

## SECTION 7

### GENERAL CONDITIONS

#### 7.1 DEFINITIONS AND TERMS

That whenever any word or expression defined herein, or pronoun used in its stead, occurs in these specifications or other Contract documents, it shall have and is mutually understood to have the meaning herein given:

**Addendum or Addenda:** A change or changes to the bid proposal documents issued by the City of Rapid City prior to the time of opening of the proposals.

**Advertisement:** The public announcement inviting bids for work to be performed or materials to be provided.

**Anode:** The electrode or metallic surface location where DC current is discharged into a surrounding electrolyte and corrosion (oxidation with a loss of electrons) occurs in a corrosion cell. The opposite of a cathode.

**Appurtenances or Fittings:** Items including but not limited to valves, fittings, elbows, tees, foster adaptors, service saddles, glands, angles, bends, blow offs, restrained joints, flanges, couplings, spool pieces, miscellaneous piping, tapping saddles, or hydrants, including metallic glands, etc.

**As-Built Plans:** Drawings that reflect changes made during the construction process, recording differences between the original design and the completed project.

**Award:** The acceptance of a bid proposal by the City of Rapid City Council.

**Base Course:** The layer or layers of specified select material placed on a subbase or a subgrade to support a surface course.

**Bidder:** The individual, partnership, firm, corporation, or an acceptable combination thereof, such as a joint venture that is submitting a proposal.

**Bid Proposal, Bid or Proposal:** The written offer of a bidder, on the prescribed form, to perform the work at the prices quoted.

**Bid Schedule:** The list of bid items, together with estimated quantities appearing in the proposal form.

**Bridge:** A structure, including supports, erected over a depression or an obstruction, such as water, highway, or railway, said structure having a length measured along the center of roadway of more than 20 feet between undercopings of abutments or extreme ends of

openings for multiple boxes and pipes where the clear distance between openings is less than half of the smaller contiguous opening.

**Bridge Length:** The greater dimension of a structure measured along the center of the roadway between backs of abutment, backwalls, or between ends of bridge floor.

**Bridge Roadway Width:** The clear width of structure measured at right angles to the center of the roadway between the bottom of curbs or, if curbs are not used, between the inner faces of parapet or railing.

**Calendar Day(s):** Unless herein otherwise expressly defined, shall mean a day or days of twenty-four hours each, beginning and ending at midnight.

**Cathode:** The electrode or metallic surface location where DC current is received or collected from a surrounding electrolyte and protection (reduction with a gain of electrons) occurs in a corrosion cell. The opposite of an anode.

**Cathodic Protection, (Cathodic Protect, Cathodically Protected, etc.):** An electrical method of reducing or eliminating corrosion by making previous anodic areas on a structure surface, turn into a cathode by creating a DC current flow to the structure surface.

**Cathodic Protection Criteria:** The NACE criteria for protected cathodic protection levels of a minimum of -0.85 volt to a copper/copper-sulfate reference electrode or a 100-millivolt polarization shift or more negative (instant off or IR accounted for) in accordance with NACE Standard SP0169. Selection of protective criteria per NACE Standard SP0169 to be at Engineer's discretion.

**Cathodic Protection Station (CPS):** An impressed current cathodic protection installation location usually consisting of a rectifier and groundbed.

**Cathodic Protection System:** Two common cathodic protection methods are galvanic anodes and impressed current cathodic protection systems. A galvanic anode system consists of galvanic anode materials (usually magnesium or zinc) that naturally corrodes or sacrifices itself and does not require an outside power source. An impressed current type system utilizes an outside power source usually a rectifier (that converts AC to DC current) and forces (impresses) current from a number of anodes (or groundbed) through the environment to the structure to be protected.

**Change Order:** A written order issued by the Engineer to the Contractor, covering changes in the plans, specifications, or quantities within the scope of the Contract and establishing the basis of payment and time adjustments for the work affected by the changes.

**City:** The City of Rapid City acting through its authorized representative(s).

**Contract or Contract Documents:** The written agreement between the Owner and the Contractor setting forth the obligations of the parties for the performance of the prescribed work.

**Contract Date or words Equivalent Thereto:** The date upon which this Contract, executed by the Contractor, is signed by the Owner.

**Contract Item, Bid Item or Pay Item:** A specific unit of work for which a price is provide in the Contract.

**Contract Performance Bond:** The security executed by the Contractor and furnished to the Owner to guarantee performance of the work in accordance with the Contract.

**Contract Time or Contract Days:** The number of working days allowed for performance and completion of the Contract or date work is to be completed, as stated in the Proposal and Contract.

**Contractor, Prime Contractor or the words Party of the Second Part:** The individual, partnership, firm, corporation, or joint venture contracting with the City of Rapid City for performance of the prescribed work covered by the Contract and his duly authorized agents or legal representatives.

**Commercial Source:** An established, lawful business operating in continual use as a source to the general public of materials or products relevant to the project.

**Compensable Delay:** Delay for which the Owner is liable in damages to the Contractor. Compensable delay is a subcategory of excusable delay, since all compensable delays will also be excusable delays. However, not all excusable delay is compensable.

**Crew Foreman:** See “Crew Superintendent” and “Contractor”.

**Crew Superintendent:** An employee of the Contractor or subcontractor that directs a group of employees working for the Contractor or subcontractor to complete a specific type of work.

**Crushed Material:** Granular material with one or more crushed faces on at least 30% of the particles retained on the #4 sieve, unless more stringent requirements are specified.

**Culvert:** A structure not classified as a bridge which provides an opening under the roadway.

**Delay:** An increase in the time required for completion of the contract work beyond that originally contemplated by the parties at the time the Contract was signed.

**Developer:** A private individual, person, or entity, or corporation; other than the City of Rapid City; constructing public and/or private improvements covered under the City of Rapid City’s jurisdiction and shall include his employees, contractors, successors, assigns, duly authorized agents and legal representatives.

**Development Project(s) or Project:** Project(s) to construct public and/or private improvements, within the jurisdiction of the City of Rapid City, in accordance with the Specifications, City approved plans and specifications, an or a permit issued by the City.

**Distribution Main:** A water main that is not a transmission main or a water service line that supplies one or more branch mains.

**Drain Anode:** A galvanic anode that is installed at foreign pipeline crossing locations with the intent that any interference current be discharged or drained from the affected pipeline by the drain anode.

**Drawings:** See "Plans".

**Electrically Continuous Pipeline:** A pipeline which has a linear electrical resistance equal to or less than the sum of the resistance (ohms) of the pipe plus the maximum allowable bond resistance for each joint as specified in this section.

**Electrically Continuous Wire:** A wire that demonstrates the ability to conduct current and that has a linear resistance (ohms) equal to or less than printed literature values for the different wire gauges and wire types. Resistance of 1,000 feet of stranded copper wire at 77°F for No. 12 AWG wire is 1.65 ohms and for No. 10 AWG wire is 1.04 ohms.

**Electrical Isolation:** The condition of being electrically isolated from other metallic structures (including, but not limited to, piping, reinforcement, casings, etc.) and the environment as defined in NACE SP0286.

**Employee:** Any person working on the project, that is under the direction of, control of, or receives compensation from the Contractor or a subcontractor.

**Engineer:** The Public Works Director, who has been employed by the City of Rapid City for this work, acting directly or through his duly authorized agents, such agents acting severally within the scope of the particular duties entrusted to them, responsible for engineering and engineering inspection, on the City's behalf.

**Equipment:** Machinery, tools, implements or apparatus together with supplies for maintenance and upkeep, necessary for the construction and completion of the work.

**Erosion Control:** Those items necessary to the completed work, which provide for the preservation of landscape materials and features. The rehabilitation and protection against erosion of areas disturbed by construction through seeding, sodding, mulching, and the placing of other ground covers. Such suitable planting and other improvements as may increase the effectiveness and enhance the appearance of the project and adherence to water quality regulations.

**Excusable Delay:** Unforeseeable delay, which excuses the Contractor's obligation to complete the work on time by extending performance time for contractually specified reasons.

**Exothermic (Thermite) Welds:** A metallurgical method of making electrical connections based on an exothermic reaction, which turns a mixture of copper oxide and aluminum into molten copper using specially designed graphite molds, steel or cast iron (ductile iron) charges, and wire sleeves.

**Extra Work:** An item of work not provided for in the Contract as awarded, but found by the Engineer to be essential to the satisfactory completion of the Contract within its intended scope.

**Fasteners:** To include but not be limited to bolts, nuts, washers, T-bolts, tie-rods, restraining devices, etc.

**Ferrous or Metallic Pipe:** Any pipe or fitting made of steel or iron, or pipe containing steel or iron as a principal structural material (such as steel, ductile iron, and cast iron), except reinforced concrete pipe or stainless steel.

**Fire Hydrant Lead:** That portion of the fire hydrant branch line from the main to the fire hydrant auxiliary valve.

**Fire Service Line:** Pipe and appurtenances delivering water from the City water distribution system to a building fire extinguishing system. Fire service lines may be located on private property or in public right of way (ROW) and are owned, operated, and maintained by the property being served.

**Foreign Owned:** Any buried pipe or cable not specifically owned or operated by the Owner.

**Functional and Performance Testing:** Tests necessary to demonstrate that installed equipment and systems function as specified and operate in the manner intended. Functional testing is a prerequisite to performance testing for equipment and systems specified to have a performance test.

**Incidental Items or Incidental Work:** Items of work, as shown on the plans and/or in the specifications, for which there are no bid items in the Bidder's Proposal. If no bid item for "Incidental Work" is included in the bid proposal, the cost of these items shall be included in the contract bid price for related work items. If a bid item for "Incidental Work" is included in the bid proposal, such work shall be included as a part of this work item.

**Inexcusable Delay:** Delay for which the Contractor is not entitled to a time extension or monetary compensation and may even be liable in damages to the Owner.

**Inspector:** The Engineer's authorized representative or representatives assigned to make detailed inspections of contract performance, limited to the particular duties entrusted to them.

**Joint Bonds:** A method of making the pipeline electrically continuous by connecting insulated copper wire(s) or strap(s) across each side of the pipe joint or fitting.

**"L" length:** The length of pipe from a fitting, valve, or feature that needs to have each pipe joint within that length restrained.

**Lead, Lead Wire, Joint Bonds, Pipe Connecting Wires, Cable:** Insulated copper conductor; the same as wire.

**Manufacturer's Representative:** Employee of manufacturer who is factory trained and knowledgeable in technical aspects of their products and systems.

**Materials:** Substances specified for use in the construction of the project.

**Mechanical Damage Protection:** Any material or equipment used to eliminate or minimize damage to the piping system (as might be caused from soil stresses and damage caused from rocks, debris, or other outside forces) without inhibiting or interfering with cathodic protection. (e.g., rock shield / rock guard materials are typically protective polyethylene mesh that protects pipeline and fitting coatings from rock backfill, intrusions and abrasions without interfering with the protection system.)

**Mils Dry Film Thickness (MDFT):** The thickness, expressed in mils, of an applied and cured coating or mastic. Mil is equivalent to 0.001 inch.

**Notice to Proceed:** The written authorization to begin work on the project.

**Owner, City, City of Rapid City, or Party of the First Part:** The City of Rapid City acting through its authorized representatives.

**Pavement Structure:** The combination of subbase, base course, and surface course placed on a subgrade to support and distribute the traffic load to the roadbed.

**Petrolatum:** A purified mixture of semisolid hydrocarbons obtained from petroleum jelly.

**Petroleum Wax:** A refined mixture of solid hydrocarbons, paraffin in nature, obtained from petroleum. Provided as a refined paraffin wax or microcrystalline wax forms.

**Pin Brazing:** A metallurgical method of making electrical connections based on an electric-arc silver solder brazing method using a specially designed portable brazing unit and gun with a hollow brazing pin containing silver solder and flux.

**Plans:** The drawings which show the location, character, and dimensions of the prescribed work, including layouts, profiles, cross sections, and all drawings and working drawings submitted to the City of Rapid City, if and when approved by the Engineer by issuance of a permit or approval of the actual drawings and specifications. Plans include all drawings submitted to the Contractor during the progress of the work.

**Plastic Reference Pipe:** Plastic conduit or pipe placed in soil next to structure to allow a portable reference electrode to be inserted into for structure-to-reference electrode potential measurements.

**Polyethylene Encasement:** A flat sheet or tube of polyethylene plastic that is typically 4-mils or 8-mils thick and meets the requirements of AWWA C105. The polyethylene encasement is a type of loose bonded coating that is wrapped around a ductile iron pipe, fitting, or valve box riser for corrosion protection.

**Polyethylene (PE) Pressure Pipe:** Polyethylene pressure pipe or water service line pipe shall be referred to herein as high density polyethylene (HDPE) water service line pipe. This needs to be revised. This definition is a little confusing because it could imply that all service line pipe is polyethylene or HDPE.

**Potential, Structure-to-Reference Electrode Potential (also Structure-To-Reference Electrode Voltage):** Common method to determine corrosion protection levels by measuring the difference in voltage (potential) between the subject metallic structure and the electrolyte in which it is buried or submerged, as measured to the standard specified reference electrode (usually a copper/copper sulfate reference electrode) placed in contact with the electrolyte.

**Private Fire Protection System:** Hydrants, valves, water pipes, and appurtenances, sprinkler systems, hose connections, and other equipment constructed for the purpose of providing fire protection for a building or group of buildings and supplied with water from a public water supply system. Private Fire Protection Systems are located on private property, although some components may be located in public ROW, and are owned, operated, and maintained by the property being served.

**Profile Grade:** The trace of a vertical plane usually intersecting the top surface of the proposed subgrade surface, usually along the longitudinal centerline of the roadbed. Profile grade means either elevation or gradient of such trace according to the context.

**Project:** The work conducted in accordance with a contract with the City, approved plans and specifications, or the requirements of a permit.

**Project Manager (City):** The Director of Public Works, who has been employed by the City of Rapid City for this work, acting directly or through his duly authorized agents, such agents acting severally within the scope of the particular duties entrusted to them and is the designated decision making authority for the Engineer and the City.

**Project Manager (Contractor):** A contractor employee that is the designated decision making authority for the Contractor and subcontractors.

**Project Superintendent:** The Contractor's authorized representative in responsible charge of the contract work and directs the daily project operations.

**Property Water Distribution System:** For the purpose of this specification, Property Water Distribution System are those pipes within the building or the premises, which convey water from the water service pipe to the point of use. For purposes of this definition, the Property Water Distribution System begins 5 feet outside of the building and will usually be the same pipe material as the Water Service Line up to where it actually enters the building.

**Provide:** To both furnish and install.

**Public Sanitary Sewer Main:** Sewer pipes of at least 8 inches in diameter, which will be installed in public right-of-way or easements, will become a part of the City sewer system and will be owned, operated, and maintained by the City of Rapid City.

**Public Water Main:** Those pipes of at least 6 inches in diameter, which will be installed in public ROW or easements and will become a part of the City water distribution system and which will be owned, operated, and maintained by the City.

**Raceways:** Conduit, sheath, plastic or metal pipe, or electrical metallic conduit (EMT) for casing of electrical or cathodic protection cables.

**Right-of-Way:** A general term denoting the property interest acquired for or devoted to a highway use. May want to change for City reasons

**Road:** A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

**Roadbed:** The graded portion of a highway within top and side slopes, prepared as a foundation for the pavement structure and shoulders.

**Roadside:** A general term denoting the area adjoining the outer edge of the roadway. Extensive areas between the roadways of a divided highway may also be considered roadside.

**Roadway:** The portion of a highway within limits of construction.

**Sewer Service or Sanitary Sewer Service:** The sanitary sewer line which connects a building to a public or private collection system and may include the service line directly outside the building to within five (5) feet of the building to the point where a connection to a public or private collection system occurs.

**Shoulder:** The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, emergency use, and lateral support of base and surface courses.

**Sidewalk:** That portion of the roadway primarily constructed for use by pedestrians.

**Special Provisions:** Additions and revisions to the standard and supplemental specifications applicable to the individual project.

**Specialty Items:** Those items of work specified in the proposal requiring special equipment, materials, or skills not normally required in typical construction work.

**Specifications:** A general term applied to all directions, provisions, and requirements pertaining to performance of the work.

**Standard Specifications:** The most current version of a book of specifications approved by the City of Rapid City for general applications and repetitive use.

**State:** The State of South Dakota acting through its authorized representative.

**Street:** A general term denoting a public way for purposes of vehicular travel.

**Structures:** Bridges, culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, endwalls, buildings, sewers, service pipes, underdrains, foundation drains, and other features which may be encountered in the work and not otherwise classified.

**Subbase:** The layer or layers of specified or selected material of designated thickness placed on a subgrade to support a base course or a surface course.

**Subcontractor:** An individual, partnership, firm, corporation, or joint venture, to which the Contractor sublets a portion of the Contract.

**Subgrade:** The top surface of a roadbed upon which the pavement structure and shoulders, including curbs, are constructed.

**Submittals:** All drawings, diagrams, descriptive literature, illustrations, instructions, schedules, safety plans, operating plans, performance and test data, product data sheets, material safety data sheets, and similar materials prepared by the Contractor or a supplier to illustrate material or equipment or some portion of the work.

**Superintendent:** The Contractor's authorized representative in responsible charge of all of the Contract work.

**Superstructure:** The entire structure except the substructure.

**Supplemental Specifications:** Approved additions and revisions to the Standard Specifications.

**Surface Course:** One or more layers of a pavement structure designed to accommodate the traffic load, the top layer of which resists skidding, traffic abrasion, and the disintegrating effects of climate. The top layer sometimes called "Wearing Course".

**Test Station:** Insulated lead wire connections to the structure, which are brought to a test station terminal board or box in order to allow an electrical connection to be made to the structure for location, and corrosion and cathodic protection testing.

**Tight Bonded Coatings:** A dielectric coating that is bonded or physically attached to the pipe surface. Ductile iron pipe bituminous asphaltic shop coating does not qualify as an approved factory or shop applied tight bonded coating.

**Traffic:** Vehicles, pedestrians, and other modes of transportation.

**Transmission Main:** A water main that supplies many tributary branches, serves a large area, and has no or few service taps.

**Traveled Way:** The portion of the roadway for the movement of vehicles, exclusive of shoulders.

**Work:** The furnishing of all labor, materials, equipment, and other incidentals necessary to the successful completion of the project.

**Working Day:** A calendar day, other than holidays or Sundays, except as permitted in writing by the Engineer, on which weather and other conditions not under the control of the Contractor will permit construction operations to proceed for at least five (5) hours, with the normal working force engaged in performing the controlling item or items of work which would be in progress at that time.

**Written Notice or Written Order:** An order, issued in writing by the Engineer requiring performance by the Contractor without negotiation of any sort. Notice of a Written Order shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if Emailed, or delivered at or sent by registered mail to the last business address known to him who gives the notice.

That whenever in these Contract documents the words "as ordered," "as directed," "as required," "as permitted," "as allowed," or words or phrases of like import are used, it shall be understood that the order, direction, requirements, permission, or allowance of the Owner and the Engineer is intended.

Similarly, the words "approve," "reasonable," "suitable," or "acceptable," otherwise particularly specified herein, shall mean approved, reasonable, suitable, acceptable, proper, or satisfactory in the judgment of the Owner and Engineer.

## 7.2 ABBREVIATIONS

Whenever the following abbreviations are used in these specifications or on other Contract Documents, they are to be construed the same as the respective expressions and to mean the code or standard that is in effect at the date of advertisement for bids:

AAN	American Association of Nurserymen
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ABS	Acrylonitrile Butadiene
AC	Asphalt Concrete
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
AGC	Associated General Contractors of America
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute

AMPP	Association for Materials Protection and Performance
ANSI	American National Standards Institute
AOS	Apparent Opening Size
ARA	American Railway Association
AREA	American Railway Engineering Association
ASCE	American Society of Civil Engineers
ASLA	American Society of Landscape Architects
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
AWPA	American Wood Preservers' Association
AWWA	American Water Works Association
AWS	American Welding Society
BB	Beam Bolster
BBU	Beam Bolster Upper
CBR	California Bearing Ratio
CLSM	Controlled Low Strength Material
FHWA	Federal Highway Association
FAA	Federal Aviation Administration
FRP	Fiberglass Pipe
FSS	Federal Specifications and Standards
GAI-LAP	Geosynthetic Accreditation Institute Laboratory Accreditation Program
GSA	General Services Administration
GTX	Audit Program for Geotextiles
HDPE	High Density Polyethylene
HMA	Hot Mix Asphalt
ICC	Interstate Commerce Commission
ICEA	Insulated Cable Engineers Association, Inc.
IMSA	International Municipal Signal Association
ITE	Institute of Transportation Engineers
ITIS	Integrated Taxonomic Information System
ITS	Intelligent Transportation System
LED	Light-Emitting Diode
LRFD	Load Resistance Factor Design
MARV	Minimum Average Roll Value
MASH	Manual for Assessing Safety Hardware
MCG	Machine Control Grading
MPEG	Moving Picture Experts Group
MSE	Mechanically Stabilized Earth
MUTCD	Manual of Uniform Traffic Control Devices
NACE	National Association of Corrosion Engineers
NASSCO	National Association of Sewer Service Companies
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NIST	National Institute of Standards and Technology
NTCIP	National Transportation Communications for ITS Protocol
NTPEP	National Transportation Product Evaluation Program
OD	Outer Diameter
OSHA	Occupational Safety and Health Administration

PACP	Pipeline Assessment Certification Program
PCC	Portland Cement Concrete
PLS	Pure Live Seed
PP	Polypropylene
PSM	Plastic Sewer Main
Psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch Gauge
PVC	Polyvinyl Chloride
RAP	Recycled Asphalt Pavement
RCP	Reinforced Concrete Pipe
RETMA	Radio Electronic Television Manufacturer's Association
RECP	Rolled Erosion Control Product
ROW	Right-of-way
SAE	Society of Automotive Engineers
SB	Slab Bolster
SBR	Styrene-Butadiene Rubber
SBU	Slab Bolster Upper
SDDANR	South Dakota Department of Agriculture and Natural Resources
SDDOT	South Dakota Department of Transportation
SDR	Standard Dimension Ratio
SPE	Society of Plastic Engineers
SSPC	Steel Structures Painting Council
SY	Square Yard
UL	Underwriters Laboratory
UV	Ultraviolet
VOC	Volatile Organic Content

### **7.3 SUBHEADINGS AND TITLES**

The titles or subheadings used in this contract and on the contract plans and drawings and in the specifications, are understood to be for convenience of reference only, and shall not be taken or considered as being a part thereof, or as having any bearing on the interpretation thereof.

### **7.4 NATURE AND LOCATION OF WORK**

It is understood and agreed that the Contractor has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character of equipment and facilities needed preliminary to and during the execution of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract.

### **7.5 VERBAL STATEMENTS NOT BINDING**

It is understood and agreed that the written terms and provisions of the Contract Documents shall supersede all verbal statements of the Engineer or other representatives

of the City, and such statements shall not be effective or be construed as entering into, or forming a part of, or altering in any way whatsoever the written Contract.

## **7.6 WRITTEN NOTICE OR WRITTEN ORDER**

Notice of a Written Order shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if Emailed, or delivered at or sent by registered mail to the last business address known to him who gives the notice.

That whenever in these Contract documents the words "as ordered," "as directed," "as required," "as permitted," "as allowed," or words or phrases of like import are used, it shall be understood that the order, direction, requirements, permission, or allowance of the Owner and the Engineer is intended.

Similarly, the words "approve," "reasonable," "suitable," or "acceptable," otherwise particularly specified herein, shall mean approved, reasonable, suitable, acceptable, proper, or satisfactory in the judgment of the Owner and Engineer.

## **7.7 SCOPE, NATURE, AND INTENT OF CONTRACT PLANS AND SPECIFICATIONS**

The Contract shall include: Notice for Bids; Instructions to Bidders; Bid Proposal; Contract Form and Contract Bond; Notices; Insurance; Performance Bond; Special Conditions; General Conditions; Special Provisions; Standard Specifications; Detailed Specifications; Standard Drawings; Detailed Plans; Plans Drawings; Addendum; Change Orders; and agreements that are required to complete construction of the work, all of which constitute one instrument.

Detailed plans and/or specifications that are furnished by the Contractor to clarify or define the Owners contract must be approved by the Engineer prior to use. Upon approval, said plans and/or specifications shall be considered a part of this Contract.

The Contractor shall, in good and first-class workmanlike manner, and at his own cost and expense, furnish all of the labor, tools, materials, and equipment necessary to complete, ready for use, all of the work as designated and as described by the Contract Documents on file with the Finance Officer of the City of Rapid City, Rapid City, South Dakota.

The said specifications, plans, and contract are intended to supplement, but not necessarily duplicate, each other and together constitute one complete set, so that any work covered in the one and not in the other shall be executed just as if it had been set forth in the Contract, in order that the work shall be completed according to the complete design or designs as decided and determined by the Engineer. It is understood and agreed that the work shall be performed and completed according to the true spirit, meaning, and intent, of the contract and specifications.

The Contractor agrees that in undertaking to complete the work within the time herein fixed, he has taken into consideration and made allowances for all of the ordinary delays and hindrances incidental to such work, whether or not growing out of delays in securing

materials or equipment. Compensation for delays due to no fault of the Contractor may be negotiated.

The Contractor also agrees that all time limits stated in the Contract Documents are of the essence of the Contract.

All the work shall be done under the direct observation of the Engineer and to the entire satisfaction of the Engineer and the Owner and in accordance with the laws of the State of South Dakota and the Ordinances and Codes of the City of Rapid City.

## **7.8 DUTIES AND POWERS OF INSPECTORS**

Properly authorized inspectors shall be considered to be the representatives of the Engineer, limited to the duties and powers entrusted to him. It shall be their duty to inspect the materials and workmanship of those portions of the work to which they are assigned, either individually or collectively, under instructions of the Engineer and to report any and all deviations from the plans, specifications, and other contract provisions which may come to their notice. Any Inspector shall have the right to order the work entrusted to his supervision stopped if in his opinion such action becomes necessary, until the Engineer is notified and he has determined and ordered that the work shall proceed in due fulfillment of all contract requirements. The Engineer and his representatives shall at all times have access to the work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for inspection.

## **7.9 SEPARATE CONTRACTS**

The Owner reserves the right to let other contracts in connection with this work. 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 any part of the Contractor's work depends for proper execution or results 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. His failure so to inspect and report shall constitute an acceptance of the other contractors work as fit and proper for the reception of his work, except as to defects which may develop in the other contractors work after the execution of his work.

To insure the proper execution of his subsequent work, the Contractor shall measure work already in place and shall at once report to the Engineer any discrepancy between the executed work and the Drawings.

## **7.10 CONTRACT EXECUTION**

The selected Low Bidder agrees that he will execute the contract in accordance with the proposal as accepted and secure and furnish the required bonds and insurance within ten (10) calendar days from the date of mailing of said notice of bid award to him at his address as given on the proposal or within such additional time as may be allowed by the Engineer;

and that, upon his failure or refusal to do so within said time, the certified or cashier's check or bidder's bond accompanying this bid and the money payable thereon shall be forfeited to and become the property of the City of Rapid City as liquidated damages for such failure or refusal.

#### **7.11 COPIES OF CONTRACT**

Not less than two (2) copies (and as many more as may be required) of the bound volumes of the proposal, contract, and specifications shall be prepared, each shall contain an exact copy of the Contract signed by both parties thereto. Two (2) executed copies shall be filed with the City. Additional copies shall be filed where and as may be required.

#### **7.12 RESPONSIBILITY OF CONTRACTOR**

**General Responsibility:** The Contractor shall furnish all transportation, ways, works, machinery, and plant, and all suitable appliances required for the safe, proper, and lawful construction, maintenance, and use thereof. The Contractor shall be fully responsible for the materials and equipment used for the work and for safeguarding the work against damage or destruction until its final acceptance by the Engineer. The Contractor agrees to make no claims for damage to the work prior to final acceptance and will make no claims for damage to the materials except through negligence or willful act of the Owner.

Before the completion and acceptance of this Contract, Contractor shall be solely answerable for all damage to the Owner or the property of the Owner; to other Contractors, or other employees of the Owner; to the neighboring premises or to any private or personal property due to improper, illegal, or negligent conduct of himself or his subcontractors; employees or agents in and about said work or in the execution of the work covered by this Contract or any extra work undertaken herein provided; or to any defect in, or the improper use of, any scaffolding, shoring, apparatus, ways, works, machinery or plant. He shall indemnify and save harmless the Owner and its officers and agents from all claims relating to labor, materials, and methods used in executing the work.

#### **7.13 PERSONS IN RESPONSIBLE CHARGE**

The Contractor shall have on the site at all times a superintendent or a person in his employ who shall be in responsible charge of all work. The Contractor shall, in writing, give the Engineer the name of the person in responsible charge prior to beginning any work. Changes of persons in responsible charge during the course of performing the work shall be submitted, in writing, to the Engineer prior to instituting the change.

#### **7.14 ORDER OF COMPLETION OF WORK**

The Contractor shall, within ten (10) days after being instructed to do so in a written notice from the Engineer, commence the work to be done under this contract; and the rate of progress shall be such that work shall have been completed in accordance with the terms of this Contract, on or before the date of completion named in the proposal hereof.

**7.15 CONTRACTOR TO CHECK SPECIFICATIONS AND SCHEDULE**

The Contractor shall check all specifications, quantities, and schedules given to him by the Engineer and shall, upon discovery, notify the Engineer in writing of any discrepancy which he may discover between the plans and specifications or between either plans and specifications and physical site conditions; or if he observes site conditions not usually encountered on this type of work; or if he believes the plans and specifications require work which would violate laws, ordinances, or codes. Failure to follow this procedure shall preclude the Contractor from making any claim for damages resulting from the alleged discrepancy.

Should anything be omitted from the specifications, plans, and/or contract which is necessary to the clear understanding of the work, or should it appear various instructions are in conflict, then the Contractor shall secure written instructions from the Engineer before proceeding with the construction affected by such omissions or discrepancies. Failure to request written instructions shall constitute a waiver to any and all claims associated with the omission or conflict.

The Contractor will not be allowed to take advantage of any error or omission in the plans, specifications or contract documents, as full written instructions will be furnished by the Engineer, should such error or omission be discovered, and the Contractor shall carry out such instructions as if originally specified.

**7.16 CALCULATED DIMENSIONS TO GOVERN**

In case of discrepancy, calculated or written dimensions will govern over scaled dimensions.

**7.17 DRAWINGS FURNISHED BY CONTRACTOR**

The Contractor shall supply such working specifications and drawings of devices, castings and composite materials to be furnished under this Contract as are called for herein or are required by the Engineer to make clear the details of equipment and of devices.

**7.18 PATENTS**

It is further agreed that all royalties for patents or patent infringement claims, whether such patents are for processes or devices, that might be involved in the construction or use of the work, shall be included in the Contract amount and the Contractor shall satisfy all demands that may be made at any time for such, and shall be liable for any damages or claims for patent infringements; and the Contractor shall, at his own expense, defend any and all suits or proceedings that might be instituted at any time against the Owner for infringement or alleged infringement of any patent or patents involved in the work; and in case of an award of damages, the said Contractor shall pay such award; final payment to the Contractor by the Owner will not be made while any such suits or claims remain unsettled.

**7.19 INDEMNITY**

The Contractor shall indemnify and save harmless the Owner from and against all losses and all claims, demands, payments, suits, actions, recoveries, and judgments of every nature and description brought or recovered against him, by reason of any act or omission of the said Contractor, his agents or employees, in the execution of the work or in the guarding of it and this shall include acts or omission of subcontractor.

The Contractor shall, and is hereby authorized to, maintain any part for such insurance, issued in the name of the Owner, as will protect the Owner from his contingent liability under this Contract, and the Owners right to enforce against the Contractor any provision of this Section shall be contingent upon the full compliance by the Owner with the terms of applicable insurance policy or policies, a copy of which shall be deposited with the Owner.

**7.20 INSURANCE**

The Contractor shall secure policies of insurance in amounts, form and companies satisfactory to the Owner, and as specified in the Contract.

**7.21 GUARANTEES**

The Contractor and any sureties under the Performance Bond guarantee to complete the project as specified and agree that loss as a result of any occurrence including acts of God, shall not relieve them of their obligation.

**7.22 CONTRACTOR LIABILITY INSURANCE**

The Contractor shall maintain insurance as will protect him from claims under Workmen's compensation acts and from any other claims for damages for personal injury, including death, which may arise from or by any subcontractor or anyone directly or indirectly employed by either of them.

**7.23 PERFORMANCE BOND**

The surety bond executed by the Contractor, issued to the Owner, shall be a guarantee:

- A.** For the faithful performance and completion of the work in strict accordance with the terms of the contract, specifications, and detailed plans;
- B.** For the payment to the Owner of all sums due or which may become due by the terms of the contract; as well as by reason of any violation thereof by the Contractor;
- C.** For the payment of all bills, including the hire, rental or lease of equipment or machinery, and the operators thereof, used on the work, and for all materials, lubricants, oils and gasoline used in or consumed in the construction of such work and for all labor performed in such work whether by sub-contract or otherwise;

- D. The payment of any and all judgments and costs of suits and actions brought against the Owner or officials thereof, for any cause whatsoever, arising from or on account of any injuries or damages to life or property suffered or sustained by any person, firm or corporation, caused by the Contractor, his or its agents, servants or employees in the construction of said work, or by or in consequence of any negligence, carelessness or misconduct in guarding or protecting the same, or any act or omission of the said Contractor his agents, servants, employees;
- E. And for the protection of the Owner against all suits and claims for infringements or alleged infringements of patent rights processes.

This section shall in no way be construed as limiting the obligation under the Performance Bond actually furnished, but may be an addition thereto.

The Owner agrees to mail a notice to the Contractor, calling his attention to any failure to comply with the requirements of the bond, not more than ten (10) days before notifying his bondsmen of such failure to comply with the terms of said bond.

#### **7.24 REEMPLOYMENT ASSISTANCE**

The Contractor to whom the Contract is awarded, will pay South Dakota Department of Labor and Regulations, all contributions and interest due under the Unemployment Compensation Law of South Dakota. Further, it is required that the Contractor furnish a certificate, prior to final payment, from the Department of Manpower Affairs that all contributions and interest due to the department in performance of that Contract have been paid.

#### **7.25 DISCRIMINATION**

The Contractor will not discriminate against any employee or applicant for employment because of race, sex, creed, color or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated fairly during employment, without regard to their race, sex, creed, color, or national origin. Such action shall include, but is not limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

The Contractor will state, in all solicitations or advertisements for employees placed by or on behalf of the City, that all qualified applicants will receive consideration for employment without regard to race, sex, creed, color, or national origin.

The Contractor will send, to each labor union or representative or workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers representative of the contractor's commitments under Section 202 of Executive Order No.

11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, of the rules, regulations, and relevant orders of the Secretary of Labor.

The Contractor will furnish all information and reports required by Executive order No. 11246 of September 24, 1965, and by the rules, regulations, and order of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

In the event of the Contractor's noncompliance with the discrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

The Contractor will include the provisions of Section 7.21 in every subcontract or purchase order unless exemption by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance: provided, however, that in the event the Contractor becomes involved, in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the contractor may request the United States and the City to enter into such litigation to protect the interest of the United States and the City.

## **7.26 LABOR AND DISMISSAL OF EMPLOYEES**

The Contractor shall employ only persons who are competent and skillful in their respective lines of work, and local labor shall be given preference. Whenever the Engineer shall notify the Contractor that any person on the work is, in his opinion, incompetent, unfaithful, disorderly or under the influence of intoxicating substances, or refuses to carry out the provisions of this contract or uses threatening or abusive language to any persons, shall be immediately discharged from the work and shall not be re-employed thereon except with the consent of the Engineer.

## **7.27 LAWS AND ORDINANCE**

The Contractor shall keep himself fully informed of all existing and current regulations of the Owner, and County, State, and National Laws which in any way limit or control the actions or operations of those engaged upon the work, or affecting the materials supplied to or by them. He shall at all times observe and comply with, all ordinances, laws, rules and regulations and shall protect and indemnify the Owner and the Owner's officers and

agents against any claims or liability arising from or based on any violation of the same. 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 Drawings and Specifications are at variance therewith, he shall promptly notify the Engineer in writing and any necessary changes shall be adjusted as provided in the Contract for changes in the work. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules, and regulations and without such notice to the Engineer, he shall bear all costs arising therefrom. Such performance shall constitute a waiver of any and all claims associated with the work.

## **7.28 PERMITS AND LICENSES**

Unless otherwise specified, permits and licenses of a temporary nature necessary for the prosecution of the work shall be secured and paid for by the Contractor. 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.

## **7.29 DIRT/DUST CONTROL**

All activities associated with this contract shall conform to Pennington County Ordinance #12, "Fugitive Dust Regulation." The Contractor shall obtain a dust control permit from the County Planning Office and furnish a copy to the Owner before beginning work on the project.

The Contractor shall make every reasonable effort to minimize fugitive dirt or dust as a result of construction activities. The Engineer may require the Contractor to water or take other actions necessary to prevent blowing dirt and/or dust and other nuisance conditions, at no additional cost to the Owner.

Upon substantial completion of construction at a given site or at any time prior to final project acceptance as directed by the Engineer, the Contractor shall clean up the project area(s) and remove all dirt and debris from the street and sidewalk surfaces to the satisfaction of the Engineer. In general, removal of the dirt and debris shall be conducted in such a way and/or at such a time as to minimize nuisance conditions of dirt and dust in the air, on vehicles, sidewalks, and buildings.

Specifically, the streets shall be swept with an approved, enclosed mechanical or vacuum-type sweeper, which picks up the dirt and debris and stores it for hauling and disposal off-site. The Contractor shall utilize a private sweeper whenever possible. However, he may request that the City Street Department do the sweeping if a private sweeper is not available when required. When the Contractor elects to utilize the City sweeper, he shall give the Engineer at least 72 hours' notice prior to the time the sweeper is desired. If the City sweeper is utilized, the City Street Department will then bill the Contractor for the use of the sweeper at the current hourly rate for sweeper and operator. If, in the opinion of the Engineer, the Contractor fails to make reasonable effort to minimize fugitive dust as a result of his construction activities, or refuses to take action when requested by the Engineer, the Engineer may elect to schedule the City sweeper to provide cleanup. The

City street Department will bill the Contractor at one and one-half times (1 1/2) the current hourly rate for the sweeper and operator.

### **7.30 CLAIMS AND DAMAGES**

Any claim for damage arising under this contract shall be made in writing to the party liable within ten (10) calendar days of the first observance of such damage, except as expressly stipulated otherwise, and shall be adjusted by agreement or by arbitration. Failure to comply with the notice requirement will result in denial of the claim.

In general, the Contractor may not recover for claims, which did not impact the critical path of the project.

The Contractor shall document his claim(s) in the following manner:

- A.** Provide an introduction and summary.
- B.** Provide a listing and explanation of subsurface information available in the bidding documents and/or through a reasonable site investigation.
- C.** Provide a report of the Contractor's site investigation.
- D.** Explain the conditions actually encountered.
- E.** Discuss the difference between actually encountered and anticipated conditions with emphasis on the impact of such things as delay, interference, disruption, changes in construction methods, and additional direct labor and equipment requirements.
- F.** Summarize the applicable laws and/or contract clauses.
- G.** Set forth the time extension claim with rational, detailed calculations.
- H.** Set forth the cost claim broken down to the smallest elements possible.

### **7.31 LIENS**

Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all labor and materials for which a lien could be filed; but the Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Engineer, to indemnify the Owner against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

### 7.32 USE TAX LIABILITY

The Contractor shall be liable to pay the use tax on tangible personal property that is supplied by the City to the Contractor for performance of the Contractor. The value of said personal property will be as indicated in Section 2.20 of the Contract. The Contractor shall be liable to pay all Federal, State, County, or local taxes required for labor and/or materials included in this Contract.

### 7.33 WORK MODIFICATIONS

The Owner, without invalidating the Contract, may order extra work or make changes by altering, adding to, or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be executed under the conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

In giving instructions, the Engineer shall have authority to verbally make minor changes in the work; but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Engineer, and no claim for an addition to the Contract Sum shall be valid unless so ordered and approved by the Council.

The value of any such extra work or change shall be determined in one or more of the following ways:

- A. By estimate and acceptance in a lump sum.
- B. By unit prices named in the Contract or subsequently agreed upon.
- C. By cost and percentage or by cost and a fixed fee.

If none of these methods is agreed upon, the Contractor, provided he receives an order as above, shall proceed with the work. In such case and also under case (c), he shall keep and present in such form as the Engineer may direct, a correct account of the net cost of labor and materials, together with vouchers. In any case, the Engineer shall certify to the amount including reasonable allowance for overhead and profit, due to the contract, or pending final determination of value, payments on account of changes shall be made on the Engineer's Estimate. Work done on a Force Account basis shall be as follows:

1. **Labor:** For labor and supervisor in direct charge of the specific operations, the Contractor shall receive the rate of wage agreed upon in writing before beginning work or the actual rate paid in the event it is less than the agreed rate, for each and every hour that said labor and supervisor are actually engaged in such work.

If a laborer or supervisor is paid for "overtime" during a calendar week in which he is employed for part of that period on force account work, the Owner will pay to the Contractor a percentage of that portion of the overtime payment. For each such

employee, this percentage will be the ratio, which the total hours he worked on force account during the week bears to the total hours he worked during that week.

Overtime incurred due to the City requiring the Contractor to do force account work, during periods not normally worked, will be paid one hundred percent (100%) by the City. In order that the Engineer may verify wages paid and pro-rate overtime, the Contractor shall furnish to the Engineer certified payrolls during the period force account work is in progress.

An amount equal to fifteen percent (15%) of the sum for labor will also be paid the Contractor as compensation for administrative and overhead costs.

2. **Bond, Insurance, and Tax:** For property damage, liability, and workmen's compensation insurance premiums, unemployment insurance contributions, excise taxes, and social security taxes on the force account work, the Contractor shall receive the actual cost, to which no percentage will be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond, insurance, and tax. In lieu of furnishing itemized statements to substantiate these costs, of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and Social Security tax, the Contractor may elect to receive an amount equal to twenty-five percent (25%) of the actual labor costs (excluding the fifteen percent [15%] for administrative and overhead costs) as compensation for those costs.
3. **Materials:** For materials accepted by the Engineer and incorporated into the project, the Contractor shall receive the actual cost of such materials delivered onto the worksite, including transportation charges paid (exclusive of machinery rentals as hereinafter set forth), to which cost fifteen percent (15%) will be added as compensation for administrative and overhead costs.
4. **Equipment:** For machinery or special equipment, including fuel and lubricants, plus transportation costs, the use of which has been directed or authorized by the Engineer, the Contractor shall be paid at an agreed upon rate; or, failing mutual agreement, in accordance with provisions and rates set forth in the current edition of the South Dakota Department of Transportation Equipment Rental Rates, for actual time such equipment is in operation on the work, except that standby costs will not be paid. Nor will additional amounts be added for administration and overhead cost.
5. **Miscellaneous:** Additional allowance will not be made for general superintendence, cost of maintaining home office, standby costs, or other costs for which no specific allowance is herein provided.
6. **Compensation:** The Contractor's representative and the Engineer shall compare records of the cost of work done as ordered on a force account basis.
7. **Statements:** Payment will be made for work performed by force account based on itemized statements of the cost of such force account work detailed as follows:

- a) Certified payrolls showing worker name, classification, date, daily hours, total hours, rate, and extension for each laborer and foreman;
- b) Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment;
- c) Quantities of materials, prices and extensions;
- d) Transportation of materials; and
- e) Cost of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions, and social security tax.

Statements shall be accompanied and supported by receipted invoices for materials used and transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then, in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

- 8. To the sum of items A through C, shall be added ten percent (10%) for profit.

#### **7.34 EXTRA WORK AS PART OF CONTRACT**

If extra work orders are in accordance with the provisions of this Contract, such work shall be considered a part hereof and subject to each and all of its terms and requirements.

#### **7.35 UNKNOWN OR CONCEALED CONDITIONS**

Whenever, during excavating operations, the Contractor encounters a heretofore unknown underground utility or other unknown or unexpected physical condition, the existence of which could not have reasonably been foreseen or anticipated and which causes a significant delay and/or expense to the Contractor, he shall contact the Engineer, before such conditions are disturbed, for a determination as to whether compensation will be allowed.

Compensation may consist of a payment to the Contractor and/or an extension of contract time. However, no compensation will be allowed unless notice is given prior to disturbing the condition. Should the Engineer allow payment, he will pay for reasonable and justifiable costs involved in dealing with the condition as specified in Section 7.29 of these specifications.

Extra contract time shall be based on the actual time of the delay caused by encountering the condition.

#### **7.36 SUSPENSION AND ANNULMENT OF CONTRACT**

If the equipment, material, or work to be furnished under this contract shall be abandoned by the Contractor, or if this Contract shall be assigned or the work sublet by him, or if at any time the Engineer shall be of the opinion, and shall so certify in writing to the Owner, the performance of this Contract is unnecessarily delayed, or that the Contractor is willfully violating any of the conditions or covenants of this Contract or of the specifications, or is executing the same in bad faith or not in accordance with the terms of said Contract, or if the work be not fully completed within the time named in this Contract for its completion, or within the time to which the completion of this Contract may be extended, the Owner may notify the Contractor to discontinue all work, or any part thereof, then the Owner is hereby empowered to suspend or annul this Contract.

If this Contract be so annulled or suspended, the Contractor shall not be entitled to anything on account thereby, nor shall such annulment or suspension in any way affect the right of the owner to damages claimed by it on account of the failure of the Contractor, but such annulment must be ratified by the Owner before being of any force or effect. In the case of annulment of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of this equipment and supplies from the property of the Owner, failing which, the Owner shall have the right to remove such equipment and supplies at the expense of the Contractor.

### **7.37 CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT**

If the work should be stopped under an order of any court, or other public authority, for a period of three months, through no act or fault of the Contractor or of anyone employed by him, then the Contractor may, upon seven (7) days' notice in writing to the Owner and the Engineer, stop work or terminate this Contract and recover from the Owner payment for all work executed and partially executed and reasonable profit.

### **7.38 ENGINEER'S RIGHT TO STOP WORK**

Should traffic, weather, or conditions caused by the actions or inactions of the Contractor dictate, the Engineer may issue a Stop Work Order to the Contractor. Upon receiving a Stop Work Order, the Contractor shall stop working and shall backfill and compact all open holes and/or trenches, properly sign, identify, and clean up the project to the satisfaction of the Engineer. When conditions improve, the Engineer will issue a Notice to Proceed for the remainder of the project. The Contractor will then have a ten (10) day equipment-ready period before contract time resumes. Remaining work shall be completed within the contract time.

### **7.39 SUGGESTIONS TO CONTRACTOR ADOPTED AT HIS OWN RISK**

Any plan or method of work suggested by the Engineer to the Contractor, not specified or required in the contract, adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor; and the Engineer and the Owner shall assume no responsibility therefore.

### **7.40 SUBLETTING OF CONTRACT**

The Contractor shall perform, with his own organization, work amounting to not less than fifty (50) percent of the original total contract price, except that any items designated by the City as "Specialty Items" so performed may be deducted from the original contract price before computing the amount of work required to be performed by the Contractor with his own organization.

Any items that have been selected as "Specialty Items" for the contract are listed as such in the proposal.

No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the Engineer. The Contractor shall request permission, in writing, to sublet, assign or otherwise dispose of any portion of the contract and shall list the names and addresses of proposed subcontractors. The Contractor shall provide a statement that the organization(s) which will perform the work is (are) particularly experienced and equipped for such work and shall provide proof that the proposed subcontractor(s) is (are) licensed to perform the work in South Dakota. The Contractor shall give assurance that all pertinent provisions of the prime contract, including the minimum wage for labor as stated in his proposal, shall apply to all work sublet, assigned or otherwise disposed of in any way. Such assurance shall be accomplished in the manner required by the Engineer. Consent to sublet, assign or otherwise dispose of any portion of the contract shall not be construed to relieve the Contractor of any responsibility for the fulfillment of the Contract.

It will not be permissible for a Subcontractor to sublet work, but any work sublet to a Subcontractor can be canceled or reassigned upon request from the prime Contractor and approval of the Engineer.

The Contractor shall accept full responsibility for actions or omissions of his subcontractors and their employees as he would if they were his own. See paragraph 7.12 of these Specifications.

If evidence and investigation establish beyond reasonable doubt that a violation of the fifty percent (50%) subcontract rule is being or has been attempted through subterfuge whereby one Contractor's equipment is directly or indirectly leased to another Contractor, or whereby a significant part of one Contractor's regular working force is placed on the payroll of another Contractor, such a conclusion shall constitute a violation of the subcontract rule. This provision shall not be construed to include in the fifty percent (50%) limitation the lease of or use of equipment of a corporation or company wholly owned by the Prime Contractor.

In the case of violation of the subcontract rule, the Rapid City Council may suspend the bidding qualifications of such Contractors for a period of up to one year.

The value of work proposed for subcontract will be determined by multiplying that portion of the original contract item quantities to be sublet by the corresponding unit price as set forth in the contract.

If any phase of work involved on a contract item is sublet, the entire contract unit cost of the item will be used for determining the value of work. Materials provided by the

Contractor for a subcontractor on a particular work item will not qualify that item as work done by the Contractor.

Work performed with equipment not owned by the Prime Contractor will be considered subcontract work unless the origin of such equipment meets one of the following conditions:

- A. Equipment supplied by an established equipment dealer on a rental or rental purchase agreement.
- B. An occasional piece of equipment temporarily obtained from another Contractor or from an individual or company engaged in similar work.
- C. Special equipment, not normally owned for the type of work involved.
- D. Trucks used to haul gravel or other materials to the project.

Equipment used by a Subcontractor, must be owned by the Subcontractor or Prime Contractor, except that equipment listed above.

Should any subcontractor fail to perform in a satisfactory manner the work undertaken by him, such subcontract shall be immediately terminated by the Contractor upon written notice from the Owner.

Nothing contained in the contract documents will create a contractual relation between the City and any subcontractor.

#### **7.41 PUBLIC SAFETY AND WORK PROTECTION**

Whenever, in the opinion of the Engineer, the Contractor has not taken sufficient precaution for the safety of public or the protection of the work to be constructed under this contract, or of adjacent structures or property which may be injured by process of construction on account of such neglect, and whenever, in the opinion of the Engineer, an emergency shall arise and immediate action shall be considered necessary in order to protect the public or private personal property interest, then, the Engineer, with or without notice to the Contractor, may provide suitable protection to the said interests by causing such work to be done and material to be furnished and placed as the Engineer may consider necessary and adequate. The cost and expense of such work and material so furnished shall be borne by the Contractor, and if the same shall not be paid on presentation of the bills therefore, then such costs shall be deducted from any amounts due or to become due the Contractor. The performance of such emergency work under the direction of the Engineer shall in no way relieve the Contractor of responsibility for damages which may occur during or after such precaution has been duly taken by the Engineer.

#### **7.42 BARRICADES AND WARNING SIGNS**

The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs, and other traffic control devices, and shall take all necessary precautions for the protection of the work and safety of the public. Highways closed to traffic shall be protected by effective barricades, and obstructions shall be illuminated during hours of darkness. Suitable signs shall be provided to properly control and direct traffic.

The Contractor shall erect warning signs in advance of any place on the project where operations may interfere with the use of the road by traffic, and at all intermediate points where the new work crosses or coincides with an existing road.

It shall be the Contractor's responsibility to clear the work area of private vehicles as necessary.

All barricades, warning signs, lights, temporary signals, and other protective devices must conform with the current Manual of Uniform Traffic Control Devices.

### **7.43 USE OF EXPLOSIVES**

When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor shall be responsible for all damage resulting from the use of explosives and shall meet all local, State, and Federal laws and requirements pertaining to explosives as well as Title 29, Code of Federal Regulations, Part 1926, Occupational Safety and Health Act regulations for construction (OSHA), and Title 30, Code of Federal Regulations, Mineral Resources, whichever is most restrictive, in the use, loading, transportation, and storage of explosives and blasting agents.

The Contractor shall obtain a blasting permit from the Rapid City Fire Department prior to the use of any explosives. The Fire Department may impose restrictions on the quantities, methods, and materials utilized for blasting.

The Contractor shall notify property owners and public and private utility companies having structures or facilities in proximity to the site of the work of their intention to use explosive. Such notice shall be given sufficiently in advance to enable them to protect their property from injury. In no case shall notice be given less than five (5) calendar days prior to the desired date of usage.

The Engineer may require the Contractor to monitor certain properties during actual blasting in order to determine effects of blasting. In some cases, the Engineer may require the use of a seismograph to document the forces of blasting.

It is recommended that, prior to blasting, the Contractor document the condition of structures in the vicinity of the work.

### **7.44 PROTECTION OF UTILITIES AND PROPERTY**

The type, size, location, and number of all known underground utilities are approximate when shown on the plans. The Contractor shall be responsible for determining and verifying the existence, depth, and location of all underground utilities within the work limits.

The Contractor shall give reasonable notice to the owner or owners of steam, gas, water, sewer, and other pipe lines, or conduits, overhead and underground wire or other structures, either public or private, railroads and other owners of property, when such property is liable to injury or damage of the execution of the work, in order that the owner or owners of such utility or other property may locate, relocate, remove or protect the same.

If the Owner or owners of any private or public property liable to be affected, endangered, or damaged by the construction of this work, does not protect its or their property, then the Contractor shall do so.

The Contractor shall use every precaution on the work to prevent harm or accident to the property, passengers, employees, or patrons of utilities, either publicly or privately owned, and to any other person legitimately employed on the premises, and the Contractor shall assume all liability for damages accruing from any accident, which may be due to his carelessness, omission or neglect; he shall pursue the work under and along and near such property as may be liable to damage thereby, as rapidly as possible when once the work is begun.

The Contractor shall satisfactorily shore, support and protect any and all pipe and other structures or utilities and shall not be entitled to any damage or extra pay on account of any postponement, interference, or delay caused by any such structures being on the line of the work, whether such structures are shown on the plans or not. Contractor shall save Owner harmless from any and all liability or expense for injuries, damages, or repair to any public or private property.

#### **7.45 CONDEMNED MATERIALS AND STRUCTURES**

The Contractor, at his own expense, shall remove from the site of the work, without delay, all rejected and condemned materials or structures of any kind whether or not incorporated into the work and shall promptly remove and re-execute all condemned work and will bear the expense of making good any work destroyed or damaged by removal of defective work, and upon his failure to do so or to make satisfactory progress in so doing, within forty-eight (48) hours after the service of a written notice for the Engineer ordering such removal, the condemned materials, work, or structure may be removed by the Owner and the cost of such removal be taken out of the money that may be due or may become due the Contractor on account of or by virtue of this contract. No such rejected or condemned material shall again be offered for use by the Contractor under this or other contract under this project.

#### **7.46 MAIL BOXES**

When necessary, mail boxes shall be removed and reset in a manner prescribed by the Postmaster of the Federal Post Office, Rapid City, South Dakota. A copy of the postal regulations can be obtained from the Postmaster.

It is expected that the Contractor shall give his full cooperation to the postal department concerning mail delivery during the construction of this project.

The owner of any structurally unsound mail box post shall furnish a new post at his expense. However, the Contractor shall not remove such a post until he has notified the project inspector.

Costs associated with this item shall be incidental to the project.

#### **7.47 PROVIDING ACCESS**

The Contractor shall conduct construction activities in such a manner as to provide continuous access to all affected properties during the duration of the project, unless the specific activity precludes continuous access. At no time shall the Contractor park equipment in front of or in any other way block a driveway or other entrance such that there is no means of ingress and/or egress to or from a property. Should such a situation occur, the Contractor shall take the necessary steps to provide immediate and safe access to or from the property.

Failure to provide access in a timely manner will cause the Owner to take the necessary action and bill the Contractor one and one-half (1 and 1/2) times the cost incurred.

#### **7.48 SATURDAY, SUNDAY, HOLIDAY, AND NIGHT WORK**

No work shall be done on Sundays and legal holidays, except such work as is necessary for the proper care and protection of work already performed, and, in any case only with the written permission of the Engineer; or, in case of emergency, which also requires the immediate notification of the Engineer. The Contractor shall request, and must receive, in writing, permission from the Engineer to enable work on Sundays and legal Holidays, except such work as noted above.

No work shall be done on Saturdays, except for emergencies, without the permission of the Engineer. The Contractor shall request permission from the Engineer to work on a given Saturday a minimum of 24 hours in advance, except such work as noted above.

No work, except for emergencies, shall be done between the hours of 9 P.M. and 6 A.M. unless the Contractor first obtains the written permission of the Engineer; such permission may be revoked at any time by the Engineer if the Contractor fails to maintain, at night, adequate force and equipment for reasonable prosecution and supervision of the work, or if Contractor's operations are unnecessarily disruptive to the public.

Holidays observed by the City of Rapid City include: The first day of January, commonly known as New Year's Day; the Friday immediately preceding Easter, commonly known as Good Friday; the last Monday in May, commonly known as Memorial Day; the fourth day

of July, commonly known as Independence Day; the first Monday in September, commonly known as Labor Day; the eleventh day of November, commonly known as Veteran's Day; the fourth Thursday in November, commonly known as Thanksgiving Day; the Friday immediately following Thanksgiving Day; the twenty-fifth of December, commonly known as Christmas Day; and any other day declared by the City to be a holiday.

If the day of observance of the foregoing holidays is changed by enacted laws of the City of Rapid City, such day will be the day of observance of such holiday. Whenever any of the foregoing holidays fall on Sunday, the Monday immediately following shall also be observed as a holiday. Whenever any of the foregoing holidays fall on Saturday, the Friday immediately preceding shall also be observed as a holiday. Saturdays and Sundays will be considered the same as Holidays.

#### **7.49 WORK DONE WITHOUT LINES, GRADES, OR INSPECTION**

Any work done without lines or grades or without the inspection of an Inspector or other representative of the Engineer may be ordered removed and replaced at the Contractor's cost and expense. In-place testing or other verification data can be requested by the Engineer at the Contractor's expense. Disregard of this requirement shall result in a Stop Work Order being issued until the Contractor provides the Engineer with an acceptable plan of prior notification procedures.

#### **7.50 STAKING WORK**

The Engineer shall furnish all necessary labor and materials to set the necessary stakes for grade and alignment for all work, but it will be the Contractor's responsibility to preserve such stakes after they are once set by the Engineer. Stakes removed, damaged, etc. by Contractor negligence shall be replaced at Contractor expense. The Engineer may require the Contractor to replace the stakes or may elect to replace the stakes and charge the Contractor for the associated costs.

All work done under this Contract shall be done to the lines and grades shown on the plans or as staked by the Engineer. The Contractor shall keep the Engineer informed, a reasonable time in advance, nominally a period of one (1) full working day, of the times and places at which he wishes to do work, in order that lines and grades may be furnished, and necessary measurements for record and payment may be made with the minimum of inconvenience to the Engineer and of delay to the Contractor. The Contractor shall determine the meaning and intent of all stakes, measurements, and marks prior to commencing work. Contractor shall be responsible for protecting stakes from displacement.

#### **7.51 MATERIALS**

**A. General:** The Contractor shall furnish only new and best commercial quality material, equipment, appliances, and supplies for the work. Bid prices shall include all sales and other taxes payable on all items incorporated in the permanent work.

Anything specified by manufacturer's name or proprietary name shall be furnished exactly as called for unless followed by the words "or approved equivalent". The decision of equity, will be made by the Engineer.

- B. Samples:** When requested by the Engineer, samples or test specimens of materials to be used or offered for use in connection with this work shall be prepared at the expense of the Contractor and furnished by him in such quantities and sizes as may be required for proper examination and test, with all carriage charges prepaid and with information as to their sources. All samples shall be submitted in ample time to permit the making of proper tests, analyses, or examination before the time at which it is desired to incorporate the material into the work. The cost of making all tests, and the cost of materials used in such tests, shall be paid by the Contractor, unless otherwise specified. Tests other than those which can be made in the field by the Engineer or can be arranged to be made by him elsewhere, shall be made by a properly equipped laboratory of established reputation. Reports of all tests shall be mailed to the Owner, to the Engineer, and to the Contractor.
- C. Warranty:** The Contractor warrants to the Owner that all materials and equipment furnished and installed under this contract will be new unless otherwise specified, and shall be of good quality, free from defects, and in conformance with the plans and specifications. All materials not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

## 7.52 CLEANUP AND RESTORATION

The Contractor shall not allow the site of the work to become littered with trash and waste material, but shall maintain the same in a neat and orderly condition throughout the construction period. The Engineer shall have the right to determine what is or is not waste material or rubbish and the manner and place of disposal.

The Owner reserves the right to require the Contractor to clean up all or any portion(s) of the project at any time prior to final project acceptance.

On or before the end of contract time, the Contractor shall, at his own expense, dismantle and/or remove all temporary structures built or furnished by him and shall replace or repair all areas disturbed as a result of this project to original condition or better.

If all other work has been completed, and winter weather, availability of materials such as hot mix asphalt or sod, or other conditions prevent complete cleanup and restoration, the Contractor shall clean up the project area(s) to the satisfaction of the Engineer prior to suspending work. After cleanup has been approved, the Engineer will issue a Stop Work Order, and contract time will stop. When conditions are once again suitable and/or materials are available, the Engineer will issue a Notice to Proceed, giving the Contractor ten (10) calendar days to resume cleanup and restoration.

All cleanup and restoration shall be completed within the remaining Contract time. If additional contract time is necessary, the Contractor shall request a time extension as set forth in these General Conditions.

If complete cleanup and restoration is not possible, for whatever reason, the Contractor will be responsible for satisfactorily maintaining all disturbed areas until such time as they are restored. Should any maintenance work be required on any portion of the project prior to issuance of the acceptance letter, the Contractor shall do so within forty-eight (48) hours of receiving notice from the Engineer. Failure to do so will cause the Owner to do the necessary work and bill the Contractor one and one-half (1 1/2) times the cost incurred.

### **7.53 TESTING OF COMPLETED WORK**

Before final acceptance, all parts of the work shall be tested and each part shall be in good condition and proper working order or shall be placed in such condition and order at the expense of the Contractor, unless otherwise specified. All tests of completed work required under this contract shall be made under the direction of the Engineer by and at the expense of the Contractor, who shall repair at his own expense all damage resulting therefrom.

### **7.54 PLACING WORK IN SERVICE**

If desired by the Owner, portions of the work, as substantially completed, may be placed in service, the Contractor to give proper access to the work for this purpose; but such use and operation shall not constitute an acceptance of the work, and the Contractor shall warrant the work as specified in Section 7.51. If such prior use increases the cost of or delays the work, the Contractor shall be entitled to such extra compensation, or extension of time, or both, as the Owner may determine.

### **7.55 COMPLETION AND ACCEPTANCE OF WORK**

The Engineer, upon completion of the contract work, shall satisfy himself by examination and test that the work has been finally and fully completed in accordance with the Specifications and Contract, and report such completion to the Owner.

### **7.56 ESTIMATED QUANTITIES**

The Contractor agrees that the quantities of work as stated in the Bid Proposal or indicated on the plans are only approximate, and that during the progress of the work the Owner may find it advisable, and shall have the right to omit portions of the work and to increase or decrease the quantities, and that the Owner reserves the right to add or to take from any items as may be deemed necessary or desirable. Under no circumstances or conditions will the Contractor be paid anything on account of anticipated profits upon the work or any portion thereof covered by this contract, which is not actually performed and which has not actually entered into the construction of said improvement.

### **7.57 METHOD OF MEASUREMENT**

Unless specifically stated otherwise in this Contract, no extra measurement or measurements according to local custom of any kind shall be allowed in measuring the work under this Contract, but only the length, area, solid contents, number, weight, or time in standard units, as the case may be, shall be considered. The Contractor will be required at his expense to furnish all scales and equipment to properly weigh and measure the various units.

## 7.58 PAYMENT

**A. General:** In consideration of the faithful performance by the Contractor and of all the conditions, provisions, and covenants of this Contract and the Specifications to the satisfaction of the Owner, the Owner shall pay and the Contractor shall receive the prices stipulated in his Bid Proposal attached hereto and made a part hereof, as full compensation for everything furnished or done by the Contractor under this Contract. The Owner also agrees to pay in addition such amounts as may be agreed upon for alteration in accordance with Section 7.32 and for extra work in accordance with Section 7.33.

Unless otherwise specified, lump sum bid items will be paid for in one lump sum following 100 percent (100%) completion and acceptance of the item by the Engineer.

**B. Mobilization:** When there is a bid item for "Mobilization" in the Bid Proposal, payment for this item will be made for preparatory work and operations performed by the Contractor, including, but not limited to those necessary for the movement of his personnel, equipment, supplies, and incidentals to the project site; for the establishment of all offices, buildings, and other facilities necessary for work on the project; and for other work operations that must be performed, or for cost incurred before beginning work on the various items on the project site.

Cost of premiums on bonds and insurance for the contract are not to be included in mobilization. No separate measurement will be made for this item. Partial payment, when allowed, shall be made according to the following schedule:

1. Twenty-five percent (25%) of the amount bid for mobilization shall be paid when five percent (5%) of the original contract amount is paid.
2. An additional twenty-five percent (25%) of the amount bid for mobilization will be paid when ten percent (10%) of the original contract amount is paid.
3. An additional ten percent (10%) of the amount bid for mobilization will be paid when twenty-five percent (25%) of the original contract amount is paid.
4. The remaining forty percent (40%) of the amount bid for mobilization will be paid when fifty percent (50%) of the original contract amount is paid.

When no bid item for "Mobilization" is included in the Bid Proposal, such costs shall be considered incidental to the various work items. In such case, no additional payment will be made for mobilization.

## 7.59 PROJECT PAYMENT

- A. Partial Payment Project:** For a project specified as a Partial Payment Project in Section 2, INFORMATION AND INSTRUCTIONS TO BIDDERS, payments will be made once each month as the work progresses or as requested by the Contractor, whichever is longer. Said payments will be based upon estimates prepared by the Engineer of the value of the work performed and materials complete, in place, and for materials delivered, in accordance with the Contract.

No partial payment will be made when the total value of the work done since the last estimate amounts to less than \$2,500.00.

From the total of the amounts ascertained as payable, an amount equivalent to 12% of the amount on the Contract up to \$50,000.00; 5% of the next \$200,000.00; and 2 1/2% of the amount of the Contract in excess of \$250,000.00 will be deducted and retained by the City until after completion of the entire Contract in an acceptable manner. The balance, less all previous payment, shall be certified for payment.

When the work under Contract has been completed and accepted, and it is anticipated that preparation of the final estimate will not be completed within ninety (90) days of when the work has been substantially completed to the extent that only minor or incidental operations remain to fully complete all of the work under the Contract. If the completion of such work is deferred or delayed in compliance with Contract provisions or, upon order of the Engineer, suspending operations by virtue of weather or climactic conditions or because of seasonal restrictions provided for in the Contract, upon written request of the Contractor and consent of the surety provider, the Engineer may prepare an estimate as figured from Contract unit prices.

Payment, either in full or partial, for materials delivered to or stockpiled on the project and not yet incorporated in the work in their final position shall be as specified in Section 2, INFORMATION AND INSTRUCTION TO BIDDERS.

Partial progress payments will be made upon written request by the Contractor on specific items, as listed herein, which are stockpiled in a manner and location satisfactory to the Engineer.

- B. Single Payment - Assessed Projects:** For a project specified as a Single Payment - Assessed Project in Section 2, INFORMATION AND INSTRUCTIONS TO BIDDERS, there will be no partial payments under the Contract, but only one final payment when the work is fully completed; accepted by the Owner; final estimate determined; assessment roll issued and approved; and the assessment bonds issued by the Owner to cover the entire cost of the project.

As soon as the work has reached a point where the Engineer can finally determine the exact cost of the construction, the Engineer will make out his final estimate and assessment roll and determine the full costs of the work and submit them for approval.

After the final approval of the final estimate and assessment roll, the Owner shall, as quickly as practical, sell the special assessment bond for the work.

After the above-outlined procedures have been completed, and upon full completion of the work by the Contractor and acceptance of the work by the Engineer as filed with the Owner, the Owner shall pay to the Contractor, in cash, the full amount of his final estimate

- C. Single Payment - Non-Assessed Projects:** For a project specified as a Single Payment - Non-Assessed Project in Section 2, INFORMATION AND INSTRUCTIONS TO BIDDERS, one (1) lump sum final payment will be made after completion of the work, acceptance by the Engineer, and formal acceptance by the Owner.

#### **7.60 DEDUCTION FOR UNCORRECTED WORK**

If the Engineer determines it inexpedient to correct damaged or nonconforming work, an equitable deduction from the contract price can be made upon certification of the amount by the Engineer.

#### **7.61 PAYMENTS WITHHELD**

The Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any pay certificate to such extent as may be necessary to protect himself from loss on account of:

- A.** Defective work not remedied.
- B.** Claims or liens filed or reasonable evidence indicating probable filing of claims or liens.
- C.** Failure of the Contractor to make payments properly to subcontractors or for material, labor, or equipment.
- D.** A reasonable doubt that the Contract can be completed for the balance then unpaid.
- E.** Damage to another Contractor, work, or property.
- F.** Reasonable doubt that Contractor can complete the work within the stipulated contracted time.
- G.** The cost to the Owner resulting from failure to complete the work on time.
- H.** Failure to provide revised project schedules when requested by the Engineer.
- I.** Failure to provide acceptable construction and labor rate schedules.
- J.** Failure to provide a job superintendent who is in responsible charge of all work of the project and is on the job site when work is being performed.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

## **7.62 VALUE ENGINEERING INCENTIVE**

- A.** General: Value Engineering Incentive applies to those cost reduction proposals initiated and developed by the Contractor for changing the drawings, designs, specifications, or other requirements of the contract. It does not apply to such proposal unless it is identified by the Contractor at the time of submission to the Owner as a Value Engineering Incentive proposal.

The cost reduction proposals contemplated are those that:

1. Would require a change order to this contract.
  2. Would result in savings to the City by providing less costly items or methods than those specified in the contract without impairing any of their essential functions and characteristics such as service life, reliability, economy of operation, ease of maintenance, and necessary standardized features.
- B.** Cost reduction proposals shall be processed in the same manner as prescribed for any proposal, which would require a change order. As a minimum, the following information shall be, submitted by the Contractor with each proposal:
1. A statement that this proposal is submitted as a Value Engineering Incentive.
  2. A description of the proposal.
  3. An itemization of the requirements of the contract, which would require a change and a recommendation of how to make each change.
  4. An estimate of the reduction in performance costs that will result from adoption of the proposal.
  5. A prediction of any effects the proposed change would have on other costs to the City.
  6. A statement of the time the change order must be issued to obtain the maximum cost reduction during the remainder of the contract and the reason for this time schedule.
  7. The dates of any previous submission of the proposals, including contract numbers and the actions of the City.
  8. A statement as to the effect the proposal would have on the time for completion of the project.

- C. The City shall not be liable for delay in acting upon a proposal submitted. The decision of the Engineer as to the acceptance of any such proposal shall be final and shall not be subject to Section (5.17). The Engineer may accept, in whole or in part, cost reduction proposals submitted by issuing a change order.

If a cost reduction proposal is accepted, an equitable price adjustment in the contract price and in other affected provisions of this contract shall be made in accordance with this Specification or other applicable provisions in this contract. The equitable adjustment shall be established by determining the effect of the proposal on the Contractor's cost of performance. When the cost of performance of this contract is decreased as a result of the change, the contract price shall be reduced by the following amount: The total estimated decrease in the Contractor's cost of performance less fifty percent (50%) of the difference between the amount of such total estimated decrease and net increase to the City which must reasonably be incurred as a result of application of the cost reduction proposal to this contract. If the change order results in an increase in the cost of performing the contract, this Specification shall not apply, and the increase shall be determined in accordance with Section 4.

- D. The substitution of one bid item for another bid item resulting in a decrease in the contract amount will not be considered as a saving under Value Engineering Incentive. When change involves the increase of one bid item and the decrease of another bid item, the change order will be made in conformance with the applicable clauses of Section 7.
- E. The Contractor may restrict the City's right to use or disclose the information submitted with a Value Engineering proposal for other purposes. Such restrictions must be in writing and be submitted with the proposal.
- F. If the proposal is accepted, this restriction shall be void, and the City may use, duplicate, or disclose, in whole or in part, data necessary to utilize such proposal.

### **7.63 DETERMINATION AND EXTENSION OF CONTRACT TIME**

The "Contract Time," or number of days allowed for the performance and completion of the work included in the contract, will be stated in the proposal and contract.

When the contract time is on a working day basis, the contract time will begin on the date determined in the Notice to Proceed and continue at the rate of one contract day charged for each day of the normal working week, Monday through Friday, except as described herein, until the work is complete. Holidays, Saturdays, and Sundays will not be included in the count of working days, except those days the Contractor has requested and been granted permission to work. No working day shall be charged when conditions beyond the control of the Contractor preclude prosecution of the work. Working days will be charged if the Contractor permits construction operations to proceed for five (5) or more hours of the day during the normal working week, or if the Contractor has requested, and been granted, permission to work on Holidays, Saturdays, or Sundays, and if, in the opinion of the

Engineer, conditions allow progress of work on items essential to the completion of the project for a period of five (5) or more hours of the day.

When the contract is on a calendar day basis, contract time shall be the time from the date determined in the Notice To Proceed to the date on which all work on the project shall be completed. Holidays, Saturdays and Sundays will be included in the count of calendar days. No calendar day shall be charged when conditions beyond the control of the contractor preclude prosecution of the work. Calendar days will be charged if the Contractor permits construction operations to proceed for five (5) or more hours of the day or if, in the opinion of the Engineer, conditions allow progress of work on items essential to the completion of the project for a period of five (5) or more hours of the day.

The Engineer will, upon written request, furnish the Contractor a statement showing the number of days charged to the contract. The Contractor will be allowed seven (7) calendar days from receipt in which to file a written protest setting forth in what respect said statement is incorrect; otherwise, the statement shall be deemed to have been accepted by the Contractor as correct. If the Engineer and the Contractor fail to reach an agreement on any statement of working days, the Engineer shall refer the statement in question to the Director of Public Works for his review and final decision.

When the contract completion time is a fixed calendar date, it shall be the date on which all work on the project shall be substantially completed. If work is not completed by the date specified, the Engineer will keep a record of working days charged after that date and will charge the Contractor on a working day basis.

Holidays, Saturdays, and Sundays will be excluded from the count of working days unless the Contractor has been granted permission to and/or utilizes such a day for construction work for five (5) or more hours of the day or if, in the opinion of the Engineer, conditions allow progress of work on items essential to the completion of the project for a period of five (5) or more hours of the day. The Contractor shall not carry on construction operations on Sundays or holidays without written permission from the Engineer, except for purposes of making emergency repairs and providing proper protection of the work, such as curing of concrete.

Days on which the work has been suspended by an action, non-action, or an omission made by the City, but through no fault of the Contractor, and days not worked because of strikes, lockouts, unusual delays in transportation, or any condition over which the Contractor has no control, shall not be counted against the contract time.

The number of days for performance allowed in the contract as awarded is based on the original quantities as outlined in the Bidder's Proposal. If satisfactory fulfillment of the contract requires performance of extra work or work on items with an increase in quantities that will take additional time to complete, the number of days allowed for performance shall be increased in the same proportion as the cost of increased work bears to the total original contract amount. Should the Contractor feel that the extension based on a monetary basis is insufficient for the increased work involved, he may submit written information, which will justify additional time. Such information must show how the increased work delays the overall completion of the entire project. Information shall be

submitted as soon as possible after the increased work has been performed. If, in the opinion of the Engineer, the information submitted justifies additional time, a Construction Change Order increasing the contract time will be prepared.

When the Contractor wishes to suspend contract time due to weather, he shall make a written request to the Engineer within ten (10) working days of the first weather day for which he desires a time suspension. Failure to comply with this notice requirement could result in denial of that request.

If the Contractor finds it impossible, for reasons beyond his control, fault, or negligence, to complete the work within the contract time as specified or as extended in accordance with the provisions of this subsection, he may, at any time, request to the Engineer for an extension of time, setting forth therein the reasons which he believes will justify the granting of his request. Such request shall be submitted within ten (10) days of the start of each occurrence for which an extension is desired. Failure to comply with notice requirements shall constitute a waiver, and failure to file a claim for additional compensation due to the delay at the time the Contractor requests the time extension bars him from claiming additional compensation for it.

The Contractor's plea that insufficient time was specified is not a valid reason for extension of time.

If the Engineer finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, he may extend the time for completion in such amount as the conditions justify. Extension of contract time will be made when unanticipated delays (beyond the control of the Contractor) in delivery of critical materials results in a delay of the work. The Contractor shall notify the Engineer immediately when it becomes evident that there will be a delay in obtaining critical materials. The extended time for completion shall then be in force and effect the same as though it were the original time for completion.

When final acceptance has been duly made as prescribed in Section 7.55, the daily time charge will cease.

#### **7.64 LIQUIDATED DAMAGES**

For each working day, as specified, that any work shall remain uncompleted after the contract time specified for the completion of the work provided for in the contract, the sum specified in the following schedule will be deducted from any money due the Contractor not as a penalty but as liquidated damages; provided, however, that due amount will be taken off any adjustment of the contract time. Liquidated damages shall be understood to be compensation to the Owner for costs incurred directly by the Owner or indirectly by the users of the facility for the delay in completion of the work. These costs include, but are not limited to, increased travel times; loss of access to homes or businesses; inconvenience from loss of sewer or water uses; fire protection, etc., beyond those circumstances anticipated for timely completion of the work.

#### **SCHEDULE OF LIQUIDATED DAMAGES**

<b>ORIGINAL CONTRACT AMOUNT</b>		<b>AMOUNT OF LIQUIDATED DAMAGES PER WORKING DAY</b>
From more than:	To and including:	
\$ 0	\$ 50,000	\$ 200.00
\$ 50,000	\$ 100,000	\$ 250.00
\$ 100,000	\$ 500,000	\$ 450.00
\$ 500,000	\$ 1,000,000	\$ 650.00
\$ 1,000,000	\$ 2,000,000	\$ 800.00
\$ 2,000,000	and up	\$ 1,300.00

Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the Contract.

The Council may waive such portion of the liquidated damages as may accrue after the work is in condition for safe and convenient use by the public.

#### **7.65 PROJECT ACCEPTANCE AND WARRANTY PERIOD**

Final acceptance of the project by the Owner will be documented by the issuance of an acceptance letter, which is issued according to the following criteria:

- A.** Construction has been completed and the facilities can be put to their intended use.
- B.** All testing has been completed, and the required results have been met.
- C.** A warranty bond, or other equivalent surety, in an amount equivalent to ten percent (10%) of the total cost of the project/improvement has been provided to the City to secure the warranty for a period of two years.
- D.** As-Built plans have been submitted to the City.

The date of the acceptance letter documents the start of the two-year warranty period, during which the Contractor / Subdivider / Developer shall be notified in writing of any defects in the project and shall submit to the Public Works Dept. a construction schedule to correct the defects at their expense within ten (10) days of receipt of the notice. Failure to correct or undertake, with due diligence, to correct the deficiencies within the specified time may cause the Owner to make the necessary repairs and bill the Contractor / Subdivider / Developer one and one-half (1 1/2) times the costs incurred; providing, however, that in case of an emergency, where, in the judgment of the Owner, delay would cause serious loss or damage, repairs may be made without notice being sent to the Contractor / Subdivider / Developer, and the Contractor / Subdivider / Developer shall pay the cost thereof.

The Owner reserves the right to extend the warranty period if excessive problems are apparent during the initial two-year period.

During a period of two years after the completion of the work covered by this contract and the final acceptance in writing thereof by the Owner, the Contractor shall make all needed repairs arising out of defective workmanship or materials furnished by the Contractor; or both, which in the judgment of the Owner shall become necessary during said period. The Owner is hereby authorized to make such repairs at the Contractor's expense, if within ten days after the receipt of a written notice to the Contractor, or his agent, the said Contractor shall neglect to make, or undertake with due diligence to make, the aforesaid repairs; providing, however, that in case of an emergency, where in the judgment of the Owner, delay would cause serious loss or damage, repairs may be made without notice being sent to the Contractor and the Contractor shall pay the cost thereof.

#### **7.66 RELEASE OF LIABILITY**

No person, firm, or corporation other than the signer of this Contract as Contractor, now has any interest hereunder, and no claims shall be valid, and neither the Owner or any employee or agent thereof, shall be liable or held to pay any money except as herein provided. The acceptance by the Contractor of the payment shall operate as, and shall be a release to the Owner and every officer and agent thereof, from all claims and liability to the Contractor for anything done or furnished for or relating to the work or for any act or neglect of the Owner or any person relating to or affecting the work.

#### **7.67 DETAIL DRAWINGS AND INSTRUCTIONS**

The Engineer shall furnish with reasonable promptness, additional instructions, by means of drawings or otherwise, necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the Contract Documents.

Unless otherwise provided in the Contract Documents, the Engineer, if requested, will furnish to the Contractor, free of charge, five (5) copies of drawings and specifications necessary for the execution of the work. The Contractor shall pay the Engineer for the cost of printing any additional copies of drawings and specifications to be furnished by the Engineer and requested by the Contractor.

The Contractor shall keep one copy of all drawings and specifications on the work site, in good order, available to the Engineer and to his representatives.

The drawings, specifications, and copies thereof furnished by the Engineer are his property. They are not to be used on other work, and with the exception of the signed Contract set, are to be returned to him on request, at the completion of the work.

#### **7.68 WAIVER OF RIGHTS**

Neither the inspection by the Owner or Engineer or any of their employees, nor any order by the Owner for payment of money, nor any payment for, or acceptance of, the whole or any part of the equipment, material, or work by the Owner or Engineer, nor any extension

of time, nor any possession taken by the Owner or its employees, shall operate as a waiver of any provision of this Contract, or of any power herein reserved to the Owner or any right to damages herein provided, nor shall any waiver of any breach in this Contract be held to be a waiver of any other or subsequent breach.

#### **7.69 RAPID CITY INFRASTRUCTURE DESIGN CRITERIA MANUAL**

Unless otherwise specified herein, all work done by the Contractor under this contract shall meet the applicable requirements of the Rapid City Infrastructure Design Criteria Manual.

#### **7.70 PRECONSTRUCTION MEETING**

Before the Contractor begins work under a City contract and before issuance of a Notice to Proceed, the Engineer will conduct a preconstruction meeting with the Contractor to establish project schedules and administrative requirements.

At the preconstruction meeting, the Contractor shall submit an acceptable written schedule, tentatively detailing the timing and sequence of major project components and showing critical construction activities and their interdependence. The Contractor, upon signing of the contract shall be required to furnish the Engineer a tentative schedule setting forth in detail the procedure he proposes to follow and giving the dates on which he expects to start and to complete separate portions of the work. If, at any time, in the opinion of the Engineer, proper progress is not being maintained, such changes shall be made in the schedule of operations as the Engineer shall direct or approve.

In addition, the Contractor shall submit a labor rate schedule for all anticipated personnel to be utilized on the project. The rate schedule shall be valid for the duration of the contract.

Submission of acceptable construction and labor rate schedules shall be a prerequisite for processing the first pay request.

The Contractor shall submit revised construction schedules periodically as directed by the Engineer to allow for changes in scheduling or whenever the present project status of critical path work items differs from the existing project schedule by more than one week. Revised schedules shall be submitted as a prerequisite for processing the subsequent pay request.

**END OF SECTION**

## SECTION 11

### UTILITY EXCAVATION AND BACKFILL

#### 11.1 DESCRIPTION

**A. General:** This work consists of excavation, backfill and compaction of trenches for installation of underground utilities, which includes Private Utility Installations, Water Piping Systems, Sanitary Sewers, and Storm Sewers and Pipe Culverts. This includes, but is not limited to, dewatering, rock excavation and disposal, bedding, and shoring and bracing.

**B. Related Work:**

Section 7	General Conditions
Section 8A	Water
Section 8B	Corrosion Protection – Plastic Pipe Systems
Section 9	Sanitary Sewer
Section 10	Clearing and Grubbing
Section 12	Roadway and Drainage Excavation and Embankment
Section 13	Removal Items
Section 17	Salvaging, Stockpiling, and Placing Topsoil
Section 18	Erosion, Sediment, and Water Pollution Control
Section 19	Incidental Work
Section 41	Utility Trench Resurfacing
Section 54	Drainage Pipe Installation
Section 90	Roadway Signs and Delineators
Section 112	Select Granular Backfill
Section 117	Aggregates for Granular Bases and Surfacing
Section 120	Drainage Pipe Materials
Section 200	Controlled Low Strength Material
Section 202	Geosynthetics for Roadways

**C. Soil Tests:** The Contractor shall provide the Engineer with the results of a modified proctor soil compaction test, as determined by AASHTO T180, for those locations determined by the Engineer. The Engineer's representative shall be present during sample collection. Soil samples shall be submitted to a certified soil testing lab within 24 hours of the Engineer's request. Failure to do so will cause the City to submit the samples and charge the Contractor at one and a half (1½) times the cost incurred. Results shall be delivered to the City directly from the testing Laboratory.

**D. Sewer Main / Storm Sewer and Water Main Crossings:**

**1. Vertical Separation:** Sewer and storm sewer mains may cross water mains with a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer or storm sewer main. This shall be the case where

the water is either above or below the sewer or storm sewer with preference to the water main located above the sewer or storm sewer. At the crossings one full length of water pipe shall be located so both joints are as far from the sewer or storm sewer as possible.

In the event that 18 inches of vertical separation cannot be maintained, adhere to one of the following:

- a) The use of bends to lower the water main under the sewer or storm sewer main to meet minimum 18 inches vertical separation.
  - b) Install an encasement pipe around either the water main or sewer main. The encasement pipe shall be 20 feet minimum in length, centered where the pipes intersect. The pipe shall have chocks/spacers, and sealed at both ends with end seals.
- 2. Horizontal Separation:** Sewer and storm sewer mains shall be constructed with a minimum of 10 feet of horizontal separation from any existing or proposed water main. The 10 feet horizontal separation shall be the clear distance (measured edge to edge) and not the centerline distance between the utilities.

The following installation requires Engineer's approval and is appropriate for installations where the 10 feet minimum separation physically is not possible or practical, adhere to one of the following:

- a) A sewer main may be constructed closer than 10 feet to a water main if it is laid in a separate trench, or it is laid in the same trench on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer main.
- b) The sewer main shall be constructed of water main pipe (pressure class pipe) meeting the requirements of Section 8A.2 or equal and pressure tested for water tightness in accordance with AWWA standards for leakage testing.
- c) The storm sewer pipe is constructed with sealed joints and passes a low pressure (5 psi) pressure test. The pressure test shall be maintained for a minimum of 30 minutes. The pressure test shall otherwise comply with the requirements of the "Low Pressure Air Test" in Section 9 Sanitary Sewer. The "Low Pressure Air Test" may be waived by the Engineer for round RCP storm sewer utilizing gasketed joints in compliance with ASTM C443.
- d) Minimum horizontal distance of 3 feet shall be maintained between storm sewer curb inlets and water mains. All other storm sewer structures and culverts shall be considered as storm sewer mains for the purposes of this section.

- e) For the purposes of horizontal separation, sanitary sewer manholes shall be treated the same as sanitary sewer mains.
- E. Sewer Main and Storm Sewer Crossings:** Storm sewer crossing over sewer mains shall have no less than 6 inches of clearance. Special structural support and insulation will be required if there is less than 18 inches clearance. The minimum horizontal clearance shall be 2 feet. Clearance refers to the distance from the outside of the sewer pipe to the outside of the storm sewer pipe.
- F. Service Line Separation:** A 10-foot horizontal separation shall be maintained between water services and sewer services. Where a water service crosses a sewer service a vertical separation of at least 12 inches shall be provided between the water service and the sewer service and the sewer service should be below the water service. The pipe joints shall be placed as far away from the crossing as the material will permit. Water services, where possible, should cross over sanitary sewer mains and storm sewers. Sewer services, where possible, should cross under water mains and storm sewers.

## 11.2 MATERIALS

- A. Select Granular Backfill and Bedding:** Shall be in accordance with Section 112 - Select Granular Backfill. Contractor shall provide a submittal to the Engineer for select granular backfill and bedding materials used.
- B. Controlled Low Strength Material:** Used for bedding or backfill shall be in accordance with Section 200 - Controlled Low Strength Material. Contractor shall provide a submittal to the Engineer for controlled low strength material when used.
- C. Water and Sewer Main Insulation:** Insulation shall be Extruded-Polystyrene Board Insulation formed from polystyrene base resin by an extrusion process using hydrochloro-fluorocarbons as blowing agent to comply with ASTM C578, Type IV, with 1.60 lb./cu. Ft. minimum density and a compressive strength of 25 lb./ sq. in as specified in ASTM D1622 and ASTM D1621 respectively. The maximum thermal conductivity of the insulation shall conform to ASTM C518, C177, and C578. The maximum water absorption percentage by volume shall be 1% in accordance with ASTM D2842. The range of water vapor permeance shall be 0.4 to 1.0 perm in accordance with ASTM E96.

Type IV Styrofoam Brand—"Square Edge" or "Score Edge" as manufactured by Dow Chemical Company or approved equal shall be used for insulating water and sewer pipes where required. The width and thickness of insulation shall be per standard detail unless otherwise noted in plans. The minimum insulation thickness shall not be less than 2 inches.

- D. Trench Check Dam Material:** Check dam material shall be compacted cohesive clay that contains a minimum of 25% minus no. 200 sieve material, with 70% passing a 3/4 inch sieve. If the normal excavated material is not suitable for construction of the check dam, then the Contractor shall obtain material from outside sources.

Check dam installation and material shall be considered as incidental to the pipe installation.

### 11.3 CONSTRUCTION REQUIREMENTS

**A. Utility Locates:** The Contractor shall contact South Dakota One Call (811) for the locations of public and private utilities prior to any excavation. Underground utilities shown on the plans are not necessarily exact and, therefore, must be located by the individual utility company prior to excavation activities. The Contractor shall contact the local residents/owners whenever any excavation may affect their property.

#### **B. Trenching**

**1. Methods:** Under ordinary conditions and where the depth of excavation and soil conditions will allow, excavation shall be by open cut from the surface. Tunneling or boring under sidewalks, curb and gutter, or other surface structures may be allowed by the Engineer on a case by case basis. Tunneling or boring under streets, turfed areas, or areas not addressed above may be required by Engineer for some installations.

The first pavement saw cuts shall be, at a minimum, the same width as the minimum trench width centered over the utility. The second saw cut shall be 1 foot outside the disturbed area on each side of the trench (see Section 41 Standard Detail).

Streets that utilize an engineering geotextile or geogrid underlayment shall be excavated down to the underlayment by hand, or other method that will prevent damage. The underlayment shall be cut longitudinally centered over the utility, laid back, then trench excavation and backfill in normal fashion. When the backfill is completed to the elevation of the original underlayment, the cut ends shall be placed back on the backfilled material. A new piece of underlayment shall be placed over the splice with a minimum overlap of 12 inches each side of the splice, or the manufacturer's minimum overlap, whichever is greater. See Section 41 Standard Details.

The geotextile or geogrid repair shall be inspected by the Engineer prior to placing base course or cushion. After inspection of the geotextile or geogrid, it may be covered with base course to the existing paving base grade. The base course can then be compacted and readied for pavement.

Where surface conditions allow, the Contractor will be permitted to slope or bench the trench sidewalls from a point three inches above the top of the pipe barrel. Below this point, the trench walls shall be vertical. Contractor shall shore as necessary. This requirement does not relieve the Contractor of the responsibility of meeting all applicable OSHA requirements.

Excavated material suitable for backfill shall be deposited a sufficient distance from the trench to limit the potential for cave-in and minimize inconvenience to the public.

All excavated material not used for the project shall be removed from the project by the Contractor at the Contractor's expense, as directed by the Engineer.

Rock, including excavated bedrock, large loose rock, boulders, fieldstones, or other unsuitable material, which cannot be used as backfill, shall be segregated from the rest of the excavated material and removed from the project by the Contractor at the Contractor's expense. Unsuitable material, which cannot be used for backfill, shall be determined by the Engineer.

Established drainage in streets, alleys, or drainage ditches, must be maintained by the Contractor during construction operations.

When either geotextile, geogrid, or under-drains are inadvertently encountered and damaged, the Contractor is responsible to notify the Engineer as soon as practical. No further excavation or repairs of the area shall be effected without the knowledge of the Engineer.

Where the proposed trench intersects an under-drain, the under-drain shall be repaired with similar material 12 inches on either side of the trench width. The pipe joints shall utilize a factory repair coupling. New fabric shall overlap existing fabric a minimum of 12 inches. New clean rock shall be placed across the trench intersection and backfilled with appropriate material. The drain repair shall be inspected by the Engineer prior to placing the clean rock.

Damage to the property of others, such as; geotextile, geogrid, under-drains, private or public utilities, fences, trees, shrubs, lawns, sidewalks, etc. shall be repaired or replaced at the Contractor's expense unless removal of such is shown on the plans or written permission was first obtained from the Engineer.

- 2. Protection of the Excavation:** The Contractor shall be solely responsible for providing a safe trenching operation and shall, as a minimum, comply with all OSHA regulations, regardless of limits of trench width imposed by project plans work limits, site constraints or the direction of the Engineer.

The Contractor shall employ qualified and properly trained personnel to install, design, place, and maintain shoring during progress of work until the trench is backfilled.

Failure to properly shore and/or brace excavations shall be at the risk of the Contractor and any damage to pipes, curb and gutter, street pavement, grassed areas, storm sewer and appurtenances, gas mains, and/or other public or private property occurring through settlements, heaving, water or earth pressures, slides, caving, or other causes due to failure of shoring, improper shoring, or lack of

shoring, or due to negligence on the part of the Contractor, shall be repaired by the Contractor at their own expense and to the satisfaction of the Engineer.

When utilized, the shoring shall be arranged so as not to place any stress on portions of the completed work until the general construction thereof has progressed far enough to provide adequate strength. Unless left in place by written order of the Engineer, shoring shall be removed as work progresses. Shoring devices and methods of construction utilizing shoring devices are the sole responsibility of the Contractor.

- 3. Dewatering:** The Contractor shall be responsible for evaluating soil and groundwater conditions and for furnishing and maintaining necessary and suitable dewatering devices and equipment.

The Contractor shall provide for positive drainage away from the excavation or otherwise take steps to protect the excavation and backfill from becoming excessively wet prior to placing the finished surface.

At all times, the Contractor shall provide and maintain ample means and devices, with which to remove promptly and properly dispose of all water that enters the excavation.

The Contractor shall dispose of water in accordance with all permits (City and/or State) and without damage to adjacent property or without creating a health hazard or nuisance condition. Water may not be discharged to private property or to irrigation ditches without prior approval from the affected property owner or ditch company. No water shall be drained into work built or under construction without prior consent of the Engineer.

Dewatering shall be accomplished by placing well points, sumps or any other acceptable method, which will insure a dewatered trench. Any proposed dewatering method shall be subject to the approval of the Engineer. The Contractor will not be permitted to allow groundwater to drain through completed sewer or water mains. The Contractor will be required to thoroughly clean all debris and sediment from newly installed sewer or water mains as directed by the Engineer.

The Contractor shall provide for positive drainage of water away from the excavation and take the necessary action to protect the excavation and backfill from becoming excessively wet prior to placing the finished surface. If the Engineer determines that any portion of the backfill or trench has become excessively wet due to actions or inactions of the Contractor after the initial excavation, the Contractor shall remove the soil and/or pipe or appurtenance(s) to the satisfaction of the Engineer and furnish an approved backfill material that meets specifications and reinstall the pipe and/or appurtenance(s) as specified herein, all at no expense to the City.

- 4. Trench Dimensions:** The following table shall be used to determine the acceptable minimum trench widths for the City. The table in general is a compilation of AWWA criteria and Uni-Bell criteria. The criteria used in compiling this table are presented in Paragraphs a. and b. For purposes of establishing acceptable minimum trench widths, the dimensions in the table shall govern unless specifically indicated otherwise in plans and detailed specifications.

**TABLE 11-1  
MINIMUM TRENCH WIDTH TABLE**

<u>Pipe Diameter</u>	<u>Minimum Width</u>
<8 in	24 in
8 in -12 in	30 in
14 in –18 in	36 in
20 in -21 in	42 in
24 in –36 in	1.25(Pipe OD) plus 12 in
>36 in	Per plans

The Contractor shall adhere as closely as possible to the minimum trench widths for water, sanitary sewer, and storm sewer installations, unless otherwise specified in the detailed plans and specifications.

The Contractor will not be allowed to excavate excessive trench width in lieu of adequate dewatering or shoring.

- a) Pressure Pipe Installation (Water and Force Mains):** For reference, only Table 11-1 will be enforced.

Minimum Trench Width: The minimum clear trench width measured at a point three inches above the top of the pipe barrel shall not be less than 18 inches or the outside pipe diameter, plus 12 inches, whichever is greater or such width as approved by the Engineer.

- b) Non-Pressure Pipe Installation (Gravity Sewer Main):** For reference, only Table 11-1 will be enforced.

Minimum Trench Width: The minimum clear trench width measured at a point three (3) inches above the top of the pipe barrel shall not be less than the greater of:

- 1) Minimum of eighteen (18) inches, or
- 2) The outside pipe diameter, plus sixteen (16) inches, or
- 3) The outside pipe diameter multiplied by 1.25, plus (12) inches, or
- 4) Such width as approved by the Engineer.

- c) Maximum Trench Length:** Not more than 300 linear feet of trench shall be open at any one time in the public Right-of-Way, in easements that contain

City owned utilities, or near roadways, unless prior written approval of the Engineer has been obtained.

5. **Foundations:** Foundations shall be considered as that material which is neither bedding nor backfill, but is used under the pipe or conduit for support in the bottom of the trench.
- a) **Normal Trench Bottom:** The bottom of the normal trench where the undisturbed soil is of a supportive nature for the pipe or conduit laid, as determined by the Engineer, shall be accurate for line and grade to provide uniform bearing and support for each section of pipe or conduit. Bell holes and depressions for joints shall be dug after the trench bottom is graded, and shall be no greater in length, depth, and width than required for making the joint. The undisturbed trench bottom shall be at least 3 inches below the bottom of pipe, to allow for the placement of Type 1 Bedding material.
  - b) **Rock Trench Bottom:** When solid rock, large loose rock, such as field stone, very coarse gravel, or any other material of a similar nature that is stable but will not allow a proper foundation for the pipe or conduit, is encountered at the trench bottom, it shall be excavated to a sufficient depth to allow refilling under the body and joints of pipe or conduit. The undisturbed trench bottom shall be at least 3 inches below the bottom of pipe, to allow for the placement of Type 1 Bedding material.
  - c) **Unstable Trench Bottom:** When the trench bottom is earth that will not support the pipe or conduit, the earth shall be considered an unstable foundation and shall be excavated below grade as directed by the Engineer. A solid foundation shall be built with select granular backfill material or with controlled low strength material.

The amount and type of foundation material required will vary depending upon the soil encountered. Generally, foundation material shall be Type 1 Bedding Material or Type 3 Foundation Material, per Section 112 or Controlled Low Strength Material per Section 200.

In some circumstances, larger foundation material may be necessary and in these cases Type 4 Foundation Material or Stabilization Rock maybe used per Section 112. If Type 4 Foundation Material or Stabilization Rock is used, then a minimum 6 inches of Type 3 Foundation Material shall be placed directly above the material and prior to the placement of the Type 1 Bedding Material. This helps to minimize the potential for the Type 1 Bedding material to migrate into the larger foundation material and result in loss of pipe support. The Engineer shall authorize the use of Controlled Low Strength Material or Foundation materials, in cases of unstable trench bottom.

Foundation material shall be compacted and placed in separate lifts from the trench bottom up to 3 inches below the bottom of the pipe. Foundation material lifts shall not exceed eight inches and each lift shall be compacted

separately. Lifts for Type 4 foundation material will be allowed to be 1.5 times the largest particle diameter.

- 6. Rock Excavation:** Rock excavation shall include solid rock in ledges, bedded deposits, un-stratified masses and conglomerate deposits so firmly cemented as to present the characteristics of solid rock. In order to be considered as Rock Excavation the material must be removed by drilling, blasting, jack hammering, or hydraulic ripper. Shale, regardless of the nature of deposit, or loose boulders or large fieldstone will not be considered rock excavation unless so designated on the plans, or as determined by the Engineer. The responsibility and cost of satisfactorily demonstrating to the Engineer that the material being considered for rock excavation cannot be removed by means other than drilling, blasting, jack hammering, or hydraulic ripper shall be the obligation of the Contractor.

In order for material to be considered as Rock Excavation, at a minimum, it shall be demonstrated that a normal excavating machine being skillfully operated cannot be effectively removed. "Effectively removed" shall be defined as, the normal production rate being reduced to 25% of normal. A normal excavating machine will be considered to be a +230 HP hydraulic excavator, crawler weighing +78,000 pounds with a - 1 CY bucket equipped with ripper teeth.

The Engineer has the sole discretion to determine if the material removed is suitable or unsuitable for backfill. The Contractor shall dispose of all unsuitable excavated material. The Contractor shall provide a disposal site for unsuitable backfill materials. The disposal site shall be approved by the Engineer.

The Contractor shall furnish an approved backfill material to fill the voids left by rock excavation. He shall also provide the results of a modified proctor (AASHTO T-180) test for the furnished backfill. Suitable backfill material to replace excavated rock within the trench shall be incidental to the Rock Excavation bid item.

The Contractor shall keep accurate daily records of the quantity of rock removed so a comparison can be made with the Inspector's records. The Contractor shall deliver their records of Rock Excavation to the Engineer or their representative within 48 hours of request. Records of Rock Excavation delivered after this period shall be declared invalid and no payment for Rock Excavation will be made.

- 7. Blasting and the Use of Explosives:** Where blasting is necessary, the Contractor shall comply with the laws, ordinances, and applicable safety code requirements relative to the handling, storage and use of explosives and the protection of life and property. Suitable covering or shielding shall be provided to confine all materials lifted by blasting to the limits of the trench or excavation, and prevent injury to property or life. The Contractor shall be responsible for all damages caused by the blasting operations. The Contractor shall demonstrate that they are in compliance with all applicable laws, rules, and regulations, and they have the required expertise in advance of any blasting work. The Contractor

shall notify all governmental agencies, property owners and utility owners that may be affected by the blast no less than five (5) calendar days in advance.

All materials removed by blasting which are deemed unsuitable shall be handled and disposed of separately from suitable backfill materials as directed by the Engineer.

The Contractor shall obtain a City permit for any proposed blasting. The Contractor shall be responsible for any safeguards or monitoring required by the Engineer for the blasting operations and shall be responsible for any and all damages resulting from the blasting operations.

- 8. Unsuitable Backfill Material Excavation:** Unsuitable Backfill Material Excavation shall consist of the removal and disposal of material which, in the opinion of the Engineer, is not suitable as backfill. Materials containing organics or contaminated soils are considered unsuitable. Typical soil contaminants are petroleum hydrocarbons, polynuclear aromatic hydrocarbons "PAH's" (such as naphthalene and benzo(a)pyrene), solvents, pesticides, lead, and other heavy metals. If the Contractor encounters material that they suspect to be contaminated because of odor, color, or other indicators, they shall immediately contact the Engineer. The Contractor shall provide an approved disposal site for unsuitable material.

The shortage of backfill material created by the removal of the unsuitable material shall be replaced by the Contractor with an imported backfill material approved by the Engineer. Payment for imported backfill will be considered if the Contractor has not exported suitable material from the project. The Contractor shall provide the results of a modified proctor analysis (AASHTO T-180) for all furnished imported backfill material.

**9. Pipe Bedding:**

- a) Bedding by Pipe Material:** All water and sanitary sewer pipe, appurtenances, and service lines shall be bedded from 3 inches below the pipe invert to 3 inches above the pipe crown over the full width of the trench. Frozen material shall not be used.

Water and Sewer pipe, appurtenances, and service lines shall be installed as per Sections 8A and 9 with bedding as described below:

- 1) Water Service Lines:** Copper and HDPE water service lines shall be bedded with washed sand, crusher fines, 3/8 inch river rock, or pea gravel. PVC water service lines may be bedded with washed sand, crusher fines, 3/8 inch river rock, pea gravel or Type 1 bedding per Section 112.

- 2) **Sewer Service Lines:** PVC sewer service lines shall be bedded with Type 1 bedding meeting the requirements of Section 112, washed sand, crusher fines, 3/8 inch river rock, or pea gravel.
- 3) **Water and Sewer Mains:** Water and sewer mains shall be bedded with Type 1 Bedding and shall meet the requirements of Section 112.
- 4) **Storm Sewer:** For storm sewer bedding requirements see Sections 54 and 112.

**b) Bedding Installation:**

**1) Granular Material:**

- I. Bedding shall be compacted and placed as a separate lift from the trench bottom, or top of foundation material, to the pipe invert and shall be placed and compacted prior to installing the pipe or appurtenance.
- II. Bedding shall be hand tamped and placed as a separate lift from the pipe invert to the pipe spring line. Maximum lift shall not exceed 6 inches.
- III. Bedding shall be hand tamped and placed as a separate lift from the pipe spring line to 3 inches above the pipe crown. Maximum lift shall not exceed 6 inches.
- IV. Bedding material shall be incidental to water and sewer pipe per Sections 8A and 9. Prior to commencing installation of water and sewer pipes, the Contractor and Engineer shall confirm the rates of material to be used for each diameter of pipe being installed, in conjunction with the Contractor's proposed maximum trench width. Weekly, or at the direction of the Engineer, the Contractor shall provide weight tickets to verify the quantity of bedding material used, along with the corresponding quantity of water and sewer pipe installed. The weigh tickets shall clearly state, the type of bedding and that it is incidental. All stockpiled bedding material used for water and sewer pipe installation shall be clearly identified on the project.

- 2) **Select Bedding:** Bedding material from 3 inches above the pipe crown to 12 inches above the pipe crown shall be "Select Bedding Material". Select Bedding Material may include loam, clay, sand, and gravel, but shall be free of cinder, ashes, refuse, organic matter, rock or material determined unsuitable by the Engineer. No material larger than one (1) inch in size shall be permitted. Frozen material shall not be used. See Section 54 for select bedding of drainage pipe.

Select Bedding Material may be native excavated material or material brought from offsite. Select Bedding Material shall be hand-tamped in the trench for its full width on each side of the pipe, simultaneously. Mechanical tampers may be used if pipe damage will not occur.

- 10. Backfill:** Normal Backfill shall start one (1) foot above the pipe or conduit crown and continue to the surface of the trench. The Contractor shall take precautions to backfill trenches in a manner that installed pipe or conduit will not be disturbed.

All backfill material shall be free from cinders, ashes, refuse, vegetation or organic material, boulders, rocks, or stones, or other material, which the Engineer determines to be unsuitable. From one foot above the pipe or conduit crown to two feet above the pipe or conduit crown, the maximum stone size shall be limited to 3 inches in diameter. From 2 feet above the top of the pipe, stones up to 12 inches along their longest dimension may be included in the backfill, unless otherwise specified.

Frozen material shall not be permitted as trench backfill.

Where excavated material is deemed unsuitable, by the Engineer, or where there is a shortage of backfill material, the Contractor shall furnish an approved Imported Backfill. Controlled Low Strength Material will be considered acceptable as backfill material when installed in accordance with Section 200 or as directed by the Engineer.

Should the Contractor cause the trench to be excavated to a greater depth or width than that designated in the plans or detailed specifications, the Contractor shall refill to grade, at their own expense, with an approved material. It may be necessary for the Contractor to bring such material from other localities or to purchase suitable material.

Prior to backfilling, the Contractor shall not sell, remove, or permit to be removed, suitable backfill material required to complete the project. If suitable backfill material is removed, the Contractor shall document the quantity of material removed and provide this information to the Engineer within 24 hours of its removal.

- 11. Insulation:** Insulation shall be placed where noted on the plans. Minimum Cover depth shall be measured from the top of pipe to finished grade. See Sections 8A and 9 for minimum cover. If minimum cover cannot be achieved and plans do not provide provisions for insulation, insulation may be used with approval from the Engineer. Insulation may also be required in instances where adequate separation between culverts or storm sewers cannot be achieved.

Insulation board shall be placed above the pipe bedding and shall be covered with select backfill material. The build-up of insulation sheeting shall be done by staggering the joints. An acceptable adhesive may be used to retain the individual sheets in the final specified dimensions.

**12. Controlled Low Strength Material:** Maybe used in lieu of Type 1 Bedding or Select Bedding Material as approved by the Engineer or as required in the plans and detailed specifications. Controlled Low Strength Material shall be installed in accordance with Section 200.

**13. Check Dam Installation:** Check dams shall be installed at intervals of 450 feet for water and sewer mains, at all laterals (tees and crosses), in service line trenches (outside of main trench), and also at locations as indicated on the plans and detailed specifications.

The check dams shall extend at a 1:1 slope vertically from the bottom of the excavation through the bedding material to the “Normal Backfill” zone and shall extend horizontally the full width of the trench. Trench check dams shall extend longitudinally a minimum distance equal to the trench width. At the location where the pipe intersects the trench check dam the length shall not be more than twice the trench width. The check dam shall seal the bedding material to prevent ground water movement in the bedding material along the trench. Check dam material shall be per Section 11.2 and compacted to the density of surrounding soil of the trench. Check dam installation and material shall be considered to be incidental to the installation of the main or service.

**14. Embankment:** Where embankment is necessary to support pipe or to cover or protect it in any way, it shall be placed to the dimensions shown in the plans and detailed specifications or as directed by the Engineer. The surface of the ground receiving the embankment shall be cleared of all unsuitable material and scarified, or loosened with a disc or multi-toothed hydraulic ripper; moisture adjusted and re-compacted as directed by the Engineer. Embankment shall be an approved material and compacted to the densities specified herein unless otherwise specified. Embankment shall be placed a minimum of 3-feet above invert of pipe prior to laying pipe. Unless otherwise approved, pipe laid in embankment shall be trenched in.

**15. Compaction and Testing:** The Contractor shall compact all materials to the following densities, unless modified by the detailed specifications or by the direction of the Engineer:

<u>SOIL TYPE</u>	<u>BACKFILL MOISTURE CONTENT</u>	<u>% OF MAXIMUM DRY DENSITY</u>
Cohesive	3% Below to 6% Above Optimum	92% Minimum
Non-cohesive	Workable	95% Minimum

Maximum dry density and optimum moisture content shall be determined by the AASHTO T-180, Modified Proctor Test.

Backfill moisture and density shall be determined at least every 200 feet horizontally and every three (3) feet vertically in each trench. The Engineer shall determine the location for moisture and density tests within each trench. The Engineer has the authority to require/take additional moisture and density tests at any location and depth desired. The Contractor shall, at their own expense, excavate the backfill at the locations and depths required by the Engineer to conduct moisture/density tests. For the purposes of calculating the number of tests required, each service line and each lateral pipe shall constitute a separate trench. If the final vertical test is not within 6-inches of the subgrade surface, a final test shall be taken within 6-inches of the subgrade surface.

- a) **Water and Sewer Vertical Testing:** The location of the first test shall be measured from the top of the pipe bedding for water and sewer.
- b) **Storm Sewer Vertical Testing:** Storm sewer vertical testing: Testing within the below described locations shall alternate from side to side of the pipe or box culvert. If a different source of backfill material or compaction procedure is used on either side, each zone shall be tested on both sides.
  - 1) On round pipe 24 inch or less in diameter or arch pipe 30 inches, or less, one test approximately half way up the pipe then every three (3) feet vertically.
  - 2) On round pipe that is 30 inch up to 72 inch in diameter, arch pipe that is 36 inch up to 84 inch, or box culverts up to 6 feet in height, one test in the lower one-half, one test in the upper one-half and then every three (3) feet vertically.
  - 3) On round pipe greater than 72 inch in diameter, arch pipe 96 inch or greater, or box culverts greater than 6 feet in height, one test in the bottom one-third, one test in the middle one-third, one test in the top one-third and then every three (3) feet vertically.

When specified moisture contents are not met, the Contractor has the options of drying wet soil, furnishing approved materials meeting specifications, or adding water as necessary, to soils that are too dry to meet specifications. If water is added to dry soil, it must be thoroughly mixed with the soil to provide uniform moisture content prior to use.

Backfill material not meeting specified densities shall receive additional compaction or shall be removed and replaced at the Contractor's expense as necessary to meet specified densities.

Wet soils that otherwise meet the requirements for backfill do not necessarily constitute unsuitable material. It is the Contractor's responsibility to either dry the material or furnish other approved material at their expense. When the Contractor furnishes backfill material, he shall also furnish the results of the AASHTO T-180 test for the furnished material.

Controlled Low Strength Material installed in accordance with Section 200 or as directed by the Engineer will not require compaction testing.

The Contractor shall not place gravel cushion, base course, topsoil, grass, etc. until the specified densities are met at each test location and the Engineer has given their approval for placement.

Trench flooding as a method of compaction is prohibited.

- 16. Frost:** When frost in the ground becomes deep enough to inhibit excavation, the Contractor may request a stop-work order. However, it shall be the Contractor's responsibility to prove to the Engineer that the cost of excavation due to the frost is excessive and a stop-work order is justified. The request for the stop-work order shall be made in writing. Regardless of when the request is made, contract time will not stop until the stop-work order is issued, i.e. the order will not be retroactive.

As a prerequisite to issuance of the stop-work order, the Contractor shall backfill and compact all open excavations and clean up the project to the satisfaction of the Engineer.

The Engineer may issue a notice to proceed when conditions improve to the point where frost does not inhibit excavation and a resumption of work is possible.

- 17. Cleanup:** Trenches located in public right-of-way shall be backfilled, compacted, and restored to original condition as soon as practicable. In cases where the permanent surfacing will not be placed within 24 hours of backfill, the Engineer may require temporary surfacing. Temporary surfacing shall be considered as incidental to the bid item for the pipe or conduit for which it pertains unless a bid item is specifically provided for Temporary Surfacing.

Temporary Surfacing shall consist of materials as specified in Section 112, Section 117, or asphalt millings.

- 18. Bedding Boxes and Other Similar Devices:** If bedding material is a unit price pay item the Contractor shall use a bedding box or other similar device for the storage of Type 1 Bedding Material and Select Granular Backfill Materials. The bedding box shall follow the progression of work and shall be used to store the materials prior to their placement in the trench. The use of such devices will minimize contamination and waste of the material. The Engineer may make a deduction in the quantity, for payment purposes, of Type 1 Bedding Material and/or Select Granular Backfill Material if the material is being contaminated or wasted.

- 19. Underground Obstructions:** The location of underground public or private utilities may be shown on the plans, as reported by the various utility companies

and the City, but this does not relieve the Contractor of the responsibility of determining the accuracy or completeness of said locations. The Contractor shall determine the location of all underground ducts, conduits, pipes, cables or structures that will be affected by the work, and shall take steps necessary to support and protect said structures by any means suitable to the owners of the structures involved and the Engineer. When necessary, the Contractor shall conduct operations as to permit access to the work site and provide time for utility work to be accomplished during the progress of the work.

Portions of existing utilities may be relocated, altered or reconstructed by the utility companies if they are found to interfere with the line and / or grade of the proposed utility, or the Engineer may order changes in the work to avoid interference.

The Contractor shall expose existing underground obstructions shown on the plans or located in the field and shall determine their elevations far enough in advance of pipe laying that the proposed pipe can be adjusted as necessary. Wherever obstructions not shown on the plans are encountered during the progress of the work and interfere with the proposed horizontal or vertical alignment of the pipe being installed, the Contractor shall notify the Engineer so that the Engineer may modify the plans and order a deviation in the line and/or grade, or may arrange for the removal or relocation of the obstruction(s). The Contractor shall not deviate from plan line or grade without the Engineer's approval.

When the plans or specifications provide for the Contractor to alter, relocate, or reconstruct an existing utility, all costs for such work shall be included in the bid price for the associated bid item unless a separate bid item is provided.

Temporary or permanent relocation or alteration of existing utilities requested by the Contractor for the Contractor's convenience shall be the Contractor's responsibility, and the Contractor shall make all arrangements and bear all costs. In those instances where existing utility relocation or reconstruction is impractical, the Engineer may order a deviation from line and grade.

The Contractor shall be responsible for notifying the various utility companies if the Contractor's work will expose, affect, or endanger any existing utility. All cost of investigation and any necessary protection, support, removal or relocation of said structures shall be included in the contract bid price for installing pipe, manholes, etc. The Contractor shall not begin construction until all utility companies have been contacted and their respective underground utilities have been located and marked.

All costs for exploratory investigation/excavation necessary for determining the location and depth of utilities shall be included in the contract bid price for installing the proposed utility, unless otherwise stated in the plans.

The Contractor shall be responsible for notifying utility companies if the Contractor's progression of work damages the utility.

#### 11.4 METHOD OF MEASUREMENT

- A. Insulation:** Water and sewer main insulation shall be measured by the square foot.
- B. Protection of the Excavation:** No measurement will be made, as these items are considered to be incidental to utility being installed, unless specifically indicated otherwise.
- C. Dewatering:** No measurement will be made, as this item is considered to be incidental to utility being installed, unless specifically indicated otherwise.
- D. Rock Excavation:** Measurement will be based on the measured and/or calculated volume of the open trench to the nearest whole cubic yard and will be limited to a maximum trench width of six (6) feet. For pipe diameters larger than 30 inches measurement will be limited to a maximum trench width of four (4) feet plus the outside diameter of the pipe being installed unless otherwise indicated in the plans or detailed specifications. At manholes the allowable trench width for computation will be 10 feet wide for a distance of seven (7) feet each side of the manhole center. For manhole diameters larger than 60 inches measurement will be limited to a maximum trench width of four (4) feet plus the outside diameter of the manhole being installed for a distance of seven (7) feet each side of the manhole center unless otherwise indicated in the plans or detailed specifications.
- E. Select Granular Backfill Materials:** Measurement for Select Granular Backfill materials will be in accordance with Section 112. Type 1 Bedding material for water and sewer pipe within 3-inches of the top and bottom of pipe shall be incidental to the pipe. Granular material for foundation or other purpose shall be measured to the nearest 0.1 tons.
- F. Imported Backfill:** Measurement of the Imported Backfill, unless otherwise stated will be to the nearest cubic yard as delivered to the project site. If suitable material was wasted from the project prior to encountering unsuitable material, measurement and payment for Imported Backfill will not be considered.
- G. AASHTO T-180 Soil Test:** This item will be measured per each as submitted to a certified lab and approved by the Engineer.

When the Contractor furnishes backfill material, he shall also furnish the results of the AASHTO T-180 test for the furnished material and these AASHTO T-180 tests will be considered as incidental to the Contractor furnished backfill material.

- H. Controlled Low Strength Material:** Measurement for Controlled Low Strength Material will be in accordance with Section 200.

- I. **Encasement (Casing Pipe):** Measurement for encasements will be measured to the nearest whole linear foot, with lengths as noted in the plans or detailed specifications.

## 11.5 BASIS OF PAYMENT

- A. **Insulation:** Payment will be at the unit price bid for insulation furnished and installed, including cushion material.
- B. **Protection of the Excavation:** No payment will be made, as these items are considered to be incidental to utility being installed, unless specifically indicated otherwise.
- C. **Dewatering:** No payment will be made, as this item is considered to be incidental to utility being installed, unless specifically indicated otherwise.
- D. **Rock Excavation:** Payment for rock excavation will be made under the bid item Rock Excavation. When no bid item exists and the Engineer agrees to pay for rock excavation, a unit price shall be negotiated. Suitable backfill material to replace excavated rock within the trench shall be incidental to the Rock Excavation bid item.
- E. **Select Granular Backfill Materials:** Payment for Select Granular Backfill materials will be in accordance with Section 112. Type 1 Bedding material for water and sewer pipe within 3-inches of the top and bottom of pipe shall be incidental to the pipe. Payment for select granular backfill materials shall include all associated costs of excavation and disposal of excavated materials, unless otherwise called for in the plans or detailed specifications.
- F. **Imported Backfill:** Payment for Imported Backfill will be made under the appropriate bid item for the material furnished and installed. Payment for Imported Backfill shall include all associated costs of excavation and disposal of excavated material unless otherwise called for. If suitable material was wasted from the project prior to encountering unsuitable material, measurement and payment for imported backfill material will not be considered.
- G. **AASHTO T-180 Soil Test:** Payment for providing the results of the AASHTO T-180 test shall be made on a per-each basis under the bid item "AASHTO T-180 Soil Test" and shall be full compensation for obtaining the soil sample, delivering it to the certified lab, conducting the test, and providing the Engineer with the results. Payment will be made for only those Proctor tests required by the Engineer.

When the Contractor furnishes backfill material, he shall also furnish the results of the AASHTO T-180 test for the furnished material and these AASHTO T-180 tests will be considered as incidental to the Contractor furnished backfill material.

- H. **Controlled Low Strength Material:** Payment for Controlled Low Strength Material will be in accordance with Section 200.

- I. **Encasement (Casing Pipe):** Payment for encasements will be at the contract unit price per linear foot. Payment shall be for the casing pipe, end seals, chocks/spacers, and all other necessary labor and materials. The pipe being encased shall be paid for separately.

**END OF SECTION**

## SECTION 13

### REMOVAL ITEMS

#### 13.1 DESCRIPTION

**A. General:** This work shall include, but is not be limited to: the removal and disposal of buildings, fences, structures, pavements; and removal and disposal or salvage of abandoned pipe lines, pipe culverts, and other obstructions which are not designated or permitted to remain, except for obstructions to be removed and disposed of under other items in the contract. It shall also include the salvaging of designated materials and backfilling the resulting trenches, holes, and pits. When the proposal does not include pay items for removal items as set out in this section, such work shall be performed under various other contract items.

**B. Related Work:**

Section 11	Utility Excavation and Backfill
Section 12	Roadway and Drainage Excavation and Embankment
Section 19	Incidental Work
Section 90	Roadway Signs and Delineators

#### 13.2 MATERIALS (not specified)

#### 13.3 CONSTRUCTION REQUIREMENTS

**A. General:** The location of waste disposal shall be properly certified for the type of waste being disposed.

Detailed plans and specifications shall state if beneficial use materials are to be delivered to the City Landfill.

Cavities left by structure removal shall be filled to the level of the surrounding ground and shall be compacted to the satisfaction of the Engineer under the same specifications as embankment. Concrete floors and similar structures shall be broken up to prevent entrapment of water. The substructures of existing bridges and similar structures shall be removed down to 1 foot below the finished ground elevation. Those structure parts in a stream shall be removed down to the natural stream bottom.

Subsurface drains or under drain which will remain and are damaged during construction shall be repaired in kind at no expense to the City unless otherwise indicated in the Contract Documents. Repair of under-drains shall be per Section 11.

Streets that utilize an engineering geotextile or geogrid underlayment which will remain and is damaged by construction shall be repaired in kind at no expense to the City

unless otherwise indicated in the Contract Documents. Repair of engineering geotextile or geogrid shall be per Section 11.

Established drainage in the street, alley, or drainage ditch must be maintained by the Contractor during his construction operations. Contractor shall take necessary precautions to prevent drainage from running into the excavation.

Street and traffic signs within the excavation area shall be removed by the Contractor and delivered to the Rapid City Traffic Operations Division. Care shall be taken to prevent damage to the signs, posts or hardware. New signs not specifically called out in the plans to be installed by the Contractor shall be erected by Traffic Operations Personnel upon notification by the Contractor that construction is sufficiently completed to enable sign installation. The Contractor shall give no less than twenty-four (24) hours' notice to the Traffic Operations Engineer.

Monuments, property pins, survey referenced points, and benchmarks shall not be disturbed without specific written permission from the Engineer. Unless otherwise called for in plans, any such markers disturbed without permission shall be replaced at the Contractor's expense by a licensed Professional Land Surveyor. Plans will indicate known, existing monuments that are scheduled to be disturbed, demolished or removed.

Damage to the property of others, such as fences, trees, shrubs, lawns, sidewalks, etc. shall be repaired or replaced at the Contractor's expense, unless removal of such is shown on the plans or written permission was first obtained from the Engineer.

- B. Remove and Salvage:** Designated salvageable material shall be carefully removed in sections or pieces, which may be readily transported and shall be stored at places specified.
- C. Remove and Reset:** Materials to be removed and reset shall be removed, transported to a location approved by the Engineer and stored, when necessary, so that there will be no damage before resetting. The Contractor will be required to replace materials damaged by his negligence.
- D. Remove and Dispose:** Unusable material shall be destroyed or disposed of off the project.
- E. Paving Surface Removal:** In removing pavement, curb, gutter, sidewalk, and similar structures where portions of the existing structures are to be left in the finished work, the old structure shall be removed to an existing joint or saw cut to provide a true line with a vertical face. Openings in the existing pavement shall be made, by sawing to full depth of the pavement.

Protection of Existing Surface use of steel faced or shod equipment without adequate padding to prevent damage to the existing pavement shall be at the Contractor's risk. Extra care shall be taken to prevent damage from excavator, loader bucket, or other equipment edges/teeth when placing or removing trench spoil or materials piles.

Damaged pavement because of the Contractor's equipment shall be repaired or replaced at no additional cost to the City.

- F. Saw Cutting:** Saw cutting of pavement ahead of trenching or excavation operations shall be required to confine pavement damage to the limits of the trench or excavation. The first pavement saw cut shall be, at a minimum, the same width as the minimum trench width centered over the utility. Asphalt or portland concrete pavement shall be cut to full depth. Pavement removal limits shall be approved by the Engineer prior to sawing. A second full depth saw cut shall be made one (1) foot outside the disturbed limits of the trench excavation on both sides. Final saw cuts shall provide a smooth vertical face, against which to resurface. Care shall be taken to prevent damage to the newly cut edge.

Final removal area limits for portland cement concrete excavation shall be as approved by the Engineer. Removal of half panels shall be in accordance with standard details.

If the asphalt concrete pavement edge is undermined at any time during construction, the pavement must be saw cut back to the undermined location and removed to form a square edge. Removals for portland cement concrete that has become undermined shall be as directed by the Engineer.

#### **13.4 METHOD OF MEASUREMENT**

When the contract stipulates that payment will be made for removal of obstructions on a lump sum basis, no separate measurement will be made.

When the contract stipulates that payment will be made for the removal of specific items on a unit basis, measurement will be made by the unit stipulated in the contract.

If detailed plans and specifications require beneficial use material to be delivered to the City landfill, no additional measurement or payment for hauling or disposal shall be made.

When removal of pipe is to be made on a unit basis, the quantity will be measured in linear feet to the nearest whole (1) foot. Quantities will be determined by measuring in place prior to removal.

When removal of AC or PCC pavement or sidewalk is to be made on a unit basis, the quantity will be measured in square feet or square yards to the nearest square foot or nearest tenth (0.1) square yard. Quantities will be determined by measuring in place prior to removal.

Curb and gutter removal shall be paid for by the nearest half (0.5) linear foot. All types of curb and gutter shall be measured the same for removal. Where curb and/or gutter is monolithic or tied to adjacent portland cement concrete pavement to be removed, it will be considered as pavement and will be measured as such.

When a portion of pavement, curb and gutter, sidewalk, or other similar structures will remain, saw cutting to the lines described in the plans or as directed by the Engineer, shall be incidental to the removal item and will not be measured.

### **13.5 BASIS OF PAYMENT**

Obstruction removal, will be considered as Incidental Work unless a bid item for the removal is provided. Payment for removal of obstructions by lump sum or unit price basis will be full compensation for removal and disposal of such items, excavation and subsequent backfill incidental to their removal.

Pipe removal, will be considered as Incidental Work unless a bid item for the removal is provided. Variance from pipe removal quantities, locations, or dimensions shown on the plans or specified herein will not be cause for adjustments in payment for Incidental Work.

AC or PCC pavement or sidewalk shall be paid for at the contract unit price bid, and shall be full payment for removal and disposal.

Removal of curb and gutter shall be paid for at the contract unit price per linear foot. Payment shall be full compensations for removal and disposal of any type of curb and gutter.

If detailed plans and specifications require beneficial use material to be delivered to the City landfill, no additional measurement or payment for hauling or disposal shall be made.

**END OF SECTION**

## SECTION 18

### EROSION, SEDIMENT, AND WATER POLLUTION CONTROL

#### 18.1 DESCRIPTION

**A. General:** This work consists of measures necessary to control erosion, sedimentation, and water pollution during the life of the contract. Measures to be used shall be included in the contract.

**B. Related Work:**

Section 10	Clearing and Grubbing
Section 11	Utility Excavation and Backfill
Section 12	Roadway and Drainage Excavation and Embankment
Section 17	Salvaging, Stockpiling, and Placing Topsoil
Section 65	Riprap
Section 66	Gabions
Section 70	Seeding
Section 71	Fertilizing
Section 72	Mulching
Section 73	Sodding
Section 202	Geosynthetics for Roadways
Section 203	Submittals

**C. Definitions:**

- 1. Final Stabilization:** Either (1) perennial vegetative cover with a density of 70 percent of the natural background vegetative cover, or (2) permanent non-vegetative stabilization (i.e. rip-rap, etc.) has been implemented to provide effective cover for exposed portions of the site.
- 2. Perimeter Control:** Sediment Control devices installed at or near the perimeter of the site to capture sediment and prevent it from leaving the site.
- 3. Permanent Stabilization:** Practices that result in permanent cover of bare soil. This includes seeding, mulching, installing erosion control blankets (over the top of seeding), turf reinforcement mats, transition mats, channel liners, geotextiles or drainage fabrics covered with rip rap or gabions, and other practices considered long term erosion control. It also includes completion of buildings, wall, drainage structures, and pavement on roads, paths, and sidewalks.
- 4. Temporary Stabilization:** Short-term cover of bare soil during construction. This includes surface roughening or applying mulches, soil stabilizers, and other practices considered temporary erosion control.

## 18.2 MATERIALS

- A. General:** All materials shall be free of invasive species, noxious weeds, and other contaminants. Material containing any of the aforementioned will be rejected and the Contractor will be required to remove the material from the project.

Materials listed on the SDDOT approved products list meeting the requirements of this specification shall be acceptable.

- B. Water Pollution Control:** The Engineer may require some or all of the items below.

**1. Concrete Washout Area:** Shall be constructed with an impermeable barrier.

**2. Dewatering and Sediment Collecting:**

- a) Small scale testing using water samples and various flocculants will be required to select a flocculant due to the varying physical and chemical properties of the sediments to be flocculated out of suspension.
- b) Materials used for filtering floc shall be approved by the Engineer.
- c) Ponds and containers used to hold water that is being treated shall not further contribute to water pollution and shall not leak.
- d) Pumps used to collect sediment laden water shall be floating pumps or shall incorporate a device that siphons clearer water off the surface to reduce the amount of sediment that needs to be removed from the discharge.

**3. Temporary Diversion Channel:**

- a) Diversion channels must be lined with plastic sheeting or Class 1 non-woven separation fabric and lined with Class A Riprap or shot rock.
- b) The original channel shall be blocked during diversion with Engineer approved sheet piling, sandbags, or an approved Temporary Water Barrier.
- c) Culverts can be used in place of diversion channels.
- d) Pumping water around the site is allowed in place of diversion channels given the diversion is not needed longer than forecasted dry weather and the Engineer approves.

**4. Temporary Water Barrier:** Shall be from the list in the plans or an approved equal.

**C. Sediment Control:**

**1. Bale Barrier:**

- a) Bales shall consist of certified weed free straw.
  - b) Bales shall be approximately 15 inch x 18 inch x 3.5 feet.
  - c) Each bale shall be held in place with two 2"x2"x4' wooden stakes.
- 2. Rock Check Dams:** Shall be constructed using 4" to 6" angular rock.
- 3. Floating Silt Curtain:** Shall be as specified in the plans or an approved equal. The Contractor will determine the water depth and other waterway characteristics such as stream flow velocity and seek technical advice from the manufacturer before ordering the floating silt curtain to make sure it is the correct type for the site.
- 4. Gravel Filter Sock:**
- a) The geotextile sock material shall be from the list in the plans.
  - b) The sock shall be filled with 3/4" rock, 3/8" lime stone chips, clean 1/4" pea gravel, clean sand or material approved by the Engineer.
- 5. Inlet Protection Device:**
- a) The Inlet Protection Device shall be from the list in the plans, or an approved equal. Installation shall be per standard details.
  - b) The device selected shall fit the curb inlet properly and be recommended for that type of inlet by the manufacturer.
  - c) Inlet protection devices can be reused from previous projects, but devices that no longer appear to be functional will be rejected.
  - d) Inlet protection devices shall be replaced when they are beyond repair.
  - e) The Contractor shall provide welded wire support for devices used on curb inlets without grates if the device has no other structural support to ensure devices do not fall into the inlet.
- 6. Interim Sediment Control at Inlets, Manholes, and Junction Boxes:**
- a) Refer to the standard detail for details of installation of high flow silt fence at drop inlets, manholes, and junction boxes.
  - b) The high flow silt fence product provided shall be from the list in the plans.
  - c) The gravel filter socks provided shall be from the list in the plans.
- 7. Silt Fence:**

- a) Silt fence shall consist of a temporary vertical barrier of fabric attached to wood or steel posts and entrenched into the ground. Low flow silt fence shall be supported by woven wire backing.
- b) Woven wire shall be 26 inch wide, 14 ½ gauge and have six horizontal wires with 6 inch or 12 inch spacing of vertical stay wires. Woven wire is not required for high flow silt fence installations unless specified in the plans or ordered by the Engineer.
- c) Posts shall be steel T line posts with 5 foot minimum length or wood posts with 5 foot minimum length and 3 inch diameter.
- d) Silt fence fabric may be selected from the SD DOT approved products list and shall be the type specified in plans, or approved equal.

Silt Fence Fabric Material Specifications

Property and Test Method	Low Flow Silt Fence	High Flow Silt Fence
Material Composition	Woven Monofilament	
Water Flow Rate ASTM D 4491	20-70 gpm/ft <sup>2</sup>	71-145 gpm/ft <sup>2</sup>
Minimum Ultra-Violet Stability ASTM D 4355 <sup>1</sup>	70%	70%

**8. Stabilized Construction Entrance:**

- a) The entrance, at a minimum, shall be 15' wide by 50' long.
- b) A drainage pipe and stabilized embankment shall be provided if necessary.
- c) The material options are:
  - 1) Wood options include slash mulches and timber pads
  - 2) Winter options include frost penetrated pad, snow or ice roads.
  - 3) Wash rack option as shown on Standard Detail.
  - 4) Manufactured options shall be selected from the list in the plans, or as approved by the Engineer.
  - 5) Other products or processes as approved during the preconstruction meeting.
  - 6) Aggregate Option as shown on Standard Detail shall be constructed with the following materials:

## Stabilized Construction Entrance: Aggregate Option

Granular Materials*	Sieve Size	Percent Passing
Granular Material-- 12" thick over Reinforcement Fabric (MSE)	3"	100%
	2 ½"	50%
	1 ½"	0%

\*The granular material will be placed in 6" maximum lifts

Reinforcement Fabric (MSE)**	Test Method	Requirement
AASHTO Class	AASHTO M 288	1 Woven
AOS, US Standard Sieve	ASTM D4751	40-100
Permittivity, Sec-1	ASTM D4491	0.005 Min
Grab Strength, lbs	ASTM D4632	315
Grab Elongation, %	ASTM D4632	35 Max
Trapezoid Tear Strength, lbs	ASTM D4533	110
Puncture Strength, lbs	ASTM D6241	620
UV Strength Retention, %	ASTM D4355	50
Wide Width Strip Tensile Strength, lbs/in	ASTM D4595	200

\*\* The fabric shall be kept as taut as possible prior to placing. Equipment will not be allowed on the fabric until the first lift of granular material is in place. All seams of the fabric will be overlapped at least 2' and shingled.

### 9. Street Sweeping:

- a) The Contractor shall use a pickup broom having integral self-contained storage to clean the roadway.
- b) The pickup broom used shall be a minimum of 6 feet wide and have working gutter brooms.

### 10. Triangular Silt Barrier: Shall be from the list in the plans or an approved equal.

### 11. Wattles:

- a) Wattles shall consist of compost or excelsior encased in ultraviolet degradable or biodegradable netting.
- b) Wattles must be from the list provided in the plans.
- c) Anchors for wattles shall be wooden or biodegradable stakes.

### 12. Sediment Basins: Shall be constructed using materials provided in the plans, or as directed by the Engineer.

- D. Erosion Control:** Placing topsoil, seeding, mulching, sodding, rip rap, gabions, rock filled wire baskets, slope protection, fabric formed concrete mats, and engineering fabric are also materials used for erosion control. Please refer to their respective sections for material requirements.

**1. Dust Control:**

- a) Dust control on areas to be vegetated shall be the temporary or permanent stabilization practice provided in the plans.
- b) Dust control on haul routes shall be water, calcium chloride, biopolymers, or other product or practice approved by the Engineer.
- c) Refer to street sweeping for dust control on paved surfaces.

**2. Erosion Control Blanket:**

- a) Blanket may be selected from the SD DOT approved products list and shall be the type specified in plans, or an approved equal.
- b) Approved equals must meet the following criteria:

Erosion Control Blanket Material Specifications

PROPERTY AND TEST METHOD	Type 1	Type 2	Type 3	Type 4
Material Composition Manufacturer's Data	Processed degradable natural and/or polymer fibers either mechanically interlocked, chemically adhered, or bound by netting to form a continuous matrix.		Processed slow degrading natural or polymer fibers mechanically bound between two slow degrading synthetic or natural fiber nettings to form a continuous matrix.	
Functional Longevity Manufacturer's Data	3 to 6 month Typical	6 to 12 month Typical	12 to 24 month typical	24 to 36 month typical
Minimum Mass Per Unit Area ASTM D 6475	8 oz/yd <sup>2</sup>	8 oz/yd <sup>2</sup>	8 oz/yd <sup>2</sup>	8 oz/yd <sup>2</sup>
Minimum Thickness ASTM D 6525	0.2 in	0.2 in	0.2 in	0.2 in
Minimum Tensile Strength ASTM D 6818 Machine Direction	60 lbs/ft	75 lbs/ft	100 lbs/ft	100 lbs/ft
Maximum Shear Stress ASTM D 6460*	1.5 lbs/ft <sup>2</sup>	1.75 lbs/ft <sup>2</sup>	2 lbs/ft <sup>2</sup>	2.25 lbs/ft <sup>2</sup>

\*(channel applications) blanket can sustain at least this shear stress without damage and without any more that 0.5" soil loss during a 30 minute flow event

3. **Interceptor Ditch:** The non-erodible material used shall be an erosion control blanket, turf reinforcement mat, or 2" thickness of shot rock, base course, or gravel cushion material.
4. **Surface Roughening:** Equipment for surface roughening shall be equipped with tracks that are capable of creating ridges in the soil that are perpendicular to the slope. Alternately, the Contractor could disc perpendicular to the slope to create ridges.
5. **Soil Stabilizers:**
  - a) Soil Stabilizers shall be selected from the list in the plans or an approved equal.
  - b) The Contractor shall apply soil stabilizer in accordance with the manufacturer's application instructions and at the rate specified in the list of approved soil stabilizers.
  - c) Wood fiber mulch that contains green dye will be mixed with the soil stabilizer to be used as a tracer when the soil stabilizer is applied hydraulically.
    - 1) Wood fiber mulch will be added at a rate of 300 pounds per acre or 1 ounce per square yard.
    - 2) Wood fiber mulch shall be used with all Soil Stabilizers unless otherwise noted.
    - 3) The wood fiber mulch shall be a 100% wood fiber product and does not need to contain a tackifier.
6. **Temporary Mulching:** Grass Hay/Straw Mulch as defined in Section 72 may be used as temporary mulching for erosion control.
7. **Temporary Slope Drain:**
  - a) Embankment material shall be free of roots or other woody vegetation, organic material, and other unsuitable material.
  - b) Steel T posts and 16 gauge wire shall be used to secure the pipe in place.
  - c) A minimum of 1 cubic yard of Class A rip rap shall be used at the outlet.
  - d) Corrugated pipe shall be used to convey drainage. The size of the pipe shall be selected based on the drainage area as shown in the table below.

Corrugated Pipe for Temporary Slope Drain

Drainage Area in Acres	Pipe Diameter in Inches
0.5	12
1.5	18
2.5	21
3.5	24
5.0	30

8. **Transition Mat:** Transition mat shall be from the list in the plans or an approved equal.

9. **Turf Reinforcement Mat:**

- a) Turf Reinforcement Mat may be selected from the SD DOT approved products list and shall be the class specified in plans, or an approved equal.
- b) Turf Reinforcement Mats on the list meet the following criteria:

Turf Reinforcement Mat Material Specifications

Property and Test Method	Class 1	Class 2	Class 3	Class 4
Material Composition Manufacturer's Data	A product composed of UV-stabilized, non-degradable, synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a permanent, three-dimensional matrix. Degradable components may be used within the permanent three-dimensional matrix.			
Unvegetated Shear Stress (psf) ASTM D6460	≥ 2	≥ 2.5	≥ 2.5	≥ 3
Vegetated Shear Stress (psf) ASTM D6460	≥ 6	≥ 10	≥ 12	≥ 14

18.3 CONSTRUCTION REQUIREMENTS

A. General:

1. Ordinances and Regulations:

- a) In the event of conflict between the requirements set forth in the contract and requirements of other Federal or State or local agencies, the more restrictive laws, rules or regulations shall apply.
- b) Local requirements: Rapid City's Municipal Code and Infrastructure Design Criteria Manual.

**2. Performance Objectives:**

- a) Construction activities shall be scheduled to minimize the total amount of soil exposed at any given time.
- b) Sediment and construction materials shall be kept on site or properly disposed.
- c) Construction fence or silt fence shall be utilized to limit traffic in areas with existing vegetation that do not require grading, excavation, or use for staging.
- d) All erosion and sediment controls shall be placed as directed in the plans or as approved by the Engineer.

**3. Preference of Erosion Control (Stabilization) Over Sediment Control:**

- a) Erosion control is the preferred method of sediment retention on-site and shall be completed as soon as possible to reduce sediment control maintenance costs.
- b) Disturbed areas that are not at final grade and soil stockpiles that will not be worked or spread within 21 days must be temporarily stabilized within 14 days.
- c) Final stabilization must begin within 14 days of an area reaching final grade.
  - 1) If final stabilization cannot begin due to seasonal limitations or conditions that make seeding or other final stabilization techniques impossible to complete, temporary stabilization must be utilized and sediment controls must be in place.
  - 2) Slopes 3:1 or steeper must be stabilized with erosion control blanket, turf reinforcement mat, bonded fiber matrix, or fiber reinforced matrix.
  - 3) The Contractor shall include multiple mobilizations in the bid for seeding, mulching, and other erosion control items.

**4. Storage of Construction Materials:**

- a) Soil, base course, and other materials containing soil shall not be placed directly on pavement for more than 24 hours without having the proper sediment controls.
- b) Contractor equipment yards and service areas shall be located or bermed so runoff and pollutants do not reach waterways or impoundments of water.
- c) Refer to plans for other requirements.

**5. Inspections:**

- a) Inspection reports shall include the inspector's name, the date, current weather and site conditions, sediment controls requiring maintenance, any temporary or final stabilization that is required, good housekeeping, and construction status.
- b) Based on the results of the inspection, the plan shall be revised and implemented, in no case later than seven days following the inspection.

**6. Maintenance:**

- a) Dirt, mud, and rock tracked into the right of way (includes—road, curb and gutter, sidewalks, and approaches) must be cleaned up by the end of each working day.
- b) Once discovered, washouts and scours shall be repaired before gullies form.
- c) Sediment control devices and rolled erosion control products that have been undercut shall be evaluated for replacement with another device or reinstallation with better trenching-in and staking or stapling.

**7. Winter Site Preparation and Management:** Engineer may require some or all of the provisions below as necessary.

- a) Do not spread frozen or saturated topsoil.
- b) If topsoil cannot be properly spread prior to freezing, the finished subgrade work should be significantly roughened and stabilized with mulch as directed below.
- c) Saturated soil may be removed on access drives and during trenching and excavation operations and stored above snow storage locations.
- d) Silt ditches shall be placed within soil stockpile areas to direct runoff to treatment BMPs for sediment control and to prevent mixing with surrounding runoff.
- e) Prepare a snow management plan for the site to account for adequate storage of cleared snow through the winter and control of meltwater.
- f) Snow mixed with significant amounts of soil should be stored in separate locations that are designed to handle larger volumes of sediment.
- g) Snow storage locations should be placed down slope of all disturbed areas, but not within natural wetlands or drainage easements.
- h) Keep all equipment travel areas as free of snow as possible to increase frost penetration to reduce track out problems.

- i) Keep drainage structures open. Check for and remove snow and ice dams to ensure drain function during construction.
- j) Snow berms may be used as perimeter control, but care must be taken not to cause offsite ponding of water.
- k) Snow shall not be piled against silt fence.

#### **8. Thawing Condition:**

- a) Keep vehicle travel areas free of snow at night and covered with snow during the day to maintain frost penetration and prevent muddy travel areas and track-out.
- b) Ensure that all areas of disturbed soil are adequately protected ahead of a forecasted melt event.
- c) Actively monitor and promptly maintain sediment controls during spring thaw.
- d) Construction activities may need to be suspended until soils are no longer saturated.

### **B. Water Pollution Control:**

#### **1. Concrete Washout Area:**

- a) The concrete washout area must be kept in a condition to maintain the capacity for all wasted concrete and washout water on the project.
- b) No washout area is necessary if all concrete trucks are going to wash out at approved site constructed by the concrete supplier.
- c) Concrete washout shall not be buried at the end of the project, it shall be removed and disposed.

#### **2. Dewatering and Sediment Collecting:**

- a) The need for Dewatering and Sediment Collecting depends on the Contractor's sequence of operations and execution of the erosion, sediment, and water pollution controls provided contract.
- b) The Contactor has the option to treat sediment laden water trapped within the project limits or to transport sediment laden water off the project.
- c) Water transported off the project limits shall not be disposed of in an area where it can enter a waterway. The disposal site must be approved by the Engineer.

- d) If dewatering into regulated water bodies, the Contractor is required to obtain a SDDANR General Surface Water Discharge Permit For Temporary Discharge.
- e) Flocculants are not to be released into regulated water bodies.
- f) Filtering materials shall be regularly maintained for optimal performance.
- g) Discharge of treated water shall not cause any erosion. The Contractor is encouraged to use drainage fabric and other materials already present on the project as erosion protection at discharge points.

### **3. Temporary Diversion Channel:**

- a) Channel alignment shall prevent scouring and downstream erosion.
- b) Compacted soil shall not be used in the natural channel to divert water due to the damage the removal will cause to the streambed.
- c) Pumping shall not be used if it will adversely affect aquatic species.
- d) Diversion channel construction shall be sequenced to provide the least amount of disturbance to the channel and pollution of the water.

### **4. Temporary Water Barriers:**

- a) Temporary water barriers shall be placed in a manner that creates the least amount of disturbance.
- b) Contaminated water within the work area collected by the water barriers shall be removed and treated.
- c) Properly designed sheet pile is an acceptable alternate temporary water barrier as approved by the Engineer.
- d) Floating silt curtains may be required.

## **C. Sediment Control:**

### **1. Bale Barrier:**

- a) Bale barriers shall be used as perimeter protection and not as ditch checks.
- b) Bale barriers shall be trenched in approximately 4 inches.
- c) Stakes shall be pounded in as far as possible, but no less than 2 inches and no more than 18 inches of the stake shall protrude through the top of the bale.

d) Bales shall tightly about each other.

**2. Floating Silt Curtain:**

a) Floating Silt Curtain shall not be placed across channels.

b) The Contractor shall install the floating silt curtain in accordance with the manufacturer's installation instructions or as directed by the Engineer.

c) Fish and other aquatic species shall be moved if trapped by the curtain.

**3. Gravel Filter Sock:**

a) Gravel filter socks shall be used to anchor silt fence around the bottom when it cannot be properly trenched in due to rocky soil.

b) Gravel filter sock shall be used as perimeter control when dirt and mud cannot be kept off paved or compacted surfaces.

**4. Inlet Protection Device:**

a) Inlet Protection Devices shall be installed prior to working in the vicinity of the drop inlets.

b) Maintenance shall be scheduled to prevent storm water from backing up into the driving lane. At a minimum, weekly maintenance shall be performed and includes sediment, snow, and ice removal and repairs or replacement to ensure the device is in working order.

c) Devices shall remain in place until vegetation of bare soils reaches 70% coverage or until the Engineer approves removal.

d) Utilize the device on Standard Detail for Type B Inlets in the winter.

e) Utilize Gravel Filter Socks in the gutter to protect Type E Inlets during winter snow melt. Remove prior to snow events that will require plowing.

**5. Remove Sediment:**

a) Sediment Removal shall be done as recommended by the manufacturer or when the device is 1/3 full, whichever happens first, on all sediment control devices.

b) Sediment shall be placed away from the perimeter of the site, waterbodies, water conveyances, drainage inlets and outlets on areas to be vegetated.

**6. Rock Check Dams:**

- a) The rock check dam shall be imbedded 6 inches.
- b) The bottom of the downhill side of the rock check dam shall be level with the top of the check dam downhill from it if there are multiple check dams installed.
- c) The embankment edges of the rock check dam shall be 6 inches higher than the middle of the check dam.

**7. Sediment Basins and Traps:**

- a) Outfalls and spillways shall be constructed first and stabilized immediately with the materials provided in the plans.
- b) Embankments shall be compacted in accordance with Section 12.
- c) When sediment fails to fall out of suspension during water storage, temporary sediment basins or traps shall be optimized by adding silt fence baffles, sandbag (gravel filter bag) weirs, flocculent, and/or basin skimmers.
- d) When approved by the Engineer, sediment basins installed as part of post-construction storm water management may be used during construction for sediment control given they are properly maintained, and excavated after construction.
- e) Sediment Traps shall be constructed as shown on Standard Detail.

**8. Silt Ditch:**

- a) Refer to Standard Detail.
- b) Shall only be used on flat sites where the ditch grade would be 2% or less.

**9. Silt Fence:**

- a) Low Flow Silt Fence shall be used along site perimeters and around stockpiles.
- b) High Flow Silt Fence shall be used for inlet protection and in ditches to capture sediment before it leaves the site.

**10. Stabilized Construction Entrance:**

- a) A functional stabilized construction entrance shall be in place until it is replaced by a roadway or until vehicular access is restricted from the site with barriers.
- b) If the Contractor elects to use one of the devices listed in the plans, then the Contractor shall install the product in accordance with the manufacturer's installation instructions or as directed by the Engineer.

- c) The Contractor is allowed to change materials used due to changes in weather, moisture, and temperature.
- d) The Stabilized Construction Entrance shall be maintained as often as necessary for it to prevent track out. Maintenance includes removal of sediment and replacement or addition of materials.

**11. Street Sweeping:**

- a) Vehicle tracking of sediment from the construction site shall be minimized.
- b) Street sweeping shall be used if erosion and sediment control best management practices are not adequate to prevent sediment from being tracked onto the street.
- c) Street Sweeping shall be performed by the end of the day if track-out occurs.

**12. Triangular Silt Barrier:**

- a) Triangular Silt Barriers shall be installed per manufacturer's instructions.
- b) Some or all of the triangular silt barriers may be left on the project until vegetation is established.
- c) Triangular silt barriers shall be removed when vegetation is established.

**13. Wattles:**

- a) Wattles shall be entrenched and staked per manufacturer recommendations and spaced as shown on the standard detail or in the plans.
- b) Wattles shall be removed and replaced while construction progresses if they are in a condition to be reused and they are no longer needed in the previous location.
- c) Wattles shall remain in place until vegetation is established unless they interfere with irrigation heads.
- d) Wattles may be left in place to disintegrate in natural areas that will not be mown.

**D. Erosion Control:****1. Dust Control:**

- a) Dust control shall be implemented any time dust is causing visibility or breathing issues for people on or off-site.

- b) Refer to Rapid City Municipal Code Chapter 8.34 Dirt/Dust Control for more information.
2. **Interceptor Ditches:** Refer to Standard Detail.
3. **Rolled Erosion Control Products (RECPs):**
- a) This category includes Erosion Control Blanket and Turf Reinforcement Mat
  - b) Installation shall be as shown on the standard detail and as described below.
  - c) Blankets and mats shall be installed like shingles where the uphill piece is on top of and overlaps the downhill piece.
  - d) Blankets and mats shall be installed parallel to the slope and not across slopes.
  - e) Blankets and mats shall be trenched in at the top of the slope (unless overlapping another blanket or mat) and at the toe of the slope.
4. **Snow Installation:**
- a) Install practices over bare frozen ground or snow (no deeper than 2 inches) using appropriate anchors.
  - b) If necessary, remove snow before placing erosion control blanket.
  - c) RECP's are useful for conveyance systems and other areas where snow mulching practices are not applicable.
5. **Soil Stabilizers:** Shall be used as a temporary stabilization measure when temporary mulching or surface roughening cannot be completed or isn't appropriate for addressing the issue.
6. **Surface Roughening:**
- a) Surface roughening shall be done on slopes 3:1 and steeper as a temporary stabilization practice.
  - b) The final condition of the surface roughening shall be approved by the Engineer.
  - c) Surface Roughening shall be performed per Standard Detail.
7. **Temporary Slope Drain:** Refer to Standard Detail.
8. **Temporary Mulching:** The Contractor shall place mulch on areas that have reached final grade during the last month of seasonal seeding limitations. The

Contractor shall later seed into the mulch. Installation of the mulch shall be as stated in Section 72 - Mulching.

9. **Transition Mat:** Installation of the transition mat shall be in accordance with the manufacturer's installation instructions. Turf reinforcement mat, sod, or geotextile shall be installed under the transition mat.

#### 18.4 METHOD OF MEASUREMENT

Measurements will only be made of items correctly installed or utilized.

- A. **Bale Barrier:** Shall be measured per bale.
- B. **Concrete Washout:** No measurement shall be made for Concrete Washout Area.
- C. **Dewatering and Sediment Collecting:** Shall be measured per detailed plans and specifications.
- D. **Dust Control:** Water and operations for dust control shall not be measured.
- E. **Erosion Control Blanket:** Shall be measured to the nearest square yard. Measurement of the overlap and top and bottom folds shall not be made. Erosion control blanket damaged from causes beyond the control of the Contractor shall be replaced and the replacement quantity added to the original quantities used.
- F. **Floating Silt Curtain:** Shall be measured to the nearest foot. Silt curtain damaged from causes beyond the control of the Contractor shall be replaced and the replacement quantity added to the original contract amount.
- G. **Gravel Filter Sock:** Shall be measured to the nearest foot.
- H. **Inlet Protection Device:** Shall be measured per each.
- I. **Interceptor Ditch:** Shall be paid for per foot of ditch.
- J. **Interim Sediment Control at Inlet:** Shall be measured per foot high flow silt fence and per foot gravel filter bag. Aggregate shall not be measured.
- K. **Mulching:** Shall be measured as described in Section 72 – Mulching.
- L. **Remove Sediment:** Unless specifically called for in detailed plans and specifications, field measurement for removal of sediment shall not be made. Sediment Removal shall be incidental to the BMP being maintained.
- M. **Rock Check Dam:** Shall be measured per cubic yard of 4"-6" angular rock.
- N. **Sediment Control Wattle, Remove and Reset Wattle, and Remove Wattle:** Shall be measured to the nearest foot.

- O. Seeding:** Shall be measured as described in Section 70 - Seeding.
- P. Silt Fence and Remove Silt Fence:** Shall be measured to the nearest foot. If removal of silt fence is not included in detailed plans and specifications, removal shall be incidental to the silt fence bid item.
- Q. Soil Stabilizer:** Shall be measured per acre or square yard covered with soil stabilizer.
- R. Sodding:** Shall be measured as described in Section 73 - Sodding.
- S. Stabilized Construction Entrance:** Shall be measured per each location.
- T. Street Sweeping:** Shall be measured per hour.
- U. Surface Roughening:** Shall be paid for to the nearest tenth of an acre.
- V. Temporary Diversion Channel:** Shall be measured per each.
- W. Temporary Mulching:** Shall be measured as described in Section 72 - Mulching.
- X. Temporary Slope Drain:** Shall be measured to the nearest foot.
- Y. Temporary Water Barrier:** Shall be measured for per foot.
- Z. Topsoil:** Shall be measured as described in Section 17 - Salvaging, Stockpiling, and Placing Topsoil.
- AA. Transition Mat:** Shall be measured per square yard.
- BB. Triangular Silt Barrier:** Shall be paid per foot.
- CC. Turf Reinforcement Mat:** Shall be measured to the nearest square yard. Measurement of the overlap and top and bottom folds shall not be made. Turf reinforcement mat damaged from causes beyond the control of the Contractor shall be replaced and the replacement quantity added to the original quantities used.
- DD. Wattle:** Shall be measured to nearest linear foot.

## 18.5 BASIS OF PAYMENT

Measures, which are required due to the Contractor's negligence, carelessness, or failure to implement as a part of the work as scheduled, shall be performed by the Contractor at no expense to the City.

- A. Bale Barrier:** Shall be paid for at the contract unit price for each bale. Payment shall be full compensation for furnishing, installing, all labor, equipment, and incidentals.

- B. Concrete Washout:** No additional payment shall be made for Concrete Washout Area. Concrete washout done on-site without a Concrete Washout Area shall result in a Stop Work Order and the Contractor shall bring the site into full compliance with all applicable permits before any work on the site can resume.
- C. Dewatering and Sediment Collecting:** Shall be paid per contract unit price.
- D. Dust Control:** Shall be incidental to the project.
- E. Erosion Control Blanket:** Shall be paid for at the contract unit price per square yard. Payment shall be full compensation for shaping and finishing ditches and channels, installing material and the furnishing of labor, equipment, staples, material, and incidentals necessary.
- F. Floating Silt Curtain:** Shall be paid for at the contract unit price per foot. Payment shall be full compensation for materials, labor and equipment necessary to install and remove the floating silt curtain.
- G. Gravel Filter Sock:** Shall be measured to the nearest foot.
- H. Inlet Protection Device:** Shall be paid for one time at each location, regardless of the number of times the sediment control devices are installed, inspected, cleaned, removed, repaired, or replaced. All costs associated with furnishing, installing, inspecting, maintaining, cleaning, sediment removal, and repairing the Inlet Protection Device shall be incidental to the contract unit price per each for "Inlet Protection Device".
- I. Interceptor Ditch:** All costs for constructing, inspecting, maintaining, and removing the interceptor ditch including labor, equipment, and materials shall be incidental to the contract unit price per foot.
- J. Interim Sediment Control at Inlets:** Shall be paid per foot high flow silt fence and per foot gravel filter bag. Aggregate shall be incidental to gravel filter bags.
- K. Mulching:** Shall be measured as described in Section 72 – Mulching.
- L. Remove Sediment:** Shall be paid for at the contract unit price per cubic yard if included in detailed plans and specifications. Payment shall be full compensation for labor, equipment, disposal, and incidentals. If not included in detailed plans and specifications, sediment removal shall be incidental to the BMP being maintained.
- M. Rock Check Dam:** All costs for constructing the Rock Check Dam including labor, equipment, excavation, and rock shall be incidental to the contract unit price per cubic yard for "Rock Check Dam".
- N. Sediment Control Wattle, Remove and Reset Wattle, and Remove Wattle:** Shall be paid at the contract unit price.

- O. Seeding:** Shall be paid as described in Section 70 - Seeding.
- P. Silt Fence and Remove Silt Fence:** Shall be paid for at the contract unit price per foot for the particular bid item. Payment shall be full compensation for furnishing, installing, repairing, labor, equipment, and incidentals. Remove Silt Fence shall include all labor for complete removal and shaping. If removal of silt fence is not included in detailed plans and specifications, removal shall be incidental to the silt fence bid item.
- Q. Sodding:** Shall be paid as described in Section 73 – Sodding.
- R. Soil Stabilizer:** All costs for furnishing and applying the soil stabilizer including wood fiber mulch, hauling, materials, equipment, labor, and incidentals necessary shall be paid for at the contract unit price per acre or square yard for “Soil Stabilizer”.
- S. Stabilized Construction Entrance:** All costs for furnishing, installing, maintaining, and removal of the construction entrance including equipment, labor, materials, and incidentals shall be included in the contract unit price per each for “Construction Entrance”.
- T. Street Sweeping:** All costs for cleaning the roadway with a pickup broom shall be incidental to the contract unit price per hour for “Sweeping”.
- U. Surface Roughening:** All costs associated with surface roughening including labor, equipment, and materials shall be incidental to the contract price per acre for “Surface Roughening”.
- V. Temporary Diversion:** All costs associated with installation and removal of Temporary Diversion Channels including labor, equipment, and materials shall be incidental to the contract price per acre for “Temporary Diversion Channel”.
- W. Temporary Mulching:** No additional payment shall be made for temporary mulching. Mulching shall be paid as stated in Section 72 – Mulching.
- X. Temporary Slope Drain:** All costs for constructing and removing the temporary slope drains including labor, equipment, and materials which include the class A riprap, corrugated pipe, steel T fence posts, wire, and necessary earthwork, shall be incidental to the contract unit price per foot for “Temporary Slope Drain”.
- Y. Temporary Water Barrier:** All costs for furnishing, installing, maintaining, and removal of the temporary water barrier including hauling, materials, equipment, labor, and incidentals necessary shall be paid for at the contract unit price per foot for “Temporary Water Barrier”.
- Z. Topsoil:** Shall be measured as described in Section 17 - Salvaging, Stockpiling, and Placing Topsoil.

- AA. Transition Mat:** All costs for furnishing and installing the transition mat including hauling, materials, equipment, labor, and incidentals necessary shall be paid for at the contract unit price per square yard for "Transition Mat". Sodding, geotextiles, or Turf Reinforcement Mat installed under the Transition Mat shall be paid for per corresponding bid item.
- BB. Triangular Silt Barrier:** All costs for furnishing, installing, and removing the triangular silt barrier including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Triangular Silt Barrier".
- CC. Turf Reinforcement Mat:** Turf reinforcement mat shall be paid for at the contract unit price per square yard. Payment shall be full compensation for shaping and finishing ditches and channels, installing material and the furnishing of labor, equipment, staples, material, and incidentals necessary.
- DD. Wattle:** Wattles shall be paid for at the contract unit price per foot. Payment shall be full compensation for furnishing, installing, labor, equipment, and incidentals. Remove and reset wattle shall be paid for at the contract unit price per foot. Payment shall be full compensation for labor, equipment, and incidentals. Remove wattle shall be paid for at the contract unit price per foot. Payment shall be full compensation for labor, equipment, and incidentals.

**END OF SECTION**

## SECTION 41

### UTILITY TRENCH RESURFACING

#### 41.1 DESCRIPTION

- A. General:** This work consists of furnishing and installing surface patching of utility trenches. This includes all equipment, tools, materials, labor, and other incidentals to provide utility trench patching to prepare the surface for regular use, and restore non-paved areas to their original condition.

Patching of trenches will be matching the in-place surface material with asphalt, concrete, gravel, grass, etc. or as specified by the Engineer.

**B. Related Work:**

Section 11	Utility Excavation and Backfill
Section 20	Granular Bases and Surfacing
Section 31	Asphalt Concrete - General
Section 32	Asphalt Concrete - Class E
Section 39	Cold Mix Asphalt Concrete
Section 40	Portland Cement Concrete Pavement
Section 64	Under-Drains
Section 70	Seeding
Section 73	Sodding
Section 90	Roadway Signs and Delineators
Section 117	Aggregates for Granular Bases and Surfacing
Section 202	Geosynthetics for Roadways

- C. Submittals:** Asphalt mix design, concrete mix design, seed mixture.

#### 41.2 MATERIALS (Not specified)

#### 41.3 CONSTRUCTION REQUIREMENTS

- A. Sub Grade Preparation:** Contractor shall not resurface the trench until all density tests have been met and the Engineer gives approval.

The subgrade shall be brought to proper grade elevation, for the specified depth of surfacing to be placed. The subgrade surface shall be smooth and level, with no loose material.

**B. Resurfacing:**

- 1. Saw Cut of Pavement Edges:** The first pavement saw cuts shall be, at a minimum, the same width as the minimum trench width centered over the utility.

- The second saw cut shall be 1 foot outside the disturbed area on each side of the trench (see Section 41 Standard Detail).
2. **Asphalt Street:** The asphalt patch shall be placed to a minimum depth of five (5) inches. If the existing pavement is greater than five (5) inches thick, the patch shall be placed to a depth matching the existing pavement. The asphalt base shall be Class E, Type 1, and/or class E, type II, as approved by the Engineer. The asphalt patching shall be in accordance with Sections 31 and 32.
  3. **Cold Mix Asphalt:** A temporary asphalt patch shall be placed when hot asphalt is not available and/or the Engineer gives approval. The Contractor shall be responsible for maintenance of the temporary patch at no extra cost to the City. The depth of the temporary patch shall be a minimum of five (5) inches. The cold mix shall be in accordance with Section 39.
  4. **Concrete Street with Asphalt Overlay:** After saw cutting per specifications, the concrete base patch shall be poured to the depth of the existing concrete. The concrete shall be allowed to attain a compressive strength of 4000 psi, or the Engineer has given approval, before the asphalt overlay can be accomplished. The asphalt overlay shall be Class E, Type I and/or Class E, type II as approved by the Engineer. The concrete and asphalt patch shall be in accordance with Sections 31, 32, and 40.
  5. **Concrete Street:** After saw cutting as per specifications, the concrete pavement patch shall be installed in accordance with Section 40.3T. The pavement patch shall not be opened to traffic until the concrete has attained a compressive strength of 4000 psi. The concrete patch shall be in accordance with Section 40.
  6. **Gravel Resurfacing:** The gravel shall be placed to a thickness equal to the in-place gravel thickness or five (5) inches, whichever is greater, or as approved by the Engineer. The gravel surface material and placement shall be in accordance with Section 20 and Section 117.
  7. **Seeding:** The area to be seeded shall be as specified on the plans and specifications and/or by the Engineer. The seeding shall be in accordance with Section 70.
  8. **Sodding:** The area to be sodded shall be as specified on the plans and specifications and/or by the Engineer. The sodding shall be in accordance with Section 73.
  9. **Geotextile or Geogrid:** If Engineering fabric is encountered during excavation, the Contractor shall immediately notify the Engineer. Damaged fabric shall be repaired as shown on the appropriate standard detail or as directed by the Engineer. Fabric removal and replacement shall be per Section 11. Final saw cuts shall be as specified in this section. Also see Section 202 Geosynthetics for Roadways.

**10. Under-Drains:** If subsurface or edge drains are encountered during excavation, the Contractor shall immediately notify the Engineer. Subsurface or edge drains shall be repaired as shown on the appropriate standard detail or as directed by the Engineer. Repair of under-drains shall be per Section 11. Final saw cuts shall be as specified in this section. Also see Section 64 Under-Drains.

**41.4 METHOD OF MEASUREMENT**

All trench resurfacing shall be measured for in accordance with the respective section.

**41.5 BASIS OF PAYMENT**

All trench resurfacing shall be paid for in accordance with the respective section.

**END OF SECTION**

## SECTION 92

### TEMPORARY TRAFFIC CONTROL

#### 92.1 DESCRIPTION

**A. General:** This work consists of furnishing, installing, and maintaining required temporary traffic control devices in accordance with the current edition of the Federal Manual on Uniform Traffic Control Devices (MUTCD).

**B. Related Work:**

Section 90	Roadway Signs and Delineators
Section 91	Pavement Marking
Section 93	Traffic Signals and Roadway Lighting
Section 203	Submittals

#### 92.2 MATERIALS

Traffic and traffic control devices shall conform to and be maintained in accordance with the requirements of Part 6 of the MUTCD. Pavement Markings used for Temporary Traffic Control shall be per section 91.

Traffic control devices are categorized by their intended use and certification requirements.

- Category I traffic control devices are lightweight devices which may be self-certified by the manufacturer including, but not limited to; cones, drums, and delineators.
- Category II traffic control devices are other lightweight devices which must be certified by individual crash testing including, but not limited to; portable signs and barricades.
- Category III traffic control devices are fixed or other massive devices which must be certified by individual crash testing including, but not limited to; breakaway sign supports, concrete barriers, concrete barrier end protection, crash cushions, truck mounted attenuators, and longitudinal barriers.
- Category IV traffic control devices are trailer mounted devices which are not required to be individually crash tested including, but not limited to; portable changeable message signs, arrow boards, portable temporary traffic signals, and work area lighting.

Category I, II, and III traffic control devices shall meet the crashworthy requirements of AASHTO Manual for Assessing Safety Hardware (MASH). Category IV traffic control devices shall be delineated with retroreflective traffic control devices.

The Contractor shall provide documentation for all traffic control devices used when requested by the Engineer or as indicated in project documents. The documentation shall show the traffic control devices used meet the applicable MASH requirements.

Temporary traffic control devices, including signs, drums, cones, tubular markers, barricades, vertical panels, and direction indicator barricades shall be reflectorized with sheeting applied to a satisfactory backing. All fluorescent orange background material on traffic control signs, all temporary delineators, and all temporary STOP (R1-1), YIELD (R1-2), DO NOT ENTER (R5-1), and WRONG WAY (R5-1a) signs will conform to the requirements of ASTM D4956 Type IX or XI. All other traffic control signs and background colors will conform to the requirements of ASTM D4956 Type IV. For barricades, vertical panels, and direction indicator barricades; the reflective sheeting shall meet or exceed the standards of Type IV as defined by ASTM D4956. Round surfaced temporary traffic control devices including, but not limited to; drums, cones, and tubular markers shall be reflectorized with reflectorized sheeting meeting or exceeding the standards of Type IV as defined by ASTM D4956. All orange colored material shall be fluorescent.

#### **A. Fabrication:**

1. **Background Color:** Shall be as specified in Part 6 of the MUTCD.
2. **Legend:** Message and borders shall be non-removable copy of the color specified in Part 6 of the MUTCD. The non-removable copy may be screened processed or direct applied. Mounting holes will not be drilled or punched in any part of the non-removable copy.
  - a) **Screened Process:** Message borders shall be processed on reflective sheeting using mechanical equipment, materials, and operational methods and procedures as prescribed by the manufacturer. Processing shall be accomplished by the direct or reverse screen method using opaque or transparent processing material. Screening may be accomplished either before or after application of the sheeting to the base panels. Free hand painting will not be permitted on any part of the finished sign face.
  - b) **Direct Applied:** Cut out message and borders shall be reflective sheeting or opaque lettering film applied directly to clean, dust free, reflective sheeting background. Message and borders shall be in accordance with the operational methods and procedures prescribed by the sheeting manufacturer. The finished letters, numerals, symbols, and borders shall be cut with smooth, regular outline, and free from ragged or torn edges.

#### **B. Traffic Control Device Standards:**

1. **Warning Lights:** Shall be portable with lens directed enclosed lights. The lens of the unit shall not be less than seven (7) inches in diameter and shall be amber in color. They may be used in either the steady burn or flashing mode. Warning lights shall be in accordance with the requirements of Equipment and Materials Standards of the Institute of Transportation Engineers (ITE) Publication No. ST 017, Purchase Specification for Flashing and Steady-Burn Warning Lights. The lights shall be certified by the manufacturer.

The use of the warning lights shall be in accordance with Part 6 of the MUTCD.

2. **Channelizing Devices:** Channelizing devices, including cones, barricades, tubular markers, vertical panels, directional indicator barricades, and drums shall conform to the requirements of Part 6 of the MUTCD. Drums shall be of a two-part construction with breakaway bases. Cones shall be a minimum of 42 inches in height.
3. **Temporary Sign Supports:** Construction sign supports shall meet the crashworthy requirements of AASHTO Manual for Assessing Safety Hardware (MASH) and shall conform to the height requirements of the MUTCD. Temporary sign support shall be allowed up to 72 hours, or as directed by the Engineer.
4. **Pilot Car:** Shall be a passenger car, multipurpose passenger vehicle, or pickup truck.
5. **Temporary Pavement Marking Tape:** Types I and II, shall conform to the requirements of ASTM D4592. The film, without adhesive, shall have a minimum thickness of 39 mils.
6. **Temporary Raised Pavement Markers:** Shall consist of a yellow or white plastic body providing a horizontal width and length of approximately four (4) inches in both dimensions and approximately 3/4 inch high.

The adhesive shall be resistant to the effects of weather and capable of retaining the marker in position during the time it is required to function.

The markers shall consist of a methyl methacrylate, polycarbonate, polystyrene, or suitably compounded acrylonitrile butadiene (ABS) shell fitted with retroreflective lenses. The exterior surface shall be smooth.

The marker reflector shall have a minimum coefficient of (retroreflected) luminous intensity conforming to Table 1.

7. **Flexible Vertical Markers (Tabs):** Shall consist of a yellow or white plastic body providing a horizontal width of approximately four (4) inches and approximately two (2) inches high.

A strip of retroreflective tape 1/4 inch minimum width shall be bonded horizontally along the top of the vertical area.

The adhesive shall be resistant to the effects of weather and capable of retaining the marker in position during the time it is required to function.

The marker reflector shall have a minimum coefficient of (retroreflected) luminous intensity conforming to Table 1.

**Table 1**  
**Minimum Coefficient of (Retroreflected) Luminous Intensity in**  
**Millicandelas per lux or (Candelas per footcandle)**

Observation Angle in Radians (Degrees)	Entrance Angle in Radians (Degrees)	Luminous Intensity for Each Color in Millicandelas per lux (Candelas per footcandle)		
		White	Yellow	Red
0.0035 (0.2°)	0.0 (0°)	279 (3.0)	167 (1.8)	70 (0.75)
0.0035 (0.2°)	0.349 (20°)	112 (1.2)	67 (0.72)	28 (0.3)

Note: The retroreflective tape shall be acrylic backed metalized polycarbonate microprism film, molded methyl methacrylate, or approved equal.

## 92.2 CONSTRUCTION REQUIREMENTS

**A. General:** The Contractor shall furnish, install, and maintain required traffic control devices and pavement marking material.

1. All traffic control devices shall be kept in proper position, clean, and legible at all times. Damaged devices shall be replaced within 24 hours, or as directed by the Engineer.
2. Non-applicable traffic control devices shall be completely covered or removed during periods of inactivity.
3. Traffic control devices shall be immediately removed or covered when the need for such devices no longer exists. When devices are no longer needed, they should be stored off the project or as close to the right-of-way line as possible.
4. Vehicles and equipment shall be stored outside the roadway and clear zone and as near as possible to the right-of-way line. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work site in a minimum number of vehicles necessary to perform the work.
5. Traffic approaching the project from intersecting roadways, streets, and approaches must be adequately accommodated. Major intersections and large commercial entrances may require additional signing, flaggers, temporary signals, and channelizing devices on a temporary basis until work activities pass these areas.
6. Unless otherwise stated, hours of darkness are defined as 1/2 hour after sunset until 1/2 hour before sunrise.

**B. Apparel:** All workers within the right of way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment

within the work area shall wear high-visibility safety apparel intended to provide conspicuity during both daytime and nighttime usage, and meeting the Performance Class 2 or 3 requirements of the ANSI/ISEA 107 publication entitled “American National Standard for High- Visibility Safety Apparel and Headwear” or equivalent revisions.

Workers shall wear a vest, shirt, or jacket as an outer garment with a background color of fluorescent yellow-green, fluorescent orange-red, or fluorescent red. The retro-reflectorized portion of the material shall be orange, yellow, white, yellow-green, or silver.

- C. Flagging:** Standards for flaggers and flagging practices shall conform to Part 6 of the MUTCD and the flagger manual.

Flagger workstations shall be illuminated during hours of darkness. Flagger workstations shall be illuminated with a minimum of 108 lux (10 foot candles) of illumination. The Contractor shall perform a drive-through after dark to check for glare from the driver’s perspective and make adjustments as necessary to eliminate or reduce the glare to the satisfaction of the Engineer.

Flaggers shall be equipped with a STOP/SLOW sign for the control of traffic. The sign should be mounted on a staff from five (5) to seven (7) feet long, from the bottom of the sign to the ground. All flagging devices and the use of such devices shall comply with Part 6 of the MUTCD, unless otherwise specified.

- D. Pilot Car:** Pilot cars and pilot car practices shall conform to Part 6 of the MUTCD.

**E. Traffic Control, Miscellaneous:**

- 1. Channelizing Devices:** Shall be reasonably plumb to the pavement, safely and neatly ballasted as needed, clearly visible, and legible.

Additional requirements for the use of specific channelizing devices are as follows:

- a) **Cones:** Minimum cone height shall be 28-inches and reflectorized.
- b) **Barricades:**
  - 1) **Type 1 Barricades:** Shall not be used in roadway.
  - 2) **Type 2 Barricades:** Shall not be used in roadway.
  - 3) **Type 3 Barricades:** Minimum width 72-inches.
- c) **Tubular Markers:** Shall not be used in lane closure tapers.
- d) **Vertical Panels:** No additional requirements.

- e) **Direction Indicator Barricades:** No additional requirements.
  - f) **Drums:** No additional requirements.
2. **Delineators:** Shall conform to Section 90.
  3. **Warning Lights:** When used in conjunction with signs, barriers, and channelizing devices; the warning light shall conform to Part 6 of the MUTCD.

Vehicles and equipment working in traffic or alongside traffic shall be equipped with a flashing amber light visible from all directions at a minimum distance of 1/2 mile. The amber light shall be mounted on the uppermost part of the Contractor's vehicle. Lights must flash at  $75 \pm 15$  flashes per minute. Vehicle flasher/hazard lights are not acceptable.

4. **Shadow Vehicles:** Shall conform to Part 6 of the MUTCD. Shadow vehicles shall be used as specified in the plans and for brooming operations unless otherwise directed. Shadow vehicles shall be a four-wheel motor vehicle with a flashing amber light. No separate payment will be made for shadow vehicles and any signs, warning lights, or other items associated with the shadow vehicles.
5. **Inspection:** The Contractor shall constantly monitor and maintain all traffic control items. The Contractor is responsible for adjustments of traffic control items when traffic conditions change.

The Contractor shall make weekly inspections after dark to verify the overall traffic control system is adequate and all devices are legible at night. This includes detour route signing. The weekly inspections shall begin when the first traffic control sign or device is put into operation and end when the last traffic control sign or device is removed from operation.

The Contractor shall designate an employee whose primary responsibility is the maintenance of traffic and traffic control devices, 24 hours a day, seven (7) days a week. The person so designated must have training and experience in the field of construction traffic control and be knowledgeable about the MUTCD. The employee selected must be approved by the Engineer. The name, phone number, and location of the person(s) shall be provided to the City.

If directed to by the Engineer, said designated person shall submit a weekly written report. The reports shall document the daytime and weekly night time inspections.

- F. **Traffic Control Signs:** Shall conform to Part 6 of the MUTCD and as specified in the plans.

**G. Temporary Traffic Control Signal:** Shall generally consist of all necessary materials and appurtenances needed to control road user movements at an intersection, bridge, or other site.

1. **General:** The Contractor shall furnish, operate, and maintain the temporary traffic control signal. The temporary traffic control signal shall reliably and continuously control traffic for all approaches at the specified location. The temporary traffic control signal system shall meet the requirements of the MUTCD, national and local electrical codes, and these specifications.

Existing signal equipment at the site may be salvaged for use in the temporary traffic control signal. Existing traffic signal equipment used on the project shall be salvaged or returned to original use as indicated in the plans. All materials furnished by the Contractor shall remain the property of the Contractor upon completion of the project.

Signal timing shall be per plans and specifications or as directed by the Engineer. Prior to operating a temporary signal contact City Traffic Operations for inspection and coordination.

The temporary traffic control signal shall display pedestrian indications if the pedestrian indications previously existed, or if it is anticipated pedestrians will utilize the temporary traffic control signalized intersection.

In the event of system failure, the Contractor shall furnish necessary flaggers to safely control traffic until the temporary traffic control signal is operable. The cost of flaggers, signing, and lighting shall be incidental to the contract price for temporary traffic control signal.

The Contractor shall have a qualified individual responsible for setup and maintenance of the temporary traffic control signal. This person shall have received training on installation, setup, and maintenance of the system.

Traffic signal operation or maintenance work is required to be performed by the Contractor when project conditions dictate, lane closures change, traffic flow is impeded, a potential risk to the public exists, or when equipment breaks down or malfunctions. Equipment break downs or malfunctions require a high priority response and are to be reacted to within one hour of notification of the event.

2. **Temporary Traffic Control Signal Equipment:** Except as required in this section, all traffic signal equipment and materials will meet the requirements of Section 93.

a) **Short Term Temporary Traffic Control Signal:** Shall consist of signal heads mounted on span wire supports.

- b) Portable Temporary Traffic Control Signal:** Shall consist of signal heads, controller, and power supply, all mounted on a heavy duty trailer.

One of the signal heads shall be mounted a minimum of 17 feet and a maximum of 19 feet above the roadway surface on the mast arm. The other signal head shall be mounted at least eight (8) feet but not more than 15 feet above the roadway surface.

The signal heads shall have the ability to be rotated 180 degrees to face in either direction. The signal heads shall also have the ability to be rotated in the vertical or horizontal plane so as to have the optimum visibility to the motorist. Signals shall be located so as to meet the visibility requirements of the MUTCD.

The portable temporary traffic control signal shall be equipped with work zone safety lights located on the back side of the signal heads to alert construction workers of the status of the traffic signal.

- 3. Temporary Traffic Control Signal Support:** The support system, with traffic signal heads, shall be designed in accordance with the current edition of the AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals. The design wind velocity shall be 90 mph. The Contractor shall complete tree trimming, as necessary.

- a) Short Term Temporary Traffic Control Signal:** The Contractor shall furnish and install span wire supports. Guy wire anchors shall be used as design requires. The Contractor shall determine the size of span support wire, span tether wire, pole type, and guy wire required.

Design and check design calculations for the span wire and support system (span wire, tether wire, poles, arms, connections, guy wires, and anchors, footings, anchor bolts, etc.) shall be signed and sealed by a Professional Engineer registered in the state of South Dakota and shall be submitted with shop drawings.

- b) Portable Temporary Traffic Control Signal:** Shall be designed to support the signal heads required.

Signal supports should be located as far as practical from the edge of the traveled way without adversely affecting the visibility of signal indications. Temporary signal trailers are not to be parked in areas or lanes open to traffic.

The Contractor shall adjust the traffic signals as necessary for the various phases of the work and traffic conditions to meet MUTCD criteria for sight distances, sight triangles, and lateral distances. This includes the relocation or realignment of traffic signal indications as project conditions require.

**4. Power:**

- a) **Short Term Temporary Traffic Control Signal:** The Contractor shall provide power to the temporary traffic control signal system. The monthly fee for power used by the short term temporary traffic control signal system shall be paid for by the Contractor.
- b) **Portable Temporary Traffic Control Signal:** The power source for the unit shall be one of the following: an engine generator unit, a solar powered unit, or a 110 volt AC power source. Solar powered units shall have a solar array charging system capable of operating without external charge for a minimum of 20 days during all seasons. The system shall monitor alternator or charging system and battery voltage. The master trailer (controller) shall monitor all functions of remote trailers and display all conditions. The remote trailers shall also provide the status of all functions for that particular remote trailer. If a low power condition occurs, the controller software shall automatically switch the trailer to a minimum power mode to preserve battery power. The Contractor shall be responsible for providing backup power if the main power source fails. The backup power supply shall be able to operate the traffic signals for a minimum of 48 hours.

**5. Controller:** Shall be capable of operating pre-timed, actuated, and by manual control.

- a) **Short Term Temporary Traffic Control Signal:** Shall operate from a controller at the site. The controller and the controller cabinet shall meet the requirements of Section 93 with the following deviations:
  - 1) Battery backup is not required.
  - 2) The controller cabinet shall be a NEMA Type M enclosure capable of pole mounting with cable conduit opening(s) in the center bottom.
- b) **Portable Temporary Traffic Control Signal:** Shall operate from one master controller at a given site. The second controller or additional slave units shall be controlled by the master unit.

The controller shall have an operating temperature range from -40 to +120°F.

- 6. Vehicle Detection:** The system shall be capable of video, loop, microwave, or radar detection. Contractor may use existing detectors per plans and shall provide temporary detectors in the event existing detectors are unusable.
- 7. Traffic Signal Programming:** The Contractor shall program the controllers with the traffic signal programming that is provided in the project plans. Should the project plans not specify a traffic signal program, the City shall provide the traffic signal programming in writing. As project conditions and traffic needs change, the

Contractor will adjust the traffic signal splits and offsets as directed by the Engineer.

- H. Arrow Boards:** On roads with normal posted speeds of 45 mph and above, Type C units shall be used for all operations 24 hours or more in duration and Type B units may be used for operations less than 24 hours in duration. On roads with normal posted speeds less than 45 mph, Type A, B, or C, units may be used for all operations.

Type A: 48 inches x 24 inches, visible for a minimum of  $\frac{1}{2}$  mile

Type B: 60 inches x 30 inches, visible for a minimum of  $\frac{3}{4}$  mile

Type C: 98 inches x 48 inches, visible for a minimum of 1 mile

- I. Portable Changeable Message Signs:** Shall conform to Part 6 of the MUTCD except the minimum mounting height may be lowered, as approved by the Engineer. The Contractor shall furnish, place, operate, and maintain the Portable Changeable Message Signs (PCMS) at the locations shown on the plans.

**J. Temporary Pavement Marking:**

1. **General:** Temporary pavement markings shall be maintained in good condition until the permanent pavement marking is in place, or until approved by the Engineer.
2. All roadways open to traffic (including, but not limited to, newly paved surfaces, cold milled surfaces, asphalt surface treatments, flush seals, fog seals, and tack coats) shall have temporary centerline markings, lane lines, and lane use markings placed according to plans and MUTCD part 6 prior to nightfall.

Unless otherwise shown on the plans, centerline and the applicable lane lines may be temporarily marked by temporary pavement marking tape, temporary raised pavement markers, temporary flexible vertical markers (tabs), or temporary pavement marking paint.

The Contractor shall take the steps necessary to ensure the temporary markings on the final surface will match the markings on the existing surface.

3. **Materials for Temporary Pavement Marking:** Temporary pavement marking tape, temporary raised pavement markers, temporary flexible vertical markers (tabs), and temporary pavement marking paint shall be of the type specified and shall meet the following requirements.
  - a) **Temporary Pavement Marking Tape:** Shall be applied according to the manufacturer's recommendations.
  - b) **Temporary Raised Pavement Markers:** Shall be applied according to the manufacturer's recommendations. Four (4) inch wide reflectorized markers may be used in place of tape or paint.

- c) **Temporary Flexible Vertical Markers (Tabs):** Shall be applied according to the manufacturer's recommendations. Four (4) inch wide reflectorized markers may be used in place of tape or paint.
- d) **Temporary Pavement Marking Paint:** Shall be applied in accordance with Section 91.
- e) **Removal of Pavement Markings:** Shall be designated by the Engineer.

Pavement markings shall be removed from the pavement by methods that do not damage the surface or texture of the pavement. Pavement markings shall be removed before the traffic pattern is changed.

Covering the markings is not acceptable removal.

Sand or other material used for removal shall be disposed of as the work progresses. Accumulations of sand or other material, which interferes with drainage or constitutes a hazard to traffic, will not be permitted.

When sand blasting is used for removal of pavement markings or objectionable material, and the removal operation is performed within 10 feet of a lane occupied by the traveling public, the residue including dust, shall be removed immediately by a vacuum attachment operating concurrently with the sand blasting operation.

Damage to the pavement surface caused by pavement marking removal shall be repaired at the expense of the Contractor.

### 92.3 METHOD OF MEASUREMENT

- A. **Traffic Control, Lump Sum:** If traffic Control, Lump Sum bid item is utilized, field measurement for traffic control will not be measured.
- B. **Flagging:** Will be measured to the nearest 0.5 hour a flagger is performing flagging work. A record of the number of flagger hours used will be submitted to the Engineer.
- C. **Pilot Car:** Will be measured to the nearest 0.5 hour a pilot car is performing pilot car work. A record of the number of pilot car hours used will be submitted to the Engineer.
- D. **Traffic Control, Miscellaneous:** Will not be made.
- E. **Type 3 Barricades:** Type 3 barricades, of the type and length specified, will be measured per each used on the project. Measurement for Type 3 barricades will be made one time even if the Type 3 barricades are moved or replaced. The number of Type 3 barricades measured will be the greatest number of installations in place at

any one time, regardless of the number of setups throughout the duration of the project.

- F. Flexible Delineators:** Will be measure per each used on the project.
- G. Traffic Control Signs:** Will be measured to the nearest 0.1 foot and the area computed to the nearest 0.1 square foot of the sign face. Deduction will not be made for rounded corners. Measurement for traffic control signs will be made one time even if the traffic control signs are moved or replaced. The amount of traffic control signs measured will be the greatest number of installations in place at any one time, regardless of the number of setups throughout the duration of the project.
- H. Temporary Traffic Control Signal:**
  - 1. Short Term Temporary Traffic Control Signal:** Will be made on a per site basis. One site will be considered to be all signals, overhead span wires, support poles, and other equipment in use at an intersection.
  - 2. Portable Temporary Traffic Control Signal:** Will be made on a per each basis. One unit will be considered to be a portable traffic control signal mounted on a trailer.
- I. Arrow Board:** Will be measured on a per each basis of the total number of arrow boards used on the project. Measurement for arrow boards will be made one time even if the arrow boards are moved or replaced. The amount of arrow boards measured will be the greatest number of arrow boards on the project at any one time, regardless of the number of setups throughout the duration of the project.
- J. Portable Changeable Message Sign:** Will be measured on a per each basis of the total number of portable changeable message signs used on the project. Measurement for portable changeable message signs will be made one time even if the portable changeable message signs are moved or replaced. The amount of portable changeable message signs will be the greatest number of portable changeable message signs on the project at any one time, regardless of the number of setups throughout the duration of the project.
- K. Temporary Pavement Marking:** Measurement for tape and paint will be made the linear foot of tape or paint. Tabs, and raised pavement markers will be measured by the each.
- L. Remove Pavement Marking:** Will not be made. The plan quantity will be used for payment unless additional pavement marking removal is ordered by the Engineer.

#### 92.4 BASIS OF PAYMENT

- A. Traffic Control, Lump Sum:** If traffic Control, Lump Sum bid item is utilized, field measurement for traffic control will not me measured. Payment will be full compensation for installation, maintenance, relocation, and removal of the traffic

control devices. Based on the lump sum contract price for Traffic Control, partial payments will be considered based on the following schedule:

<u>Milestone</u>	<u>Payment Amount</u>
Necessary signs furnished to site	50% of bid item amount
40% of original contract amount earned	75% of bid item amount
Project completion	100% of bid item amount

- B. Flagging:** Will include all costs for provided certified flagger, stop/slow paddle, flag, and any nighttime illumination required. The accepted number of flagging hours will be paid at the contract unit price.
- C. Pilot Car:** Will be paid for at the contract unit price.
- D. Traffic Control, Miscellaneous:** Will include all costs for installation, maintenance, and removal of all cones; Type 1 and Type 2 barricades; tubular markers; vertical panels; direction indicator barricades; drums; flashing warning lights; and flags on signs; temporary pedestrian access route. Payment will include all costs for removing and covering non-applicable traffic control devices, shadow vehicles, traffic control inspections, reporting for traffic control inspections, and the designated traffic control contact person.
- E. Type 3 Barricades:** Will include all cost for installation, maintenance, and removal.
- F. Flexible Delineators:** Will include all cost for installation, maintenance, and removal.
- G. Traffic Control Signs:** Will be paid for by the square foot. Payment for traffic control signs will be made following satisfactory installation. Payment will be full compensation for installing, maintaining, relocating, and removing traffic control signs and supports. Hinged signs and signs with tabs, such as right and left signs, will be paid for as one sign. Costs for posts and supports shall be included in the contract unit price of the sign.

Additional payment will not be made for any traffic control sign turned away, covered, or temporarily taken out of service and returned to service. If a fixed location traffic control sign is relocated due to an error in the plans or as directed by the Engineer, an additional 50% of the designated sign rate will be paid.

The Contractor's failure to maintain, relocate, or remove traffic control signs and supports as required will result in a price adjustment assessed to the contract.

**H. Temporary Traffic Control Signal:**

- 1. Short Term Temporary Traffic Control Signal:** Will be paid for at the contract unit price per each site. Payment will be full compensation for furnishing, installing, maintaining, tree trimming, and all other incidentals for the short term

- temporary traffic control signal, which may include using existing controller, signal heads, and detectors or providing new as designated in the plans.
- 2. Portable Temporary Traffic Control Signal:** Will be paid for at the contract unit price per each unit. Payment will be full compensation for furnishing, installing, maintaining, relocating, tree trimming, and all other incidentals for the portable temporary traffic control signal.
  - I. Arrow Board:** Will be paid for at the contract unit price per each. Payment will be full compensation for labor, equipment, materials, delivery, installation, maintenance, relocation, and removal.
  - J. Portable Changeable Message Sign:** Will be paid for at the contract unit price per each. Payment will be full compensation for labor, equipment, materials, delivery, installation, maintenance, relocation, and removal.
  - K. Temporary Pavement Marking:** Will be by the linear foot for paint and tape, and per each for tabs and raised pavement markings. Payment will be full compensation for all costs to furnish, install, and remove (when required) temporary pavement markings including costs to remove and properly dispose of temporary road marker covers, temporary road markers, and temporary pavement marking tape.
  - L. Remove Pavement Marking:** Will be by the foot, each, word, or square foot depending on the bid item unit description. Payment will be full compensation for all costs to remove and properly dispose of the pavement markings.

**END OF SECTION**