Colorado Mountain College

12TH STREET & BOB ADAMS DRIVE SIDEWALK IMPROVEMENTS

March 2013

DRAFT

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Project No. 3730.008F

Issue/Date: Final Design
March 8, 2013

Revised: _____

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GENERAL INFORMATION

This project manual represents the specifications portion of the construction documents to be used in conjunction with the civil drawings for the Colorado Mountain College 12th Street and Bob Adams Drive Sidewalk Improvements project. This manual also provides Bidding information and General Conditions of the Contract. The specifications which follow cover the technical requirements for completing the work, including provisions for measurement and payment.

The contract form, terms and conditions shall be as required by the Owner and are not included herein. The Contractor shall adhere to the requirements of the Owner for procurement and contracting, general project requirements and any other requirements not addressed in this project manual. Where any article, paragraph or subparagraph in the specifications is in conflict with the Owner's Standard Construction Contract and Agreement, the Standard Construction Contract and Agreement shall prevail. Any part of such article, paragraph or subparagraph not in conflict with the Standard Construction Contract and Agreement shall remain in effect.

The project consists of the construction of approximately 1,850 linear feet of sidewalk, 1,150 linear feet of valley gutter and curb and gutter, 800 linear feet of 12" to 24" diameter polyethylene culvert and storm drain, 3,100 linear feet of 4" fiber optic (broadband) conduit, nine (9) catch basin/inlets, concrete driveway replacement, gravel parking lot surfacing, dry stack boulder wall and miscellaneous grading and drainage work, The time for completion of the work shall be thirty (30) calendar days, beginning approximately June 15, 2013.

Provisions for a Performance Bond, Labor and Material Payment Bond, Insurance, Liquidated Damages or other forms of project security which may be required by the Owner are not included herein and shall be negotiated separately if desired by the Owner.

The Contractor shall be solely responsible for the construction means, methods, techniques and safety procedures to be followed during completion of the work. Neither the Owner nor the Engineer shall have any duty or responsibility in this regard.

BIDDER'S QUALIFICATION STATEMENT

Project: CMC 12th Street & Bob Adams Drive Sidewalk Improvements

Submitted to: Colorado Mountain College
ATTN: Peter Waller, Director of College Wide Facilities
802 Grand Avenue
Glenwood Springs, CO 81601

Submitted by: Name_____

Address _____

_____

_____

Use a blank sheet if additional space is needed to answer questions.

1. CORPORATIONS please answer the following:

   Date of incorporation _____ State of incorporation _____

   President_____

   Vice-President _____

   Secretary _____

   Treasurer _____

2. PARTNERSHIPS please answer the following:

   Date of organization _____

   Type of partnership (general, limited or association) _____

   Names and addresses of partners:

   _____

   _____

   _____

   _____

3. PROPRIETORSHIPS please answer the following:

   Date business started_____

   Name and address of proprietor_____

   _____

   _____

4. How many years has your organization been in business as a general contractor under your present business name? _____

5. How many years experience in _____ construction work has your organization had:

   a) As a General Contractor?_____(b) as a Sub-Contractor?_____

6. Are you actively or financially involved in any other businesses? If so, please list and explain:

   _____

_____

_____

7. Have you ever failed to complete any work awarded to you? _____
   If so, where and why? _____

   _____

8. Has any officer or partner of your organization ever been an officer or partner of some other organization that has failed to complete a construction contract? _____
   If so state name of individual, other organization and reason:

   _____

   _____

9. What is the construction experience of the principal individuals of your organization?
   Individual's Name _____
   Present Position or Office _____
   Years of Construction Experience ____ In What Capacity _____
   Magnitude and Type of Work _____

   _____

   _____

   Individual's Name _____
   Present Position or Office _____
   Years of Construction Experience ____ In What Capacity _____
   Magnitude and Type of Work _____

   _____

   _____

   Individual's Name _____
   Present Position or Office _____
   Years of Construction Experience ____ In What Capacity _____
   Magnitude and Type of Work _____

   _____

   _____

   Individual's Name _____
   Present Position or Office _____
   Years of Construction Experience ____ In What Capacity _____
   Magnitude and Type of Work _____

   _____

   _____

10. List representative projects that your organization has completed in order to show your overall experience. Include projects similar to the proposed project or which include the work of those trades required to complete the proposed project.

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Date Completed _____

Name and Address of Owner/Contracting Officer _____

_____

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Date Completed _____

Name and Address of Owner/Contracting Officer _____

_____

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Date Completed _____

Name and Address of Owner/Contracting Officer _____

_____

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Date Completed _____

Name and Address of Owner/Contracting Officer _____

_____

11. List projects that your organization has completed within the past three years.

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Date Completed _____

Name and Address of Owner/Contracting Officer _____

_____

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Date Completed _____

Name and Address of Owner/Contracting Officer _____

_____

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Date Completed _____

Name and Address of Owner/Contracting Officer _____

_____

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Date Completed _____

Name and Address of Owner/Contracting Officer _____

_____

12. List the construction projects your organization has under way on this date.

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Percent Completed _____

Name and Address of Owner/Contracting Officer _____

_____

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Percent Completed _____

Name and Address of Owner/Contracting Officer _____

_____

Name of Project _____

Description of Work _____

_____

Contract Amount_____ Percent Completed _____

Name and Address of Owner/Contracting Officer _____

_____

_____

Dated at_____ this _____ th day of _____ 20 ___ .

_____

Name of Organization

By _____

_____
Title

State of _____

County of _____

_____being duly sworn deposes and says that the answers to the foregoing questions and all statements therein contained are true and correct.

Sworn to before me this _____th day of _____ , 20___.

_____
Notary Public

My commission expires_____

GENERAL CONDITIONS

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1. DEFINITIONS

1.1 Whenever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

1.2 ADDENDA - Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS AND SPECIFICATIONS, by additions, deletions, clarifications or corrections.

1.3 BID - The offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.

1.4 BIDDER - Any person, firm or corporation submitting a BID for the Work.

1.5 BONDS - Bid, Performance, and Payment Bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.

1.6 CHANGE ORDER - A written order to the CONTRACTOR authorizing an addition, deletion or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.

1.7 CONTRACT DOCUMENTS - The contract, including Advertisement For Bids, Information For Bidders, BID, Bid Bond, Agreement, Payment Bond, Performance Bond, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.

1.8 CONTRACT PRICE - The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.

1.9 CONTRACT TIME - The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.

1.10 CONTRACTOR - The person, firm or corporation with whom the OWNER has executed the Agreement.

1.11 DRAWINGS - The part of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.

1.12 ENGINEER - The person, firm or corporation named as such in the CONTRACT DOCUMENTS.

1.13 FIELD ORDER - A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the ENGINEER to the CONTRACTOR during construction.

1.14 NOTICE OF AWARD - The written notice of the acceptance of the BID from the OWNER to the successful BIDDER.

1.15 NOTICE TO PROCEED - Written communication issued by the OWNER to the CONTRACTOR authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.

1.16 OWNER - A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the WORK is to be performed.

1.17 PROJECT - The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

1.18 RESIDENT PROJECT REPRESENTATIVE - The authorized representative of the OWNER who is assigned to the PROJECT site or any part thereof.

1.19 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

1.20 SPECIFICATIONS - A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.21 SUBCONTRACTOR - An individual, firm or corporation having a direct contact with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the WORK at the site.

1.22 SUBSTANTIAL COMPLETION - That date as certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

1.23 SUPPLEMENTAL GENERAL CONDITIONS - Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

1.24 SUPPLIER - Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

1.25 WORK - All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

1.26 WRITTEN NOTICE - Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the WORK.

2. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

2.1 The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2.2 The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

3. SCHEDULES, REPORTS AND RECORDS

3.1 The CONTRACTOR shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

3.2 Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which he proposes to carry on the WORK, including dates at which he will start the various parts of the WORK, estimated date of completion of each part and, as applicable:

3.2.1 The dates at which special detail drawings will be required: and

3.2.2 Respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.

3.3 The CONTRACTOR shall also submit a schedule of payments that he anticipates he will earn during the course of the WORK.

4. DRAWINGS AND SPECIFICATIONS

4.1 The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by the OWNER.

4.2 In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.

4.3 Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to the ENGINEER, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the CONTRACTOR'S risk.

5. SHOP DRAWINGS

5.1 The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a CHANGE ORDER.

5.2 When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

5.3 Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

6. MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

6.2 Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

6.4 Materials, supplies and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

6.5 Materials, supplies or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

7. INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

7.2 The OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

7.3 The CONTRACTOR shall provide at his expense the testing and inspection services required by the CONTRACT DOCUMENTS.

7.4 If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing or approval.

7.5 Inspections, tests or approvals by the ENGINEER or others shall not relieve the CONTRACTOR from his obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

7.6 The ENGINEER and his representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection, or testing thereof.

7.7 If any WORK is covered contrary to the written instructions of the ENGINEER it must, if requested by the ENGINEER, be uncovered for his observation and replaced at the CONTRACTOR'S expense.

7.8 If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

8. SUBSTITUTIONS

8.1 Whenever a material, article or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Any cost differential shall be deductible from the CONTRACT PRICE and the CONTRACT DOCUMENTS shall be appropriately modified by CHANGE ORDER. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

9. PATENTS

9.1 The CONTRACTOR shall pay all applicable royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and save the OWNER harmless from loss

on account thereof, except that the OWNER shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the ENGINEER.

10. SURVEYS, PERMITS, REGULATIONS

10.1 The OWNER shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the WORK together with a suitable number of bench marks adjacent to the WORK as shown in the CONTRACT DOCUMENTS. From the information provided by the OWNER, unless otherwise specified in the CONTRACT DOCUMENTS, the CONTRACTOR shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

10.2 The CONTRACTOR shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

10.3 Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, he shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in Section 13, CHANGES IN THE WORK.

11. PROTECTION OF WORK, PROPERTY AND PERSONS

11.1 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

11.2 The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of the OWNER or the ENGINEER or anyone employed by either of them or

anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

11.3 In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. He will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

12. SUPERVISION BY CONTRACTOR

12.1 The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

13. CHANGES IN THE WORK

13.1 The OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, or in the time required for performance of the WORK, an equitable adjustment shall be authorized by CHANGE ORDER.

13.2 The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles him to a change in CONTRACT PRICE or TIME, or both, in which event he shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE or TIME within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER or further instruction from the OWNER.

14. CHANGES IN CONTRACT PRICE

14.1 The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

a. Unit prices previously approved.

b. An agreed lump sum.

c. The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work. In addition there shall be added an amount to be agreed upon but not to exceed fifteen (15) percent of the actual cost of the WORK to cover the cost of general overhead and profit.

15. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1 The date of beginning and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

15.2 The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the WORK described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

15.3 If the CONTRACTOR shall fail to complete the WORK within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be in default after the time stipulated in the CONTRACT DOCUMENTS.

15.4 The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following, and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to the OWNER or ENGINEER.

15.4.1 To any preference, priority or allocation order duly issued by the OWNER.

15.4.2 To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

15.4.3 To any delays of SUBCONTRACTORS occasioned by any of the causes specified in paragraphs 15.4.1 and 15.4.2 of this article.

16. CORRECTION OF WORK

16.1 The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to the OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.

16.2 All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, the OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

17. SUBSURFACE CONDITIONS

17.1 The CONTRACTOR shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the OWNER by WRITTEN NOTICE of:

17.1.1 Subsurface or latent physical conditions at the site differing materially from those indicated in the CONTRACT DOCUMENTS; or

17.1.2 Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the CONTRACT DOCUMENTS.

17.2 The OWNER shall promptly investigate the conditions, and if he finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the WORK, an equitable adjustment shall be made and the CONTRACT DOCUMENTS shall be modified by a CHANGE ORDER. Any claim of the CONTRACTOR for adjustment hereunder shall not be allowed unless he has given the required WRITTEN NOTICE; provided that the OWNER may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

18. SUSPENSION OF WORK, TERMINATION AND DELAY

18.1 The OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the CONTRACTOR, by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which notice shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.

18.2 If the CONTRACTOR is adjudged a bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials or equipment or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK or if he disregards the authority of the ENGINEER, or if he otherwise violates any provision of the CONTRACT DOCUMENTS, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the WORK by whatever method he may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

18.3 Where the CONTRACTOR'S services have been so terminated by the OWNER, said termination shall not affect any right of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by the OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

18.4 After ten (10) days from delivery of WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the Contract. In such case, the

CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

18.5 If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by the OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted, or the OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER or awarded by arbitrators within thirty (30) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to the OWNER and the ENGINEER, terminate the CONTRACT and recover from the OWNER payment for all WORK executed and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days written notice to the OWNER and the ENGINEER stop the WORK until he has been paid all amounts then due, in which event and upon resumption of the WORK, CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

18.6 If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of the OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of the OWNER or ENGINEER.

19. PAYMENTS TO CONTRACTOR

19.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect his interest therein, including applicable insurance. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate. The OWNER shall retain ten (10) percent of the amount of each payment until final completion and acceptance of all work covered by the CONTRACT DOCUMENTS. The OWNER at any time, however, after fifty (50%) percent of the WORK has been completed, if he finds that satisfactory progress is being made, shall reduce retainage to five (5%) percent on the current and remaining estimates. When the WORK is substantially complete (operational or beneficial occupancy), the retained amount may be further reduced below five (5%) percent to only that amount necessary to assure completion. On completion and acceptance of a part of the WORK on which the price is stated separately in the CONTRACT DOCUMENTS, payment may be made in full, including retained percentages, less authorized deductions.

19.2 The request for payment may also include an allowance for the cost of such major materials and equipment which are suitably stored either at or near the site.

19.3 Prior to SUBSTANTIAL COMPLETION, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

19.4 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of the OWNER.

19.5 Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted by him under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the WORK.

19.6 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the WORK. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, his Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

19.7 If the OWNER fails to make payment thirty (30) days after approval by the Engineer, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at the maximum legal rate commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

20. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

20.1 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of the OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or his sureties from any obligations under the CONTRACT DOCUMENTS or the Performance BOND and Payment BONDS.

21. INSURANCE

21.1 The CONTRACTOR shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the CONTRACTOR'S execution of the WORK, whether such execution be by himself or by any SUBCONTRACTOR or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

21.1.1 Claims under workmen's compensation, disability benefit and other similar employee benefit acts;

21.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

21.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

21.1.4 Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and

21.1.5 Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

21.2 Certificates of Insurance acceptable to the OWNER shall be filed with the OWNER prior to commencement of the WORK. These Certificates shall contain a provision that coverages afforded under the policies will not be cancelled unless at least fifteen (15) days prior WRITTEN NOTICE has been given to the OWNER.

21.3 The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, liability insurance as hereinafter specified;

21.3.1 CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting him from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether such operations be by himself or by any SUBCONTRACTOR under him, or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR under him. Insurance shall be written with a limit of liability of not less than $500,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than $500,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than $200,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than $200,000 aggregate for any such damage sustained by two or more persons in any one accident.

21.3.2 The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of the OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

21.4 The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, in accordance with the provisions of the laws of the state in which the work is performed. Workmen's Compensation Insurance, including occupational disease provisions, for all of his employees at the site of the PROJECT and in case any work is sublet, the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workman's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statute, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of his employees not otherwise protected.

21.5 The CONTRACTOR shall secure, if applicable, "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by the OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightening, vandalism, malicious mischief, wind collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by the OWNER. The policy shall name as the insured the CONTRACTOR, the ENGINEER, and the OWNER.

22. CONTRACT SECURITY

22.1 The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish the OWNER with a Performance Bond and a Payment Bond in penal sums equal to the amount of the CONTRACT PRICE, conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor and materials in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal BONDS, CONTRACTOR shall within (10) days after notice from the OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to the OWNER.

23. ASSIGNMENTS

23.1 Neither the CONTRACTOR nor the OWNER shall sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of his right, title or interest therein, or his obligations thereunder, without written consent of the other party.

24. INDEMNIFICATION

24.1 The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury,

sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

24.2 In any and all claims against the OWNER or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefit acts.

24.3 The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, his agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, CHANGE ORDERS, designs or SPECIFICATIONS.

25. SEPARATE CONTRACT

25.1 The OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTORS reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate his WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that render it unsuitable for such proper execution and results.

25.2 The OWNER may perform additional WORK related to the PROJECT by himself, or he may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or the OWNER, if he is performing the additional WORK himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate his WORK with theirs.

25.3 If the performance of additional WORK by other CONTRACTORS or the OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by the OWNER or others involves him in additional expense or entitles him to an extension of the CONTRACT TIME, he may make a claim therefor as provided in Sections 14 and 15.

26. SUBCONTRACTING

26.1 The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

26.2 The CONTRACTOR shall not award WORK to SUBCONTRACTOR(s), in excess of fifty (50%) percent of the CONTRACT PRICE, without prior written approval of the OWNER.

26.3 The CONTRACTOR shall be fully responsible to the OWNER for the acts and omissions of his SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

26.4 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

26.5 Nothing contained in this CONTRACT shall create any contractual relation between any SUBCONTRACTOR and the OWNER.

27. ENGINEER'S AUTHORITY

27.1 The ENGINEER shall act as the OWNER'S representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed. He shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

27.2 The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship and execution of the WORK. Inspections may be made at the factory or fabrication plant of the source of material supply.

27.3 The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

27.4 The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

28. LAND AND RIGHTS-OF-WAY

28.1 Prior to issuance of NOTICE TO PROCEED, the OWNER shall obtain all land and rights-of-way necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS, unless otherwise mutually agreed.

28.2 The OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights- of-way acquired.

28.3 The CONTRACTOR shall provide at his own expense and without liability to the OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials.

29. GUARANTY

29.1 The CONTRACTOR shall guarantee all materials and equipment furnished and WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR

the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.

30. ARBITRATION

30.1 All claims, disputes and other matters in question arising out of, or relating to, the CONTRACT DOCUMENTS or the breach thereof, except for claims which have been waived by the making and acceptance of final payment as provided by Section 20, shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgement may be entered upon it in any court having jurisdiction thereof.

30.2 Notice of the demand for arbitration shall be filed in writing with the other party to the CONTRACT DOCUMENTS and with the American Arbitration Association, and a copy shall be filed with the ENGINEER. Demand for arbitration shall in no event be made on any claim, dispute or other matter in question which would be barred by the applicable statue of limitations.

30.3 The CONTRACTOR will carry on the WORK and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

31. TAXES

31.1 The CONTRACTOR will pay all sales, consumer, use and other similar taxes required by the law of the place where the WORK is performed.

ADDITIONAL SUPPLEMENTAL GENERAL CONDITIONS
(1-11)

The following supplements shall modify, delete, and/or add to the General Conditions. Where any article, paragraph, or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph, or sub- paragraph shall remain in effect and the supplemental provisions shall be considered as added thereto. Where any article, paragraph, or subparagraph in the General Conditions is amended, voided, or superseded by any of the following paragraphs, the provisions of such article, paragraph, or subparagraph not so amended, voided, or superseded shall remain in effect.

A. DEFINITIONS; General Condition No.1.

Add the following paragraph 1.27:

ADDITIONAL SUPPLEMENTAL GENERAL CONDITION - A part of the CONTRACT DOCUMENTS which amends or supplements the General Conditions. A SUPPLEMENTAL GENERAL CONDITION required by other than a Federal agency.

B. SCHEDULES, REPORTS, AND RECORDS; General Condition No.3. 1.

Amend paragraph 3.2 as follows:

Delete the words "Prior to the first partial payment estimate" and substitute them with "At the Pre Construction Meeting, or, if none is held, within 5 days after receipt of the Notice To Proceed and before actually commencing work".

Add a new paragraph 3.4 as follows:

Unless waived by the ENGINEER, prior to the CONTRACTOR com- mencing Work at the project site, a Preconstruction Meeting shall be held for the purpose of review and acceptance of project schedules and to review and establish procedures for handling Shop Drawings and other submittals, for processing Applications for Payment, for review of administrative requirements established by funding agencies, to review survey and staking requirements and procedures, and to establish a working understanding among the parties as to the Work. The CONTRACTOR and ENGINEER shall establish a mutually agreeable time and date for the Preconstruction Meeting.

C. DRAWINGS AND SPECIFICATIONS; General Condition No.4.

Add the following paragraph to paragraph 4.1:

It is the intent of the Specifications and Drawings to describe a complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work that may reasonably be inferred from the Specifications or Drawings as being required to produce the intended results shall be supplied whether or not it is specifically called for.

D. SHOP DRAWINGS; General Condition No.5.

Delete General Condition No. 5 and substitute the following:

5.1 The CONTRACTOR shall provide SHOP DRAWINGS and samples as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. Where a SHOP DRAWING or sample is required by the SPECIFICATIONS, no related Work shall be

commenced until the submittal has been reviewed by the ENGINEER. The ENGINEER shall promptly review all SHOP DRAWINGS and samples.

5.2 When submitted for the ENGINEER'S review, SHOP DRAWINGS and samples shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and samples and that they are in conformance with the requirements of the CONTRACT DOCUMENTS. CONTRACTOR's stamp of approval on any Shop Drawing or sample shall constitute a representation to OWNER and ENGINEER that CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data or assumes full responsibility for doing so, and the CONTRACTOR has reviewed or coordinated each SHOP DRAWING or sample with the requirements of the Work and the CONTRACT DOCUMENTS. Any deviations that the SHOP DRAWINGS or samples may have from the requirements of the CONTRACT DOCUMENTS shall be called out to the ENGINEER'S attention in writing by the CONTRACTOR at the time of submittal.

5.3 The data shown on the SHOP DRAWINGS will be complete with respect to dimensions, design criteria, materials of construction and like information.

5.4 The ENGINEER's review shall be only for general conformance with the design concept of the Project and for compliance with the information given in the CONTRACT DOCUMENTS and shall not extend to means, methods, sequences, techniques or procedures of construction or to safety precautions or programs incident thereto. The review of a separate item as such will not indicate review of the assembly in which the item functions. CONTRACTOR shall make any corrections required by ENGINEER and shall return the required number of corrected copies of SHOP DRAWINGS and resubmit new samples for review. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

5.5 ENGINEER's review of SHOP DRAWINGS or samples shall not relieve CONTRACTOR from responsibility for any deviations from the CONTRACT DOCUMENTS unless CONTRACTOR has in writing called ENGINEER's attention to such deviation at the time of submission and ENGINEER has given written concurrence or in the case of substantial deviations processed a CHANGE ORDER authorizing the specific deviation. The ENGINEER'S review shall not relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or samples.

5.6 A copy of each reviewed SHOP DRAWING and sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

E. SUBSTITUTIONS; General Condition No.8.

Add the following paragraph 8.2 and subparagraphs 8.2.1 and 8.2.2:

8.2 Substitutions may be accepted by the ENGINEER if sufficient information is submitted by the CONTRACTOR to allow the ENGINEER to determine that the material or equipment proposed is equivalent to that named in the Specifications. The procedure for review by the ENGINEER will be as set forth in paragraphs 8.2.1 and 8.2.2 below.

8.2.1 Requests for review of substitute items of material and equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment CONTRACTOR shall make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions called for by the general design, be similar and of equal substance to that specified and be suited to the same use and capable of performing the same function as that specified. The application will state whether or not acceptance of the substitute for

use in the Work will require a change in the Drawings or Specifications to adapt the design to the substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified shall be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish at CONTRACTOR's expense additional data about the proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered or installed without ENGINEER's prior written acceptance. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.

8.2.2 ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Drawings or Specifications occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's consultants for evaluating any proposed substitute.

F. SURVEYS, PERMITS, REGULATIONS, General Condition No.10.

Delete paragraphs 10.1 and 10.2. Refer to Section 1031 Staking, Quantities, and As-Constructed Measurements for requirements.

G. PROTECTION OF WORK, PROPERTY AND PERSONS, General Condition No.11.

Add the following paragraphs 11.4 and 11.5:

11.4 The utilities shown on the Drawings are a representation of existing utility locations to the best knowledge of the ENGINEER. Field locations shown are approximate only. The utility information provided is solely for the purpose of aiding the CONTRACTOR in the bidding process and in no way relieves the CONTRACTOR from obtaining timely field locations of utilities or in confirming the existence of utilities which may or may not be shown on the Drawings.

The CONTRACTOR shall be responsible for the notification of and coordination with all utility companies for accurate field locations of utilities which may be damaged by the CONTRACTOR during the performance of work. If blasting is required in the vicinity of natural gas pipelines, the CONTRACTOR shall request a leak survey as required by Federal Law.

The immediate repair of damaged utilities or special precautions required to protect existing utilities from damage shall be the CONTRACTOR's responsibility.

11.5 Where existing fences and improvements are present, the CONTRACTOR shall be responsible for removing and replacing such items to a quality equal to that which existed just prior to the disturbance. There shall be no separate payment for this Work unless addressed otherwise in the specifications. Its cost shall be considered incidental to the project.

H. CHANGES IN WORK, General Condition No. 13.

Delete Paragraph 13.2 and add the following:

The ENGINEER may also at any time issue a field order for the purpose of clarification, information, warnings, or changes in the details of the work. The CONTRACTOR shall proceed with the requirements of the order as indicated. If the CONTRACTOR believes that such field order entitles him to a change in the contract price or time, or both, he shall notify the ENGINEER in writing within 7 days and return a copy of the field order to the ENGINEER, with the amount of change in the contract time and price noted, within 30 days. Determination of changes in contract price will be made in accordance with General Condition No. 14 as amended by these Additional Supplemental General Conditions. Field orders and associated costs will be authorized by Change Order. If so directed, the CONTRACTOR may commence directed work prior to initiation of a Change Order.

The CONTRACTOR may at any time submit a clarification request to the ENGINEER for the purpose of clarification, information or proposed changes in the details of work. The clarification request shall be subject to the ENGINEER's review and the CONTRACTOR may proceed with clarification request requirements, if applicable, as approved by the ENGINEER. Adjustments to the Contract Price or time should be included with the clarification request. Clarification requests shall be authorized by Change Order as described above.

The ENGINEER shall supply the CONTRACTOR with the above forms and additional information following project initiation.

I. CHANGES IN CONTRACT PRICE, General Condition No. 14.

Delete Subparagraph (C) of Paragraph 14.1 and add the following:

The value of the increase or decrease shall be determined by the ENGINEER on the basis of costs and a percentage for overhead and profit. Costs shall only include labor (payroll, payroll taxes, fringe benefits, workmen's compensation, etc.), materials, equipment and other incidentals directly related to the work involved. The maximum percentage which shall be allowed for CONTRACTOR's combined overhead and profit, shall be as follows:

a. For all such work done by his own organization, the CONTRACTOR may add up to 10% of his actual net increase in costs.

b. For all such work done by Subcontractors, each Subcontractor may add up to 10% of his actual net increase in costs for combined overhead and profit. The CONTRACTOR may also add up to 5% of the Subcontractor's total for his combined overhead and profit; provided that no overhead or profit shall be allowed on costs incurred in connection with premiums for public liability insurance or other special insurance directly related to such work.

In such case, the CONTRACTOR will submit in form prescribed by the ENGINEER an itemized cost breakdown together with supporting data.

The amount of credit to be allowed by the CONTRACTOR to the OWNER for any such change which results in a net decrease in cost, will be the amount of the cost net decrease as determined by the ENGINEER, as described above, plus a percentage for combined overhead and profit as outlined above, when both additions and credits are involved with any one change, the combined overhead and profit shall be figured on the basis of the net increase or decrease. The CONTRACTOR will not be required to credit actual incurred overhead expenses to the OWNER on Change Orders involving net decreases to the Contract Price.

J. TIME FOR COMPLETION AND LIQUIDATED DAMAGES; General ConditionNo.15.

Add the following Paragraph 15.5:

15.5 When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation. A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

K. SUBSURFACE CONDITIONS, General Condition 17.

Add the following paragraph 17.3:

17.3 In the event the CONTRACTOR and the ENGINEER are unable to reach an agreement concerning the alleged changed conditions, the CONTRACTOR shall keep an accurate and detailed cost record which will indicate not only the cost of the work done under the alleged changed conditions, but the cost of any remaining unaffected quantity of any bid item which has had some changed conditions. Failure to keep such a record shall be a bar to any recovery of costs by reason of such alleged changed conditions. Such cost records will be kept with the same particularity as force account records, and the ENGINEER shall be given the same opportunity to supervise and check the keeping of such records as is done in force account work.

Records are to include, but not be limited to: date; weather conditions; equipment type; hours used, work performed and location; personnel; work performed, hours worked and location; subcontractors on project; nature of unusual or differing site condition; delays, disruptions, and out-of-sequence work; and daily production, anticipated vs. actual.

L. PAYMENT TO THE CONTRACTOR, General Condition No. 19 1.0

Add the following to paragraph 19.1:

If the OWNER is a public entity at least ninety percent of the calculated value of any work completed shall be paid until fifty percent of the work required by the contract has been performed. Thereafter, the public entity shall pay any of the remaining installments without retaining additional funds if, in the opinion of the public entity, satisfactory progress is being made in the work. The withheld percentage of the contract price of any such work, improvement, or construction shall be retained until the contract is completed satisfactorily and finally accepted by the public entity.

Add the following paragraphs 19.1a, 19.8, 19.9, 19.10, and 19.11:

19.1a On a daily basis the CONTRACTOR shall measure all Unit Price WORK which cannot be readily measured in the field after the WORK has been completed. No less than weekly the CONTRACTOR shall submit an itemized list of all such work with backup data to the ENGINEER for review. No payment shall be made for any such WORK unless the procedure in this paragraph has been followed.

19.8 The ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning Project upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents and any qualifications stated in the recommendation) and the CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been

made to check the quality or the quantity of the Work, or that the means, methods, techniques, sequences, and procedures of construction have been reviewed or that any examination has been made to ascertain how or for what purpose CONTRACTOR has used the moneys paid or to be paid to CONTRACTOR on account of the Contract Price, or that title to any Work, materials or equipment has passed to OWNER free and clear of any Liens.

19.9 The ENGINEER may refuse to recommend the whole or any part of any payment if, in his opinion, it would be incorrect to make such representations to OWNER. He may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

19.9.1 the Work is defective, or completed Work has been damaged requiring correction or replacement,

19.9.2 written claims have been made against OWNER or Liens have been filed in connection with the Work,

19.9.3 the Contract Price has been reduced because of Modifications,

19.9.4 OWNER has been required to correct defective Work or complete the Work,

19.9.5 of CONTRACTOR's unsatisfactory prosecution of the Work in accordance with the Contract Documents, or

19.9.6 CONTRACTOR's failure to make payment to Subcontractors, or for labor, materials or equipment.

19.10 When CONTRACTOR considers the entire work ready for its intended use CONTRACTOR shall, in writing to OWNER and ENGINEER, certify that the entire Work is substantially complete and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving his reasons therefor. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which he may make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating his reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflect- ing such changes from the tentative certificate as he believes justified after consideration of any objections from OWNER.

19.11 Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by OWNER to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by OWNER, nor any act of acceptance by OWNER nor any failure to do so, nor the issuance of a notice of acceptability by ENGINEER, nor any correction of defective Work by OWNER

shall constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents.

M. INSURANCE, General Condition No. 21.

Amend Paragraph 21.3.1 as follows:

Increase damages arising out of bodily injury including death by two or more persons to not less than **$2,000,000** aggregate.

Increase property damage sustained by any one person in any one accident to not less than **$1,000,000**.

Increase property damage sustained by two or more persons in any one accident to not less than **$1,000,000**.

Add a new paragraph 21.6 as follows:

The OWNER, its employees and/or agents shall be named as an additional insured on all insurance policies required in this contract to be furnished by the CONTRACTOR or any subcontractor.

N. INSURANCE AND CONTRACT SECURITY, General Conditions No.21 and 22.

Add the following new paragraph, 21.1.6 to General Condition No. 21 and 22.2 to General Condition No. 22:

Payment for the costs of Insurance and Contract Security shall be made per the "Insurance and Contract Security" lump sum Bid item. If no separate item is provided in the Bid, the costs shall be uniformly distributed to other Bid items.

O. SUBCONTRACTING; General Condition No. 26.

Add the following paragraph 26.6:

The Contractor shall not employ any Subcontractor or other person or organization (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. A Subcontractor or other person or organization identified in writing to OWNER and ENGINEER by CONTRACTOR prior to the Notice of Award and not objected to in writing by OWNER or ENGINEER prior to Notice of Award will be deemed acceptable to OWNER and ENGINEER. Acceptance of any Subcontractor, other person or organization by OWNER or ENGINEER shall not constitute a waiver of any right of OWNER or ENGINEER to reject defective Work. If OWNER or ENGINEER after due investigation has reasonable objection to any Subcon- tractor, other person or organization proposed by CONTRACTOR after the Notice of Award, CONTRACTOR shall submit an acceptable substitute and the Contract Price shall be increased or decreased by the difference in cost occasioned by such substitution, and an appropriate Change Order shall be issued. CONTRACTOR shall not be required to employ any Subcontractor other person or organization against whom CONTRACTOR has reasonable objection.

P. ENGINEER'S AUTHORITY; General Condition No.27.

Add the following paragraphs 27.5 and 27.6:

27.5 Whenever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used, to describe requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective never indicates the ENGINEER shall have authority to supervise or direct performance of the Work or authority to undertake responsibility contrary to the provisions of paragraphs 27.1 and 27.3.

27.6 Neither ENGINEER's authority to act under this Article 27 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

Q. CLAIMS AND ARBITRATION; General Condition No. 30.

Delete paragraphs 30.1, 30.2 and 30.3 and substitute the following:

30.1 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 14 and 15 in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than seven days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within fourteen days after such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

30.2 When functioning as interpreter and judge under paragraphs 27.1 and 30.1, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 27.1 and 30.1 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in Article 20 will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

30.3 All claims, disputes and other matters in question between OWNER and CONTRACTOR arising out of, or relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by Article 20) will be decided by Colorado Law; or, if specifically agreed to in writing by the OWNER and CONTRACTOR, by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining subject to the limitations of this Article 30. Any agreement so to arbitrate and any other agreement or consent to arbitrate entered into in accordance herewith as provided in this Article 30 will be specifically enforceable under the prevailing law of any court having jurisdiction.

30.4 No agreement for arbitration of any claim, dispute or other matter that is required to be referred to ENGINEER initially for decision in accordance with paragraph 30.1 will be made

until the earlier of (a) the date on which ENGINEER has rendered a decision or (b) the tenth day after the parties have presented their evidence to ENGINEER if a written decision has not been rendered by ENGINEER before that date.

30.5 No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder or in any other manner any other person or entity (including ENGINEER, ENGINEER's agents, employees or consultants) who is not a party to this contract unless:

30.5.1 the inclusion of such other person or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration.

30.5.2 such other person or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings, and

30.5.3 the written consent of the other person or entity sought to be included and of OWNER and CONTRACTOR has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.

30.6 The award rendered by the arbitrators will be final, judgement may be entered upon it in any court having jurisdiction thereof, and will not be subject to modification or appeal except to the extent permitted by Sections 10 and 11 of the Federal Arbitration Act (9 U.S.C. Sections 10, 11).

R. TAXES, General Condition No. 31.

Add the following paragraph 31.2:

On all work where the OWNER is a municipality or other public entity, the CONTRACTOR and all Subcontractors shall obtain a SALES TAX EXEMPTION number and therefore will not pay sales tax on materials purchased for this project as allowed by Colorado law. The sales tax exemption application form DR172 is available from the Colorado Department of Revenue, Sales Tax Division, 1375 Sherman St., Denver, Colorado 80261, Telephone 866-3767, Extension 500.

The CONTRACTOR will not be reimbursed by the OWNER for sales tax paid on materials installed as part of the Project Work.

S. Add the Following GENERAL CONDITION No. 32.

USE OF EXPLOSIVES: When the use of explosives is necessary for the prosecution of the work, the CONTRACTOR shall exercise the utmost care so as to not endanger life or property, including new work. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives. The CONTRACTOR shall comply with all local, state and federal laws, ordinances, safety codes and OSHA regulations relative to the handling, storage and use of explosives. All blasting operations shall be under the direct supervision of a duly licensed person. The CONTRACTOR shall be responsible for notifying all parties affected by blasting operations.

SECTION 1000
SPECIAL PROVISIONS

The Special Provisions section is the first section of the Specifications and supplement, modify, delete and or add to the following sections of the Specifications as required specifically for this project. Where any article, paragraph, or subparagraph in the Specifications is in conflict with one of the following provisions the following provisions shall prevail. Any part of such article, paragraph or subparagraph not in conflict with the following provisions shall remain in effect.

1. CONSTRUCTION DOCUMENTS FOR CONTRACTOR

The Contractor will receive at no charge three complete sets of drawings and specifications. Additional copies will be at the Contractor's expense.

The Contractor shall return one copy of the drawings with as-constructed notes to the Engineer following construction

.

2. PUBLIC IMPROVEMENTS

The public improvements for this project include:

1. Sidewalks within City R.O.W.
2. Drainage improvements within City R.O.W.

Prior to acceptance, these items of work must be completed in substantial conformance with these approved construction drawings and specifications and any subsequent approved changes. The Engineer will be required to provide a construction report rendering his opinion as to the conformance of the completed work with the referenced documents.

3. PROJECT ACCEPTANCE FOR PUBLIC IMPROVEMENTS

The City of Steamboat Springs (City) has approved these Drawings and Specifications. Project acceptance requires the Engineer and Geotechnical Engineer to provide construction observation of the work in progress for all public improvements and for select private improvements in accordance with the requirements of the referenced standard specifications and specific project requirements included in these specifications or drawings. The Contractor is responsible for coordination of construction observation services.

The Contractor shall comply with the requirements of these standard specifications as necessary to insure approval and/or acceptance of the completed work. Refer to these standard specifications for specific requirements:

a. Prior to commencement of construction a pre-construction meeting is required.

b. Upon substantial completion of construction the Contractor shall make a request in writing to the Engineer for City Preliminary Acceptance review and inspection. The Engineer is required to review the status of the completed work and provide an initial punch list to the Contractor. The Engineer will submit a written request to City for a Preliminary Acceptance inspection. Accompanying the request, the Engineer will provide the completion status of the Engineer's initial punch list. The Engineer's request will be accompanied by quality control test results and (as necessary) field staking of utility easements.

c. Refer to the standard specifications for the Preliminary Acceptance requirements. Generally, preliminary acceptance requires completion of all punch list items, receipt of record drawings, testing results and observation reports, and recording of all easements.

d. Two years following Preliminary Acceptance by City, a request for Final Acceptance shall be made by the Contractor. If the Final Acceptance inspections by City reveal deficiencies in the project due to poor materials or workmanship of the Contractor, the Contractor shall correct the deficiencies as soon as possible under the contract warranty. If the inspection reveals deficiencies that are due to routine wear and tear, snow plowing, the elements, or other factors not associated with original workmanship or materials the Contractor shall repair the deficiencies as negotiated with the Owner.

e. Upon issuance of a letter of Final Project Acceptance by the City, the Contractor shall be relieved of all warranty liability except for a one-year warranty of items repaired under the original warranty.

By accepting a contract for performing the work, the Contractor agrees to expedite the City acceptance procedure to obtain the Preliminary Acceptance in the same construction season in which the work was performed. Inspection after November 1 may be made only by special request.

4. WARRANTY

The Contractor shall guarantee all materials and equipment furnished and work performed for the time period(s) as specified herein for all private improvements and as specified in the City of Steamboat Springs Standard Specifications for all public improvements, regardless of these requirements.

As a minimum, the Contractor shall warrant and guarantee for a period of one (1) year from the date of substantial completion of the system for private improvements and from the date of preliminary acceptance for public improvements that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The Contractor shall warrant and guarantee all sidewalk and drainage improvements until final acceptance of the work is granted by the City. Final acceptance for these items can not be requested until two (2) years following preliminary acceptance.

The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred.

5. PROTECTION OF WORK, PROPERTY AND PERSONS

The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the work and other persons who may be affected thereby, all the work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the Work may affect them. The Contractor will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable.

The utilities shown on the Drawings are a representation of existing utility locations to the best knowledge of the Engineer. Field locations shown are approximate only. The utility information provided is solely for the purpose of aiding the Contractor in the bidding process and in no way relieves

the Contractor from obtaining timely field locations of utilities or in confirming the existence of utilities which may or may not be shown on the Drawings.

The Contractor shall be responsible for the notification of and coordination with all utility companies for accurate field locations of utilities which may be damaged by the Contractor during the performance of work. If blasting is required in the vicinity of natural gas pipelines, the Contractor shall request a leak survey as required by Federal Law.

The Contractor shall also be responsible for the notification and coordination and costs required to field verify the location of all buried private utilities prior to beginning excavation, including the services of an independent utility locating service.

The immediate repair of damaged utilities or special precautions required to protect existing utilities from damage shall be the Contractor's responsibility.

Where existing Fences and Improvements are present, the Contractor shall be responsible for removing and replacing such items as part of the Work. Items are to be restored to at least an equal quality to that which existed prior to disturbance. The cost for such work is to be incorporated into other bid items, unless a separate bid item is provided for the work.

6. ENGINEER'S PERSONNEL AT THE CONSTRUCTION SITE

The presence or duties of the Engineer's personnel at the construction site, whether as an on-site representative for construction observation or otherwise, do not make the Engineer or its personnel in any way responsible for those duties that belong to the Contractor, and do not relieve the Contractor of their obligations, duties and responsibilities including, but not limited to all construction methods, means, techniques, sequences and procedures necessary for coordinating and completing all portions of the construction work and any health or safety precautions required by such construction work. The Engineer and its personnel have no authority to exercise any control over any construction contractor or their employees in connection with their work or any health or safety programs or procedures and have not been retained to correct or report on health or safety deficiencies of the construction contractor or other entity or any other persons at the site. The Contractor shall be solely responsible for jobsite and worker safety. The Contractor also agrees that the Engineer shall be made an additional insured under the Contractor's policies of general liability insurance.

7. INDEMNIFICATION

The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the Work, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts.

The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, his agents or employees arising out of the preparation or approval of Drawings, opinions, reports, surveys, Change Orders, designs or Specifications.

8. DRAWINGS AND SPECIFICATIONS

It is the intent of the Specifications and Drawings to describe a complete project (or portion thereof) to be constructed in accordance with the Contract Documents. Any work that may reasonably be inferred from the Specifications or Drawings as being required to produce the intended results shall be supplied whether or not it is specifically called for.

The apparent silence of the Specifications and Drawings as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications and Drawings shall be made upon that basis.

In case of conflict between the Drawings and Specifications, the Specifications shall govern. Figure dimensions on Drawings shall govern over scale dimensions, and detailed Drawings shall govern over general Drawings.

Any discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported to the Engineer, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after his discovery of such discrepancies, inconsistencies or ambiguities shall be done at the Contractor's risk. The Contractor is responsible to verify the quantities of all items included in the work and to verify all dimensions and details prior to installation of the work.

9. ALTERNATIVE MATERIALS, EQUIPMENT OR DESIGNS

If the Contractor proposes alternative materials, equipment, designs, or other changes to the drawings or specifications, the Contractor shall be responsible for all services performed by the Engineer or the Engineer's consultants to evaluate such alternatives, to provide opinions of such alternatives or to incorporate changes resulting from such alternatives into reports, drawings, specifications or other documents and to facilitate review of such changes by review agencies.

10. REQUESTS FOR CLARIFICATION OR INTERPRETATION (RFIs)

The Contractor may after exercising due diligence to locate required information, request from the Engineer clarification or interpretation of the requirements of the Contract Documents. However, if the information requested by the Contractor is apparent from field observations, is contained in the Contract Documents or is reasonably inferable from them, the Contractor shall be responsible to the Owner for all reasonable costs charged by the Engineer for the additional services required to provide such information.

11. LIMITS OF CONSTRUCTION

Contractor shall limit his work area to those areas within City of Steamboat Springs Rights-of-way temporary and permanent easements and the Owner's property as identified on the drawings and in these specifications. The Contractor is not permitted to encroach on any adjacent property without the specific written permission of the property owner.

The Contractor shall install "orange" construction fencing on steel fence posts at 10-foot centers where work activities are within 20 ft of adjacent improvements and facilities owned by others.

12. TRAFFIC AND PEDESTRIAN CONTROL

Work zone traffic and pedestrian control is the sole responsibility of the Contractor. All traffic control shall be in accordance with applicable OSHA regulations and the latest edition of the Manual on Uniform Traffic Control Devices. The Contractor shall coordinate the phasing, vehicular access, pedestrian circulation, emergency access, etc. with other ongoing projects in the vicinity to minimize disruption to the public.

The Contractor shall submit traffic and pedestrian control plans to the Engineer for review and City approval. The plan must be submitted a minimum of one week prior to commencing construction. No construction will be allowed prior to approval of such plan.

Payment for traffic and pedestrian control shall be paid at the lump sum bid item for “Traffic Control”.

See City of Steamboat General Specifications Section 1570, Traffic and Pedestrian Control, for additional requirements.

13. MATERIALS TESTING

The Owner shall be responsible for the costs of quality assurance testing. The Contractor shall be responsible for coordination and scheduling with the QA Firm. The Contractor is responsible for all costs associated with retesting of failed tests or additional testing costs resulting from lack of or inadequate coordination by the Contractor. Testing frequencies shall be per the appropriate standard specifications or as specified herein. A summary report will be required by the QA Firm in accordance with the appropriate standard specification requirements.

The Contractor is responsible for all internal quality control testing.

14. CONSTRUCTION STAKING

The Owner’s Surveyor shall provide construction staking and surveying per Section 1031 of these specifications. The Contractor shall be responsible for providing a survey schedule to the Engineer in accordance with Section 1031 and for coordinating the staking and survey work with the Owner’s Surveyor. All other necessary construction staking or surveying shall be the Contractor’s responsibility. Should the Contractor choose to utilize machine-control methods for construction staking, a construction staking plan shall be provided for review and approval by the Owner. The construction staking plan may modify the specifications of Section 1031 in order to check the work in the most efficient and beneficial manner.

15. PERMITS

Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the Contractor unless otherwise stated in the Contract Documents. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn and specified.

Preliminary calculations indicate that the disturbed area required for this work is just under 1 acre. This calculation does not account for additional disturbance that might occur due to the Contractor’s operations. The Contractor shall evaluate the need for acquisition of a Construction Site Discharge Permit from CDPHE and obtain the permit as required by state law.

16. CONSTRUCTION SITE MANAGEMENT PLAN

A Construction Site Management Plan is required by the City of Steamboat Springs. The Contractor shall prepare a Construction Site Management Plan and receive approval from City Construction Services prior to starting construction. This is considered a temporary permit to be secured and paid for by the Contractor. The Contractor shall be required to comply with the requirements of the permit. A copy of the Permit shall be sent to the Owner and Engineer. The cost for the Permit shall be incidental to the project.

17. GEOTECHNICAL

These civil drawings and specifications do not cover soils requirements beneath, immediately adjacent to, or within the influence zone of any buildings or structures.

18. SIGNING AND STRIPING

Sign relocation is required as a part of this project, as shown on the Drawings.

19. HOT MIX ASPHALT

Hot mix asphalt paving and patching shall meet the requirements of the City of Steamboat Springs Standard Specifications Section 2513.

20. PAVEMENT REMOVAL, REPLACEMENT, AND TEMPORARY SURFACING

Pavement Removal and Replacement shall be per the City of Steamboat Springs Standard Specifications Section 2238.

Pavement removal for the sidewalk, curb and gutter shall extend to one foot beyond the edge of the new concrete. Pavement removal for the utility excavations shall be kept to a minimum as required by the Contractor's methods, but shall be four ft. maximum in width. Pavement removal in excess of the aforementioned limits will not be measured for payment and will be considered as incidental to the Work.

The Contractor is alerted to the requirement for temporary surfacing on this project. Contractor shall place and compact "black base" course (recycled asphalt millings) as temporary finish surface for pavement removal areas as listed below. Permanent asphalt surfacing will be completed by others approximately 3 weeks after completion of this project. During these 3 weeks the contractor is responsible to monitor and maintain all temporary surfacing to the City's satisfaction.

Pavement patching for the sidewalk, curb and gutter shall be:

a) full depth of "black base" recycled asphalt millings from the top of the hot mix asphalt up to finish grade (temporary) on the roadway side.
b) hot mix asphalt matching the existing pavement thickness up to finish grade on the parking lot or driveway side.

Pavement patching for utility trench excavations shall be:

a) hot mix asphalt matching the existing pavement thickness up to finish grade through private drives and parking lots.
b) 12" of flow fill backfill up to existing pavement grade for transverse roadway trenches
c) 10" of Class 6 Aggregate base course; plus
d) 6" of "black base" recycled asphalt millings or Class 6 Aggregate base course up to finish grade for longitudinal roadway trenches (temporary).

Measurement and Payment

a) Along Bituminous Pavement Surfaced Trenches: will be measured and paid for at the Unit Price per Square Yard under the item Pavement Removal and Replacement.

   Payment width shall be the actual width of bituminous pavement installed not to exceed the Maximum Pavement Replacement Pay width shown on the Drawings.

   Payment shall include protection of existing pavement, cutting excavation and removal of the pavement structure; installation of base courses, installation and removal of temporary pavement, installation of bituminous pavement and all other incidental materials or Work required.

b) At Miscellaneous Bituminous Pavement Surfaced Locations: such as at test holes or other locations designated by the Engineer. Measurement and payment for the bituminous pavement to exclude base course material will be at the Unit Price per Square Yard under the item Pavement Removal and Replacement, based upon actual square yards in place.

   Payment shall include protection of existing pavement; cutting, excavation and removal of the pavement structure; installation and removal of temporary pavement; installation of bituminous pavement and all other incidental materials or Work required.

21. 4 FIBER OPTIC (BROADBAND) CONDUITS AND PULL-BOXES

The Contractor shall install two parallel 4” Schedule 40 PVC conduits as shown on the drawings.

Pull Boxes shall be installed as shown on plans (every max 1000lf, 180deg of combined bends or at any 90deg bends, at locations determined necessary) The conduit is intended for future broadband upgrades. Installing wire or innerduct within this conduit is not a part of this project. The bury depth shall be 30- 36” below finish grade, and offset from edge of any sanitary sewer, water and storm sewer pipe a minimum of five feet horizontal distance). Pull boxes shall be installed as specified in the plans and standard details. Pull box shall be 24”x36”x18” in dimension, H20 traffic rated box and lid, lid shall include adequate bolt connections so that the lid cannot be opened by personnel not serving as fiber optic providers, cover label shall read “Fiber Optics”. 10 gauge solid copper tracer wire with 45 mil polyethylene coating shall be taped to the top of the conduit no less than every 20-feet using 2 inch wide PVC tape. 2,500lb pull tape shall be installed in the conduit.

Contractor shall submit to the Owner for approval a fiber optic conduit system package prior to installation. This submittal shall include manufacturer cut sheets, specifications, and installation/connection procedures for conduit material, pull box, tracer wire, and pull tape. Costs for conduit installation shall include the cost of all materials and installation, including pull tape, tracer wire, and all necessary trenching and backfill. The Owner reserves the right to remove this work from the scope of the contract prior to signing the contract.

Contractor must ensure that conduit systems are not covered or hidden from view before the facilities are inspected visually by the project engineer. A Mandrel pull test shall be conducted by the contractor in the presence of the project engineer. The contractor, using an appropriately sized, flexible-steel mandrel, shall insert and pull the mandrel through the length of the conduit system in the presence of the Engineer without encountering blockages or obstructions.

Payment shall be made under the bid item: “4-inch Broadband Conduit per linear foot, and “Pull-Boxes” per each, and shall include the cost of all labor, equipment, materials, excavation, backfill, bedding, compaction, tracer wire, pull tape and all other incidentals necessary to complete the work.

22. COORDINATION BETWEEN CONTRACTORS

The Contractor is hereby notified that there will be active construction project(s) in the surrounding area and within the limits of this Project. These projects may affect the Contractor's schedule. The City and Colorado Mountain College reserve the right at any time to contract for and perform other additional work within the limits of, or adjacent to, the Project.

When separate contracts are let within the limits of any one project, or in areas adjacent thereto, the Contractor shall conduct his work so as to cause the least interference with or hindrance to the progress or completion of the work being performed by other contractors. The Contractor assumes the positive obligation of cooperating with such other contractors and coordinating his activities with theirs. When contracts are awarded to separate contractors for concurrent construction within a common area, the contractors, in conference with the City and Colorado Mountain College, shall establish a written joint schedule of operations. Such schedule will set out approximate dates and sequences for work to be performed with due regard to needs and contract time limitations of each contract. The City may allow modification of the schedule when mutual benefit to the contractors, the City, and Colorado Mountain College will result. Any modification of the joint schedule shall be in writing, mutually agreeable, and signed by the contractors.

If there is a difference of opinion as to the respective rights of the Contractor and others doing work within the limits of or adjacent to the Project, the City and Colorado Mountain College will decide as to the respective rights of the various parties involved in order to secure the completion of the Work in general harmony and in a satisfactory manner. The decision of the City and Colorado Mountain College is final and binding and is not cause for claims by the Contractor for additional compensation.

The Contractor is not responsible for damage to work performed on the Project or on other contracts within or adjacent to the site of the Project that may be caused by or on account of the work of other contractors. The Contractor is responsible for any damage done or caused by his operations, (including all subcontractors) within or adjacent to the site of the Project, and the Contractor shall repair or replace any such damage in a manner satisfactory to the City and Colorado Mountain College and at no cost to the City and Colorado Mountain College.

The following is a list of project(s) within the surrounding area with which the Contractor needs to coordinate activities:

Project: Bob Adams Drive Water Main Replacement
Owner: City of Steamboat Springs
Project Manager: Jon Snyder, Utilities Engineer
Anticipated Construction: May 1st to June 15th, 2013

Project: 12th Street and Bob Adams Drive Pavement Overlay
Owner: City of Steamboat Springs
Project Manager: Ben Beall, City Engineer
Anticipated Construction: August 1st to September 1st, 2013

The contractors identified to perform the above projects are known to be working or will be working in the area.

23. CONCRETE SIDEWALK AND CURB & GUTTER BED COURSE

It is anticipated that segments of sidewalk, curb and gutter abutting the existing roadway will be constructed upon existing gravel courses, with minimal subgrade replacement with imported base course. In such areas a nominal 1" to 2" depth bed course may be necessary to facilitate final subgrade preparation if the existing materials cannot be graded and compacted satisfactorily.

Where no underlying granular materials exist in sidewalk, curb and gutter areas, a full depth (4") bed course will be required. Where a mixture of clay and underlying granular materials exist in sidewalk, curb and gutter areas, and in questionable areas, the Contractor shall coordinate with the geotechnical engineer to obtain recommendations for subgrade preparation.

24. LABOR AND EQUIPMENT RENTAL

Work included: This specification covers the furnishing and operation of equipment and the furnishing of labor for miscellaneous work authorized in writing by the Engineer or Owner which is beyond the original scope of work and which the Engineer or Owner has agreed would be paid for at the equipment and labor rental rates proposed by the contractor in his Bid.

a. Equipment furnished shall be of the type, size and equipped as described by the Contractor in the Equipment and Labor rental portion of the bid.

   Equipment must be in good operating condition and must be maintained in good operating condition by the contractor throughout the life of the contract.

b. The equipment shall be furnished complete with competent operating personnel. Operators shall be qualified to perform all reasonably anticipated work in a skillful and workman-like manner.

c. The Contractor shall furnish competent laborers qualified to perform all reasonably anticipated work in a skillful and workman-like manner, and all supervision.

d. The Contractor shall maintain a Job Diary to record activities, progress and accomplishments. At the close of each day's operations, when equipment and labor rental work is being performed, the Contractor shall prepare, and submit for approval to the Engineer or the Owner, an equipment and labor rental log listing the date, times and total hours, computed to the nearest one-half hour, each piece of equipment and laborer actually operated or performed work. Total hours shall include time spent in performing work as well as time for the equipment to move around the work site when performing such work. Total hours will not include transportation to and from the work site, maintenance of equipment, or nonproductive or "down-time" of the equipment.

26. MEASUREMENT AND PAYMENT

a. Measurement and payment will be made in accordance the Measurement and Payment subsections within each specification section and as indicated in the Special Provisions.
b. Where specification sections do not contain Measurement and Payment subsections, measurement and payment will be made in accordance with Section 01025 Measurement and Payment.
c. Items not measured and paid for under individual Sections, in the Special Provisions or in Section 01025 Measurement and Payment, shall be considered as incidental to the Work.

SECTION 1020
STANDARD SPECIFICATIONS

The Standard Specifications for construction of this project shall be the 2010 City of Steamboat Springs Engineering Specifications (http://steamboatsprings.net/departments/public_works/engineering/) and the April 1, 2010 City of Steamboat Springs Standard Specifications for Water and Wastewater Utilities (http://steamboatsprings.net/departments/public_works/utilities/). The Contractor is required to obtain copies of these Standard Specifications for pricing and construction of the work.

The Contractor shall comply with the applicable requirements of the following sections of the 2010 City of Steamboat Springs Engineering Specifications for construction of public roadways, sidewalks, embankment construction, grading, drainage and storm sewer within public ROWs.

1030	Alternates and Substitutions
1045	Engineering Services
1050	Construction Surveying
1400	Quality Control
1420	Referenced Standards
1505	Mobilization
1560	Dust Control
1565	Erosion Control
1570	Traffic and Pedestrian Control
1600	Material and Equipment
1770	Contract Closeout
1785	Warranties

Division 2000 – All Sections, except 2236 Crusher Fines Paving, 2521 Concrete Unit Pavers and 2720 Catch basin Inlets

The Contractor shall comply with the applicable requirements of the following sections of the April 1, 2010 City of Steamboat Springs Standard Specifications for Water and Wastewater Utilities for construction of all water and wastewater utilities.

All sections, <u>except</u>:

14	Traffic Regulation
15	Water Pollution Control
16	Dust Control
22	Revegetation
26	Pavement Removal and Replacement

The following supplements, modify, delete or add to the Standard Specifications and take precedence over the Standard Specifications. Where any article, paragraph, or subparagraph in the Standard Specifications is in conflict with one of the following provisions the following provisions shall prevail. Any part of such article, paragraph or subparagraph not in conflict with the following provisions shall remain in effect.

Throughout these standard specifications, the term Project Engineer shall initially refer to the Project Design Engineer (Engineer of Record) on matters related to the specific site design and design intent. The Project Engineer may need to refer to the City Public Works Department on matters related to public improvements or administration of City permits or City construction requirements. Otherwise, the term Project Engineer shall refer to the project Owner's designated representative. The term Owner's Representative shall refer to the Project Design Engineer on matters related to the specific site design and design intent, on matters related to initial review of products and materials required by these specifications and on matters related to the private (non Public) improvements. The Owner's Representative may need to refer to the City Public Works Department on matters related to administration of City permits or City construction requirements. Otherwise, the term Owner's Representative shall refer to the project Owner's

designated representative. The term Owner shall refer to the City of Steamboat Springs for all Public Improvements upon Final Acceptance of the public improvements and shall refer to the project Owner's designated representative for all other matters and prior to Final Acceptance of the public improvements.

SECTION 1045 ENGINEERING SERVICES

Paragraph 3.02 A.3.a) revise the first line as follows:
Prior to placement of base course and following "blue top" staking by the surveyor, observe and document….

SECTION 1050 CONSTRUCTION SURVEYING

Paragraph 3.01 C is modified as follows:
Delete the entire paragraph after the first two sentences, beginning with "EDM's, total stations, and GPS receivers shall be checked on a National Oceanic and Atmospheric Administration (NOAA) calibrated baseline. Equipment calibration accuracy and adjustments made to meet requirements specified in the …"

Paragraph 3.01 F is modified as follows:
Delete sub-paragraphs 8 and 9.

SECTION 1565 – EROSION CONTROL

Paragraph 1.03 A is modified as follows:
The erosion and sediment control plan shall be submitted to the City of Steamboat Springs as part of a Construction Site Management Plan required for a construction permit (building permit, grading permit) for review and approval prior to initiating construction activities. The Design Engineer shall have no authority or responsibility to review sediment and control practices, procedures and materials.

SECTION 1570 – TRAFFIC CONTROL

Paragraph 1.03 A is modified as follows:
The Design Engineer shall have no authority or responsibility for review or administration of the Traffic Control Plan (TCP) and Methods of Handling Traffic (MHT).

SECTION 1770 – CONTRACT CLOSEOUT

Paragraph 1.05 A is modified by deleting the last sentence.

SECTION 1785 – WARRANTIES

The requirements of this section are limited to Public Improvements that will be accepted by the City of Steamboat Springs or other public entities.

SECTION 2200 EARTHWORK

Paragraph 3.06 C 2 first sentence is modified as follows:
No fill materials should be placed during poor/inclement weather conditions.

SECTION 2221 EXCAVATION, BACKFILL AND COMPACTING

Paragraph 3.02 is modified by adding the following paragraph:

Pipe bedding, design and installation should follow ASTM D2321. If the granular bedding does not meet filter criteria for the enclosing soils, then non-woven filter fabric (Mirafi® 140N, or the equivalent) should be placed around the bedding.

Paragraph 3.05 B 3 is modified as follows:
Test Results: The testing laboratory will have a period of 24 hours after field-testing to report the field results verbally. Written confirmation of results will be provided later to the Contractor, Owner and Project Engineer.

SECTION 2232 AGGREGATE BASE COURSE

Paragraph 2.01 B is modified by adding the following.
Percent passing the 6 inch sieve shall be 100
Percent passing the No. 4 sieve shall be 30-65
Percent passing the No. 200 sieve shall be 3-15

Paragraph 3.01 D 6 is modified as follows:
Temperature must be above 32 degrees and the sub grade must be free of frost penetration before any proof roll on road sub grade is conducted.

SECTION 2238 PAVEMENT REMOVAL AND REPLACEMENT

Paragraph 2.01 C is modified as follows:
Surface Course: Bituminous pavement shall meet the requirements of Section 2513.

SECTION 2513 ASPHALT PAVING

Paragraph 2.01 A is modified as follows:
Delete the reference to the “2005 Standard Specifications (Blue Book)” and replace with the “2011 Standard Specifications (Green Book)”.

SECTION 2515 CONCRETE PAVING

Paragraph 2.01 A, is modified by adding the following:
Concrete for sidewalks, paving bands, valley pans, trails, curb and gutter shall be CDOT Class D with AASHTO M43 size no. 67 reinforced with fibrous concrete reinforcing at the rate of 1.5 Lb. per cubic yard. All other concrete pavement within roadway travel lanes, such as concrete crosswalks, shall be CDOT Class P reinforced with fibrous concrete reinforcing at the rate of 1.5 lb. per cubic yard.

Paragraph 2.01 G.1. is modified as follows:
Fibrous concrete reinforcement shall be manufactured by Propex Concrete Systems, Inc.

Paragraph 2.01 G.2. is modified as follows:
a) Tensile Strength 70-110 ksi

Paragraph 3.04 A is modified as follows:
Smooth dowel bars shall be placed at each sidewalk expansion joint during the concrete pour. One half of the dowel length shall be coated with a bond breaker or an approved covering.

Paragraph 3.04 B, revise the last sentence as follows:
Placement tolerances for dowels shall be per CDOT Standard M-412-1, including the referenced Standard Specifications subsection 412.13(b)2.

Paragraph 3.05 A, revise the third sentence as follows:
The joints shall be constructed to between 1/4 and 1/3 the concrete depth by saw cutting.

Paragraph 3.05 B is modified as follows:
Expansion joints, ½ inch wide, by full slab depth, shall be installed at each side of structures, at ends of curb returns, at all curb ramps, at 25-foot intervals along the curb, at approximately 100-foot intervals along sidewalks, or as noted on the Drawings.

Paragraph 3.05 C is modified as follows:
When tie bars or dowel bars are specified, they shall be installed within the tolerances and of the size, grade, and spacing specified.

Transverse construction joints and expansion joints shall be constructed as shown on the Drawings. Transverse construction joints shall be constructed when initial set is imminent. Transverse joints shall not be constructed within 3 feet of another transverse joint. If sufficient concrete has not been mixed at the time of interruption to form a slab at least 3 feet long, the concrete back to the preceding joint shall be removed and the bulkhead placed in accordance with the requirements for standard tie bar placements. Transverse construction joints shall be placed at the end of each day's placement.

Tie bars shall be inserted into plastic state concrete or into drilled holes in hardened concrete with epoxy as shown on the Drawings. Holes with a diameter ¼" greater than the required bar diameter shall be drilled laterally into the hardened concrete slabs at one half the slab depth. Each hole shall be cleaned out with compressed air, stiff bristled cylindrical brush, or other approved means until there is no longer any evidence of dust, debris or loose material in the hole.

An approved epoxy shall be used and installed according to the manufacturer's instructions. Epoxy shall be placed in the back of each hole with an applicator that will reach the end of the drilled hole. A sufficient amount of epoxy shall be placed in each hole and on each bar to insure that the bar will be completely covered and to minimize voids or air pockets.

SECTION 2623 CULVERT AND STORM PIPE INSTALLATION

Paragraph 2.03 High Density Polyethylene Pipe (HDPE): shall meet the requirements of Section 2521 HDPE Pipe and Installation of these specifications.

SECTION 2925 TOPSOIL

Paragraph 2.02 A is modified and 1st sentence will be replaced by -Topsoil proposed for importation to the project shall be tested by a soils lab for fertility. As part of the analysis, the lab will provide recommendations for improving soil fertility above and beyond the amendments outlined in this Section, Paragraph 3.01 B.

Paragraph 2.02 C is removed.

SECTION 2933 - REVEGETATION

Replace Section 2.01, B with Native grass seed mix shall be:

Bromus biebersteinii	Smooth Brome (Meadow)	6lbs PLS/ac
Agropyron desertorum	Crested Wheatgrass (Standard)	6lbs PLS/ac
Festuca ovina v. duriuscula	Hard Fescue (Durar)	3lbs PLS/ac
Agropyron smithii (Arriba)	Western Wheatgrass	8lbs PLS/ac

Elytrigia intermedia	Intermediate Wheatgrass	9.5lbs PLS/ac
Poa pratensis	Kentucky Bluegrass	2lbs PLS/ac
Phleum pratense L.	Timothy, climax	.5lbs PLS/ac
Lollium mulitflorum	Annual Ryegrass	5lbs PLS/ac
		40lbs PLS/ac

SECTION 1031
STAKING, QUANTITIES, AND AS-CONSTRUCTED MEASUREMENTS
P.S. (08-08)

PART 1 GENERAL

1.1 DESCRIPTION

A. Work Included:

This work consists of the construction surveying, calculating, and staking necessary for the construction of all elements of the work.

1.2 QUALITY ASSURANCE

The work shall be done under the supervision of a Professional Land Surveyor (PLS) or Professional Engineer (PE) as defined and required by the State of Colorado. Staking and surveys shall be completed by persons experienced in construction surveying who are capable of taking accurate measurements, determining when smaller survey tolerances are necessary, and providing neat, legible and accurate field notes or sketches.

The survey tolerances specified herein shall be considered maximums. When necessary the Contractor shall supply more accurate staking to achieve the intended results at critical locations.

All survey equipment shall be checked and calibrated in accordance with industry standards and CDOT Survey Manual.

1.3 SUBMITTALS

In writing, supply the staking procedures proposed to meet the requirements of this section for the Engineer's review and concurrence. Include a schedule indicating when Owner supplied survey work for the various work segments is anticipated to be required. Submit this data at, or before, the pre-construction meeting; or, if none is held, at a time mutually agreeable with the Engineer.

PART 2 PRODUCTS

No products this Section.

PART 3 EXECUTION

3.1 GENERAL

A. Notification:

Supply the Engineer with an updated schedule for Owner supplied survey work as schedule changes occur. Provide a reasonable amount of time for the Owner to respond based upon the extent of survey work needed. A minimum notification of 2 days is required. Any delays in the performance of project work which may result from the Contractor's failure to give reasonable notice of the need for Owner supplied survey work shall be the Contractor's sole responsibility.

B. Discrepancies:

Any known or suspected discrepancies found in the field staking when compared to the Drawings, Specifications, other field staking or site conditions shall be immediately reported to the Engineer. Work done by the Contractor after his discovery of such discrepancies shall be done at the Contractor's risk.

C. Staking

1. Owner's Responsibility:

   In general the Owner shall provide overall project control staking only. This will typically include base lines, bench marks, and in some instances location stakes for some facilities.

   The Owner shall provide detailed staking as described herein.

2. Contractor's Responsibility:

   Verify staking information provided by the Owner prior to contractor staking or start of construction activities

   Carefully preserve and reference all Owner supplied bench marks, reference points and staking. In the case of willful or careless destruction, Owner supplied staking shall be reset by the Owner and the actual cost of such re-staking shall be deducted from the Contractor's payment.

   Complete and carefully preserve all detailed staking which is necessary to install the Work to accurate line and grade. If the Contractor's stakes are destroyed during progress of the work and are deemed necessary by the Engineer to accurately complete the work, the Contractor shall reset such stakes at no additional cost to the Owner. (The Contractor is cautioned not to prematurely destroy horizontal offset and elevation reference stakes.)

   Routinely check the work as it progresses to be sure it conforms with the staking.

D. Quantity Surveys:

Pay quantity surveys are divided into three categories and are to be measured and calculated as follows:

1. Items which can be tabulated directly using lineal or area measurements or number count and which can be easily verified at a later date with field measurements. These items are to be field measured by the Contractor and supplied in tabular form with the pay requests. Examples of these items include pipe length, manholes, valves, acreage of revegetation, etc..

2. Items which are buried and which cannot be easily verified after the work is complete. The Contractor shall measure these items daily as they are being installed and no less than weekly submit an itemized list of all such quantities with backup data to the Engineer for review. Examples of these items include spot gravel placement, washed rock used for foundation stabilization, etc..

3. Volumetric quantities which require field measurements and detailed drafting and/or other calculation procedures to arrive at the pay quantities. Measurements for these quantities shall be made by the Contractor. These measurements will be supplied to the Engineer and the final quantities will be calculated by the Engineer. Examples of these items include earthwork, base

and subbase gravels, etc.

E. As-Constructed Measurements:

The Contractor shall be responsible for measuring or referencing all facilities which are to be included on record drawings and which will be buried and cannot be measured at a later date. The Contractor shall submit his proposed methods for measurement or referencing to the Engineer prior to construction.

The Engineer shall supply a set of drawings to the Contractor to be used for keeping the as-constructed measurements. The Contractor shall use the drawings and other supplemental information that may be required to keep all measurements in a neat and legible manner and assure that the measurements are accurate.

Refer to the City of Steamboat Springs Standard Specifications for Water and Wastewater Utilities for specific requirements.

3.2 STAKING, QUANTITIES, AND AS-CONSTRUCTED MEASUREMENTS

A. Sanitary and Storm Sewer Collection Systems:

1. Owner's Responsibility:

Centerline location stakes for manholes, inlets, and cleanouts.

Alignment stakes near the ends of sewer service lines.

Invert elevations of manholes, inlets, cleanouts and end of service lines.

All other construction staking required to be provided by the Engineer in Section 6 of the City of Steamboat Springs Standard Specifications for Water and Wastewater Utilities.

2. Contractor's Responsibility:

Horizontal offset and elevation reference stakes as needed.

Provide grade control methods to assure lines are being installed at the grades required and/or with the proper cover.

Assure that manhole rims, inlet rims, cleanouts, and any other facilities are set to the proper elevation relative to the final surface grade.

Assure that service lines terminate at the locations specified in the plans and specifications in relation to the street right of way or other criteria specified.

All other construction staking required to be provided by the Contractor in Section 6 of the City of Steamboat Springs Standard Specifications for Water and Wastewater Utilities.

3. Survey Tolerance:

Horizontal = 0.5'; Vertical = 0.03'.

4. Quantities:

   Provide quantity information in tabular form with each pay request to include:

   a. Manhole to manhole distances for mains
   b. Service line lengths by lot or house number.
   c. Manhole depths tabulated by manhole number.
   d. Similar tabulations for other facilities.

B. Water Distribution Systems:

1. Owner's Responsibility:

   Centerline location stakes for water lines, valves, bends, and fire hydrants.

   Alignment stakes near the ends of water service lines.

   All other construction staking required to be provided by the Engineer in Section 6 of the City of Steamboat Springs Standard Specifications for Water and Wastewater Utilities.

2. Contractor's Responsibility:

   Horizontal offset and elevation reference stakes for all facilities.

   Provide grade control to assure that the lines are installed at the proper cover.

   Assure that hydrants, valve boxes, and other appurtenances are at the proper elevation relative to the final surface grade.

   Assure that service lines terminate at the locations specified in the plans and specifications in relation to the street right of way or other criteria specified.

   All other construction staking required to be provided by the Contractor in Section 6 of the City of Steamboat Springs Standard Specifications for Water and Wastewater Utilities.

3. Survey Tolerance:

   Horizontal = 0.5'; Vertical = 0.2'.

4. Quantities:

   Provide quantity information in tabular form with each pay request to include:

   a. Main line distances from fitting to fitting.
   b. Service line lengths by lot or house number.
   c. Hydrant lateral lengths by hydrant number.
   d. Similar tabulations for other facilities.

C. Roads:

1. Owner's Responsibility:

   Control Points shown on the Drawings. Electronic project stakeout information including

alignment and vertical and horizontal data for staking of subgrade and base courses at each station.

Centerline staking, to include a permanent centerline offset reference hub on one side at least 10' outside the construction limits, and slope stakes on both sides of the road. Additional centerline, slope, and offset staking will be required at PC's and PT's of curves.

Centerline stakes for all connecting driveways, field access roads and all other special features not specifically dimensioned on the plans.

“Bluetop” stakes for subgrade and base course including a stake at centerline, both shoulder points, and at any other cross section grade break. Additional blue top staking will be provided at superelevation transition points.

Unless otherwise specified all staking shall be provided at 50’ intervals. When additional centerline, slope, and offset staking is required at PC’s and PT’s of curves, and additional blue top staking is required at superelevation transition points the 50’ station will be omitted provided that the additional points are within 15’ of the 50’ station.

Radius points for all intersections.

ROW limits and appropriate easements.

2. Contractor's Responsibility:

a. General:

After slope staking and prior to any topsoil stripping or embankment placement, the Contractor shall schedule a meeting with the Engineer for the purpose of reviewing the location of slope stakes with respect to proposed right-of- way and physical features and determining any revisions to slope ratios which may be necessary.

“Bluetop” stakes for subbase course including a stake at centerline, both shoulder points, and at any other cross section grade break. Additional blue top staking will be provided at superelevation transition points.

A stringline for asphalt placement laid out from centerline, or if centerline is not dimensioned on the plans, laid out to “best fit” the existing road surface. (The Engineer’s approval is required prior to asphalt placement.)

Routine checks of slopes and subgrade as the work progresses to assure that the proper lines and grades are being achieved.

b. Quantities:

The Contractor shall provide quantity information in tabular form for all work items paid on a unit basis with each pay request to include:

1) Culvert pipe by station location.
2) Fencing, special ditches, unsuitable excavation and replacement, fabric, etc.
3) Survey for material quantity calculations

The Engineer will determine earthwork quantities with assistance from the Contractor. The

Contractor shall provide the field elevation of the centerline and slope stake points as well as any other cross section information required.

The Contractor and the Engineer will measure the topsoil stripped by measuring the topsoil depths at the centerline and slope catch points or other appropriate points on the cross section.

Rock excavation will be measured by the Contractor by use of cross sections or other method approved by the Engineer. This cross section data will be supplied to the Engineer for calculation of the rock quantity. The Contractor shall give timely notice to the Engineer prior to any rock excavation measurement, and the Engineer shall observe such measurement, unless this requirement is specifically waived by the Engineer.

3. Survey Tolerance:

Tolerances shall be per the following table:

Staking Item	Horizontal (Relative to centerline)		Vertical
	Parallel	Perpendicular	
Benchmarks	n/a	n/a	0.02'
PI's	0.1'	0.1'	n/a
Centerline	0.1'	0.1'	n/a
Offset References			
For PC's & PT's	0.1'	0.1'	0.02'
For All Others	0.5'	0.1'	0.02'
Slope Stakes	0.5'	0.2'	0.20'
Bluetops	0.5'	0.2'	0.03'
Drainage Structures	1.0'	1.0'	0.10'

Note: The horizontal tolerances for offsets, slope stakes, and blue tops require the use of a right angle prism or similar device.

D. Overlot Grading, Embankments, and Other Earthwork:

1. Owner's Responsibility:

Base line and bench marks.

Detailed grade staking using a grid system supplemented with slope stakes at the grading limits. The method of establishing the grid shall be approved by the engineer prior to the start of the work. The size of the grid increments shall be sufficiently small to allow accurate grading of the areas in between grid points.

“Blue top” stakes for subgrade and top of base course.

2. Contractor's Responsibility:

“Blue top” stakes for top of subbase course.

3. Survey Tolerances:

   Survey tolerances will vary depending on the nature of the overlot grading. Generally the tolerances shall be similar to those specified in the previous Road section.

4. Quantities:

   Quantities will be calculated by the Engineer with field measurement data supplied by the Contractor similar to that specified for Roads in the previous section. Field information required from the Contractor will include the elevations of the existing ground at the grid and slope stake points, and any final grade information if such final grade varies from the plans.

E. Structures:

1. Owner's Responsibility:

   a. Base line and a bench mark.

2. Contractor's Responsibility:

   a. Detailed staking required to assure the structure is constructed to the lines and grades specified.

3. Survey Tolerances:

   The Contractor shall consult with the Engineer on the tolerances required.

4. Quantities:

   Generally no unit price items to measure. Provide all measurements of any unit price earthwork associated with the structure.

F. Curb, Gutter, Sidewalk, and Paving Stones:

1. Owner's Responsibility:

   Offset line and grade staking at the ends of all straight sections and at 25' or 50' intervals on all curved sections including all radius points. Line and grade stakes will also be provided at all changes in alignment, cross section, width, etc. This includes locations of curb cuts on curb projects.

2. Contractor's Responsibility:

   Contractor shall supplement the Owner supplied staking with additional line and grade stakes as required, including slope stakes where necessary. He shall also provide any stringline or batterboard staking desired.

3. Survey Tolerances:

   Tolerances shall be per the following table:

Staking Item	Horizontal	Vertical
Curb, Gutter And Sidewalk Adjacent To Roads Or Other Fixed Facilities	0.05'	0.02'
Meandering Sidewalks	0.5'	0.20'

4. Quantities:

   Provide lineal or areal quantity tabulations of completed work with each pay request.

5. As-constructed Measurements:

   Generally none required.

G. Bicycle and Pedestrian Paths:

1. Owner's Responsibility:

   Centerline staking at the ends of all straight sections, at all radius points and at changes in cross section or width. At the Owner's option grade staking may also be provided.

2. Contractor's Responsibility:

   Offset stakes for all Owner supplied centerline stakes, and slope stakes where necessary.

3. Survey Tolerances:

   Horizontal = 0.5'; Vertical = 0.2'.

4. Quantities:

   Provide lineal or areal quantity tabulations of completed work with each pay request. Slope stake notes and other measurements taken to establish earthwork quantities shall also be submitted.

H. Fences:

1. Owner's Responsibility:

   The Owner will specify by station the distance from the road centerline to the proposed fence.

2. Contractor's Responsibility:

   The Contractor shall stake all points required by the installer of the fence to insure that the fence is installed at the location specified.

3. Survey tolerance: 0.1'

   Horizontal = 0.5’; Vertical = 0.2’.

4. Quantities:

   Provide quantity measurements as the work progresses.

I. Miscellaneous:

Other facilities not specifically addressed in this section shall be completed in a fashion similar to that specified herein for similar facilities. The Contractor, Owner, and the Engineer shall agree on the staking, quantity survey, and as constructed measurement requirements prior to beginning the project.

PART 4 MEASUREMENT AND PAYMENT

Separate payment for staking, including quantity surveys related to the staking, will be made on a lump sum or unit price basis when bid items for this work are provided in the bid form.

If no bid item is provided, the cost of staking shall be included in the work item price of the facility being staked.

No separate payment will be made for other quantity surveys or for as-constructed measurements.

Pay requests submitted without required quantity survey information and as-constructed measurements shall be considered incomplete. The Engineer will notify the Contractor of any such deficiencies and shall give the Contractor one week to supply the required information. If the information is not supplied promptly, the Engineer will process the pay request and the Owner will withhold an additional 20% from all pay items for which information is missing or is not in correct form. The additional withheld payment will not be made until the next regular pay request after the information is received in correct form.

SECTION 1070
CUTTING AND PATCHING
(03-13 PS)

PART 1 GENERAL

1.1 DESCRIPTION

Work included: This section establishes general requirements for excavation, cutting, fitting, and patching necessary to:

Make the individual project components fit and function properly as a complete installation.

Remove and replace work or components not conforming to the requirements of the Specifications.

Uncover ill-timed, unsupervised, or untested work for inspection and, or testing.

1.2 QUALITY ASSURANCE

Follow the requirements of the Specifications, the manufacturer's recommendations, and, when necessary, the Engineer's instructions to assure the completed work meets the intent of the Specifications and the work components are not damaged while proceeding.

1.3 SUBMITTALS

A. Prior to proceeding with cutting and patching which the Contractor believes is beyond the original scope of work, the Contractor shall submit a clarification request outlining the basis for his assertion to include a cost estimate for any additional charges. The Engineer's approval is required before proceeding.

B. Submit on any proposed cutting and patching that is not specifically required and addressed by the Specifications. Do not proceed without the Engineer's authorization.

C. Submit on any proposed cutting and patching which affects structural integrity. Do not proceed without the Engineer's authorization.

D. Submit on any proposed cutting and patching which will alter or affect work performed by others under separate contract with the Owner. Do not proceed without the Engineer's authorization.

PART 2 PRODUCTS

No products this Section.

PART 3 EXECUTION

3.1 PREPARATION

A. Inspection: Inspect existing conditions to determine components subject to movement or damage during cutting, excavating, backfilling, and patching. After exposing the work, determine conditions which affect the method of installation.

B. Discrepancies: Immediately notify the Engineer if exposed conditions are not as anticipated or as shown on the Drawings. Do not proceed until all discrepancies affecting the segment of work being completed have been resolved.

3.2 PERFORMANCE

Provide all required protection including, but not limited to dewatering, shoring, bracing, and support to maintain structural integrity of new and existing structures, utilities, as well as all other affected components or materials.

Perform all required excavating and backfilling as required under the appropriate sections of the Contract Documents.

Perform cutting and demolition by methods which will prevent damage to other portions of the work and will provide proper surfaces to receive installation or repair of new work.

Perform fitting and adjustment of products to provide a finished installation complying with the specified tolerances and finishes, and the requirements of the manufacturer of the products.

PART 4 MEASUREMENT AND PAYMENT

No separate measurement for payment will be made for the Work under this section. Its cost shall be per Section 1025 Measurement and Payment.

SECTION 1085
APPLICABLE STANDARDS
(6-98)

PART 1 GENERAL

1.1 DESCRIPTION

Work included: Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.

Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship which meet or exceed the specifically named code or standard.

It is also the contractor's responsibility, when so required by the Contract Documents or by written request from the Engineer, to deliver to the Engineer all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Engineer, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Engineer.

1.2 QUALITY ASSURANCE

A. Familiarity with pertinent codes and standards: In procuring all items used in this work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this work meet or exceed the specified requirements.

B. Rejection of non-complying items: The Engineer reserves the right to reject items incorporated into the work which fail to meet the specified minimum requirements. The Engineer further reserves the right, and without prejudice to other recourse the Engineer may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Engineer and the Owner.

C. Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. AASHTO = American Association of State Highway and Transportation Officials, 341 National Press Building, Washington, D.C. 20004.

2. ACI = American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48219.

3. AISC = American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, New York 10020.

4. ANSI = American National Standards Institute (successor to USASI and ASA) 1430 Broadway, New York, New York 10018.

5. ASTM = American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

6. AWS = American Welding Society, Inc., 2501 N. W. 7th Street, Miami, Florida 33125.

7. AWWA = American Water Works Association, Inc., 6666 West Quincy Avenue, Denver, Colorado 80235.

8. CDOT (Formerly CDOH) = Colorado Department of Transportation, 4201 E. Arkansas Ave., Denver, CO 80222, reference: "Standard Specifications for Road and Bridge Construction".

9. CRSI = Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610.

10. CS = Commercial Standard of NBS, U.S. Department of Commerce, Government Printing Office, Washington, D.C. 20402.

11. FGMA = Flat Glass Marketing Association, 3310 Harrison, Topeka, Kansas 66611.

12. NAAMM = The National Association of Architectural Metal Manufacturers, 1033 South Boulevard, Oak Park, Illinois 60302.

13. NEC = National Electrical Code (see NFPA).

14. NEMA = National Electrical Manufacturers Association, 155 East 44th Street, New York, New York 10017.

15. NFPA = National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210.

16. NSF = NSF International, 3475 Plymouth Road, PO Box 0140, Ann Arbor, Michigan 48113-0140.

17. SDI = Steel Deck Institute, 135 Addison Avenue, Elmhurst, Illinois 60125

18. SSPC = Steel Structures Painting Council, 4400 5th Avenue, Pittsburgh, Pennsylvania 15213.

19. TCA = Tile Council of America, Inc., P.O. Box 326, Princeton, New Jersey 08540.

20. Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611.

21. Fed Specs and Fed Standards Specifications Sales (3FRI), Bldg, 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407.

22. MIL-SPECS Military Specifications, Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.

23. UBC = Uniform Building Code, International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, California 90601.

PART 2 PRODUCTS

No products this Section.

PART 3 EXECUTION

The Contractor is responsible for being familiar with all named or implied codes. The latest revision or edition of codes or standards shall be used.

PART 4 MEASUREMENT AND PAYMENT

No separate measurement for payment will be made for the Work under this section. Its cost shall be considered incidental to the project.

SECTION 1300
SUBMITTALS AND SUBSTITUTIONS
(3-92)

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included:

Preparation and submittal of shop drawings, cut sheets, certifications of compliance or other documents or samples as required by the Contract Documents in order to ensure that the specified products are furnished and installed in accordance with design intent.

B. Additional requirements are described in the following sections of the Contract Documents:

1. Additional Supplemental General Conditions

   SCHEDULES, REPORTS, AND RECORDS section; SHOP DRAWINGS section; SUBSTITUTIONS section.

2. General Conditions

   Section 3. SCHEDULES, REPORTS AND RECORDS

   Section 8. SUBSTITUTIONS

3. Specifications

   Individual requirements for submittals and substitutions may also be described in the technical Specifications section pertaining to the item.

1.2 QUALITY ASSURANCE

The Work is based on the standards of quality established in the Contract Documents.

All products proposed for use, including those specified by required attributes and performance, shall require review by the Engineer before being incorporated into the Work.

The Contractor shall bear ultimate responsibility for providing a complete working system and shall guarantee that all installed system components are compatible and will provide for the intended operation of the component and the system of which it is a part.

PART 2 PRODUCTS

2.1 SUBMITTAL SCHEDULE

A. General: At the Pre Construction Conference or within 10 days after Notice of Award, whichever comes first, compile and submit 2 copies of a complete and comprehensive schedule of all submittals anticipated to be made during progress of the work. Include a list of each type of item for which Contractor's drawings, Shop Drawings, Certificates of Compliance, material samples, guarantees, or other types of submittals are required. Upon approval by the Engineer this schedule

will become part of the Contract and the Contractor will be required to adhere to the schedule except when specifically permitted otherwise.

B. Coordination: Coordinate the schedule with all necessary subcontractors and materials suppliers to ensure their understanding of the importance of adhering to the approved schedule and their ability to so adhere. Coordinate as required to ensure the grouping of submittals as described in Paragraph 3.2 below.

C. Revisions: Revise and update the schedule on a monthly basis as necessary to reflect conditions and sequences. Promptly submit revised schedules to the Engineer for review and comment.

2.2 SHOP DRAWINGS AND COORDINATION DRAWINGS

Shop Drawings:

A. Scale and measurements: Make all Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the work.

B. Prints required: Submit 4 copies of all Shop Drawings.

C. Shop Drawings shall not be made on copies of the Contract Documents.

2.3 MANUFACTURERS' LITERATURE

Submit 4 copies of manufacturer's literature. When the submitted literature includes options or other data not pertinent to the work, clearly indicate which items and options are being supplied.

2.4 SAMPLES

A. Accuracy of Samples: Samples shall be of the precise article proposed to be furnished.

B. Number of Samples required: Unless otherwise specified, submit 2 samples one of which will be retained by the Engineer.

C. Use of Engineer's Sample: The Contractor may submit a clarification request requesting that the Engineer's retained sample be installed in the project. The Engineer may approve the request if, in his sole opinion, it is not critical that the sample be retained.

2.5 COLORS AND PATTERNS

Unless the precise color and pattern is specifically described in the Contract Documents, and whenever a choice of color or pattern is available in a specified product, submit accurate color and pattern charts to the Engineer for review and selection.

2.6 SUBSTITUTIONS

Submittals for proposed substitutions shall meet the requirements of this section.

2.7 AVAILABILITY OF SPECIFIED ITEMS

A. Verification: The Contractor shall be responsible for verifying to his satisfaction that all specified items will be available in time to allow orderly and timely progress of the Work.

B. Notification: In the event specified items will not be available, the Contractor shall notify the Engineer prior to receipt of bids.

C. Delays: The costs of delays resulting from non-availability of specified items, when such delays could have been avoided by the Contractor, will be the Contractor's liability and shall not be borne by the Owner.

PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. General: Consecutively number all submittals. Accompany each submittal with a letter of transmittal containing all pertinent information required for identification and checking of submittals.

B. Internal Identification: On each copy of each submittal, and elsewhere as required for positive identification, clearly indicate the submittal number in which the item was included.

C. Resubmittals: When material is resubmitted for any reason, transmit under a new letter of transmittal.

D. Submittal Log: Maintain an accurate submittal log for the duration of the Contract, showing current status of all submittals at all times. Make the submittal log available for the Engineer's review upon request.

3.2 COORDINATION OF SUBMITTALS

A. General: Prior to submittal for approval, use all means necessary to fully coordinate all material including, but not necessarily limited to:

1. Determine and verify all interface conditions, catalog numbers, and similar data.

2. Coordinate with other trades as required.

3. Clearly indicate all deviations from requirements of the Contract Documents.

B. Grouping of Submittals: Unless otherwise specified, make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents and the Contractor shall be strictly liable for all delays so occasioned.

3.3 TIMING OF SUBMITTALS

A. General: Make all submittals far enough in advance of schedule dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

B. Engineer's Review Time: In scheduling, allow at least 10 calendar days for review by the Engineer following his receipt of the submittal.

C. Delays: Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the Contract completion date.

3.4 ENGINEER'S REVIEW

A. General: Review by the Engineer shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve the Contractor from responsibility for errors which may exist.

B. Authority to Proceed: The notations "No Exception Taken", "Make Corrections Noted", and "Other", authorize the Contractor to proceed with fabrication, purchase, or both, of the items so noted, subject to the revisions, if any, required by the Engineer's review comments.

C. Revisions: Make all revisions required by the Engineer. If the Contractor considers any required revision to be a change, he shall so notify the Engineer as provided for under "Changes" in the General Conditions. Show each drawing revision by number, date, and subject in a revision block on the drawing. Make only those revisions directed or approved by the Engineer.

D. Revisions after Approval: When a submittal has been reviewed by the Engineer, resubmittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary.

PART 4 MEASUREMENT AND PAYMENT

No separate measurement for payment will be made for the Work under this section. Its cost shall be considered incidental to the project.

SECTION 1600
MATERIAL, EQUIPMENT AND WORKMANSHIP
(11-91)

PART 1 GENERAL

1.1 DESCRIPTION

Work under this Section shall establish the general standards for quality of materials, equipment purchase and installation and general project workmanship.

1.2 QUALITY ASSURANCE

A. All Materials: All materials and equipment supplied for this project shall be new, unused and correctly designed for the intended application. They shall be of standard first grade quality, produced by expert workmen, and be intended for the use for which they are offered. Materials or equipment which, in the opinion of the Engineer, are inferior or of a lower grade than indicated, specified or required will not be accepted.

All materials and equipment supplied shall meet specified performance requirements at the elevation of the project site.

Any two or more pieces of material or equipment of the same kind, type or classification, and being used for similar types of services, shall be made by the same manufacturer.

Where intended for use with potable water, materials and methods shall in general, comply with the appropriate AWWA and NSF standards.

B. Equipment: Equipment and appurtenances shall be designed in conformity with ANS, ASME, IEEE, NEMA and other generally accepted standards. All equipment supplied shall be of rugged construction and suitable for the intended purpose, under design operating conditions, in the location and climate where they are to be used.

All equipment supplied shall be in accordance with the requirements of the Contract Documents.

Equipment shall be of the approximate dimensions indicated on the Drawings or as specified, shall fit the spaces shown on the drawings with adequate clearances, and shall be capable of being handled through openings provided in the structure for this purpose. Equipment shall be of such design that piping and electrical connections, ductwork and auxiliary equipment can be assembled and installed without causing major revisions to the location or arrangement of any of the facilities.

Where applicable all equipment shall bear a brass or stainless steel nameplate giving manufacturer's rated capacity, head, speed, horsepower, service factor and any other pertinent operating data.

Equipment shall be of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation and all conditions of operation. All bearings and moving parts shall be adequately protected against wear by bushings or other approved means and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers and the like, shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.

C. Machinery: Machinery parts shall conform exactly to the dimensions shown on the working Drawings. There shall be no more fitting or adjusting in setting up a machine than is necessary in assembling high grade apparatus of standard design. The equivalent parts of identical machines shall be made interchangeable. All grease lubricating fittings on equipment shall be of a uniform type. All machinery and equipment shall be safeguarded in accordance with the safety codes of the ANS, applicable state and local codes and with U.S. Department of Labor, Part 1910 Occupational Safety and Health Standards, promulgated under the Occupational Safety and Health Act of 1980 (PL 91-596).

1.3 PRODUCT HANDLING AND STORAGE

All materials and equipment to be incorporated in the work shall be handled and stored by the Contractor in a manner satisfactory to the Engineer and in such a way as to prevent damage or theft of the same.

All materials and equipment subject to corrosive damage by the atmosphere if stored outdoors (even though covered by canvas) shall be stored in a building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the Engineer.

All materials which, in the opinion of the Engineer, have become so damaged as to be unfit for the use intended or specified shall be promptly removed from the site of the work, and the Contractor shall receive no compensation for the damage material or its removal.

All pipe and other materials delivered to the job shall be unloaded and placed in a manner which will not hamper the normal operation of existing facilities or interfere with the flow of necessary traffic or with construction progress.

PART 2 PRODUCTS

No products this Section

PART 3 EXECUTION

General requirements for installation of equipment specified for use on the project shall be as follows:

All equipment shall be installed, equipped and serviced as per the manufacturer's recommendations except as supplemented or modified by the requirements of these Specifications or as directed by the Engineer.

All equipment shall be leveled, plumbed, aligned and wedged into position to fit connecting piping and assemblies without transmitting stresses to the equipment.

Where applicable, equipment base frames shall be anchored to concrete pads with cast-in-place anchor bolts. Dimensions for equipment pads shall be determined by the equipment manufacturer and shall be shown on the Shop Drawings. The base frame shall be grouted solid.

All inlet and discharge piping connections to equipment shall include unions for ease of removal and repair. Waste water from packing shall be piped directly to a drain and not allowed to discharge freely on the floor or elsewhere.

All equipment shall be greased, lubed, oiled, and in all ways properly prepared for start-up by the Contractor per the manufacturer's written recommendations. Where required by these Contract Documents, a qualified service technician shall provide the necessary start-up services.

Ceiling lifting hooks shall be installed above most plant equipment. All hooks shall provide a safety factor of 5 against failure for the equipment gross weight.

All concrete work shall be of first grade quality, meeting the requirements of Division 3 or as specified elsewhere in the Contract Documents. All floors shall be free of ponding and irregularities and shall drain to the outlets provided.

The Contractor shall provide all labor, tools, equipment and coordination necessary to provide compliance with the Contract Documents for leakage, performance, quantity, thickness, efficiency, etc. of installed materials and equipment.

PART 4 MEASUREMENT AND PAYMENT

There shall be no separate measurement or payment for work in this section. Its cost shall be considered incidental to the work.

SECTION 1710
CLEANUP
(1-96)

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Maintain the project site in an orderly manner to the standard of cleanliness described in this Section.

B. Related work described elsewhere: In addition to the general standards described in this Section, comply with all specific requirements for cleaning and cleanup described elsewhere in the Specifications.

1.2 QUALITY ASSURANCE

A. Inspection: The Contractor shall conduct regular inspections to verify that requirements of cleanliness are being met.

B. Codes and standards: In addition to the standards described in this Section, comply with all requirements of other agencies having jurisdiction.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

Provide all personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

Use cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material and which will not damage the surface being cleaned.

PART 3 EXECUTION

3.1 STORAGE OF MATERIALS AND PERIODIC CLEANUP

Store all items to be used on the Project in an orderly manner allowing maximum access. Stored materials shall not impede drainage or traffic.

Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of the project on the work site.

At least twice each month, and more often if necessary, collect and remove all scrap, debris, and waste material from the job site and dispose of the same in an appropriate disposal area. Storage of all items awaiting removal from the job site, shall be done in such a manner as to minimize fire hazard or environmental damage.

3.2 FINAL CLEANUP

A. Definition: Except as otherwise specifically provided, "clean" shall be defined as the level of cleanliness generally provided by skilled cleaners using commercial quality building or site maintenance equipment and materials.

B. General: Upon completion of the work, remove all tools, surplus materials, equipment, scrap, debris, and waste from the work site.

C. Site: Unless specifically authorized otherwise by the Engineer broom clean all paved areas on the site and all public paved areas adjacent to the site which were contaminated because of the work. Completely remove all resulting debris. Periodic cleaning during the project may be required to remove debris carried onto public rights-of-way.

   Gravelled parking or driveway areas within or adjacent to the work site which have had excavated or other loose materials stockpiled on them shall be scraped clean down to the original surface. Replacement of gravel materials may be required to restore the surface to its original condition.

   Grassed areas within or adjacent to the work site shall be scraped and raked clean to the original grass or soil level. All stones larger then 2 inches in diameter and other loose debris shall be picked up and removed.

   Following completion of the associated work, remove all construction staking lath, stakes, flagging, etc. and dispose of properly. Remove and dispose of all temporary sedimentation and erosion control facilities which have degraded beyond their intended purpose or usefulness.

D. Structures: Inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting or other special cleaning.

   Inspect all interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Removal all paint droppings, spots, stains, and dirt from finished surfaces. Use only appropriate cleaning materials and equipment. Clean all glass inside and outside. Polish all surfaces requiring the routine application of buffed polish, with the polish recommended by the manufacturer.

E. Timing: Schedule final cleaning and cleanup to enable the Owner to accept a clean, finished project.

PART 4 MEASUREMENT AND PAYMENT

There shall be no separate payment for the work covered in this section, its cost shall be considered incidental to the project.

SECTION 2211
SUBGRADE CONSTRUCTION
(03-10)

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: The work under this section shall include clearing and grubbing, topsoil removal and replacement, subgrade construction, waste areas, rock excavation, and utility installation for work associated with construction of overlot grading, trails, sidewalks, parking lots, miscellaneous embankment construction, and roadways.

B. Definitions: The following definitions shall apply to work and materials under this Section.

1. Clearing and grubbing materials: Trees, stumps, brush, roots, down timber, rotten wood, rubbish and other vegetation that exists within the construction limits. This item may also include old fences, buildings or other structures as designated on the Drawings or as may be discussed elsewhere in the Specifications.

2. Topsoil: Top layer of loose friable loam that is free of subsoil, refuse, stumps, roots, rocks, brush, weeds, heavy clay, toxic substances, or other material which would be detrimental to its use on the project.

   Wetland topsoil material shall consist of the moist, organic soil, including any existing wetland vegetation and seeds, to be excavated from areas as shown on the plans or as directed.

3. Common excavation (cut): The materials, both suitable and unsuitable, that exist above final subgrade elevation that are to be excavated during the subgrade construction or overlot grading including the excavation for roadway/trails ditches.

4. Embankment Materials: The suitable materials acquired from excavations, hauled, and placed in embankments (fills) that are required to raise the prepared existing grade to the final subgrade elevation.

5. Embankment construction: embankment construction shall include preparation of the areas upon which embankments (fill) will be placed; and, placing and compacting of approved material for the purpose of constructing roadway embankments, water retaining berms, dikes, trails, sidewalks, parking lots, and overlot grading fills. Embankments (fills) shall be further defined as follows:

   a. Embankment: Fills for roadways, water retaining berms, dikes, trails, sidewalks, parking lots, and overlot grading fills.

   b. Structural Backfill: Fill placed below the designed final grade and adjacent to structures. The backfill shall continue from the structure wall to tie to excavated walls; or to a point 10’ out from structure walls if no excavation walls exist.

   c. Structural Fill: Fills placed in areas within proposed building foundations or under proposed building slabs.

   d. General Site Fill: Fills not defined as embankments or structural fills.

6. Trench Backfill: Backfill required following the excavation of trenches for the placement of underground utilities and drainage culverts.

7. Rock excavation: The removal of solid rock masses i.e., shale, Browns Park, etc. which can not be reasonably ripped, broken, and removed with skillfully operated excavating equipment using a 30-36 inch toothed bucket or single shank; or isolated boulders of 1 cubic yard or larger; or several "nested" boulders of 1/2 cubic yard or larger which act like a single rock mass.

8. Unsuitable materials: Materials encountered in subgrade construction other than topsoil which contain roots, debris, organic or frozen material, or which contain stones larger than 6 inches in diameter which cannot easily be separated and removed. It also includes soils with excessive moisture, soils that flow when dumped or soils that cannot be reasonably dried for use in subgrade construction. Generally this includes soils with moisture content >6% over optimum moisture content.

9. Suitable materials: Soil materials which can be compacted to form a stable subgrade and which are not classified as unsuitable.

10. Waste material: The following materials may be designated waste materials:

    a. Clear and grub materials.

    b. Excess topsoil.

    c. Excavated Rock.

    d. Unsuitable material.

    e. Excess suitable material.

11. Overlot grading: Grading of lots adjacent to a road to provide for site improvements or to provide a balance of cut and fill materials quantities.

12. Borrow: Fill materials that are generated from a source other than the common excavation area of the project that are required to supplement the suitable common excavation material to complete the project embankment fills. Locations of borrow areas may be either designated (described in the specifications or shown on the drawings) or undesignated (to be agreed upon by the Contractor and the Engineer). Borrow from undesignated areas must be approved by the Engineer prior to use on the project.

1.2 QUALITY ASSURANCE

A. Standards: The following standards shall apply to work under this Section as appropriate.

1. Reference Standard Specifications for Road and Bridge Construction, CDOT, State of Colorado, including all standard special provisions, herein called *Standard Specifications*.

2. Particle Size Analysis of Soils, ASTM D 422

3. Liquid Limit of Soils, ASTM D 423

4. Plastic Limit and Plasticity Index of Soils, ASTM D 424

5. Test method for laboratory compaction characteristics of soil using modified effort, ASTM D 1557.

6. Test method for laboratory compaction characteristics of soil using standard effort, ASTM D 698.

7 Density of Soil and Soil Aggregate In-Place by Nuclear Method, ASTM D 2922

8 Moisture Content of Soil and Soil Aggregate In-Place by Nuclear Methods, ASTM D 3017

PART 2 PRODUCTS

2.1 FILL MATERIAL, GENERAL

A. Approval required: All fill material shall be subject to the approval of the Engineer.

B. Notification: For approval of imported fill material, notify the Engineer at least 10 working days in advance of intention to import material, designate the proposed borrow area, and provide the Engineer a sample from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

2.2 SUITABLE FILL MATERIAL

A. All on-site material suitable for STRUCTURAL BACKFILL and STRUCTURAL FILL shall be soil or soil-rock mixture which is free from frozen material, organic matter, and other deleterious substance. It shall contain no rocks or lumps over 6” in greatest dimension, and not more than 15% of the rocks or lumps shall be larger than 2 1/2" in greatest dimension. It shall be a non-expansive soil.

B. All on-site excavated material suitable for EMBANKMENT and GENERAL SITE FILL construction shall meet the requirement of suitable material for STRUCTURAL BACKFILL with the following exceptions; materials generated on-site that exceed the maximum 6" dimension requirement but are less than 12" in dimension may be used for embankment construction within embankments that will allow placement of the over sized materials at least 18" from any final grade or surface, when approved by the Engineer. Expansive soils may be used as fill material in these areas.

C. Imported Washed or Screened Rock used for a granular cushion, selected pipe bedding, or for subdrain gravel pack shall be washed or screened gravel free from an appreciable amount of fines or any organic or other foreign material. The gradation of the gravel shall be such that the minimum size is 3/8" diameter and the maximum size is 1 1/2" diameter. No more than 15% shall be smaller than 1/2" diameter.

D. Imported Pit Run shall be well graded Class 3 Aggregate Base Course per Section 703.03 of the *Standard Specifications* with the following modifications:

1. Crushed reclaimed concrete or asphalt material shall not be used unless approved by the Engineer.

2. Percentage passing the 6 inch sieve shall be 100.

3. Percentage passing the No. 4 sieve shall be 30-65.

4. Percentage passing the No. 200 sieve shall be 3-15.

2.3 OTHER MATERIAL

All other materials, not specifically described but required for a complete and proper installation, shall be as selected by the Contractor subject to the approval of the Engineer.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

The Contractor shall clear and grub the entire area within the limits of subgrade construction such that no objectionable materials remain to be mixed in with topsoil and other suitable materials. Care should be taken not to leave uprooted objectionable materials along the immediate fringes of the limits of subgrade construction. Excess amounts of salvageable topsoil shall not be removed during the clearing and grubbing process. Contractor may elect to “brush hog” the grass and mix into the topsoil.

All objectionable material removed shall be disposed of at the waste area as designated in the Special Provisions or on the Drawings. If the objectionable material is disposed of on- site, a minimum of 12 inches of topsoil shall be lightly compacted over the debris.

3.2 TOPSOIL

A. Topsoil removal, stockpiling and disposal

1. Topsoil within the limits of the subgrade construction shall be salvaged prior to beginning hauling, excavating, or fill operations by excavating and stockpiling the material at designated locations in a manner that will minimize sediment damage, and not obstruct natural drainage.

   Topsoil depths and quantities shown on the Drawings and stated in the Bid are estimates. The actual depths of topsoil to be removed shall be determined by the Engineer during topsoil excavation. Care shall be taken to prevent intermixing of topsoil with suitable subgrade materials.

   Topsoil shall be stockpiled adjacent to the excavation or embankment fill limits for subsequent replacement on cut and fill slopes. Topsoil shall be stockpiled in a manner that minimizes impacts to construction staking and vegetation.

   Topsoil quantities in excess of that required to be replaced on cut and fill slopes shall be disposed of in an on-site waste area unless off-site disposal is specified; coordinate with Engineer.

2. Borrow area: Remove topsoil from designated borrow areas to the depths agreed upon by the Engineer. Stockpile the topsoil adjacent to the areas stripped and out of the way of other construction. Maintain all adjacent surface drainage.

B. Topsoil Replacement:

1. Topsoil shall be placed on all disturbed areas not designated for other surface treatments and to the thickness provided in the Contract and shall be keyed to the underlying material. All grass and sod shall be broken up and mixed with the topsoil before placement. When field operations and conditions permit, the Contractor shall stockpile some topsoil on top of the cut slope for periodic replacement as the slope is being cut or "brought down" to the specified

subgrade elevation. Early placement of topsoil is desired to encourage the development of a better bond with native materials. Topsoil shall be placed to a depth of 3 inches, unless otherwise specified. After being spread and graded, the topsoil shall be lightly compacted with tracks of a dozer moving up and down the slope. This process is to serve the dual purpose of lightly compacting the topsoil as well as creating horizontal cleat impressions to retard erosion.

2. Borrow and overlot grading areas: All of the topsoil removed from borrow and overlot grading areas shall be replaced on these areas to the approximate original depths. The topsoil shall be smooth-graded and compacted by track or wheel rolling.

3.3 SUBGRADE CONSTRUCTION

A. General: Notify the Engineer a minimum of 48 hours in advance of beginning construction. The Contractor shall not excavate beyond the limits established and material shall not be removed prior to staking of the site. Prior to beginning grading operations in any area, all necessary clearing and grubbing and topsoil removal in that area shall have been performed and approved by the Engineer. During construction, the Contractor shall prevent the subgrade or suitable materials from being contaminated with topsoil or other unsuitable materials. Contamination shall also include the incorporation of excessive moisture into subgrade materials do to inadequate surface drainage provisions. Any contamination of the subgrade shall immediately be removed before grading operations continue.

All excavations and embankments shall be finished to a reasonably smooth and uniform surface. The degree of finish shall be that ordinarily obtained from either bladegrader or scraper operations. The surface shall be free of depressed areas where water would pond. All earth slopes shall be finished to reasonably smooth surfaces that will merge with the adjacent terrain without any noticeable break. At intersections of cuts and fills, slopes shall be adjusted and warped to flow into each other or into the natural ground surface without noticeable break. Excavation operations shall be conducted so that material outside of the limits of slopes will not be disturbed.

B. Excavation:

1. Common excavation (cut):

a. General: Common excavation materials in roadway/trails and overlot cut areas shall be excavated to the lines and grades as shown on the Drawings. Suitable materials shall be excavated, transported and deposited at areas to receive fill. Unsuitable materials and excess suitable materials shall be excavated, transported and deposited in the appropriate waste areas.

b. Roadway/trails ditches: Ditches shall be cut accurately to the design cross-sections and grades. All roots, stumps, rock and foreign matter in the sides and bottoms of ditches shall be cut to conform to the slope, grade and shape of the section shown.

c. Overexcavation: Unauthorized overexcavation shall be backfilled to grade with suitable material meeting the compaction requirements as specified under "Embankment fill".

2. Rock excavation: Before beginning excavation of rock, the Contractor shall notify the Engineer for coordination of measurement and waste area placement. Measurement shall be performed by the Contractor and Engineer prior to removal to the waste area or as appropriate. All boulders and ledge rock encountered in the excavation shall be removed or broken off to a depth not less than 6 inches below subgrade. The resulting area shall be brought to the required grade with compacted suitable material. See Section 2224 Rock Excavation for

additional requirements.

C. Embankment:

1. General: The maximum lift permitted shall be 6 inches. Rocks exceeding the maximum allowable dimension occurring in otherwise suitable fill shall be removed to the appropriate waste area.

   All embankment construction shall be completed under moisture and density control.

   Structural Backfill: The Contractor shall complete placement of subdrains, gravel pack, geotextile, dampproofing, concrete patching, etc. prior to placing any structural backfill material.

2. Compaction requirements:

Item.....	Standard Proctor[1] (%)
Structural fill	100
Structural backfill	95
General site fill (< 5 ft)	90
Subgrade preparation	
Base of fill areas	
Fill >1’	95
Fill < 1’	95
Base of Cut areas	95
Embankment	
all except top 2’	95
top 2’	95
Subbase course	95[2]
Base course	95[2]
Special areas	95
Penetrations into water retaining berms	95
Landscape berms	90
Trenches	
Refer to Trenching, Bedding and Backfill requirements	

[1] As determined by ASTM D 698
[2] As determined by ASTM D 1557

3. Moisture content: The Moisture content shall be within 3 percent +/- of optimum; unless indicated otherwise in the project soils report or directed otherwise by the Engineer. If materials are unstable at specified moisture content, then moisture content shall be reduced until materials are stable.

D. Rock Fill: When called for in the Special Provisions embankments may be constructed of rock fill. Rock fills may be used only when large amounts of rock exist and large fills are required. Approval of the Engineer must be obtained before placement of any rock fill. When rock fills are allowed a uniform gradation of large to small rocks shall be placed to prevent large voids from occurring.

E. Borrow: When projects require additional suitable material for fill other than what is on-site, and adjacent overlot cut is not available, an off-site borrow area may need to be established. The

Contractor shall be responsible for locating suitable off-site borrow areas within a reasonable distance from the site if no off-site borrow area is designated in the Specifications or on the Drawings. The Contractor shall excavate the suitable materials from the approved borrow area and transport them to the required fill areas.

Upon completion of the work, the borrow area shall be smooth graded to blend into the existing contours with no cut slopes steeper than 3:1. Proper drainage shall be maintained within and around the borrow area at all times.

F. Subgrade preparation:

1. General: Subgrade preparation shall be the work required to prepare the ground surface in fill areas to receive fill, and the work required to compact the surface of the subgrade in cut areas once common excavation materials have been removed. It is also to include grading of the final subgrade including ditches and slopes as well as horizontally scarifying or otherwise roughening the slopes prior to the placement of topsoil.

2. Subgrade preparation in fill areas: The ground surface in all areas to receive fill shall be properly cleared and grubbed. Sloped surfaces steeper than 1 vertical to 4 horizontal on which fill is to be placed shall be plowed, stepped or benched in such a manner that the fill material will bond with the existing surfaces and prevent further slippage. The method of establishing benches and their geometry shall be approved by the Engineer.

   The existing ground surface prior to fill placement shall be scarified to a depth of 1 foot and recompacted. Any existing ground area within 1 vertical foot of final subgrade elevation shall be scarified to a depth of 12” and then compacted.

3. Subgrade preparation in cut areas: The final subgrade surface, which exists in cut areas after the common excavation materials are removed, shall be scarified to a depth of 1 foot and recompacted.

4. Preparation of final subgrade surface.

   a. Immediately prior to the placement of subbase or base course gravels, the subgrade shall be scarified, shaped and compacted to design density at specified moisture content, then proof rolled to identify areas of pumping, checking, or cracking which must be corrected before proceeding further. The Contractor's method of proof rolling shall be as agreed upon by the Engineer prior to proceeding.

   b. If the final subgrade surface consists of suitable materials, but the compaction standards cannot be met due to excessive moisture content, the Contractor shall be required to dry or manipulate the material to a depth of 1 foot until the proper compaction can be achieved. Use of smaller, lighter equipment may be required to achieve the required density in the natural soils.

   c. If the final subgrade surface consists of unsuitable material, or suitable material with excessive moisture content which, in the opinion of the Engineer, cannot be dried due to high water table conditions, the section titled "Repair of unstable subgrade" shall apply.

G. Repair of unstable subgrade

1. General: An unstable subgrade is one in which the Contractor cannot meet the compaction requirements called for in "Subgrade preparation" due to:

a. Presence of unsuitable materials.

b. Suitable materials with excessive moisture content which cannot be stabilized by manipulating and drying the top 1 foot.

c. Presence of groundwater near the subgrade surface preventing proper stabilization of the subgrade.

If such conditions exist, the Contractor shall meet with the Engineer to decide upon the method of solution. The following solutions exist.

2. Solutions to unstable subgrade:

a. Unsuitable materials and suitable materials with excessive moisture content may be excavated and disposed of at the appropriate waste area. The excavation may subsequently be filled with on-site excess suitable materials or with suitable material from a borrow area.

b. Alternatively, suitable materials with excessive moisture content may be excavated, dried by manipulation or mixing with other dry materials and recompacted in the excavation.

c. Installation of underdrains: If groundwater exists, underdrains may need to be installed.

d. Geotextiles: The Engineer may direct that ground stabilization geotextile be installed. In this case, the geotextile shall be installed over the unstable subgrade in accordance with the manufacturer's recommendations and as described in Section 2242, Geotextiles.

3. For all solutions to stabilizing a subgrade, the Contractor shall meet the requirements called out in "Subgrade preparation". If, however, unstable subgrades exist below 3 feet from finished grade and after a reasonable but unsuccessful attempt by the Contractor to stabilize the subgrade, the Engineer may waive the requirements for subgrade preparation. In such a case, the Engineer may direct the Contractor to place suitable fill over the unstable area.

H. Drainage

1. General: At the onset of construction, the Contractor shall take whatever steps are deemed necessary to protect all work from damage due to inadequate drainage, to protect suitable materials from obtaining additional moisture, to assist in drying of existing materials with excessive moisture and to protect the site from excessive erosion. During construction the embankments and excavations shall be kept shaped and drained. Ditches and drains along the sub-grade shall be maintained in such a manner as to drain effectively at all times. Excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. Additional work to dry materials with excessive moisture content due to rain or snow or lack of proper drainage shall be the responsibility of the Contractor.

2. Culverts and riprap: Culverts as required shall be constructed along the subgrade in a timely fashion to provide proper drainage.

3. Drainageways: Care should be taken in construction of drainageways to minimize disturbance of existing vegetation adjacent to the drainageways.

3.4 WASTE AREAS

A. General: The Engineer and Contractor shall establish which waste materials are to be deposited in the on-site or off-site waste areas. The locations and depths of the materials to be placed in the waste areas shall also be established. No compaction other than that achieved by equipment during smooth grading will be required for waste areas, unless specified in the Special Provisions.

B. On-site waste areas: On-site waste areas may be as designated on the Drawings or as agreed upon by the Contractor and Engineer. On-site waste areas will be located within the project site.

   The Contractor may, with prior permission of the Engineer, waste excess topsoil along the toe of fill slopes. However, such materials placement may require special placement considerations.

C. Off-site waste area: If an off-site waste area is not identified in the Drawings and Specifications, the Contractor shall be responsible for disposing of off-site waste.

D. Grading of on-site waste area: Upon completion of use of the on-site waste area, it shall be graded to a smooth and uniform grade compatible with the surrounding terrain. All material shall be blended into existing contours. No fills shall be placed in excess of 3 vertical feet on any exposed face. Fill slopes shall not be in excess of 5:1, unless approved by the engineer.

E. Removal of excess materials: The Contractor may not remove excess topsoil and other waste material from the site without the Owner's approval.

3.5 UTILITY INSTALLATION COORDINATION

It shall be the Contractor's responsibility to coordinate the installation of other utilities such as gas, electric, telephone and TV within the construction area. No utilities; gas, electric, telephone, CATV, sewer and water lines are to be installed until the subgrade within the area of utility installation is constructed to grade, including ditches.

3.6 FIELD QUALITY CONTROL

The Contractor shall develop quality control procedures as necessary to control his installation and assure that his work meets the requirements of the specifications.

A. Sampling of Materials: Sampling and delivery of each principal type of material to be used in subgrade construction shall be the responsibility of the Contractor. Samples shall be delivered to the Engineer for testing sufficiently in advance of construction so as to not delay the Work. All embankment material proposed to be imported from off site shall be tested to determine its soil classification, gradation, liquid limit, plasticity index and moisture density relations. Sampling procedures shall be result in samples that are representative of the actual materials delivered to the site.

B. Testing of Materials in place: Testing of materials in place shall be the responsibility of the Owner unless otherwise specified in the Special Provisions or negotiated with the Contractor. Tests for determination of maximum density and optimum moisture content shall be performed in accordance with the requirements of ASTM D 1557 or ASTM D 698, as specified for each principal type of material or combination of materials encountered or utilized. Testing frequency shall be as specified by the accepting agency or as determined by the Owner.

   Coordination for materials testing shall be the responsibility of the Contractor. The Contractor shall

schedule his operations to allow ample time for testing. Testing by the Owner will not relieve the Contractor from responsibility for the work. Deficiencies in construction as determined by in place density tests shall be immediately corrected by the Contractor at no additional cost to the Owner.

If certain areas of the subgrade are unstable or suspect to the Engineer, the Engineer may require density tests below the surface of the suspect subgrade. In such instances, backhoe pits shall be excavated for testing purposes and then backfilled to required compaction standards by the Contractor.

3.7 GRADING TOLERANCE

A. General: All excavation and embankment shall be constructed to attain the lines and grades shown on the drawings. Grading tolerances shall be:

Subgrade:

1. Building and parking areas:	+/- 0.1 foot

Finish grade:

1. Granular cushion under concrete slabs:	+/- 0.05 foot
2. Road base and subbase course:	+/- 0.05 foot
3. Site fills, embankments:	+/- 0.1 foot

B. Treatment after completion of grading: Use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures are installed.

3.8 FOOTINGS AND SLABS

A. General: Refer to requirements of building foundation designer and Geotechnical Engineer. In the absence of such requirements, refer to the following:

B Excavating: Excavate to the lines and grade established by the building designer. Cut off bottom of trenches level, and remove all loose soil. Where soft spots are encountered or overexcavation occurs, remove all defective material and replace with lean concrete or suitable compacted fill material as directed by the Engineer.

C. Fill: Compact all fill surfaces upon which footings will be placed in accordance with the compaction requirements established in this Section of these Specifications. Satisfactory compaction test results and approval of the engineer is required prior to forming for footings.

3.9 PLACING GRANULAR CUSHION

Carefully place the specified granular cushion uniformly attaining the required thickness and providing all required transition planes and support fabric as indicated on the Drawings.

PART 4 MEASUREMENT AND PAYMENT

The Contractor is responsible to coordinate the necessary survey and measurement work for payment quantity calculations.

4.1 CLEARING AND GRUBBING

The work performed shall be paid for on a lump sum basis per the appropriate Bid item. The price shall include removal, transporting and disposal to the appropriate waste area.

4.2 TOPSOIL

The Contractor shall be paid for handling topsoil in the following manner.

A. Excavation of topsoil from disturbed areas: Topsoil excavation shall be paid for per cubic yard as measured in the excavation area. Quantities of topsoil shall be calculated by the following procedure. The excavated depth shall be measured at the centerline and at the two slope stake points. The width will be the distance measured between the slope stakes. Depth and width measurements as defined will be taken at 50 foot stations and the Average End Area Method shall be used to calculate the quantity for payment. Payment for this item shall include temporary stockpiling and/or disposal in an on-site waste area. It shall also include smooth grading of the on-site waste area.

B. Topsoil replacement on disturbed areas: Topsoil replacement shall be paid for per cubic yard as measured on the slopes after placement. Field measurements of the topsoiled area shall be made, or the area may be calculated from as-built cross sections. The payment quantity shall be calculated using this area and the design depth.

C. Excavation and Replacement of topsoil on borrow and overlot grading areas: This shall be paid for as measured in the topsoil excavation area. The depth of topsoil removed shall be measured at grid points. The area of the borrow area shall be measured using the grid system. Quantities of topsoil shall be determined using the Truncated Prism Calculation Method. This item shall include removal of topsoil, temporary stockpiling and replacement of the topsoil.

4.3 SUBGRADE CONSTRUCTION

A. Excavation:

1. Common Excavation (cut): Common excavation shall be paid for on a lump sum basis or per cubic yard as measured in the place of excavation; as provided in the Bid Form. Common excavation is measured from the ground line remaining after topsoil is removed down to the final subgrade line. Quantities shall be calculated using the Average End Area Method. Payment for common excavation shall include the cost of excavation, transporting and depositing the material in fill areas or at an on-site disposal area. If suitable excavated materials are temporarily stockpiled before placed in fills, no extra payment will be received for the stockpiling. Excavation classified as rock excavation will not be paid under the common excavation item but will be paid only under the rock excavation item.

2. Rock excavation: Payment for rock excavation shall be on a cubic yard basis and shall include excavation and removal to an appropriate waste area. Measurement for payment shall be performed in an appropriate manner agreed upon between the Contractor and the Engineer; generally, it shall be measured in place prior to removal.

B. Embankment fill: Embankment fill shall be paid for on a lump sum basis or per cubic yard as measured in place; as provided in the Bid Form. Fill depth is measured from the ground line remaining after topsoil is removed up to the final subgrade line. Quantities shall be calculated using the Average End Area Method. Payment for fill shall include the cost of shaping and compacting

the fill materials with the proper moisture and density control.

C. Rock fill: Payment for rock fill shall be per the appropriate Bid item and shall be further defined in the Special Provisions.

D. Off-site Borrow: Payment for borrow shall be per cubic yard measured in the borrow area and shall include the cost of excavation, loading, haul and depositing at the fill area. Truck or scraper counts shall also be kept by the Contractor.

E. Subgrade preparation: Payment for the work required for subgrade preparation for both cut and fill areas shall be lump sum per the appropriate Bid item.

F. Repair of unstable subgrade: Four general methods of payment exist for repair of unstable subgrade, depending on the method of solution.

1. Unsuitable materials and suitable materials with excessive moisture content are excavated, disposed of at the appropriate waste area, and the excavation subsequently filled with on-site excess suitable materials or with other suitable material. The Contractor shall receive payment for excavation of the unsuitable or wet materials per cubic yard measured in the excavation. He shall receive additional payment for filling the excavation with suitable materials as measured in place per the appropriate Bid item.

2. Suitable materials with excessive moisture content are excavated, dried by manipulation or mixing with other dry materials and recompacted in the excavation. The Contractor shall be paid on a time and materials basis for such work.

3. If underdrains are installed, payment for the installation of washed rock and pipe for underdrains shall be per the appropriate Bid item.

4. If geotextiles are installed, measurement and payment shall be per square yard of material installed under the appropriate Bid item.

G. Drainage: No additional payment for temporary drainage control during construction shall be made. Permanent drainageways will be paid for per lineal foot of drainageway.

H. Compaction Tests: No separate payment will be made for excavation and backfill of test holes for compaction testing purposes.

I. Soil Testing: If the Contractor proposes the use of borrow sources other than those designated in the Specifications or Drawings, the Contractor shall provide the necessary samples and be responsible for testing at no cost to the Owner.

4.4 WASTE AREAS

A. Measurement: Care should be taken when placing materials in the waste areas to allow for separate in place measurement of the various types of waste materials for payment. Measurements in the waste area shall be made using a grid system and the Truncated Prism Calculation Method.

B. Payment for material placed at on-site waste areas: The Contractor will receive no extra payment for on-site wasting of excavated materials.

C. Payment for material placed at off-site waste areas: The Contractor will receive additional payment

for off-site disposal of waste materials. The additional payment will be the cost over and above the cost of excavating the waste materials and disposing of them on-site. Payment for off-site disposal of waste materials will be per cubic yard measured in the waste area. The Contractor shall submit to the Engineer, on a daily basis, a truck count as a check for waste material quantities.

D. Grading: No additional payment will be made for grading of waste areas.

SECTION 2242
GEOTEXTILES
(3-92)

PART 1 GENERAL

1.1 DESCRIPTION

Work included: Provide all fabric, complete in place, as shown on the Drawings or directed by the Engineer.

1.2 SUBMITTALS

General: Submittals are required. Comply with Section 1300.

PART 2 PRODUCTS

MATERIALS

A. Drainage: Fabric for use in subsurface drainage applications and building foundations where high permeability is of importance shall be MIRAFI 140N, a surface conforming, non- woven polypropylene fabric as manufactured by MIRAFI, Inc.

B. Riprap: The fabric required beneath riprap shall be according to the following applications or as specifically noted on the Drawings.

   1. Application 1: Where soil retention and free passage of water are of primary importance, and where the fabric is to be covered with a minimum of 3 inches of select fine material prior to placement of riprap, the fabric shall be MIRAFI 140N as in 2.1A above.

   2. Application 2: Where increased strength may be necessary, or when a covering of select fines is not specified prior to riprap placement, the fabric shall be MIRAFI 700X as manufactured by MIRAFI, Inc.

C. Stabilization: Fabric for use in ground stabilization situations where separation, confinement and load distribution are of primary importance shall be MIRAFI 500X or 600X, a surface conforming woven polypropylene fabric as manufactured by MIRAFI, Inc.. MIRAFI 600X shall be used where higher than normal installation stresses are anticipated such as in bog or very wet areas.

D. Pavement Reinforcement: Fabric for use as asphaltic pavement reinforcement shall be a 100% needle-punched, non-woven polypropylene such as PETROMAT, Paving Grade, as manufactured by Phillips Fibers Corporation.

PART 3 EXECUTION

PREPARATION

The surface upon which the fabric is to be placed shall in general be free from trees, stumps, large rocks and other protruding objects which could damage the fabric. The Engineer will determine the appropriate degree of preparation required prior to fabric placement.

3.2 INSTALLATION

Installation of all fabric shall be per the manufacturer's written recommendations and as directed by the Engineer.

In riprap applications the Engineer shall inspect and approve the placement of select fine materials on top of fabric prior to the Contractor commencing final placement of riprap.

PART 4 MEASUREMENT AND PAYMENT

4.1 GENERAL

Fabric will be measured in place per square yard of surface area covered. Total quantities will be computed to the nearest square yard. Areas of fabric overlap will be paid as one surface area only. Payment will be made at the Contract price per square yard under the appropriate Bid item.

Work related to preparing the surface for fabric placement shall be included in the cost of fabric placement unless otherwise indicated in the Bid.

4.2 RIPRAP APPLICATIONS

Measurement for payment shall be as described above. Payment for Application #1 fabric placement shall include all work required to provide the specified layer of select fines over the fabric.

SECTION 2261
RIPRAP
(7-92)

PART 1 GENERAL

1.1 DESCRIPTION

Work included: Furnishing and installing rip rap to include preparation of the surface to receive rip rap as shown on the Drawings or required.

1.2 QUALITY ASSURANCE

Standard Specifications: Materials, and installation shall be in accordance with the current edition of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, 2011 as referenced and modified herein, and referred to as the Standard Specifications.

1.3 SUBMITTALS

Submit the source of the riprap to the Engineer for review prior to transporting and placing riprap. Provide the samples of riprap only if requested by the Engineer.

PART 2 PRODUCTS

MATERIALS

Per section 506.02 of the standard specifications. If no stone size is shown on the Drawings, the stone size (d50) shall be 12 inches.

PART 3 EXECUTION

3.1 PREPARATION

Earth surfaces on which the rock riprap is to be placed shall be trimmed and graded to conform to the lines or sections shown on the Drawings. Surfaces which are below grade shall be brought to grade by filling with well-compacted materials similar to the adjacent materials.

3.2 INSTALLATION

Per section 506.03 of the standard specifications modified as follows. The riprap shall be placed to the full course thickness in one operation and in such a manner as to avoid displacement of the underlying materials. The finished surface of the riprap shall be slightly below the adjacent ground surface and shall slope toward the center of the riprap installation.

PART 4 MEASUREMENT AND PAYMENT

The quantity of rock riprap will be determined from the specified thickness shown on the Drawings and the area on which acceptable placement has been made. Total quantities will be computed to the nearest cubic yard.

Payment will be made at the Contract Price per cubic yard under the appropriate Bid Item.

SECTION 2521
HDPE PIPE AND INSTALLATION
(08-12 PS)

PART 1 GENERAL

1.1 DESCRIPTION

Work included: Work shall include furnishing and installing culvert and storm drain pipe for surface drainage, and irrigation pipe applications. Unless otherwise indicated on the project drawings, all pipe shall be High Density Polyethylene Pipe as specified in these documents, and the terms “culvert” and “storm drain pipe” shall be considered as interchangeable.

1.2 QUALITY ASSURANCE

All workmanship and materials shall comply with current applicable standards of the Colorado Department of Transportation 2011 Standard Specifications for Road and Bridge Construction.

PART 2 PRODUCTS

2.1 PIPE MATERIAL

A. Pipe Requirements:
   1. Low Head pipe shall have a smooth interior and annular exterior corrugations.
      - 24 through 60 inch shall meet AASHTO M294, Type S or ASTM F2306 with the modifications listed herein.
      - Manning’s “n” value for use in design shall be 0.012.
      - Where low head applications sustain continuous pressure, the sustained pressure shall not exceed 5 psi for a minimum 50-year design service life with seasonal pressures not exceeding 10 psi for a consecutive 9 month period.

   2. Watertight pipe (per ASTM F2648) shall have a smooth interior and annular exterior corrugations.
      - 4 through 18 inch shall meet ASTM F2648.
      - Manning’s “n” value for use in design shall be 0.012.

B. Joint Performance

   1. The 4- through 60-inch pipe shall be watertight according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly. All joints shall be watertight.

      The 24- through 60-inch diameters spigots shall have two gaskets and shall have a reinforced bell with a polymer composite band. The bell tolerance device shall be installed by the manufacturer. All joints shall be watertight.

C. Fittings

   1. Fittings shall conform to AASHTO M294 or ASTM F2306. Bell and spigot connections shall utilize a spun-on, welded or integral bell, welded bell and valley or saddle gasket and spigot with gaskets meeting ASTM F477. Fitting joints shall meet the watertight joint performance requirements of ASTM D3212 or ASTM F2306.

D. Material Properties

1. 24- through 60-inch Pipe: Virgin material for pipe and fitting production shall be high-density polyethylene conforming with the minimum requirements of cell classification 435400C for the corrugated exterior profile, and 445464A for the interior liner as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The 24- through 60-inch virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306 respectively. The interior liner resin shall have a material designation code of PE3408/PE3608 by the Plastic Pipe Institute and a Hydrostatic Design Basis of 1600 psi.

2. 4- through 18-inch Pipe: Material for pipe production shall be an engineered compound of virgin and recycled high-density polyethylene conforming with the minimum requirements of cell classification 424420C (ESCR Test Condition B) for 4- through 10-inch diameters, and 435420C (ESCR Test Condition B for 12- through 18-inch diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed 4%. The design engineer shall verify compatibility with overall system including structural, hydraulic, material and installation requirements for a given application.

2.2 EMBEDMENT AND BACKFILL MATERIALS

A. Bedding, Haunch Backfill, Initial Backfill: ASTM D2321 Class I (Crushed rock angular) and Class II (Clean, coarse-grained soils), 1-1/2 inch minus.

B. Final Backfill: Suitable excavated materials or imported pit run.

PART 3 EXECUTION In General - Refer to The ADS, Inc. Drainage Handbook Section 5-0 Installation.

3.1 CULVERT INSTALLATION

A. Excavation: Trenches shall be excavated to a width sufficient to allow for proper jointing of the culvert and thorough compaction of the bedding and backfill under and around the culvert.

Minimum Trench Widths: Pipe Diameter (Dia.) - Minimum Trench Width (MTW)
12 in. Dia - 30 in. MTW;
15 in. Dia - 34 in. MTW;
18 in. Dia - 39 in. MTW;
24 in. Dia - 48 in. MTW;
30 in. Dia - 56 in. MTW

B. Installation: Installation shall be in accordance with ASTM D2321 and pipe manufacturer's recommended installation guidelines, with the exceptions that minimum cover in traffic areas for 4- through 30-inch shall be 18". Backfill for minimum cover situations shall consist of Class 1 (compacted) or Class 2 (minimum 90% SPD) material.

C. Connections:

1. HDPE pipe: All connections shall be made watertight with the proper sized band as supplied by the manufacturer.

D. Backfill:

1. Bedding: If no undesirable foundation material is found, a minimum of 4- to 6-inches (0.1-0.15m) of bedding shall be placed and compacted on the foundation to equalize load distributions along the invert of the pipe. Refer to ADS Figure 5-2 for a pictorial description of backfill terminology.

A stable and uniform bedding shall be provided for the pipe and any protruding features of its joints and/or fittings. The middle of the bedding, under the pipe invert, equal to 1/3 of the pipe O.D. should be loosely placed, with the remainder compacted to minimum 90% standard proctor density. The same class of material recommended for the initial backfill is suitable for the bedding; however, the compaction requirements for the bedding may be higher than compaction requirements for the initial backfill to ensure the stability of line and grade.

2. Haunch Backfill: The next layer of backfill, the haunching, is the most important since it is this layer that provides the pipe with support against the soil and traffic loadings. Haunching shall be placed in lifts of 4- to 6-inches and compacted in accordance with product specific guidelines listed in Appendix A-5, Table A-5-2 to achieve required depth of fill. Construction of each lift should be repeated up to the spring line. See Table 5-3 General Recommendations for Installation and Use of Soils and Aggregates.

3. Initial Backfill: Initial backfill extends from the spring line, and depending on product and application, to the crown of the pipe or six inches above the crown of the pipe. This area of the backfill anchors the pipe and ensures that loads are distributed as evenly as possible into the haunching. The same material used in the haunching shall be used for the initial backfill.

   When using a material that requires compaction, it is important not to use mechanical compaction equipment directly on the pipe itself. Initial backfill shall be placed in lifts of 4 to 6 inches and compacted in accordance with product-specific guidelines in Appendix A-5, Table A-5-2 to achieve required depth of fill. Tamp to achieve the specified compaction, or shovel into the area, eliminating voids, if the material doesn't require mechanical compaction. Construction of each lift should be repeated until the initial backfill zone is completed.

   Flowable fill can be used throughout the pipe zone as an alternative to compacted granular material, however special precautions are necessary for a successful installation. Flowable fill may cause the pipe to float or misalign. Therefore the pipe will need to be weighted with sandbags or held with some type of anchoring system. The flowable fill may also be poured in layers that are allowed to cure before the next layer is poured to help reduce the tendency for the pipe to float. As with any backfill material, proper installation of the flowable fill around the pipe is critical to the structural performance of the pipe. For additional information on the use of flowable fill, refer to ADS, Technical Note, TN 5.02, *Flowable Fill Backfill for Thermoplastic Pipe*.

4. Final Backfill: Final backfill, which extends from the initial backfill layer to the ground surface, does not directly support the pipe. Excavated materials may be of adequate quality for final backfill, depending on the intended use at the surface. Selection, placement and compaction of final backfill shall be as directed by the design engineer. When placing final backfill, consideration needs to be given to compaction equipment and construction loads operating over top of the pipe. Proper compaction of the final backfill area is not nearly so critical for the pipe as in the other layers; however, if roads or drives will be crossing the pipe, a relatively high degree of compaction is needed to prevent pavement settlement.

E. Minimum cover: Minimum cover shall be measured from the top of the pipe to the finished subgrade. Minimum cover of culverts shall be 12 inches for the following types and sizes unless waived by the Engineer.

   When no pavement will be installed, but vehicle traffic is expected (e.g. gravel driveway), a total minimum cover of 18-inches for 4 to 48 inch diameters and 30-inches for 54 and 60 inch diameters is recommended to minimize rutting. If the ground surface is truly green space or a landscape area, minimum cover may be 12-inches from top of pipe to ground surface for all diameters. These recommendations assume the pipe is installed in accordance with manufactures recommendations and may not address the cover needed to prevent flotation.

Minimum cover for sizes larger than those shown and maximum fill heights for all culverts shall be per the manufacturer's recommendation and subject to approval by the Engineer.

3.2 FIELD QUALITY CONTROL-COMPACTION

Maximum density and optimum moisture content shall be as determined by ASTM D 698, Standard Proctor.

Hand tampers and Hand-held Power Tempers: Compaction of the haunch layer may require a small tamping mechanism to obtain the specified compaction in a confined area. A hand-held pole or two-by-four can be used to compact the haunching. Tampers for horizontal layers shall not weigh more than twenty pounds and the tamping face shall be limited to an area no larger than 6-inch by 6-inch.

Rammers or rammer plates: Impact action is used to force out air and water from between soil particles to consolidate the fill. This equipment works well on cohesive or high-clay content soils. Care should be taken not to use rammer-type compactors directly on the pipe. For heavy-duty compaction equipment, such as a Ho-pac or equivalent type compactors, a minimum of 4-feet of backfill shall separate the pipe from the equipment at all times.

PART 4 MEASUREMENT AND PAYMENT

4.1 CULVERTS AND STORMDRAIN PIPE

Payment for culverts and storm drain pipe shall be on a per installed linear foot basis and shall include the cost of the pipe, bends, bands, excavation, haul off of excess dirt,bedding, backfill, washed rock and fabric as required.

SECTION 2522
CATCH BASINS/INLETS
(03-13 PS)

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: The work under this Section shall include furnishing and installing catch basins/inlets as noted on the Drawings.

B. Related work described elsewhere:

1. HDPE Pipe and Installation, Section 2521

2. Colorado Department of Transportation 2011 Standard Specifications for Road and Bridge Construction, Section 601, Structural Concrete.

1.2 QUALITY ASSURANCE

All workmanship and materials shall comply with current applicable standards of the Colorado Department of Transportation, Standard Specifications for Road and Bridge Construction.

1.3 SUBMITTALS

Comply with the requirements of Section 1300. If alternate catch basins are proposed to those specified, shop drawings and other suitable manufacturers information shall be submitted for review and approval.

PART 2 PRODUCTS

2.1 CATCH BASINS

Catch basins maybe precast or cast-in-place, as shown and noted on the drawings.

2.2 FRAMES AND GRATES

The type of frame and grate shall be as specified on the drawings. Minimum standards for manufacture of gray iron castings shall be ASTM designation A48 Class 25 unless otherwise specified.

PART 3 EXECUTION

3.1 INSTALLATION

A. Excavation: The excavation shall be sufficient to allow for proper installation of the catch basin to the dimensions and elevations specified. Adequate area shall be excavated to permit proper compaction of the backfill around the catch basin.

B. Culvert Placement: Catch basins shall be installed on a smooth and uniform foundation. A minimum of 6 inches of well-graded, granular material is to be placed beneath any catch basin installed on a soft foundation. Hard or rock foundations are to be over-excavated a minimum of 6 inches and a well-graded, granular backfill or other suitable material installed to the proper grade and to the required density. All installations are to be made in dewatered conditions.

C. Connections:

1. Precast catch basins: Openings for culverts shall be of adequate size to allow for grouting between the culvert and the catch basin. Openings shall have a minimum diameter of 2 inches larger than the outside diameter of the culvert. The void between the culvert and catch basin shall be filled with non-shrink grout. The culvert shall be trimmed flush with the inside wall of the catch basin. The bottom of the catch basin shall be filled to the invert of the culvert with concrete or grout to allow for free discharge without puddling or shall be as otherwise detailed on the drawings.

2. Cast-in-place catch basins: Once the base has been poured, catch basin walls shall be formed around the in place culverts. The culvert shall be trimmed flush with the inside wall of the catch basin.

D. Frame and Grate Installation: Upon completion of the catch basin installation, the specified frame and grate shall be grouted to the catch basin with non-shrink grout. Any grade adjustment over 3 inches, which is necessary to achieve the proper grate elevation, shall be made with a combination of grout and precast masonry material, such as brick or cement block.

E. Backfill: Granular backfill material is preferred; however, cohesive type material may also be used if careful attention is given to compaction at or very near optimum moisture content.

3.2 FIELD QUALITY CONTROL

Moisture content and maximum dry density shall be as determined by ASTM D-1557, modified proctor. All backfill material is to be compacted to 95 percent of maximum density. In existing pavement areas, allowance shall be made to permit the placement of a minimum of 4 inches of road base material and a 4 inch asphalt patch.

PART 4 MEASUREMENT AND PAYMENT

Payment shall be a lump sum for each inlet installed per the appropriate Bid items.

SECTION 2620
CURB, GUTTER, SIDEWALK AND TRAIL SURFACES
(03-13 PS)

PART 1 GENERAL

1.1 DESCRIPTION

Work included: This specification shall govern all labor, materials, equipment and services which are required for the installation of curbs, gutter, sidewalk and concrete trail surfaces.

1.2 QUALITY ASSURANCE

A. Standards: Comply with standards specified in this Section, except as herein after modified.

1. CRSI "Manual of Standard Practice".
2. ACI 301 "Specifications for Structural Concrete".
3. ACI 305 "Specification for Hot Weather Concreting".
4. ACI 306 "Standard Specification for Cold Weather Concreting".
5. ACI 308 "Standard Specification for Curing Concrete."

In case of conflict between the referenced standards, the more stringent requirements shall govern.

B. Applicable Guidelines

1. ACI 304 "Guide for Measuring, Mixing, Transporting and Placing Concrete".
2. ACI 309 "Guide for Consolidation of Concrete".
3. ACI 318 “Building Code Requirements for Structural Concrete”.
4. ACI 347 "Guide to Formwork for Concrete"

C. Qualifications of installers: Throughout the progress of installation of the work of this Section, provide at least 1 person who shall be thoroughly familiar with the specified requirements, completely trained and experienced in the necessary skills, and who shall be present at the site and shall direct all work performed under this Section.

D. Quality control: Prior to all work under this Section, make all necessary arrangements with the testing laboratory. The testing laboratory shall be able to furnish the following upon request:

1. Test, and furnish certified reports on:
   a. Proposed aggregates.
   b. Proposed cements.
   c. Mixing water.
2. Prepare design mixes for each type of concrete, using previously tested and approved materials. These mix designs shall be prepared under the supervision of a concrete technologist experienced in the special considerations of materials and mixes.

3. Proportion mixes by either laboratory trial batch or field experience methods, using materials to be employed on the work for each class of concrete required.

   a. Complete identification of aggregate source of supply;

   b. Results of tests of aggregates for compliance with specified requirements.

   c. Scale weight of each aggregate.

   d. Absorbed water in each aggregate.

   e. Brand, type, chemistry, and physical test for each cement.

   f. Source, type, chemistry, physical test and toxicity test for fly ash.

   g. Brand, type, and amount of each admixture.

   h. Amounts of water used in trial mixes.

   i. Proportions of each material per cu. yd.

   j. Gross weight and yield per cu. yd. of trial mixes.

   k. Measured slump.

   l. Measured air content.

   m. Compressive strength developed at 1 day, 3 days, 7 days, and 28 days, from not less than 3 test cylinders cast for each 1, 3, 7, and 28 day test, and for each design mix.

4. Furnish certified reports of each proposed mix for each type of concrete at least 7 days prior to start of installation of the work of this Section. Do not begin concrete production until all mixes have been reviewed and approved by the Engineer.

5. All concrete for cast on site work for this project shall have the following properties:

Maximum water/cement ratio	0.42 (total cementitious)*
Total Cementitious* Content	615-660 lbs. / c.y.
Compressive strength	4,500 psi minimum in 28 days
Maximum coarse aggregate size	3/4”
Maximum fine aggregate size	3/8”
Air content	5% – 8% by volume
Slump (on site)	4½” maximum
Fibrous Concrete Reinforcement	Per manufacturer’s recommendation

   * Total cementitious is defined as Portland Cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast furnace slag and silica fume.

6. Approved fly ash may be substituted for Portland Cement up to a maximum of 20 percent Class C or 30 percent Class F by total weight of cementitious material..

D. Finished Product: Shall be in close conformity with lines, grades, and typical cross sections shown on the Drawings, as required to match existing adjacent sidewalk, or as established by the Engineer.

For exposed fine aggregate concrete (Type II Finish) maximum size aggregate shall be 3/8", and shall comply with "Fine Aggregate" gradation. Aggregate shall have a variety of color and be approved prior to us.

1.3 SUBMITTALS

A. General: Comply with provisions of Section 1300.

B. Product data: Within 14 calendar days after award of Contract.

1. Complete information on proposed consolidation equipment;

2. Complete description of proposed curing methods;

3. Concrete mix designs, prepared in accordance with the provisions of subparagraph 1.2 C above.

4. Saw cut/joint filler equipment and material.

1.4 PRODUCT HANDLING

A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 CEMENT

A. General: Cement shall be Type I or Type II Portland cement conforming to the requirements of ASTM C 150 "Standard Specifications for Portland Cement", unless otherwise specifically modified on the drawings or in the special provisions.

B. Sequence of use: Use only one brand of cement for the entire work and use in the same sequence as received at the site.

2.2 AGGREGATES

A. General: All aggregates shall conform to requirements of ASTM C 33, except as modified below.

B. Coarse and fine aggregate: Aggregate shall comply with ASTM C 33 "Standard Specifications for Concrete Aggregates".

C. Aggregate sources: Provide aggregates from one source of supply only.

D. Aggregate sizes: Maximum aggregate size shall be not larger than 1/5 of the narrowest dimension between sides of forms, nor 3/4 of the minimum clear spacing between individual reinforcing bars or bundles of bars.

1. Fine aggregate: shall meet the following grading requirements.

Sieve size	% passing
3/8”	100
No. 4	95-100
No. 16	45-80
No. 50	10-30
No. 100	2-10
No. 200	0-3

2. Coarse aggregate: shall meet the following grading requirements.

Sieve size	% passing
1”	100
3/4”	95-100
3/8”	20-55
No. 4	0-15
No. 8	0-3

E. Stockpile the aggregates in a manner to protect from contamination.

2.3 WATER

Water used as an ingredient in concrete shall be clean, potable, and free from injurious amounts of foreign matter or other substances that may be deleterious to concrete or reinforcement.

2.4 CONCRETE ADMIXTURES

A. General: All admixtures shall be as follows:

1. Air-entraining admixtures, Comply with ASTM C 260.

2. Water reducing admixtures, Comply with ASTM C 494 - Type A

3. Water reducing/retarding, Comply with ASTM C 494 - Type D

4. Other admixtures shall conform to ASTM C 494 unless specific approval is secured before starting mix design procedures.

B. Acceptable substitutes: The Engineer will only consider those proposed admixture substitutions which have been completely tested and reported upon by the testing laboratory in accordance with the provisions of subparagraph 1.2 C above.

C. Calcium chloride: Addition of calcium chloride to the concrete mix at the batch plant or at the job site will not be allowed.

2.5 CURING MATERIALS

A. Burlap cloth made from jute or kenaf and weighing approximately 9 ounces per square yard for moist curing shall conform to AASHTO M 182. Use 2 layers and stagger joints.

B. Sheet materials for curing concrete shall conform to ASTM C 171. Plastic sheeting shall be a minimum thickness of 6 mil, colored white.

C. Liquid curing and sealing compounds shall be a clear membrane-forming compound conforming to ASTM C 309.

2.6 JOINT FILLERS

Preformed expansion joint filler material shall be bituminous fiber type conforming to ASTM D 1751. Filler for each joint shall be furnished in a single piece for the full depth and thickness required.

Poured joint filler shall be a silicone sealant per CDOT Standard Specifications Section 705 and installed per CDOT M&S Standards, Standard Plan No. M-412-1.

2.7 REINFORCING STEEL

Dowels shall be smooth ASTM A615, Grade 60 or round ASTM A 36 bar.

Dowel baskets shall be constructed of ¼" diameter cold drawn wire side frame supports meeting ASTM A 108, Grade 1010-1020. Weld additional wires across side frames for assembly stability.

Tie bars shall be ASTM A615 Grade 40, deformed.

ASTM Welded wire fabric shall comply with ASTM A 185.

All dowels and tie bars for trails shall be epoxy-coated.

2.8 FORM MATERIALS

A. Forms: Construct formwork for exposed (painted or unpainted) concrete surfaces with smooth faced undamaged plywood or steel or other panel type material acceptable to the Engineer, to provide continuous, straight, smooth as-cast surfaces. Furnish in largest practicable sizes to minimize number of joints.

   Construct formwork for concrete concealed from view as indicated above. Less attention may be given to condition of plywood and other appearance considerations, except that bowed, unstable and leaky formwork will not be tolerated.

   Provide form material with sufficient thickness to withstand pressure of newly placed concrete without excessive and objectionable bow or deflection.

   Bender boards with adequate supports shall be used on all trail concrete with curves of less than 75 foot radius.

B. Form coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, nor adversely affect concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds.

2.9 GROUT

Grout shall be a nonshrink, ready-to-use, non-metallic aggregate product requiring only the addition of water at the job site, and shall have the following attributes:

A. Be capable of producing a flowable grouting material having no drying shrinkage or settlement at any age.

B. The compressive strength of grout 2" cubes shall be no less than 5,000 psi at age 7 days, and 7,500 psi at age 28 days.

Store, mix, and place the nonshrink grout in strict accordance with manufacturer's recommendations.

2.10 BATCHING, MIXING, AND DELIVERY EQUIPMENT

Use ready-mixed concrete from approved batching and mixing plant. Batch, mix and transport concrete to site in accordance with provisions of ASTM C 94.

2.11 UTILITY CONDUIT

Utility conduits shall be gray, Schedule 40 Electrical PVC unless otherwise noted or specified.

2.12 FIBROUS CONCRETE REINFORCEMENT

A. General: Use 100 percent virgin polypropylene, fibrillated fibers containing no reprocessed olefin materials and specifically manufactured for use as concrete reinforcement. Fibrous concrete reinforcement shall be manufactured by Propex Concrete Systems 6025 Lee Highway Suite 425, Chattanooga, TN 37422, or approved equal.

B. Physical Characteristics:

1. Specific Gravity, 0.91 +/- 0.05
2. Tensile Strength, 80 - 110 ksi
3. Fiber Length, 1/2", 3/4", 1 1/2", 2" per manufacturer

2.13 BED COURSE

Bed Course shall be Class 6 Aggregate Base Course, per CDOT Standard Specifications Section 703.

2.14 CRUSHER FINES SCREENINGS

A. Clean, hard, durable particles or fragments of 3/8 inch minus select brown/gray crushed granite or basalt. Fines shall be evenly mixed throughout the aggregate. When produced from gravel, fifty (50%) by weight, of the material retained on a Number four (4) sieve shall have two or more fractured faces.

B. The portion retained on the Number four (4) sieve shall have a maximum percentage of wear of fifty (50) at five hundred (500) revolutions as determined by AASHTO T96-77.

C. The portion passing a Number forty (40) sieve shall have a maximum liquid limit of twentyfive (25) and a maximum plasticity index of seven (7), as determined by AASHTO T89-81.

D. The crushed aggregate screenings shall be free from clay lumps, vegetable matter, and deleterious material.

E. Grading requirements are as follows.

1. Percentage of Weight Passing a Square Mesh Sieve
2. AASHTO T11-82 AND T27-82.

Sieve Designation	Percent Passing	Sieve Designation	Percent Passing
3/8 inch	100	No. 16	40-70
No. 4	90 - 100	No. 30	25-50
No. 8	55 – 80	No. 200	6-15

PART 3 EXECUTION

3.1 REMOVAL OF EXISTING CURB AND GUTTER AND SIDEWALK

A. Sawcutting: Where removal is required for reconstruction or replacement with concrete or paving stone, the existing concrete section shall be saw cut with an abrasive type saw and carefully removed. Saw cuts shall be done to the proper lines to permit placement of new concrete surfaces or paving stones as shown on the Drawings or as directed by the Engineer. Saw cuts shall not deviate from established lines by more than 1/4 inch. Cuts for appurtenances such as grates must be of adequate size and proper configuration to allow placement of the appurtenance.

B. Haul Away: The Contractor shall be responsible for haul away and disposal of all removed curb and sidewalk materials to an off-site waste area.

3.2 SUBGRADE PREPARATION - TRAILS

Refer to Section 2211 Subgrade Construction

3.3 SUBGRADE PREPARATION - CURB, GUTTER AND SIDEWALKS

A. Excavation: The excavation shall be made to the required depth to permit the installation of the paved surface including bed course materials, and to the required width to allow for installation and bracing of forms. The foundation shall be shaped and compacted to a firm, even surface conforming to the section shown on the plans or as staked.

B. Soft Spot Repair: All soft and yielding subgrade soils shall be removed and replaced with compacted imported fill materials as directed by the Engineer. A minimum of 12 inches of native material shall be removed. Stabilization fabric shall be placed over the native materials prior to placing imported fill.

C. Overexcavation: Any accidental overexcavation made by the Contractor shall be replaced with suitable fill and recompacted to 95% of maximum density as determined by ASTM D-1557.

D. Fill: All areas beneath the paved surface requiring imported fill shall be filled with base course or pit run materials compacted to a minimum of 95% of maximum density as determined by ASTM D-1557. Any paved surface that settles in the vicinity of fill areas during the one year warranty period shall be replaced by the Contractor as a warranty item.

E. Bed Course: A 4 inch thick layer of bed course materials shall be placed beneath the paved surface. Where the existing subgrade consists of stable, granular material, the Engineer may delete the requirement for placement of bed course material prior to making the excavation. Bed course material is not required when typical sections on the Drawings do not show such material. The bed course material shall be compacted to 95 percent of maximum density and shaped to a smooth surface to conform with required concrete section.

F. Haul Away: The Contractor shall be responsible for haul away and disposal of all unsuitable and excess materials requiring removal from the Work area.

3.3 FORMWORK

A. Typical Section: All concrete curb and gutter and trail shall conform to the typical sections shown on the Drawings or as described in the Specifications.

B. Line and Grade: New trail surfaces shall match the existing adjacent sidewalk grade unless otherwise directed.

C. Grades and Drainage: All flow lines of gutters shall have positive drainage to inlets or curb ending points. Positive drainage shall be defined as a grade of at least 0.3 percent along all sections of the curb. Any

low spots in the flow line of the curb and gutter which cause water to stand to a depth greater than 1/4", or low spots in the backslope of the pan which permit water to escape the flow line and flow across streets, shall be removed and replaced at the Contractor's expense. All curb and gutter of questionable slope shall be tested by the Contractor by flowing water in the gutter line in the presence of the Engineer.

All forms shall be checked by the Contractor with an appropriate leveling device prior to concrete placement to assure that the requirement for positive drainage is met. Errors in staking or calculation of cuts by the Engineer shall not relieve the Contractor of the positive drainage requirement. Upon discovery of such errors the Contractor shall immediately notify the Engineer so he may remedy the problem. Concrete shall not be placed until such grade problems are resolved.

D. Forms: Forms shall be smooth on the side placed next to the concrete, and shall have a true smooth upper edge and shall be rigid enough to withstand the pressure of fresh concrete without distortion. All forms shall be thoroughly cleaned and coated with form oil to prevent the concrete from adhering to them. The depth of forms shall be equal to the full depth of the concrete to be placed. Forms shall be carefully set to alignment and grade and shall conform to the required dimensions. Forms shall be held rigidly in place by stakes. Clamps, spreaders, and braces shall be used where required to insure rigidity in the forms. Benders or thin plank forms shall be used on curves, grade changes, or for curb returns. Back forms for curb returns may be made of 1/2" thick benders cleated together for the full depth of the curb. The form on the front of curbs shall not be removed in less than one hour nor more than 6 hours after the concrete has been placed. In no event shall forms be removed while the concrete is sufficiently plastic to slump.

3.4 DOWEL INSTALLATION - TRAILS

A. For 10-ft. wide “core trails” or where specifically noted: Smooth dowel bars shall be placed in the forms at each expansion, construction and contraction joint. One-half of the dowel length shall be coated with a bond breaker of lead or tar paint or other approved covering. Joints must be laid out and marked on forms such that contraction joints align properly with dowels.

B. For 8-ft. wide “secondary trails” or where specifically noted: Smooth dowel bars shall be placed as noted in “A” above, except dowel bars are not required in contraction joints.

C. Dowels shall be made up in "dowel baskets", or other approved assembly, such that dowels can be set level and parallel to one another and parallel to the length of the slab. "Dowel basket" assemblies must be anchored to the subgrade to prevent movement during concrete placement. Placement tolerance for dowels shall be per CDOT Standard M-412-1.

3.5 CONCRETE PLACEMENT

A. General: Concrete placement shall generally comply with the applicable practices and recommendations of ACI 304, and as herein specified.

B. Procedures: Do not place concrete on frozen, muddy or saturated soil, or into standing water. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. The subgrade should be moist at the time of concrete placement. If necessary it should be dampened with water in advance of concreting.

If a section cannot be placed continuously, provide construction joints with expansion material as herein specified and as approved by the Engineer.

Deposit concrete as nearly as practicable in its final location to avoid segregation due to rehandling and flowing. Do not subject concrete to any procedure which will cause segregation.

Screed concrete which is to receive other construction to the proper level and avoid excessive skimming and grouting.

Do not use concrete which becomes non-plastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials, or has remained in the concrete truck for over 1 hour.

Adding water to the batched concrete on site is not allowed unless the Contractor can demonstrate that the design water-cement ratio is not exceeded. Then, small increments of retempering water may be added to mixed batches to obtain the desired slump. The production of concrete of excessive slump, or adding water in excess of the design water-cement ratio to compensate for slump loss resulting from delays in delivery or placing is prohibited.

C. Concrete Testing: Routine testing to determine the acceptability of the concrete will be performed through an approved testing laboratory. Testing procedures and frequency shall be per ACI and ASTM Standards.

These tests will include, as a minimum, the following:

1. Slump: As per ASTM C 143.
2. Air Entrainment: As per ASTM C 173 or C 231.
3. Compressive Strength: As per ASTM C 31 and C 39.

Slump and air entrainment testing shall be performed immediately after 10% of first batch has been discharged. Sampling shall be done at the final point of discharge.

Compressive strength testing shall include the taking of 4 concrete cylinders for each 100 cubic yards, or fraction thereof, placed in any one day. Sampling shall be from the middle of a batch.

Cylinders shall be broken as follows:

1 cylinder at 7 days;

2 cylinders at 28 days

The remaining cylinder shall be retained for breaking at a later date, as directed by the Engineer.

The Contractor shall notify the Engineer of the time and amount of an anticipated pour at least 24 hours in advance to allow the Engineer to schedule testing and sampling. The Contractor shall assist the Engineer with sampling as required.

Early form removal, early backfilling, or other unusual construction practices will require verification of concrete strength through the casting of additional test cylinders. The cost of additional cylinders shall be at the Contractor's expense. The Contractor shall notify the Engineer at least 48 hours prior to a pour of the need for additional cylinders.

The Contractor is responsible for obtaining test results, for correcting the proportions of the concrete mix to bring it within specifications and for the replacement of concrete placed that is not within specifications. Additional testing required as a result shall be at the Contractor's expense.

D. Concrete conveying: Handle concrete from the point of delivery and transfer to the concrete conveying equipment, and to the locations of final deposit, as rapidly as practicable and by methods which will prevent segregation and loss of concrete mix materials.

Provide runways for wheeled concrete conveying equipment from the concrete delivery point to the locations of final deposit.

Keep interior surfaces of conveying equipment, including chutes and tremies, free from hardened concrete, debris, water, and other deleterious materials.

Pumps may be used only if they can pump the mix designed. Do not add fine aggregate or water to the mix to satisfy needs of a pumping device.

Use chutes or tremies for placing concrete where a drop of more than 60 inches is required.

E. Placing concrete: Deposit and consolidate concrete in a continuous operation, within the limits of construction joints, until the placing of a panel or section is completed.

Bring slab surfaces to the correct level with a straight edge, and then strike off.

Use bullfloats or darbies to smooth the surface, leaving it free from bumps and hollows.

Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to start of finishing operations.

F. Cold weather placing: Comply with ACI 306 to protect all concrete work from physical damage and reduced strength which would be caused by frost, freezing actions, or low temperatures.

G. Hot weather placing: Comply with ACI 305 when hot weather conditions exist which would seriously impair the quality and strength of concrete.

H. Weather Limitations: Unless adequate protection is provided, concrete shall not be placed during rain, sleet or snowfall. In no case shall concrete be deposited on a frozen subgrade. Any concrete poured when the temperature is below 40 degrees Fahrenheit shall be at the Contractor's risk.

3.6 CONSOLIDATION

A. General: Concrete consolidation shall generally comply with the applicable practices and recommendations of ACI 309, and as herein specified.

Internal (hand held immersion) Vibrators: During all phases of operation, maintain a frequency of 8,000-12,000 vibrations per minute.

Surface Vibrators (non-roller): During all phases of operation, maintain a frequency of 3,000 – 6,000 vibrations per minute.

Do not vibrate forms or reinforcement. Do not use vibrators to transport concrete horizontally inside the forms.

B. Equipment: Provide adequate number of units and power source at all times. Maintain spare units on hand to ensure adequacy.

Under ordinary conditions, concrete for trail surfaces 8-ft. and wider shall be struck-off and consolidated by means of a truss type vibrating screed machine, Allen Engineering Corporation “Razorback Screed” or approved equal. The Contractor shall provide a submittal on the machine for the Engineer's review and approval. Alternate types of mechanical vibration equipment shall be required in areas not accessible to the vibrating screed type machine.

If, in the opinion of the Engineer, the equipment being used is not adequate to accomplish proper consolidation, the Engineer may order delay in further placement of concrete until such equipment is available for use at the location of placement of concrete.

C. Procedures: Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation of aggregates.

Spacing between insertions of a hand held immersion vibrator which is used to consolidate shall not exceed twice the radius of action as shown in table 5.1.4 of ACI 309.

Under no circumstances shall the points of insertion during the consolidation phase be more than 18" apart.

3.7 JOINTS

Contraction joints, 1/8 inch wide, shall be constructed at the intervals noted on the Drawings or as directed by the Engineer. When Portland Cement concrete pavement is adjacent thereto, or to be constructed adjacent thereto, the joints shall coincide with the contraction joints in the adjacent pavement. Contraction joints shall be placed equal to the width of trail or sidewalk installed if not directed or specified otherwise. Contraction joints in curb and gutter shall be at 10 ft. maximum intervals. The joints shall be constructed to a minimum depth of 1/3 the concrete depth by saw cutting.

Cutting shall commence after the concrete is sufficiently hard so that the blade does not dislodge aggregate and that the edges of the cut do not ravel, and shall be done within 12 hours of finishing. Shallower cuts made with early-entry, dry-cut saws will be considered an acceptable alternate when submittals documenting proven performance of this method by the Contractor on previous projects are submitted to and approved by the Engineer. Where saw cuts abutt other construction, the length of the proposed cut which can not be sawn shall be tooled out from the obstruction the required distance. Slabs that experience shrinkage cracking due to inadequate joint depth or due to untimely and improper saw cutting shall be removed and replaced at no cost to the Owner.

Expansion joints, 1/2 inch wide by full slab depth, shall be installed at each side of structures, at ends of curb returns, at all curb ramps, at 50 foot intervals along curbs and attached sidewalks, at maximum 100 foot intervals along trail slabs and detached sidewalks, at trail and detached sidewalk intersections, to match existing expansion joints, or as directed by the Engineer. Expansion joints shall consist of preformed joint filler conforming to the provisions herein.

Install smooth dowel bars at construction, contraction (10-ft. wide “core” trail or where noted only) and expansion joints in trail surfaces. Install deformed “tie” bars at joints where noted or detailed.

Isolation joints shall be formed around all appurtenances such as manholes, catch basins, lighting structures, etc., extending into and through the trail or curb. Preformed expansion joint filler 1/2 inch thick shall be installed in these joints. The Contractor shall attempt to locate expansion or contraction joints to intersect isolation joints in a symmetrical manner.

3.8 FINISHING

A. Type I Finish (Brush Finish): The surface shall be finished with a wooden or magnesium float. No plastering of the surface will be permitted. All outside edges of the slab shall be edged with a 1/2 inch radius edging tool.

   Prior to the removal of the forms, the surface shall be finished true to grade by means of a straightedge float, not less than 10 feet in length, operated longitudinally over the surface of the concrete. Form clamps and braces shall be so constructed as not to interfere with the operation of this float. Immediately after removing the front curb forms, the face of the curb shall be troweled smooth to a depth of not less than 0.17 feet below the flow line or to the flow line of integral curb and gutter, and then finished with a steel trowel. The top shall be finished and the front and back edges rounded as shown on the plans. After the face of the curb has been troweled smooth the entire curb and gutter surface shall be given a final fine brush finish with brush strokes parallel to the line of the curb. All slabs shall have a medium brush finish perpendicular to the direction of travel.

B. Type II Finish (Exposed Fine Aggregate): When an exposed fine aggregate finish is specified a set retardant shall be sprayed on flat surfaces after the concrete has been placed and on forms prior to

concrete placement for vertical faces. After concrete has set, usually the next day, forms are to be stripped and the surfaces to be exposed are to be sprayed with a high pressure hose and brushed to expose the aggregate. The final exposed aggregate surface shall be cleaned and be uniform in texture. Areas where the aggregate is not exposed uniformly shall be sandblasted at the Contractor's expense to produce a uniform texture.

C. All Finishes: The top and face of the finished curb and the top and edge of the trail slab shall be true and straight, of uniform width, free from humps, sags or other irregularities. When a straight edge 10 feet long is laid on the top or face of the curb, on the surface of gutters, or on the top surface or edge of the trail slab, the surface shall not vary more than 0.01 foot from the edge of the straightedge, except at grade changes or curves.

The Contractor shall clean at his expense all discolored concrete. The concrete may be cleaned by abrasive blast cleaning or other methods approved by the Engineer.

3.9 CURING

A. All Surfaces: Immediately upon completion of the finishing, concrete shall be moistened and kept moist for three days. The method and details of curing shall conform with requirements of ACI 308, subject to the approval of the Engineer.

Adequate precautions shall be taken for protection of all concrete after it is placed as well as for prevention of the temperature of the deposited concrete from falling below 40 degrees Fahrenheit for seven days. A sufficient supply of insulation blankets for covering or protecting the concrete shall be provided on the site and spread to a depth necessary to maintain the required temperature. As a minimum, the Contractor shall provide two thermometers within the protected area for monitoring purposes.

Concrete shall be cured a minimum of three days for pedestrian traffic and for a minimum of 7 days for vehicular traffic, subject to additional requirements specified in ACI 308. The Contractor shall adequately monitor and/or barricade the site to prevent damage from any source to the freshly placed surface and to prevent pedestrian traffic for three days after concrete placement and vehicular traffic for seven days after concrete placement. All completed surfaces damaged or disfigured during this time period shall be replaced by the Contractor.

B. Trail Surfaces: Comply with the provisions above and as modified herein.

Immediately upon completion of the finishing, the concrete surface shall be kept moist at all times by fogging with an approved atomizing nozzle until the curing material is in place.

The surface of the concrete shall be entirely covered with white polyethylene sheeting having a minimum thickness of 6 mils (.006") placed over burlap mats. The mats shall extend at least 12" beyond the edge of the slab. Prior to being placed, the mats shall be thoroughly saturated with water. The mats shall be placed and weighed so as to remain in contact with the slab surface, and shall be maintained fully wetted and in position for the full curing period. Curing shall be started as soon as the concrete has hardened sufficiently to prevent surface damage.

If the ambient temperature falls below 40° F, insulation blankets shall be used to maintain specified curing temperature and to maintain moisture in concrete. Blankets shall be lapped 8 inches minimum and be free of holes. Blankets shall be secured at laps and edges to prevent moisture from escaping.

3.11 CURB MACHINE/SLIP-FORM PAVER

Curb, gutter and sidewalks may be constructed with a slip-form paving machine provided the final product is of equal quality to that required by these specifications. The use of a continuous forming machine for the placement of the trail slab shall be allowed only if approved by the Engineer. The end product must exhibit

smooth curve transitions. Irregular transitions or deviations from the intended end product will not be acceptable and must be replaced at the Contractor's expense.

3.12 DETECTABLE WARNINGS

A. Detectable Warnings shall be self-weathering gray cast iron truncated dome plates, as manufactured by East Jordan Iron Works.

B. Installation shall be per manufacturer's recommendation.

PART 4 MEASUREMENT AND PAYMENT

Measurement and payment for the following items shall include all equipment, labor, materials and incidentals necessary for a complete installation as specified and shown on the drawings.

4.1 SAWCUT CONCRETE SURFACE

No separate measurement or payment will be made for the work under this item. The cost shall be included in other bid items.

4.2 CURB AND GUTTER

Measurement for payment shall be on a per linear foot basis. Payment shall be per the appropriate unit price bid item.

4.3 TRAIL SURFACES

Concrete Trail Slab: Measurement for payment of concrete trail slab surface installation or replacement shall be per square yard.

4.4 SIDEWALK SURFACES

Concrete Sidewalk: Measurement for payment of concrete sidewalk surface installation or replacement shall be per square yard.

4.5 DETECTABLE WARNINGS

Detectable warnings shall be measured for payment as a lump sum per each completely furnished and installed detectable warning location shown on the drawings.

SECTION 2900
DRY STACKED BOULDER WALL
(03-13 PS)

PART 1 DESCRIPTION

1.1 This work consists of constructing boulder wall structures at the locations and to the dimensions shown on the plans. Boulder walls, boulder veneer and boulder slopes are formed of interlocking, dry stacked rocks without reinforcing steel, mortar, or concrete. Boulder walls may be constructed as either single structures or in tiers.

PART 2 MATERIALS

2.1 ROCK

A. General: Furnish hard, angular to subangular, and durable rock that consists of intact blocks without open fractures, foliation, or other planes of weakness. Conform to the following:

1. Rock has sufficient hardness so that it cannot be scratched with a knife or scratched only with difficulty

2. Apparent specific gravity, AASHTO T85 2.5 min.

B. Sizes and Shapes: Furnish angular rocks that are generally cubical, or rectangular in shape. Conform to the following:

1. The rock lengths should randomly range between 2 feet and 4 feet, except chinking rocks.

2. Rock width and height are greater than or equal to one-half of the rock length.

C. Color: Furnish rocks with a color indigenous to the area. Submit at least three (3) 12-inch samples of rock to be used for boulder wall facing that are representative of rock color for approval by the Engineer. Furnish rocks free of machine-made scratches, mars, or other damage to the visible face.

2.2 GEOTEXTILE

The separation geotextile behind the boulder wall shall be MIRAFI 140 N, unless specified or noted differently elsewhere.

PART 3 CONSTRUCTION REQUIREMENTS

3.1 BOULDER WALL CONSTRUCTION

A. Boulder Wall Foundation Excavation: Perform the work under Section 2211 – Subgrade Construction. Excavate a foundation trench to subgrade and obtain the geotechnical engineer's approval of the subgrade before beginning boulder placement.

B. Rock Placement: Place the first course of rocks on firm, unyielding soil or bedrock with full contact between the rock and the subgrade. Excavate any loose, soft or other wise unsuitable material present at subgrade and replace with foundation fill as shown in the plans. Compact the foundation fill according to Section 2211 – Subgrade Construction. As the boulder wall is

constructed, place the rocks so that there are no continuous joints in either the vertical or lateral direction.

C. Voids: Where voids with a minimum dimension of 6 inches or greater exist in the face of the boulder wall, fill the voids with smaller rock.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENTS

A. Measure boulder wall or veneer or slope by the vertical square foot of boulder wall front face.

B. Nonwoven geotextile will not be measured for payment, and is considered incidental to the boulder walls.

4.2 PAYMENT

A. The accepted quantities will be paid for at the contract unit price per unit of measurement for the pay items listed below. Payment will be made under:

Pay Item	Pay Unit
Dry Stack Boulder Wall	Vertical Square Foot
Boulder Slope	Vertical Square Foot

B. Payment will be full compensation for designated measurements including all labor and miscellaneous items that are necessary to construct dry stacked boulder retaining walls prescribed in this Section.