mulched or otherwise treated in accordance with the Summer Erosion Control Procedure as specified in the Special Provisions. The permanent seeding of these

areas shall then commence during the fall at a time approved by the Engineer. The Contractor shall be required to either mulch or otherwise treat in accordance with the Summer Erosion Control Procedure or permanently seed any topsoil area within 15 days of topsoil placement. Application rates for permanent seeding are shown in the Special Provisions.

Seeding of the finished slopes shall require repeated seeding operations until approved by the Owner, and shall not be construed to mean that the required finishing, topsoiling, fertilizing, mulching, Summer Erosion Control Procedure, and seeding may be done only once at the convenience of the Contractor. Any additional move-in required will not be paid for separately as the cost thereof shall be absorbed in the Contract unit price for seeding, fertilizing and mulching.

It is necessary, insofar as it is practicable and feasible, as determined by the Engineer, that the seedbed surface, at the time of application of seeds, not be excessively wet, snow-covered, or frozen and be reasonably free of large lumps, clods, and impervious crusts of dirt; that there be no appreciable areas of loose soils which can feasibly be compacted; that the surface, to a depth of approximately 4", not be so tightly compacted that seed cannot begin growth. The Contractor shall treat such areas, as required by the Engineer, to attain, as nearly as practicable, the condition described.

If seeding is hampered due to standing vegetation, the vegetation shall then be mowed and left lay after seeding. Mowing shall be done, where terrain permits, with equipment using a cutting blade which rotates in a plane parallel to the ground. Whether alive or dead, the vegetation shall be removed if it will prevent good seeding practice.

Excessively tight or compacted soils shall be loosened to the minimum depth of 4 inches. Discing, harrowing, or tilling of the soil shall be done at right angles to the natural flow of water on the slopes, unless otherwise approved by the Engineer. Compaction of the soil when required shall be performed by equipment which will produce a uniform rough textured surface ready for seeding and mulching. Compacting of loose soils may be required by the Engineer.

Existing structures and facilities shall be adequately protected and any damage done by the Contractor shall be repaired or adjusted to the satisfaction of the Engineer.

B. APPLICATION OF FERTILIZER - Fertilizer shall be applied to the accepted seedbed surface at the rate as specified in the Special Provisions. Mechanical or hydraulic methods of application are acceptable so long as a uniform application at the specified rate is accomplished. Fertilizer shall not be applied within 5 days of the time of spoils material lime application if no topsoil covers spoils material. Fertilizer shall be applied prior to seeding. The application method is subject to approval by the Engineer.

The fertilizer shall be incorporated into the soil by discing, raking, or shallow plowing to the full depth of the topsoil or to a maximum depth of 6 inches, whichever is less. Exceptions will be made for seed drills that are capable of incorporating the fertilizer and seed directly into the seedbed. In no instance shall subsoil be incorporated into the seedbed as a result of this operation. Fertilizer shall be incorporated with equipment operated at right angles to the slope of the land.

If the Contractor is required to perform the Summer Erosion Control Procedure, fertilization will be completed at the time of permanent seeding. The application methods and methods for incorporating the fertilizer into the seedbed shall be specified herein.

C. SEED DISTRIBUTION

1. General. Seed shall be applied to the conditioned seedbed no longer than 48 hours after the seedbed has been conditioned. The method of seeding will be as called for in the Special Provisions.

Broadcast or hydraulic seeding methods shall not be used during adverse weather as determined by the Engineer.

The applied seed, regardless of the method of application, shall not be covered by a soil thickness greater than 1/2-inch in depth.

The basic rate of seed application will be described in the Special Provisions.

2. Seeding by Drill. Seeding equipment used for applying grass seed must be designed, modified or equipped to regulate the application rate and planting depth of grass seed. If equipment for sowing cover crop seed is not equipped with press wheels, the seed shall be compacted with a cultipacker immediately after the ground has been drilled. Seed must be uniformly distributed in the drill hopper during the drilling operation. Acceptable drills are: custom seeders, furrow drills, disc drills, no till drills or other drills approved by the Owner. All grass establishment equipment shall be operated normal to the slope drainage.

Planting depth shall be regulated by depth bands or coulters. The drill box shall be partitioned by dividers no more than 24 inches apart, in order to provide for more even distribution on sloping areas. A drill shall be no wider than the width of the area over which it is to operate.

The rows of planted seed shall be a maximum of 8 inches apart and shall be at right angles to the natural slopes.

3. Broadcast Seeding. Seeding by hand or mechanical broadcasting will be permitted on areas inaccessible to drills or impractical to seed by other prescribed methods. Broadcast seeding requires the approval of the Engineer.

4. Hydraulic Seeding. Hydraulic seeding equipment may be used. The seeding Special Provisions will indicate which slopes require hydraulic seed coverage. Seed and mulch will be applied in separate and distinct operations except for the following:

When using the hydraulic seeding method, the Contractor must provide 1 pound of wood fiber or organic mulch per each 3 gallons of water in the hydraulic seeder as a cushion against seed damage. The mulch used as a cushion may be part of the total required mulch with the remainder applied after the seed is in place.

When hydraulically applying mulch in a separate operation, the Contractor may mix the seed with the fertilizer if his hydraulic seeding equipment is capable of uniformly mixing water, fertilizer, and seed - in that order - and power blowing or spraying the mixture uniformly over the seedbed. THIS OPTION MAY ONLY BE APPLIED ON SLOPES STEEPER THAN 2:1. After blending, the slurry shall be applied to the seedbed within 45 minutes after the seed has been added to the water/fertilizer mixture. If the slurry cannot be applied within the specified 45 minutes, it shall be fortified, at no cost to the Owner, with the correct ratio of seed to the remaining slurry and a new 45-minute time frame established for applying the fortified mixture.

The Contractor will be required to use extension hoses to reach the extremities of slopes.

The Contractor shall remove any equipment tracks on the seedbed prior to final mulching. The Contractor shall use a rake, small harrow, or other acceptable means to remove the tracks.

D. TRACKING - All seeded and fertilized areas may or may not require tracking as noted in the Special Provisions. Tracking shall be accomplished using a tracked vehicle equipped with grousers sufficient to groove the surface to at least 1/2-inch. The tracking vehicle shall be operated so as to completely cover the surface with grouser marks. All grousers marks shall run perpendicular to the natural slopes. The tracking vehicle shall be operated alternately between forward and reverse on each pass to eliminate damage to the seedbed resulting from 180 degree skid turns.

If the area is seeded by hydraulic methods, tracking of the slopes shall be done at such time when the surface has had sufficient time to dry. The length of time established will be at the discretion of the Engineer.

E. SEEDING DATES

1. Western Seeding Zone. The following counties shall comprise the Western Seeding Zone and seeding shall be permitted from October 15 through May 20.

Flathead	Mineral
Granite	Missoula
Lake	Ravalli
Lincoln	Sanders

2. Eastern Seeding Zone. All counties not included in the Western Seeding Zone shall be included within this zone. Seeding shall be permitted from October 15 through April 30.

SUBSECTION 340.00: EROSION CONTROL MAT

340.01GENERAL

A. DESCRIPTION - This work item shall consist of furnishing, placing, and stapling erosion control mat to the ground surface on the slopes designated by the Engineer and as shown on the Drawings.

B. SUBMITTALS - The Contractor shall provide the following submittals in accordance with the Supplementary Conditions:

* One-square-foot sample of each type of mat and sample staple.
* Manufacturer's catalog cuts and material specifications for the erosion control mat and staples.
* Installation manuals.

340.02MATERIALS

A. EROSION CONTROL MAT - The erosion control mat shall be curled wood excelsior or straw with photodegradable extruded plastic mesh or woven jute fabric. Erosion control mats shall be furnished in continuous rolls of 30-feet or greater with a minimum width of 4 feet. The erosion control mat shall be as manufactured by North American Green, American Excelsior Company, Belton Industries, or approved equal. Mat type and grade (model) shall be as specified in the Special Provisions.

B. STAPLES - Staples shall be made of wire, 0.091-inch in diameter or greater and have a "U" shape with legs 6 to 8 inches in length and a 1 to 2-inch crown. On slopes steeper than 3:1, staples shall have at least 8 inches legs.

340.03CONSTRUCTION REQUIREMENTS

A. GENERAL - The area to be covered with the erosion control mat shall be as shown on the Drawings and areas designated by the Engineer. The area to be covered shall be properly prepared, fertilized, seeded, and approved by the Engineer before the mat is applied. Those areas to which the mat is to be applied shall not be mulched unless otherwise specified in the Special Provisions.

Erosion control mat may be placed either perpendicular or normal to the slope and shall be "trenched in" at the uphill end of the mat as shown on the Drawings and according to the manufacturer's recommendations. Additional trenching and backfilling of mat may be required to insure adequate stability. The mat shall be stapled on 2-foot centers in trench bottoms.

When the erosion control mat is unrolled, the finer mesh size side or fiber side of the mat will be placed in contact with the soil (not applicable to woven jute fabric). The mat will not be stretched and will lay loosely on the soil surface to achieve maximum contact with the soil. Mat edges shall be butted snugly against each other and stapled. Ends shall be overlapped, and end joints shall be staggered as recommended by the manufacturer. Staples shall be placed according to manufacturer's recommendations, as shown on the Drawings and additionally as requested by the Engineer. Wire staples shall be driven into the ground for the full length of the legs.

Mat installation, if after seeding, shall be in a manner as to not seriously disturb the seedbed surface. If the seedbed is seriously disturbed, the Engineer may require re-preparing the seedbed and reseeding at no additional cost to the Owner.

SUBSECTION 502.00: DEBRIS AND STRUCTURE REMOVAL

502.01GENERAL

A.DESCRIPTION - This work shall consist of the disposal of all debris and trash specifically including that from previous mining operations as designated on the Drawings and by the Engineer and the disposal of this debris in designated areas. Debris shall be defined as but not limited to the remains of any manmade objects found within the project limits. Debris removal shall also include the demolition and disposal of existing structures as indicated on the Drawings or designated by the Engineer. Structures shall be defined as but not limited to buildings, foundations, fences, abandoned pipe lines, vent pipes, utility facilities, etc. within the project limits.

Some structures may be required to remain completely undisturbed for historical reasons. Such structures will be designated on the Drawings or by the Engineer.

B.SUBMITTALS - The following submittals are required in accordance with the Supplementary Conditions:

*Location of disposal or burning area.
*Authorized burn permits when burning is used.

502.02MATERIALS

A.COVER MATERIAL - Materials used for cover of debris in embankments or subsidence holes shall be as described in Subsection 220.00, Waste Pile Disposal.

502.03CONSTRUCTION REQUIREMENTS

A.GENERAL - The Contractor shall gather and dispose of all debris, trash, and structures as specified herein. Disposal may consist of burial, burning, salvaging or off-site disposal of debris, trash, and structures.

B.BURIAL - All non-biodegradable materials such as but not limited to wire, rails, scrap metal, concrete, discarded appliances and vehicles, glass, etc. may be placed in the areas of deepest fill in embankment or subsidence holes as designated by the Engineer, providing the finished work will result in a minimum of 2 feet of cover with suitable backfill material. Crushing of these materials may be required before placing in the burial site.

Burial of large amounts of combustible materials on-site will not be allowed. Burial of small amounts of combustible materials is at the discretion of the Engineer.

C.BURNING - All combustible materials such as, but not limited to, trees, brush, trash, planks, wooden ties, timbers, etc. may be burned on the project site. Burning of materials will be allowed when authorized in writing by the proper fire and air pollution control authorities, provided that all requirements set forth by such authorities are met. Burning of materials will be allowed only if such burning operations can be performed without damage to on-site or adjacent properties. Proposed burning locations must also be approved in writing by the Engineer prior to burning any materials. Burning will not be allowed in adit cuts or subsidence areas where there exists potential for igniting coal or spoils material.

The Contractor shall maintain adequate fire-fighting equipment at the site at all times during any burning. Shovels, rakes, and a water truck equipped with a pump shall be included in the fire-fighting

equipment. The Contractor may be required to demonstrate the fire-fighting water pump prior to any burning.

Fires shall be guarded at all times and shall be under constant surveillance until completely extinguished.

The Contractor shall be fully responsible for any damages incurred as a result of any burning operations. A copy of all required permits shall be furnished to the Engineer prior to the start of any burning operations.

D.SALVAGING - The Owner reserves the right to salvage any mining artifacts, historically significant materials, or other materials discovered at the site. The Contractor shall coordinate with the Engineer for the salvage of such material. Any other salvage not designated by the Owner shall become the property of the Contractor and must be removed from the site or disposed of as specified herein.

All materials denoted to be salvaged shall be carefully moved and stockpiled in the areas designated. All salvaged materials shall be in sections or pieces that can be readily transported. Timber and other wood components shall be neatly stacked on skids. Salvaged materials are not to be used by the Contractor in the course of his work.

E.OFF-SITE DISPOSAL - Any materials which cannot be gathered and disposed of on site by burial, burning or salvaging shall be hauled and disposed of at an approved legal off-site disposal area at no additional cost to the Owner.

SUBSECTION 503.00: EQUIPMENT USE

503.01GENERAL

A.DESCRIPTION - This work shall consist of providing by the Contractor to the Owner on an equipment use basis, the equipment he proposes to utilize in completion of the work as specified. The equipment will be available to accomplish work as required by the Owner which may arise during the course of the project but is not now identified in the Bidding Documents.

B.LISTED EQUIPMENT - The Contractor is requested to list on the Bid Sheet the horsepower and the hauling capacity or otherwise identify the size of the equipment he proposes to have available on a rental basis.

C.NEED FOR EQUIPMENT - The Owner will determine the need for work to be performed and the Contractor will be so notified. The Contractor will not be expected to keep equipment available on a standby basis and will not be required to move in equipment to perform a special item of work unless special compensation is allowed. There may be no work performed under this subsection.

503.02MATERIALS

Not applicable.

503.03CONSTRUCTION REQUIREMENTS

A.**GENERAL REQUIREMENTS** - Any equipment furnished shall be in good mechanical condition and shall have sufficient motive power for successful, continuous performance of the assigned work. Any equipment not capable of meeting these requirements will not be permitted on the work site.

B.METHOD OF MEASUREMENT -

1.Equipment. Equipment use will be measured by the hour of actual production time to the nearest quarter hour for the use of any unit specified in the performance of actual assigned work. Time consumed in moving equipment from point to point on the project and for repairing and servicing will not be measured.

C.BASIS OF PAYMENT -

1.Equipment. The Contractor will be paid a reasonable rental price for all necessary power tools and equipment, including fuel and lubricants, necessary for the work. Rental rates will be calculated from the current issue of the Rental Rate Blue Book for Construction Equipment as published by Dataquest Incorporated. A price will be established by mutual agreement between the Owner and the Contractor and documented in the bid documents prior to the commencement of any work. This "Agreed to" rental rate shall apply to the actual time the tools and equipment are in productive use on such work.

2.The hourly equipment rental rate, as documented in the bid documents, shall include the following: Operator wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll bonuses, sick leave, vacation and holiday pay applicable thereto. General overhead costs shall also be included in the rental rate and may include, but are not limited to: Office rent, utilities, telephone,

printing, postage, depreciation, general insurance, legal fees, business development costs, property taxes, filing, file maintenance, and file storage. Such costs must actually be incurred by Contractor during the period of performance of services. Base costs used to calculate overhead burden shall not duplicate base costs used to calculate salary overhead. No other costs may be added to this rate. Profit (fixed fee), shall be negotiated as a separate item and will not be based as a percentage of work performed.

SUBSECTION 540.00: PROVIDE WATER

540.01GENERAL

A.DESCRIPTION - This item shall consist of furnishing and applying water required in all compaction work, hydroseeding and mulching, soil-cement, cement, stowing work, injection work, drilling, grouting, fire control, and dust control all in accordance with the requirements of these Specifications. Unless otherwise specified in the Proposal and Special Provisions, water used in any work will not be measured or paid for but will be considered incidental to and included in payment for other items of the Contract.

540.02MATERIALS

Water shall be reasonably clean and free from acid, oil, alkali, or vegetable substances and shall not be brackish or salty. The Contractor shall be responsible for obtaining any necessary water rights, permits, and for payment of any royalty costs on the water provided. The source of water to be used shall be indicated to the Engineer prior to use.

540.03CONSTRUCTION METHODS

Water, when required, shall be applied at the locations and in the amounts required to properly complete the work. An adequate water supply shall be provided by the Contractor. The equipment used for watering shall be of ample capacity (minimum water holding capacity of 1,000 gallons) and of such design as to assure uniform application of water in the amounts required.

Equipment used for fire control and extinguishing burning waste piles shall be capable of providing a minimum of 100 gpm of water at sufficient pressure to successfully accomplish the work specified. Extension hoses may be required for this work.

In the watering of subgrades and embankments, the Engineer may require the Contractor to apply water in such quantities that the subgrade and embankment shall be compacted at a moisture content in excess of "optimum moisture". When so required, the amount of water required in excess of "optimum moisture" will not be greater than 3%. The Contractor shall also apply water during the course of the work to control dust, maintaining all embankment and base courses in a damp condition.

The Contractor shall provide watering for dust control during construction and for maintenance of traffic on public roadways and other access roads as required by the Engineer and the Air Quality Bureau, Environmental Sciences Division, Montana Department of Health and Environmental Sciences.

SUBSECTION 650.00: CONSTRUCTION FABRIC

650.01GENERAL

A.DESCRIPTION - This section covers installation of construction fabrics for drainage, silt control or embankment stabilization. Material classifications, location and installation shall be shown on the Drawings and/or listed in the Proposal.

B.SUBMITTALS - The following submittals are required in accordance with the Supplementary Conditions:

*Manufacturers' catalog cuts, material, and product specifications for construction fabric.
*Certification by the manufacturer of the fabric to be furnished on this project, certifying that the fabric complies with the applicable specifications.
*Certified test results for permeability, tensile and burst strength for fabric material.
*Certified test results for UV resistance of fabric material.
*Manufacturer's installation instructions for seaming and installing fabric.

C.REFERENCE STANDARDS - All fabric shall be manufactured and installed in accordance with all applicable requirements of the most current editions of ASTM, ANSI, and AASHTO.

650.02MATERIALS

A.GENERAL - Construction fabrics shall be of the type noted on the Proposal or described on the Drawings or in the Special Provisions. Fabric type will be identified based on appropriateness for the application.

B.DRAINAGE FABRIC - Drainage fabric shall be non-directional (non-woven) designed to allow water passage while retaining soil particles, allowing a water flow rate of at least 250 gpm/sf (clean fabric condition). Thickness shall be at least 50 mils with a minimum weight of 4 oz/sy. Fabric shall be constructed of spun or matted fibers or random orientation. Equivalent U.S. Standard Sieve opening size shall be no greater than 200 per test method COE CW 02215-77. Grab strength per ASTM D-1682-64 shall be at least 100 lb. Drainage fabric shall be equal to Mirafi 140N.

C.BANK STABILIZATION FABRIC - Bank stabilization fabric shall be woven (directional), and designed to provide a filter medium beneath riprap or on slopes to prevent erosion. Thickness shall be at least 16 mils, with a grab strength per ASTM D-1682-64 of at least 300 lb. in each direction. Water flow rate shall be at least 100 gpm/sf. Mullen burst strength (ASTM D-3786-80) shall be a minimum of 500 psi, and puncture strength per ASTM D-3787-80 shall be at least 135 lb. UV radiation stability shall be at least 85% as determined by ASTM G-26/D-1682-64. Bank stabilization fabric shall be equal to Mirafi 700X.

D.GRADE STABILIZATION FABRIC - Grade stabilization fabric shall be woven (directional), and designed to stabilize subgrades for roadways or prevent migration of fines into aggregate courses. Thickness shall be at least 20 mils, with a grab strength per ASTM D-1682-64 of at least 200 lb. Water flow rate shall be at least 30 gpm/sf. Mullen burst strength (ASTM D-3786-80) shall be a minimum of 350 psi, and puncture strength per ASTM D-3787-80 shall be at least 80 lb. UV radiation stability shall be at least 30% as determined by ASTM G-26/D-1682-64. Grade stabilization fabric shall be equal to Mirafi 500X.

E.SILT FENCE - Silt fence shall be a woven (directional) fabric designed for retention of silt in runoff, backed

by an industrial netting stitched to the fabric. Fabric shall be furnished in 100 feet continuous rolls of at least 3-foot width. Net backing may be 6 inches less than fabric width. Silt fence shall be suitable for attachment to driven wood or steel posts. Silt fence shall be equal to Mirafi Enviro-Fence 100X.

650.03CONSTRUCTION REQUIREMENTS

A.CONSTRUCTION FABRICS - Construction fabrics shall be installed on prepared subgrade surfaces or otherwise installed as shown on the Drawings. The surface receiving the fabric shall be free of excessive irregularities and sharp or pointed rocks or debris that may puncture or tear the fabric. If necessary a sand or soil cushioning course of 2 inches thickness shall be used beneath the fabric at no additional cost to the Owner.

Fabric shall be continuous for the entire width of area shown on the Drawings. End joints shall be lapped at least 3 feet. Fabric shall be folded to form the radius around bends. All tears, holes and other imperfections shall be covered with a patch extending no less than 3' feet in each direction from the imperfection.

B.SILT FENCE - Silt fence shall be erected by attachment to driven wood or metal posts or other suitable anchors at a maximum spacing of 10 feet. Fence shall be erected to prevent sags that runoff water may overtop. If necessary to prevent sagging, silt fence shall be backed with metal mesh. Joints in silt fence shall be lapped a minimum of 5 feet, and secured against breaching.

SUBSECTION 720.00 STRUCTURAL STEEL AND MISCELLANEOUS METAL

720.01GENERAL

A.DESCRIPTION - This section covers the requirements for structural steel, miscellaneous metal fabrications, bolts, and metal accessories.

B.STANDARDS - Except as otherwise specifically noted on the drawings or specified herein, all materials furnished and work performed in connection with structural steel shall be in conformity with the AISC "Manual of Steel Construction, Eighth Edition". Welded connections shall be in accordance with applicable requirements of the American Welding Society.

C.SUBMITTALS - The following submittals are required in accordance with the Supplementary Conditions:

*Material specifications for metals, structural members and metal accessories.
*Certification by the manufacturer of structural members and connections to be furnished on this project, certifying that they comply with the applicable specifications.
*Layout (erection) drawings for metal fabrications and structural steel indicating dimensions and connections. Field and shop connections shall be distinguished.
*Manufacturers' catalog cuts, dimensional data, materials, and product specifications for metal accessories and coatings.
*Manufacturers' application instructions for metal coatings.
*Structural calculations bearing the seal of a registered professional engineer for structural elements noted as requiring same on the Drawings or Special Provisions.

720.02MATERIALS

Contractor-furnished structural steel items shall be new and undamaged and shall conform to pertinent AISC and ASTM Standard Specifications and the following requirements:

A.STEEL -

Plates & ShapesASTM A36, min. yield of 36 ksi

SheetsASTM A366 or A569, zinc-coated

Pipe ASTM A120

Bolts & Nuts ASTM A307, zinc-plated as per ASTM A164, Type GS

Self-Locking Nuts	Prevailing torque type; IFI-100, Grade A
Flat Washers	ANSI B18.22.1
Lock Washers	Spring type, ANSI B18.21.1

Checkered PlateInland "4-Way Floor Plate" or US Steel "Multigrip Floor Plate"

Steel GratingMcNichols Co. 1 1/2-inch by 3/16-inch Type SGW-150 or equal; hot-dipped galvanized with edge banding

Structural Tubing ASTM A500 or A501

Welding ElectrodesLow hydrogen type, E70xx electrodes, AWS Specifications

B.STAINLESS STEEL -

Plates & ShapesASTM A167

Bolts & NutsIFI-104, Grade 303 or 305

C.ALUMINUM -

Sheet & PlateASTM B209, alloy 6061-T6

Rod & Bar ASTM B211, alloy 6061-T6 or 2017-T4

Pipe ASTM B429, alloy 6061-T6 or 6063-T6

Checkered Plate Alcoa B26 or B85

D.CHAIN - Galvanized, welded steel, twist-link style, short link pattern

Stainless steel, 3/16 inch or 2/0 min., for railing applications

E.EXPANSION ANCHORS -

For ConcreteFed Spec FF-S-325; wedge type, Group II, Type 4, Class 1 or 2, self-drilling type, Group III, Type 1; or non-drilling type, Group VIII, Type 1 or 2; Phillips, Rawlplug, USM, or Wej-It

For MasonryFed Spec FF-S-325; lag shield (zinc) type, Group II, Type 1; or split shield type, Group II, Type 3, Class 3, Phillips or Rawlplug

F.BIRD SCREEN -2 mesh, galvanized steel, min. wire dia. 0.125 inch.

G.SPECIALTY ITEMS -

Stainless cable2,000 lb. min. stainless steel cable with stainless steel cable clamps of equal strength

Galvanized cable2,000 lb. min. galvanized steel cable with galvanized steel cable clamps of equal strength

Low friction bearing platesLubrite Type F or acceptable equal.

Metal primer paintZinc-Rich rust-inhibitive, Tnemec "77 Chem-Prime", Kopper "No. 10 Inhibitive Primer", or equal

720.03CONSTRUCTION REQUIREMENTS

A.STRUCTURAL STEEL FABRICATION -

1.General. Structural steel shall be fabricated in conformity with the dimensions, arrangements, sizes, and weights or thicknesses indicated on the Drawings or stipulated in the Specifications. Framing and connections of all members shall be detailed and fabricated in accordance with AISC Standards, Specifications and Details unless otherwise indicated on the Drawings or specified herein.

All fabricated materials shall conform to the tolerances specified in the AISC Manual and ASTM A46.

All members and other parts of fabricated material, as delivered, shall be free of winds, warps, local deformations, unauthorized splices, or unauthorized bends. Holes and other provisions for field connections shall be accurate and shop checked so that proper fit will be provided when the units are assembled in the field. Erection drawings shall be prepared and all separate pieces shall be piece marked as indicated on such drawings. Where required, either by notations on the drawings or by the necessity of proper identification and fitting of field connections, the connections shall be matchmarked.

Structural steel shall be fabricated and assembled in the shop to the greatest extent practicable. Shearing, flame cutting, and chipping shall be done carefully and accurately. Soleplates, fillers, stiffeners, and splice plates shall be neatly fitted and shall not have ragged edges. Holes shall be cut, drilled, or punched at right angles to the surface and shall not be made or enlarged by burning. Holes shall be clean-cut without torn or ragged edges, and burrs resulting from drilling or reaming operations shall be removed with the proper tool. Deburring will not be required for holes punched in stair stringers to receive stair tread bolts.

Structural steel shall be fabricated to tolerances that will permit field erection within AISC tolerances, except that the displacement of any column center line from the established column line shall be no more than 1 inch at any point in the total height of the column.

The shop portion of beam-to-column connections shall be attached to the beams unless otherwise specified or indicated on the Drawings.

The end connections of all beams connecting to existing steel framing shall be slotted for adjustment and shall be bolted with high strength bolts. Slotted end connections shall be friction type and shall permit adjustment in the horizontal plane of 1 inch from the theoretical dimensions, either toward of away from the existing structure.

Contact surfaces at all column splices and at all other compression joints depending upon contact bearing shall have the bearing surfaces prepared to a common plane by milling, sawing or other acceptable means.

Typical shop beam connections shall be all welded. If shop bolted connections are used, gauges of connections shall be modified to provide adequate clearance for power wrench type bolting tools when the steel is erected. Where slotted beam connections are required, gauges of connections shall be modified to provide for bolting tool clearances. Typical field beam connections shall be with high strength bolts. When a particular connection method (bolting or welding) is specified or detailed for a particular connection or class of connections, such particular method shall take precedence over the typical connections.

Unless other specified or indicated on the Drawings, both shop and field beam connections shall correspond to the details indicated on Standard Drawing 720.01, Standard Beam Connections.

Where no beam connection detail is indicated on the drawings, the appropriate 2B through 20B connection shall be used.

The gauge of the holes in the outstanding legs shall be 5-1/2 inches unless otherwise required.

All bolts shall be 3/4 inch diameter unless otherwise indicated on the Plan.

High strength bolts shall conform to all requirements for A325 bolts of the "Specifications for Structural Joints Using ASTM A325 or A490 Bolts" including the commentary given therewith, as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation, and endorsed by AISC, except as otherwise modified and supplemented herein. The Research Council Specification is dated May 8, 1974, with an errata sheet dated October 22, 1974.

High strength bolted connections shall be bearing type connections with threads permitted in the shear planes except where other type connections are required by the Drawings or Specifications.

Connections of wind bracing and other members subject to stress reversal shall be friction type connections. Contact surfaces of bearing type connections may be painted. Contact surfaces of friction type connections shall not be painted and shall be free of loose scale, dirt, burrs, oil, paint, lacquer, galvanizing and other foreign materials that would prevent solid seating of the parts.

2.Welding. Except as otherwise specified, all welds, welding, and related operations for structural steel shall be in conformity with the applicable provisions of the AWS Structural Welding Code, AWS D1.1-75 and its 1976 revisions, as issued by the American Welding Society.

All welding shall be performed in accordance with written procedures and only the following welding processes will be permitted subject to proper code qualifications.

* Shielded metal arc
* Flux cored arc
* Submerged arc
* Gas metal arc
* Electroslag/electrogas

The short circuiting transfer mode of the gas metal arc process shall not be used.

All welds shall be made with the addition of filler metal.

Except as otherwise specified, welding shall be performed using only those joint details which have a prequalified status when performed in accordance with the referenced AWS Code.

All welding procedures and operators shall be qualified by an independent testing laboratory in accordance with the applicable provisions of the referenced AWS Code. All procedure qualifications shall be in written form and shall be submitted to the Engineer for review prior to beginning the work. Accurate records of welder and welding operator qualifications shall also be maintained by the Contractor and shall be made available to the Owner upon request.

The use of self-shielded electrodes in the flux cored arc welding process will be permitted only in certain cases with the specific permission of the Engineer. Supplemental shielding of self-shielded electrodes, in the flux cored arc welding process, will be acceptable.

Low hydrogen electrodes shall be stored and handled during use in a manner that will maintain their low hydrogen characteristics.

All welded joints exposed in exterior locations or subject to submergence in any location shall be provided with continuous welds along all contact edges.

Welds that are not dimensioned on the Drawings shall be sized to develop the full strength of the least strength component involved in the connection.

Components to be welded shall be accurately positioned and shall be rigidly secured during welding.

Groove welds shall be terminated at the ends of the joint by use of extension bars or runoff plates. Extension bars and runoff plates shall be removed upon completion and cooling of the weld, and the ends of the weld shall be made smooth and flush with the edges of the abutting parts.

If proposed by the Contractor for use on this project, electroslag and electrogas welding procedures and operators shall be fully qualified under the provisions of the referenced AWS Code. The Engineer will accept properly documented evidence of previous qualification tests. Qualification tests shall be made for this project. Impact tests are required. Documentation for electroslag and electrogas welding procedures, testing, and operator qualifications shall be submitted to the Engineer.

When welding is called for on galvanized surfaces the surface shall first be ground to remove all galvanizing. After welding these surfaces all ground or weld surfaces shall be coated with cold zinc.

3.Shop Painting. All structural steel materials furnished under these specifications, unless specifically exempted, shall be painted with one coat of metal primer paint after shop fabrication and before moving from the fabricating shop or manufacturing plant. Surfaces shall be dry and proper temperature when painted, and free of grease, oil, dirt, dust, grit, rust, loose mill scale, weld flux, slag, weld spatter, or other objectionable substance.

Cleaned surfaces shall be kept dry and clean and shall be prime coated within 8 hours after cleaning.

All shop paint shall be applied in a skillful manner by acceptable methods which will provide a closely adhering coating of uniform thickness not less in any location than 1-1/2 mils (dry film)

or such greater thickness as may be recommended by the paint manufacturer. If spray painting is permitted or allowed, a sufficient number of passes shall be made to build up a uniform coat of acceptable thickness which is free of sags, blisters, and runs. Should materials which have been shop coated, arrive on the job with an inadequate or damaged coating, or a coating which is not free of sags, blisters, and runs or shows evidence of being handled or loaded before the paint has properly set, the Contractor shall be responsible for removing any rust that has formed, cleaning of the surface, and application of an adequate and defect-free coat of the primer paint.

Prepared edges which will be field welded shall not be painted or prepared for painting.

During painting, the ambient temperature shall not be below 50°F. During damp or wet weather all painting shall be done in a dry shelter.

Materials shall not be handled in any manner until the shop paint is dry, hard and able to resist abrasion.

Contact surfaces at friction type high strength bolted field connections shall not be painted.

4.Erection. All materials erected under this section shall be erected in accordance with AISC, the Drawings, approved submittals, and these Specifications.

All parts shall be assembled accurately as indicated on the Drawings and matchmarks shall be carefully followed. Light drifting to draw the parts together will be acceptable, but drifting to match unfair holes will not be acceptable. Any enlargements of holes necessary to make corrections in the field shall be done by reaming with twist drills, care being taken not to weaken the adjoining metal. Enlarging of holes by burning is prohibited. Connections requiring extensive hole enlargements or adjustments, other than provided for by shop fabricated slotted holes, shall be brought immediately to the Engineer's attention. The necessary adjustments shall be made as approved by the Engineer.

All joints shall be assembled and abutted surfaces drawn tightly together and the framework shall be checked for alignment, plumb, and level in accordance with the specified tolerances.

5.Baseplates. Baseplates shall be neatly cut to the proper size. The baseplate top shall be pressed or milled at the bearing surface to provide full bearing to the column.

Plates bent at an angle greater than 90 degrees shall be forged to prevent cracking and reduction in metal thickness.

Baseplates shall be leveled and aligned carefully before they are grouted. Grouting shall be "Embeco 636 Grout" as manufactured by Master Builders Co. of Cleveland, Ohio, or equal. Installation and mixing shall be in accordance with the manufacturer's recommendations.

6.Tolerances. Unless specified otherwise, erection tolerances shall be as specified in the AISC Code of Standard Practice given in the AISC "Manual of Steel Construction, 8th Edition" and as specified under Section 720.03-A, "Structural Steel Fabrication".

The displacement of any column center line from the established column line shall be no more than 1/500 of the column height with a maximum displacement of no more than 1 inch at any point in the total height of any column. The limit of tolerance in column plumbness shall be based on the height from the baseplate to the point being plumbed and shall be

measured from the true center line of the column.

7.Field Bolting. The length of high strength bolts installed in field connections shall be determined in accordance with the Research Council Specification and Commentary specified hereinafter. Two types of field bolted connections are required as follows:

a.Bearing type connections with bolt threads permitted in the shear planes of the connected materials shall be used unless otherwise indicated.

b.Friction type connections with uncoated contact surfaces shall be used for connections of vertical and horizontal wind bracing and other members subject to stress reversal. Slotted connections shall also be friction type.

Tightening shall be done using either the calibrated wrench method or the "turn-of-nut" method. All methods, tools, and equipment shall be acceptable to the Engineer. The work shall be done by competent and experienced bolting crews.

If the bolts are tightened by the calibrated wrench method, each impact wrench shall be calibrated at the start of each day's work and at least once during the day. Calibration records showing the serial number of each wrench used shall be submitted weekly to the Engineer. Wrench calibration shall be performed using the same diameter and length of hose and air pressure used during the tightening method, a washer shall be used under the element turned in tightening.

For either method, bolted connections shall be drifted to proper position and the holes inspected to ensure that bolt threads will not be damaged by forcing the bolts in place. Connections shall be tightly drawn together using not less than 25% of the total number of bolts in the completed joint but never less than 2 bolts. Bolts for initial tightening shall be distributed uniformly about the joint. Either fitting-up bolts or high strength bolts may be used for this purpose.

Any ASTM bolt which has been tightened more than one-half turn beyond snugtight shall not be loosened and retightened. All such bolts shall be discarded and new bolts used in their place.

Smooth beveled washers shall be used when the bearing faces of the bolted parts have a slope of 1:20 or greater with respect to a plane normal to the bolt axis.

The tightened bolts shall be checked at random in the presence of the Engineer. Calibrated hand torque wrenches and the necessary platforms, equipment, and personnel shall be provided for the random check.

The torque wrench shall be constructed so that it will visually or audibly indicate when the proper torque is reached. The wrench shall be calibrated to indicate a torque equivalent to bolt tension of 28,000 pounds for 3/4 inch bolts. The number of bolts checked shall be acceptable to the Engineer based upon the Engineer's observance of the quality and completeness of the tightening operation. A minimum of 10% of the bolts in each connection, but not less than 2 bolts in each connection, shall be checked.

8.Field Welding. Field welding shall conform to the welding requirements specified under "Welding" and to these additional requirements.

Each welding operator shall be qualified for all welding procedures and positions required in a joint that he

welds. The entire weld of any structural joint shall be made by one operator.

Each welding operator shall be assigned an identification mark or symbol, and upon completion of a structural weld, the operator shall apply his assigned mark in the parent metal adjacent to the weld.

The Contractor shall provide visual inspection of all welds and shall correct all defective welds in accordance with the requirements of AWS D1.1-75 and its 1976 revisions.

9.Touch-Up Painting. After erection of steel, touch-up paint all abrasions and fasteners. Touch-up with paint using the same material as used for the shop paint.

B.MISCELLANEOUS METAL FABRICATIONS -

1.Connections. All bolts shall be equipped with self-locking nuts or lock washers. Where welding is required or permitted, all but and miter welds shall be continuous and where exposed to view shall be ground smooth. In addition, intermittent welds shall have an effective length of at least 2 inches and shall be spaced not more than 6 inches apart.

2.Fabrication and Erection. Miscellaneous metal shall be fabricated in conformity with dimensions, arrangement, sizes and weights or thicknesses shown on the Drawings or stipulated in the Specifications.

All members and parts, as delivered and erected, shall be free of winds, warps, local deformations, and unauthorized bends. Holes and other provisions for field connections shall be accurate and shop checked so that proper fit will result when the units are assembled in the field. Erection drawings shall be prepared if required, and each separate piece shall be marked as indicated thereon. All field connection materials shall be furnished.

Before assembly, surfaces to be in contact with each other shall be thoroughly cleaned. All parts shall be assembled accurately as shown on the Drawings. Light drifting will be permitted to draw parts together, but drifting to match unfair holes will not be permitted. Any enlargement of holes necessary to make connections in the field shall be done by reaming with twist drills. Enlarging holes by burning is absolutely prohibited.

3.Storage. Miscellaneous metal shall be stored on blocking so that no metal touches the ground and water cannot collect thereon. The material shall be protected against bending under its own weight or superimposed loads.

4.Edge Grinding. Sharp corners shall cut or sheared edges that will be submerged in operation shall be dulled by at least one pass of a power grinder to improve paint or galvanizing adherence.

5.Galvanizing. All galvanizing shall be done by the hot-dip process after fabrication in conformity with requirements of ASTM A123, A153, and A385.

6.Dissimilar Metals. Direct contact of dissimilar metals shall be avoided. When necessary, such contact shall be protected with a liberal coating of thixotropic coal tar paint.

C.CHECKERED FLOOR PLATES - Checkered floor plates shall be painted steel unless specifically

designated on the Drawings to be aluminum.

Lifting holes shall be provided in all checkered plates which are not required to be bolted or welded in place. Warped or bent checkered plate shall be shop-straightened so they will lie perfectly flat.

Steel members which support checkered plates shall be hot-dip galvanized after fabrication.

D.GRATING -

1.General. All grating shall be steel. Support angles for grating shall be full-length steel shapes as shown on the Drawings. Where supports are secured to concrete, stainless steel anchor bolts shall be used.

Except as modified herein, grating manufacture, fabrication and installation shall comply with recommendations in the "Metal Bar Grating Manual" of the National Association of Architectural Metal Manufacturers.

2.Fabrication. Grating shall be laid out so that openings are centered on a joint between sections. Cuts in grating shall be sawed or sheared. Cuts shall be clean and smooth without fins, beads, or other projections. Ends of bearing bars in grating floor sections shall be provided with full-depth steel bands 3/16 inch thick.

Grating shall be fabricated in panels that can be easily handled in the future by plant personnel. Unless otherwise shown on the Drawings, panels should not exceed 100 pounds, nor be less than 40 pounds in weight. Panels shall be within 3/16 inch plus or minus of authorized width, and shall have a maximum difference in length of opposite diagonals of 1/4 inch. The spacing of bearing bars shall be within 1/32 inch of authorized spacing. Cross bars of adjacent panels shall align. After installation, there shall be not more than 1/4 inch clearance between panels. All bearing bars shall be parallel.

Grating sections, frames, and support angles including anchor straps shall be hot-dipped galvanized after fabrication.

3.Installation. Grating shall not be damaged during handling and installation.

Grating shall rest unanchored on support angles. All grating shall lie flat with no tendency to rock when installed. Poorly fitting or damaged grating will be rejected.

E.METAL LADDERS AND GRAB BARS - Metal ladders and grab bars shall be provided where indicated on the Drawings. Ladders shall be fabricated of aluminum shapes as shown. Support brackets and angles shall likewise be aluminum secured with stainless steel fasteners. All aluminum in contact with concrete shall be liberally coated with thixotropic coal tar on the contacting surface prior to installation.

F.ANCHOR BOLTS - Anchor bolts shall conform to the material requirements for bolts and nuts in this section and to the placement requirements of Section 720.03-A.6. All bolts shall be delivered in time to permit setting when structural concrete is placed. Anchor bolts which are cast-in-place in concrete shall be provided with sufficient threads to permit a nut to be installed on the concrete side of the concrete form or supporting template. Anchor bolts shall be set per Standard Drawing 720.02.

G.EXPANSION ANCHORS - Expansion anchors shall be installed in conformity with the manufacturer's

recommendations for maximum holding power, but in no case shall the depth of hole be less than 4-bolt hole diameters. Minimum distance between the center of any expansion anchor and an edge or exterior corner of concrete shall be at least 4 1/2 times the diameter of the hole in which the anchor is installed, unless otherwise indicated on the Drawings. The minimum distance between the centers of expansion anchors shall be at least 8 times the diameter of the hole in which the anchors are installed.

Nuts and washers for expansion anchors shall be as specified for anchor bolts. Expansion anchors shall be zinc-plated steel unless otherwise specified or indicated on the Drawings.

H.GUARDPOSTS - Guardposts shall be installed in accordance with Standard Drawing 720.03.