

**CITY OF SPRINGDALE  
CAPITAL IMPROVEMENTS PROGRAM**



**STANDARD SPECIFICATIONS  
FOR  
STREET AND DRAINAGE CONSTRUCTION**

Version 4  
November 2005

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## DIVISION 100. GENERAL PROVISIONS

### Section 101. Definitions and Terms

**101.01 Abbreviations and Definitions.** Whenever the following abbreviations are used in these specifications or on the plans, they are to be construed the same as the respective expressions represented:

**(a) Industry Abbreviations.**

ACI	American Concrete Institute
AASHTO	American Association of State Highway and Transportation Officials
ADPCE	Arkansas Department of Pollution Control and Ecology
AGC	Associated General Contractors of America
AHTD	Arkansas State Highway and Transportation Department
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ARA	American Railway Association
AREA	American Railway Engineering Association
ARTBA	American Road and Transportation Builders Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
ATSSA	American Traffic Safety Service Association
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
CoE	U.S. Army Corps of Engineers
CRSI	Concrete Reinforcing Steel Institute
FHWA	Federal Highway Administration
FSS	Federal Specifications and Standards, General
ITE	Institute of Traffic Engineers
MIL	Military Specifications
MUTCD	Manual on Uniform Traffic Control Devices for Streets and Highways
NEMA	National Electrical Manufacturers Association
OSHA	Occupational Safety and Health Administration
SAE	Society of Automotive Engineers
SSPC	Steel Structures Painting Council
UL	Underwriter's Laboratory
USC	United States Code

**(b) Contract Abbreviations for Construction Work**

AC	Asphalt Cement	ACHM	Asphalt Concrete Hot Mix
ACTD	Actuated	ADJ	Adjusted
AGG	Aggregate(s)	ALUM	Aluminum
APPL	Application	APPR	Approach
ASPH	Asphalt	ASSY	Assembly
AST	Asphalt Surface Treatment	AUTO	Automatic
BIND	Binder	BIT	Bituminous
BLDG	Building(s)	BLDG	Building(s)
BLKT	Blanket	BNG(S)	Bearing(s)
BR	Bridge(s)	BST	Bituminous Surface Treatment
C & G	Curb and Gutter	CA	Corrugated Aluminum
cc	cubic centimeter(s)	CD	Compacted Depth
CEM	Cement	CL	Class
CLVT(S)	Culvert(s)	CM	Corrugated Metal
CMBN	Combination	CNTL	Control, Controller
COMP	Compaction, Controller	CONC	Concrete
CONT	Continuous, Continuously	CONST	Construction
CRS	Course(s)	CORR	Corrugated
CTD	Coated	CR	Crushed
DBL	Double	CS	Corrugated Steel
DWY(S)	Driveway(s)	CU,cu	Cubic
EMUL	Emulsified	DI	Drop Inlet(s)
EXC	Excavation	EWK	Earthwork
F & I	Furnish and Install	EXP	Expansion
FES	Flared End Section(s)	FDN	Foundation
FURN	Furnish, Furnishing	FNC	Fence(s)
GA	Gage, Gauge	GALV	Galvanized
GR	Grade, Graded	GRVL	Gravel
ha	hectare(s)	HI	High Intensity
HM	Hot Mix	HMA	Hot Mix Asphalt
HMAS	Hot Mix Asphalt Stabilized		
INST	Install, Installing, Installation		
j	joule(s)		
kg	kilogram(s)	kL	kilometer(s)
km/h	kilometers per hour	KPa	kilopascal(s)
L	liter(s)	LAB	Laboratory
m	meter(s)	mm	millimeter(s)
MA	Mineral Aggregate	MAINT	Maintenance
MATL	Material(s)	MES	Mitered End Section(s)
MET	Metal	MG	1000 Gallons
MIN	Mineral	MOB	Mobilization
MOD	Modified	MPa	MegaPascal(s)

## Standard Specifications

MRK	Marking(s)	msta	metric station
mton	1000 kilograms		
NO	Number(s)	NON MET	Non-Metallic
NON REINF	Non-Reinforced	NPDES	National Pollutant Discharge Elimination System
OCT	Octagonal	OFF	Office
Pa	Pascal(s)	PC	Portland Cement
PIL	Piles, Piling	PM	Plant Mixed
ppm	parts per million	PRCST	Precast
PRFMD	Preformed	PROC	Process, Processing
PVC	Polyvinylchloride	PVMT	Pavements(s)
PVNG	Paving		
QPL	Qualified Products List	QUAD	Quadruple
QUINT	Quintuple		
R & D	Removal and Disposal	RC	Reinforced Concrete
RDWY	Roadway(s)	RECOMP	Recompact(ed), Recompaction
RECON	Reconstruct(ed)		
REFL	Reflectorized	REHAB	Rehabilitate, Rehabilitation
RELOC	Relocate, Relocation	REMV	Removal, Removing, Removed
RELP	Replace, Replacing		
RESTOR	Restoration	RESTEEL	Reinforcing Steel
RMC	Rigid Metallic Conduit	RNMC	Rigid Non-Metallic Conduit
SCAR	Scarify, Scarifying	SGNL(S)	Signal(s)
SHLD(S)	Shoulder(s)	SPEC	Special
sq	Square	Sta	Station (100 feet)
STAB	Stabilized, Stabilization	STKPL	Stockpile, Stockpiling
STL	Steel	STN	Stone
STR(S)	Structure(s)	STRL	Structural
SURF	Surface, Surfacing	SWPPP	Storm Water Pollution Prevention Plan
SYS	System, Systems		
TEMP	Temporary	TERM	Terminal
THERMPL	Thermoplastic	TMBR	Timber
TRAF	Traffic	TRPL	Triple
TRMT	Treatment	TRTD	Treated
TY	Type		
UNCL	Unclassified	UNTRTD	Untreated
UT	Uniform Thickness	VAR	Variable
VEH	Vehicle(s)		
µm	micrometer ( 1 x 10 <sup>-6</sup> m )		

## City of Springdale

**(C) Definitions.** Whenever in these specifications or in other contract documents the following terms, or pronouns in place of them, are used, the intent and meaning shall be interpreted as follows:

**Addenda.** Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

**Advertisement.** The public announcement, as required by law, inviting bids for work to be performed or materials to be furnished.

**AHTD Standard Specifications.** The Standard Specifications for HIGHWAY CONSTRUCTION, Arkansas State Highway and Transportation Department, Edition of 2003 or latest version, unless version date indicated otherwise.

**Agreement.** The written agreement between Owner and Contractor covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein. The terms Agreement and Contract are used interchangeably.

**Award.** The acceptance by the City of a proposal.

**Bid.** The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed. The terms Bid and Proposal are used interchangeably.

**Bid Bond.** The security furnished with a bid to guarantee that the bidder will enter into the Contract if the bid is accepted.

**Bidder.** An individual, partnership, corporation or joint venture submitting a bid for the advertised work. (The terms “Bidder” and “Contractor” are frequently used synonymously.)

**Bid Proposal Form.** The approved form on which the Owner requires bids to be prepared and submitted for the work.

**Business Day.** Any calendar day except Saturdays, Sundays, and City recognized holidays. If a holiday falls on Saturday or Sunday, the observed day shall be the Friday preceding the Saturday or the Monday following the Sunday.

**Calendar Day.** Any day shown on the calendar, beginning and ending at midnight. If a day is not identified by any other modifier, it shall be considered a calendar day.

**Change Order.** A written order issued by the Owner to the Contractor, covering changes in the plans or quantities or both, 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 Springdale, Arkansas, including authorized representatives.

**City Engineer.** An Engineer employed by the City responsible for construction administration and inspection of projects for which the City is the Owner.

**Construction Field Change.** A written order issued by the Owner covering minor changes in the work, but which does not involve a change in the Contract Price or the Contract Time.

**Contract.** The written agreement between the City and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the work, the furnishing of labor and materials, and the basis of payment. (The Contract includes the contract form; the contract schedule of prices; the payment and performance bonds; specifications, supplemental specification, and special provisions; general and detailed plans; and any change orders and agreements that are required to complete the construction of the work in an acceptable manner, including authorized extensions thereof, all of which constitute one instrument.)

**Contract Documents.** The Contract Documents includes the executed Agreement; Addenda (which pertain to the Contract Documents); Advertisement for Bids; Information for Bidders, Contractor's Bid (including documentation accompanying the Bid and any Post-Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement; List of proposed Subcontractors; the Bonds; the Specifications; Special Provisions, Supplementary Conditions, Certificates of Insurance; the Plans (Drawings) as the same are more specifically identified in the Agreement; together with all written modifications, Change Orders and Engineer's written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics and the like that may be furnished by Owner to Contractor are not Contract Documents.

**Contract Item (Pay Item).** A specifically described unit of work for which a price is provided in the Contract.

**Contract Time.** The number of working days allowed for completion of the Contract. If a fixed date of completion is shown in the proposal, the Contract shall be completed by that calendar date.

**Contractor.** The individual, partnership, corporation, or any combination thereof, or joint venture contraction with the City for the prescribed work. (The terms "Contractor" and "Bidder" are frequently used synonymously.)

**Culvert.** Any structure not classified as a bridge that provides an opening under the roadway.

**Defective.** An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, test or approval referred to in the Contract Documents, or has been damaged prior to final payment.

**Effective Date of Agreement.** The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

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**Engineer.** The Engineer of record, acting directly or through duly authorized representatives, whose engineering seal appears on the plans and specifications.

**Equipment.** All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and tools and apparatus necessary for the proper construction and acceptable completion of the work.

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

**Extra Work Order.** A change order concerning the performance of work or furnishing of materials involving extra work. (Such extra work may be performed at agreed prices or on a force account basis as provided elsewhere in these specifications.)

**Holidays.** The City observes the following legal holidays: New Year's Day, January 1; Memorial Day, last Monday in May; Independence Day, July 4; Labor Day, 1<sup>st</sup> Monday in September; Veteran's Day, November 11; Thanksgiving Day and the following day, 4<sup>th</sup> Thursday and Friday in November; Christmas Eve, December 24; and Christmas Day, December 25. If a holiday falls on Saturday or Sunday, the observed day shall be the Friday preceding the Saturday or the Monday following the Sunday.

**Incidental item.** Work shown on the plans but for which there is no bid item included. This work shall not be paid for separately; rather the cost of the work is considered to be included in the contract amount bid for the project.

**Inspector.** The City's authorized representative assigned to make detailed inspections of Contract performance.

**Laboratory.** The Quality Control Testing Laboratory of the City or any other testing laboratory that may be designated by the City.

**Materials.** Any substances specified for use in the construction of the project and its appurtenances.

**Milestone.** A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work for which liquidated damages may or may not apply.

**Notice of Award.** The written notice by Owner to the apparent successful Bidder stating that upon timely compliance by the apparent successful Bidder with the conditions listed therein, Owner will sign and deliver the Agreement.

**Notice to Contractors.** The advertisement for proposals for all work or materials on which bids are required indicating with reasonable accuracy the quantity and location of the work to be done, or the character and quantity of the materials to be furnished; and the time and place of the opening of proposals.

**Notice to Proceed.** A written notice given by Owner to Contractor fixing the date on which the Contract Time will commence to run and on which Contractor shall start to perform his obligation under the Contract Documents. Notice to Proceed is also referred to as Work Order.

**Observer.** The Engineer's or City's designated personnel appointed to observe the Work.

**Owner.** The City of Springdale, Arkansas, and/or the duly authorized agent of the City of Springdale, Arkansas, with whom Contractor has entered in the Agreement and for whom the Work is to be performed.

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

**Payment Bond.** The approved form of security, executed by the Contractor and his/her Surety or Sureties, guaranteeing the payment of all legal debts of the Contractor pertaining to the construction of the project.

**Performance Bond.** The approved form of security, executed by the Contractor and his/her Surety or Sureties, guaranteeing complete performance of the Contract and all supplemental agreements thereto.

**Plans.** The approved plans, profiles, typical cross-sections, working drawing, and supplemental drawings, or exact reproductions thereof, which show the location, character, dimensions, and details of the work to be done. (The Title Sheet of the plans is provided for general information only and is not to be taken as an all-inclusive description of the work. Other work and/or locations may be included in the Project as described by the plans, specifications, supplemental specifications, and special provisions.) The term Drawings and Plans are used interchangeably.

**Profile Grade.** Unless otherwise shown on the plans, the trace of a vertical plane intersecting the top surface of the proposed wearing surface, usually along the longitudinal centerline of the roadbed. (Profile grade means either the elevation or gradient of such trace according to the context.)

**Project.** The specific section of the highway together with all appurtenances and construction to be performed thereon under the Contract.

**Proposal.** The offer of a bidder, on the prescribed form, to perform the work and to furnish the labor and materials at the unit prices quoted.

**Proposal Form.** The approved form on which the City requires bids to be prepared and submitted for the work.

**Proposal Guaranty.** The security furnished with a bid to guarantee that the bidder will enter into the Contract if the bid is accepted.

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**Prospective Bidder.** An individual, partnership, corporation, or joint venture who has requested and been issued a proposal form from the City.

**Qualified Products List.** A list of products that are approved for use in Highway Contracts with the Arkansas State Highway and Transportation Department. The QPL is maintained by AHTD.

**Registered Professional Engineer.** An Engineer registered in the State of Arkansas by the Arkansas State Board of Registration for Professional Engineers and Land Surveyors. All details, drawings, calculations, and reports submitted by the registrant as required by these specifications shall be certified, signed, and stamped with the seal or facsimile thereof as authorized by the Board.

**Registered Professional Land Surveyor.** A Land Surveyor registered in the State of Arkansas by the Arkansas State Board of Registration for Professional Engineers and Land Surveyors. All details, drawings, calculations, and reports submitted by the registrant as required by these specifications shall be certified, signed, and stamped with the seal or facsimile thereof as authorized by the Board.

**Registered Scale Mechanic.** A person registered with the Arkansas Bureau of Standards, Division of Weights and Measures, as being qualified by training and experience to make adjustments and repairs to commercial scales and performs such work as a skilled trade.

**Right-of-Way.** A general term denoting land, property, or interest therein, acquired for or devoted to highway purposes.

**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, or as defined in other sections.

**Shop Drawings.** All drawings, diagrams, illustration, schedules and other data which are specifically prepared by Contractor, Subcontractor, manufacturer, fabricator, supplier or distributor to illustrate some portion of the Work.

**Shoulder.** The portion of the roadway constructed primarily for the use of pedestrians.

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

**Sieve.** U.S.A. Standard Series, as defined in AASHTO M 92. Percent passing or retained is by weight.

**Special Provisions.** Additions and revisions to the standard and supplemental specifications covering conditions peculiar to an individual project.

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

**Standard Specifications.** This printed book of Standard Specifications for Street and Drainage Construction. Unless otherwise noted, the Edition in effect on the date of advertisement.

**Station.** A station when used as a definition or term of measurement will be 100 linear feet measured horizontally.

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

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

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

**Subcontractor.** An individual, firm, or corporation to whom the Contractor sublets part of the work.

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

**Substantial Completion.** A condition upon which the work has progressed to the point that it can be utilized for the purposes intended; as evidenced by a Certificate issued by the Engineer under the authority of the City. If no such certificate is issued, Substantial Completion shall be when the work is complete and ready for final payment.

**Substantial Completion Date.** The time at which the Work has progressed to the point where, in the opinion of the Owner, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it was intended without further disruption to the public or occupants of the facility.

**Substructure.** All of that part of the structure below the bearings of simple and continuous spans, skewbacks of arches and tops of footings of rigid frames, together with the backwalls, wingwalls, and wing protection railings.

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**Superintendent.** The Contractor's authorized representative in responsible charge of the work, present at the work site at all times during the progress to supervise and direct construction, to receive and fulfill instructions from the Owner's representative, and to accept orders for changed and extra work.

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

**Supplemental Agreement.** A written negotiated agreement constituting a modification of the originally executed Contract and covering the performance of work beyond its general scope. (The items of work contained therein will be included in an approved Change Order.)

**Supplemental Specifications.** Revisions to the Standard Specifications that are adopted subsequent to issuance of the printed book of Standard Specifications.

**Surety.** The company, other than the Contractor, executing a bond furnished by the Contractor.

**Titles (Or Headings).** The titles or headings of the sections and subsections herein are intended for convenience of reference and shall not be considered as having any bearing on their interpretation.

**Ton.** 2000 pounds.

**Traveled Way.** The portion of the roadway for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

**Unit Price Work.** Work to be paid for on the basis of unit prices.

**Work.** The furnishing of all materials, labor, equipment, tools, and incidentals necessary or convenient to the successful completion of the project and the carrying out of the duties and obligations imposed by the Contract.

**Working Day.** A calendar day during which normal construction operations could proceed; normally excludes Saturdays, Sundays, and City recognized holidays.

**Working Drawings.** Stress sheets, shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, or any other supplementary plans or similar data that the Contractor is required to submit to the Engineer for informational and record purposes or for approval.

**Work Order.** Written notice from the Engineer directing the Contractor to begin prosecution of the work.

**101.02 Specification Language.** To avoid cumbersome and confusing repetition of expressions in these specifications, it is provided that whenever anything is, or is to be, done, if, as, when, or where "contemplated, required, determined, directed, specified, authorized,

ordered, given, designated, indicated, considered necessary, deemed necessary, permitted, reserved, suspended, established, approval, approved, disapproved, acceptable, unacceptable, suitable, accepted, satisfactory, unsatisfactory, sufficient, insufficient, rejected, or condemned,” it shall be understood as if the expression were followed by the words “by the Engineer/City Engineer” or “to the Engineer/City Engineer”.

## **Section 102. Bidding Requirements and Conditions**

**102.01 Qualifications of Bidders.** The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein.

**102.02 Notice to Contractors.** After the date is fixed for the bid opening for the work, the Owner will give notice of bidding to contractors. The advertisement will contain a description of the proposed work, and information to the bidder regarding access to proposal forms, plans, and specifications, and the amount and nature of the proposal guaranty.

**102.03 Contents of Proposal.** Upon request, the Owner will furnish the prospective bidder with Plans and a Proposal form. The Proposal form will state the location and description of the contemplated construction and will show the estimate of the various quantities and kinds of work to be performed or materials to be furnished, and will have a schedule of items for which unit or lump sum bid prices are invited. The Proposal form will state the time in which the work must be completed, the amount of the proposal guaranty, and the date, time and place of the opening of proposals. The Proposal form will also include any special provisions or requirements that vary from or are not contained in the Standard Specifications.

All papers bound with or attached to the Proposal form are considered a part thereof and shall not be detached or altered when the Proposal is submitted.

The plans, specifications, and other documents designated in the Proposal form will be considered a part of the Proposal whether attached or not.

The prospective bidder will be required to pay the Owner or the Engineer the sum stated in the advertisement for each copy of the Proposal form and each set of plans.

Conditional bids will not be accepted.

**102.04 Rejection of Bid Proposals.** The Owner reserves the right to refuse to award a Contract due to a lack of competency or adequate machinery, plant, other equipment or personnel as revealed by the investigation allowed under Subsection 102.01 “Qualification of Bidders.” In performing the investigation, the Owner may request additional information on and evaluate the following factors:

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- 1) Uncompleted work that, in the judgment of the Owner, might hinder or prevent the prompt completion of additional work if awarded.
- 2) Failure to pay or satisfactorily settle all bills due for labor and material on former contracts in force at the time of issuance of Proposals.
- 3) Misconduct which, in the opinion of the Owner, is of such a serious nature as to adversely affect the ability of the Contractor to perform future work.
- 4) Default under previous contracts.
- 5) Failure to reimburse the Owner for monies owed on any previously awarded contracts including those where the prospective bidder is a party to a joint venture and the joint venture has failed to reimburse the Owner for monies owed.
- 6) Previous failure to execute a Contract and/or submit acceptable bonds for any subsequent advertisement of that project.
- 7) Unsatisfactory performance record as shown by past work for the Owner judged from the standpoint of workmanship and progress.
- 8) If the prospective bidder is the Contractor on a current Contract with the Owner on which Liquidated Damages are being assessed due to failure to complete the work within the Contract time.
- 9) Default under previous contracts.

**102.05 Interpretation of Quantities in Proposal Schedule.** The quantities appearing in the schedule are approximate only and are prepared for the comparison of bids. Payment to the Contractor will be made only for the actual quantities of work performed and accepted or materials furnished in accordance with the Contract. The scheduled quantities of work to be done and materials to be furnished may each be increased, decreased, or omitted as hereinafter provided.

**102.06 Examination of Plans, Specifications, Special Conditions, and the Site.** The Owner will prepare plans and specifications giving such directions as will enable a competent Contractor to carry them out. The bidder is expected to examine carefully the site of the proposed work, the proposal, plans, specifications, supplemental specifications, special conditions, contract forms (including all addenda) before submitting a proposal. The submission of a bid shall be considered prima facie evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the plans, specifications, supplemental specifications, special provisions, and contract. The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect to his bid.

When the Plans or Special Conditions include information pertaining to subsurface exploration, boring logs, soil survey information, or other preliminary investigations, such information was obtained by the Owner for design and estimating purposes only. This and other subsurface investigation information may be available and prospective bidders will be permitted to examine such information upon request. It is expressly understood and agreed that said information does not constitute a part of the Contract and represents only the best knowledge of the Owner as to the location, character, and depth of the materials encountered. This information is only included and made available so that prospective bidders may have access to subsurface information obtained by the Owner and is not intended to be a substitute for personal investigation, interpretation, and judgment of the bidder. The bidder should be cognizant of the possibility that conditions affecting the cost and/or quantities of work to be performed may differ from those indicated.

It is further understood and agreed that each bidder is solely responsible for all assumptions, deductions, or conclusions which he may make or obtain from his/ her examination of the subsurface information furnished by the Owner. The Contractor may not rely upon or make any claim against Owner, Engineer, or Engineer's Consultants with respect to (1) the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by the Contractor and safety precautions and programs incident thereto, (2) other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings, (3) any Contractor interpretation of or conclusion drawn from any data, interpretations, opinions, or information.

**102.07 Preparation of Proposal.** The proposal shall be submitted upon the forms furnished to the prospective bidder by the Owner. The bidder shall specify a unit price in words or figures, or both if required, for each pay item for which a quantity is given and should also show the products of the respective unit prices and quantities written in figures in the column provided for that purpose, and the total amount obtained by adding the amounts of the several items. These extensions and totals as calculated by the bidder are for information only; the total proposal amount will be the true sum of the products obtained by multiplying the approximate quantities by their respective unit bid prices. Any notes, comments, or amounts written outside the column headed "Unit Bid Price" will be disregarded when calculating the total proposal amount. All figures shall be in ink and legible. The unit bid price should not be carried beyond the cent (\$0.01). Any figures on the unit bid price beyond the cent will be dropped. Should a bidder need to change a unit bid price on the bid proposal schedule of items, the original entry shall be marked out and the new entry shall be initialed by the person signing the proposal or another officer of the firm. Should a bidder need to change an extension, subtotal, or total on the bid proposal schedule of items, the original entry should be marked out and the new entry should be initialed by the person signing the proposal or another officer of the firm. Changes are defined as any physical alterations to the original figures including, but not limited to erasures, cross-outs, line-outs, or liquid paper corrections (white-outs).

The bidder's proposal must be signed with ink by the individual, by one or more members of the partnership, by one or more members or officers of each firm representing a joint venture, or by one or more officers of a corporation, or by an agent of the Contractor legally qualified

and acceptable to the Owner. If the bidder's proposal is made by an individual, the name of the individual must be shown; by a partnership, the name of each partnership member must be shown; as a joint venture, the name of a member or officer of each of the firms represented by the joint venture must be shown; by a corporation, the name of the corporation must be shown.

**102.08 Irregular Proposals.** Proposals may be considered irregular and may be rejected for the following reasons:

- 1) If changes are made to the entries for unit bid prices on the bid proposal schedule of items and they are not initialed by the person signing the proposal or an officer of the firm.
- 2) If the proposal does not contain a unit price or extension for each pay item listed except in the case of authorized alternate pay items or lump sum pay items.
- 3) If the proposal is not prepared and signed with ink.
- 4) If the proposal is not accompanied by the proper proposal guaranty.
- 5) If a proposal is received from an individual, firm, partnership, or corporation with an interest, as principal, in another proposal for the same project.
- 6) If any unit price entered on the Schedule of Items is illegible.
- 7) If the proposal is not submitted by the prospective bidder who purchased the original Contract Documents.
- 8) If the proposal is on a form other than that furnished by the Owner; or if the form is altered except as authorized; or any part thereof is detached.
- 9) If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind that may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.
- 10) If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
- 11) Unbalanced proposals in which the prices for some items are out of proportion to the reasonable costs representative of those items.

Conditional Bids will not be accepted.

**102.09 Proposal Guaranty.** No proposal will be considered by the Owner unless it is accompanied by a guaranty in the form of a bank draft, certified check, or cashier's check drawn on a solvent bank or trust company, or a bidder's bond duly executed by the Bidder as principal and having as surety thereon a surety company approved by the Owner. The

guaranty shall be made payable to the City of Springdale, Arkansas, and shall be in an amount not less than five (5) percent of the bid.

**102.10 Delivery of Proposals.** Each proposal must be submitted in a sealed envelope bearing on the outside the name of the Bidder, his address, his Arkansas Contractor's license number, the name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the City of Springdale and be identified as a bid proposal. In the event that the second envelope is not identified as a bid proposal, the Owner will not be responsible for consideration of the proposal if it is not recognized as such by the time designated for receipt of proposals. Any proposal received after the time stated in the proposal form for receipt of proposals will not be accepted and will be returned unopened to the bidder.

**102.11 Withdrawal/Modification of Proposals.** A bidder may withdraw or modify a proposal after it has been deposited with the Owner, provided a request for withdrawal or modification, as described herein, is received by the contracting Department of the City of Springdale before the closing time set for receipt of proposals. Opened proposals may not be withdrawn within 60 days after the actual date of the opening of proposals.

A request to withdraw or modify a proposal before bid opening must be legible and in one of the following forms.

- 1) **Written Request.** Written requests for withdrawal of the bid proposal shall be signed by the bidder. Proposals withdrawn in this manner may be modified and resubmitted, but the modifications must be legible and must satisfy all other criteria for changes listed in this Section. Failure to resubmit a modified proposal before the time set for bid opening will result in no bid on behalf of the company that has withdrawn its bid.
- 2) **Facsimile Communication.** Proposals may be modified by facsimile communications at any time prior to the scheduled closing time for receipt of bids, provided such facsimile communications is received by the contracting Department of the City of Springdale prior to closing time, and provided further, the Owner is satisfied that a written confirmation of the facsimile modifications over the signature of the Bidder was mailed prior to the closing time. The facsimile communication should not reveal the bid price but should provide the addition or subtraction or other modification so that the final price or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the facsimile modification.

**102.12 Public Opening of Proposals.** Proposals will be opened and read publicly at the time and place indicated in the Advertisement For Bids. Bidders, their authorized agents, and other interested parties are invited to be present.

**102.13 Disqualification of Bidders.** Only one proposal from an individual, firm, partnership, or corporation, whether under the same or under different names, will be considered. Should it appear to the Owner that any bidder is interested, as principal, in more

than one proposal for any one project, all such proposals in which the bidder is interested will be rejected.

A bidder may, however, submit a proposal as principal and also quote as a subcontractor to other principals on the same project provided the quotation as a subcontractor does not exceed 60% of the total bid, and by so doing will not thereby be liable for disqualification.

Furthermore, it is not the intent of this specification to disqualify any proposal because of quotations made by any one subcontractor to more than one principal. Should there be reasonable grounds for believing that collusion or a combination exists, all proposals may be rejected and bidders or participants in such combination or collusion will not be considered in future proposals for the same work.

**102.14 Material Guaranty.** The successful bidder may be required to furnish a complete statement of the origin, composition, and manufacture of any or all materials to be used in the construction of the work together with samples, which samples may be subjected to the tests provided for in these specifications to determine their quality and fitness for the work.

**102.15 Project Withdrawal.** The City of Springdale reserves the right to withdraw a project previously scheduled for letting. In the event of such withdrawal, potential bidders will be notified by the Owner, time permitting. In any case, an announcement will be made before opening bids for such withdrawn project and the unopened bids will be returned to the bidders.

**102.16 Subcontractors.** The bid proposal shall contain the names, and addresses and Contractor's License numbers for all subcontractors listing the description of work to be performed by each subcontractor. Acceptance or rejection of the listed subcontractors shall be in accordance with Subsection 109.01 "Subletting of Contract."

## **Section 103. Award and Execution of Contract**

**103.01 Consideration of Proposals.** After the proposals are opened and read, they will be compared on the basis of the bid total, which is the summation of the products obtained by multiplying the approximate quantities shown in the Proposal by the unit bid prices. Errors found in the bidder's extensions will be corrected before release of the final summation. The results of such comparisons will be immediately available to the public.

The Owner reserves the right to reject any or all proposals, to waive technicalities, or to advertise for new proposals.

**103.02 Award of Contract.** If it is in the opinion of the Owner that the Owner's best interest would be served thereby, the contract shall be awarded, within 60 calendar days after the opening of the proposals, to the lowest bid submitted by a responsible Bidder. The responsibility of the Bidder shall be determined according to the competency investigation provided for in Subsection 102.01 "Qualification of Bidders." The successful Bidder will be notified by letter of the bid acceptance and of the award of the Contract.

The lowest bid shall be determined by deducting any permitted deductive alternates desired to be exercised by the Owner from the total (base) bid. If the determined lowest total (base) bid is greater than the funds appropriated (the funds currently available for the project as determined by the Owner prior to opening of any bids) but is in excess of the amount appropriated by no more than 25% of the amount appropriated, the Owner may negotiate an award with the apparent responsible low Bidder. At any time, the language of this Subsection shall be interpreted in accordance with controlling Arkansas state law.

**103.03 Cancellation of Award.** The City of Springdale reserves the right to cancel the award of any contract at any time before the execution of said contract by all parties without any liability against the City of Springdale.

**103.04 Return of Proposal Guaranty.** All proposal guaranties in the form of checks, except those of the three lowest bidders, will be returned within three days following the opening and verification of the proposals. The retained proposal guaranties of the three lowest bidders will be returned after the Contract has been executed, or if no award has been made within the allowable time after the date of opening of the bids, upon demand of the Bidder at anytime thereafter, so long as they have not been notified of the acceptance of their bid.

**103.05 Requirement of Performance Bonds and Payment Bonds.** Prior to or simultaneously with the execution of the Contract, the successful bidder shall furnish bonds with approved sureties in the amounts and for the purposes noted below:

- 1) Performance Bond and Payment Bond or Performance and Payment Bond in a sum equal to the full amount of the Contract as security for faithful performance of the contract and for the payment to all persons and entities performing labor on the project or furnishing materials in connection with the project; and,
- 2) The Performance Bond shall include all requirements and conditions as indicated including the warranty, guarantee and maintenance requirements. A separate "Maintenance Bond" will not be required.
- 3) All companies furnishing bid bonds and performance bonds shall furnish evidence of being on the U.S. Treasury Department's most current list (Circular 570, as amended) and be authorized to transact business in the State of Arkansas.

The bonds shall be in the forms prescribed by the bidding documents and shall be signed by a licensed Arkansas Resident Agent of the Surety who shall attach to each bond a Power of Attorney supporting the Agent's signature.

In event the surety or bonding company fails or becomes financially insolvent, the Contractor shall, within five days of such failure, or insolvency, file a new bond in the amount designated by the Owner. The Owner reserves the right to refuse bonds from sureties with a record of unsatisfactory performance under previously accepted bonds.

**103.06 Requirement of Insurance.**

City of Springdale

**(a) General.** Before any Work at the site is started, Contractor shall deliver to Owner certificates (and other evidence of insurance requested by Owner), which Contractor is required to purchase and maintain as stated below.

**(b) Contractor's Liability Insurance.** Contractor shall purchase and maintain such commercial general liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance and furnishing of the Work and Contractor's other obligations under the Contract Documents, whether it is performed or furnished by Contractor, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

- 1) Claims under workers' compensation, disability benefits, and other similar employee benefit acts;
- 2) Claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
- 3) Claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
- 4) Claims for damages insured by personal injury liability coverage which are sustained:  
(i) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or (ii) by any other person for any other reason;
- 5) Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;
- 6) Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle.

The insurance required by this paragraph shall include the specific coverages, and be written for not less than the limits of liability and coverages specified or required by Law, whichever is greater.

- |  |                  |
|--|------------------|
| 1) <b>Workers' compensation:</b>   | Statutory        |
| 2) <b>Employer's Liability:</b>  |                  |
| a. \$100,000   | Each person      |
| 3) <b>Commercial General Liability Bodily Injury</b> (including completed Operations and products liability) |                  |
| \$1,000,000  | Each occurrence  |
| \$2,000,000  | Annual Aggregate |

**4) Property Damage**

\$1,000,000	Each occurrence
\$2,000,000	Annual Aggregate
or a combined single limit of	\$5,000,000

**5) Commercial Automobile Liability:**

Bodily Injury	
\$500,000	Each person
\$1,000,000	Each occurrence
Property Damage	
\$500,000	Each occurrence
or a combined single limit of	\$1,000,000

The insurance specified above, except Workers' Compensation and Employer's Liability, shall be endorsed to include the Owner as additional insured thereunder.

The commercial general liability insurance shall include completed operations insurance and premises/operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed, or renewal refused until at least thirty days' prior written notice has been given to Owner by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Subsection 109.18 "Warranty and Guarantee." In addition, Contractor shall maintain such completed operations insurance for at least two years after final payment and furnish Owner with evidence of continuation of such insurance at final payment and one year thereafter.

The property damage liability coverage under this policy shall contain no exclusion (commonly referred to as XC&U exclusion) relative to blasting, explosion, collapse of buildings, or damage to underground property. This policy shall provide Broad Form Property Damage coverage.

General Public Liability and Property Damage insurance to the (1) the Owner, its officials, its officers and its employees, (2) the Engineer, and (3) the Owner's agent, acting in the scope and course of their employment, and protecting them from all claims for personal injury, including death, and all claims for destruction of or damage of property, arising out of or in connection with any operations under the Contractor's contract, whether such operations be by the Contractor or by any subcontractor under him or by anyone directly or indirectly employed by the Contractor or a subcontractor under him. All such insurance shall have the limits of liability specified in the preceding paragraphs.

**(c) Contractual Liability Insurance.** The commercial general liability insurance required above shall include contractual liability insurance applicable to Contractor's obligations

under Subsection 108.19 “Responsibility for Damage Claims.” The insurance required by this paragraph shall be written for not less than the limits of liability and coverages specified.

**(d) Property Insurance.** Contractor shall purchase and maintain property insurance upon the Work at the Site to the full insurable value thereof. This insurance shall be completed value form, shall include the interests of Owner, Contractor, Subcontractors, all of whom shall be listed as insured or additional insured parties, shall insure against the perils of fire and extended coverage and shall include “at risk” insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and shall include damages, losses, and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property including but not limited to fees and charges of engineers, architects, attorneys, and other professionals. If not covered under the “all risk” insurance, Contractor shall purchase and maintain similar property insurance on portions of the Work stored on and off the Site or in transit when such portions of the Work are to be included in an Application for Payment.

**(e) Waiver of Rights.** Owner and Contractor waive all rights against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to Subsection 103.06(d) “Property Insurance” and any other property insurance applicable to the Work, and also waive all such rights against the Subcontractors, and all other parties named as insured in such policies for losses and damages so caused. Each subcontract between Contractor and Subcontractor shall contain similar waiver provisions by the Subcontractor in favor of Owner, Contractor, and all other parties named as insureds. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by the Owner as trustee or otherwise payable under any policy so issued.

Owner and Contractor intend that any policies provided in response to Subsection 103.06(d) “Property Insurance” shall protect all of the parties insured and provide primary coverage of all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage, the insurer will have no rights of recovery against any of the parties named as insureds or additional insureds; and if the insurers require separate waiver forms to be signed by any Subcontractor, Contractor shall obtain the same.

**(f) Owner’s and Engineer’s (Third Party) Protective Liability Insurance**

The Contractor shall obtain Owner's and Engineer's Protective Liability insurance, which shall be in force for the entire project period, naming as the insured therein, the City of Springdale (Owner) and the Engineer. Such insurance shall be provided as a separate policy from the Contractor's insurance as listed above. Limits of liability shall be the following:

Bodily Injury Liability (Including Death)	- \$1,000,000/occurrence
and Physical Damage Liability	
(Damage to or Destruction of Property)	- \$2,000,000/aggregate

A copy of the insurance policy shall be delivered to the Owner and Engineer.

**(g) Acceptance of Insurance.** If Owner has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by Contractor in accordance with this Section on the basis of its not complying with the Contract Documents, Owner shall notify Contractor in writing thereof within ten days of the date of delivery of such certificates and other evidence of insurance to Owner in accordance with Section. Contractor will provide to the Owner such additional information in respect of insurance provided by him as the other may reasonably request. Failure to furnish the required proof of Liability Insurance with the submission of the Contract signed by the successful bidder shall be just cause for the cancellation of the award and forfeiture of the proposal guaranty, which shall become the property of the City of Springdale, not as a penalty, but in liquidation of damages sustained. Failure to furnish notice of cancellation or change in the policy will result in the temporary suspension of work as provided in Subsection 109.07 “Temporary Suspension of Work.” Temporary suspension shall remain in effect until proof that the required insurance is in effect is received by the Owner. If no proof of insurance is received within 20 calendar days of the Suspension Order, the Owner may proceed with written notice of default according to Subsection 109.17 “Default and Termination of Contract.”

**103.07 Execution and Approval of Contract.** The Contract shall be signed by the successful bidder and returned, together with the required bonds and proof of liability insurance, within ten (10) calendar days after written notice of award has been issued. If the Contract is not executed by the Owner within sixty (60) calendar days after the opening of proposals, the bidder shall have the right to withdraw the bid without penalty. The Contract will not be considered effective until it has been fully executed by all parties to the Contract.

**103.08 Failure to Execute Contract.** Failure to execute the Contract and file acceptable bonds and proof of liability insurance within 10 days after the written notice of award has been issued to the bidder shall be just cause for the cancellation of the award and forfeiture of the proposal guaranty, which shall become the property of the City of Springdale, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest responsible bidder, or the work may be re-advertised and constructed under contract or otherwise, as the Owner may decide. The low bidder who fails to execute the Contract and submit acceptable bonds and proof of liability insurance will not be permitted to bid on any subsequent advertisement of that project.

## **Section 104. Scope of Work**

**104.01 Intent of Contract.** The intent of the Contract is to provide for the construction and completion in every detail of the work described. The Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work according to the plans, specifications, and terms of the Contract.

**104.02 Alteration of Plans or Character of Work.**

**(a) General.** The City shall have the right to increase or decrease the extent of the work or to change the location, gradient, or the dimensions of any part of the work, provided that the length of the improvement is not increased or decreased in excess of 25% of the contract length, or that the quantities of work to be done or the materials to be furnished are not increased or decreased in money value in excess of 25% of the total Contract. Such changes shall not be considered as a waiver of any conditions of the Contract nor invalidate any of the provisions thereof. The Contractor shall perform the work as increased or decreased within the qualifying limits named and no allowance will be made for anticipated profits on increases or decreases so incurred.

If changes in the work require an adjustment in unit prices already established, or if additional work for which unit prices have not already been established by the contract is necessary, the contract price shall be adjusted according to the General Conditions of the Contract and this Section. If additional work is performed before an adjustment is made in the contract, the additional work will be paid for at unit prices already established for similar work, if such additional work is deemed necessary by the Engineer/City Engineer. If the Contractor performs additional work without authorization from the City and without an agreed Contract adjustment for such work, no payment for such additional work will be made.

**(b) Significant Changes in the Character of Work.** The City reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the Contract nor release the Surety, and the Contractor agrees to perform the work as altered.

If the alterations or changes in quantities significantly change the character of the work under the Contract, whether or not changed by any such different quantities or alterations, an adjustment, excluding loss of anticipated profits, will be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the Contractor in such amount as the Engineer/City Engineer may determine to be fair and equitable. If the alterations or changes in quantities do not significantly change the character of the work to be performed under the Contract, the altered work will be paid for as provided elsewhere in the Contract.

The term "significant change" shall be construed to apply only to the following circumstances:

- When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction or
- When a major item of work is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any adjustment due to an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed. A major item of work is defined as any bid item for which the original contract value is more than 10 percent of the total original contract value.

**(c) Differing Site Conditions.** During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the Contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the Contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed. Upon written notification, the Engineer/City Engineer will investigate the conditions. If the Engineer/City Engineer determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the Contract, an adjustment, excluding loss of anticipated profits, will be made and the Contract modified in writing accordingly. The Engineer/City Engineer will notify the Contractor of the determination whether or not an adjustment of the Contract is warranted. No Contract adjustment that results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice. No Contract adjustment will be allowed under this clause for any effects caused on unchanged work.

**104.03 If and Where Directed Items.** The plans and the proposal may specify one or more items to be incorporated into the project "if and where directed" by the Engineer/City Engineer. The Engineer/City Engineer shall have discretion in determining whether and to what extent such items will be incorporated into the project. The Engineer/City Engineer may order incorporation of such items at any location within the project and at any time during the work. These items may or may not be located on the plans. The estimated quantities set out in the proposal for such items are presented solely for the purpose of obtaining a representative bid price. The actual quantities employed may be only a fraction of, or many times the estimated quantities. The Contractor shall make no claim for additional compensation because of any increase, decrease, or elimination of such items.

## **Section 105. Control of Work**

### **105.01 Authority and Direction.**

#### **(a) Direction and Control by the Contractor.**

**(1) General.** The detailed manner and method of performing the work shall be under the direction and control of, and by, the Contractor, but all work performed shall at all times be subject to the observation of the Engineer/City Engineer or his authorized representative to ascertain its conformance with the Contract Documents. The Contractor shall furnish all reasonable aid and assistance required by the Engineer for the proper observation and examination of the work and all parts thereof.

The Engineer/City Engineer is not responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction, or safety precautions and programs incident thereto.

The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, Subcontractors, or materialmen engaged upon this Contract. He

## City of Springdale

shall be prepared to guarantee to each of his Subcontractors the locations and measurements which they may require for the fitting of their work to all surrounding work.

Observers may be appointed by the Engineer or Owner. Observers shall have no authority to permit any deviation from the Plans and Specifications except on written order from the Engineer/City Engineer and the Contractor will be liable for any deviation except on such written order. Observers shall have authority, subject to the final decision of the Engineer/City Engineer, to condemn and reject any defective work and to suspend the work when it is not being performed properly.

The observer shall in no case act as superintendent or foreman or perform other duties for the Contractor, nor interfere with the management of the work by the latter. Any advice which the observer may give the Contractor shall in no way be construed as binding to the Engineer/City Engineer or Owner in any way or releasing the Contractor from fulfilling all of the terms of the Contract.

Any defective work may be rejected by the Engineer/City Engineer at any time before final acceptance of the work, even though the same may have been previously overlooked and estimated for payment and payment therefore made by the Owner.

**(2) Accident Prevention.** The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of the work. The safety provisions of applicable laws and building and construction codes, including applicable parts of the Arkansas Department of Labor Safety Code, shall be observed. The Contractor shall take or cause to be taken such safety and health measures, additional to those herein required, as he may deem necessary or desirable. Machinery, equipment, and all hazards shall be guarded in accordance with the safety provisions of the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, Inc., to the extent that such provisions are not in conflict with applicable local laws.

The Contractor shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly furnish the Owner with reports concerning these matters.

The Contractor shall indemnify and save harmless the Owner, and the Engineer, from any claims for damages resulting from personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this Contract.

**(b) Authority of the Engineer.** As the direct representative of the Owner, the Engineer has immediate charge of the engineering details of each construction project; is responsible for the general administration of the Project; and has the authority to reject unacceptable material or work and to suspend any work that is being improperly performed.

The Owner, with input from the Engineer, will decide all questions that may arise as to the quality and acceptability of materials furnished and work performed and as to the rate of

progress of the work; all questions that may arise as to the interpretation of the plans and specifications; and all questions as to the acceptable fulfillment of the Contract by the Contractor.

The Engineer, with concurrence by Owner, will have the authority to suspend the work wholly or in part due to the failure of the Contractor to correct conditions unsafe for the workers or the general public; for failure to carry out provisions of the Contract; for failure to carry out orders; for such periods as deemed necessary due to unsuitable weather; for conditions considered unsuitable for the prosecution of the Work; or for any other condition or reason deemed to be in the public interest.

Any unresolved disputes arising under the Contract shall be submitted by the Contractor in writing to the Engineer. Disputes claiming additional compensation shall contain the information set forth in Subsection 109.10 "Claims for Adjustment and Disputes." The Engineer shall render a written decision within 60 calendar days of receipt of the Contractor's letter and information. Should a dispute not be resolved by the written decision of the Engineer, subsequent appeal by the Contractor shall be submitted in writing within 60 calendar days of the decision of the Engineer, and shall be addressed directly to the Owner.

#### **105.02 Plans and Submittals.**

**(a) Plans.** Plans will show lines, grades, details of all structures, typical cross sections, and a summary of items appearing on the proposal. Work may be provided for on the Plans that is not located within the limits of the project as shown on the plan sheets. Work of this nature may include but is not limited to removal of existing items, obliteration, grading, base and surfacing, transitions, etc., and is considered a part of the project. The Plans will be supplemented by such working drawings or sketches issued by the Engineer as are necessary to adequately control the Work.

**(b) Submittals.** Shop drawings, mix designs, vendor data, testing reports, certifications, calculations and working drawings for structures shall be furnished by the Contractor as required herewith. They shall consist of such data and detailed plans as may be required to adequately control the work and are not included on the plans furnished by the Owner. They shall include stress sheets, shop drawings, erection plans, falsework plans, cofferdam plans, or any other supplementary plans or similar data required of the Contractor.

Where calculations, plans or design are a requirement of any submittal, such shall be prepared and sealed by a Professional Engineer competent in the applicable field of practice and Licensed in the State of Arkansas.

All submittals shall be submitted to the Engineer for informational and record purposes or for approval as specified for the item of work involved. Contractor shall, in writing, call Engineer's attention to any deviation that the Submittal may have from the requirements of the Contract Documents. The Contractor should anticipate a review period of 15 - 30 calendar days from receipt by the Engineer of submittals. The review of submittals by the Engineer will be limited to checking for general agreement with the plans and specifications, and shall in no way relieve the Contractor of responsibility for errors and omissions

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contained therein, nor shall such review or approval operate to waive or modify any provisions contained in the Specifications or Drawings. It is mutually agreed that the Contractor shall be responsible for agreement of dimensions and details as well as conformity of its submittal with the Contract plans and specifications.

(1) Where a Shop Drawing or sample is required by the Specifications, no related work shall commence until the submittal has been reviewed and approved by Engineer.

Any Shop Drawings submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any Drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of Contract price and/or time; otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the Drawings have been reviewed.

The review of Shop Drawings by the Engineer shall be considered an accommodation to the Contractor to assist him in the execution of the Contract. The Engineer's review of such Drawings shall not relieve the Contractor of his responsibility to perform the work in strict accordance with the Plans and Specifications, and approved changes.

If the Shop Drawing is in accordance with the Contract or involves only a minor adjustment in the interest of the Owner not involving a change in Contract price or time, the Engineer shall so stamp the Drawing and shall contain in substance the following:

"Corrections or comments made on the shop drawings during this review do not relieve Contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner".

(2) The Contractor shall submit all material, product, or equipment samples, descriptions, certificates, affidavits, etc., as called for in the Contract Documents or required by the Engineer, promptly after award of the Contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the Contract time. Submit four (4) copies of data for Engineer's review.

Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with Contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the

producer, and all specifications or other detailed information which will assist the Engineer in passing upon the acceptability of the sample promptly. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.

Approval of any materials shall be general only and shall not constitute a waiver of the Owner's right to demand full compliance with Contract requirements. After actual deliveries, the Engineer will have such check tests made as he deems necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories which fail to meet check tests have been incorporated in the work, the Engineer will have the right to cause their removal and replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable, at the Contractor's expense.

Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:

- (a) The Contractor shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the Engineer;
- (b) The Contractor shall assume all costs of re-testing materials which fail to meet Contract requirements;
- (c) The Contractor shall assume all costs of testing materials offered in substitution for those found deficient.

The contract price will include the cost of furnishing all required working drawings, record drawings and other submittals.

**105.03 Conformity with Plans and Specifications.** All work performed and all materials furnished shall be in reasonably close conformity with the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown on the plans or indicated in the specifications.

Unless otherwise specified, in the event the materials or the finished product in which the materials are used is not within reasonably close conformity with the plans and specifications but reasonably acceptable work has been produced, the Engineer/City Engineer shall determine if the work shall be accepted and remain in place. If the work is accepted, the Engineer/City Engineer will document the basis of acceptance by Contract modification that will provide for an appropriate adjustment in the contract cost for such work or materials.

In the event the materials or the finished product in which the materials are used or the work performed is found not to be in reasonably close conformity with the plans and specifications and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced or otherwise corrected at no cost to the City.

**105.04 Coordination of Plans, Specifications, and Special Conditions.** These Specifications including General Provisions and Technical Specifications, the Plans, Supplementary Conditions, Special Provisions and all other supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work.

The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, Subcontractors, or materialmen engaged upon this Contract. He shall be prepared to guarantee to each of his Subcontractors the locations and measurements which they may require for the fitting of their work to all surrounding work.

In addition, the Specifications include references to the Arkansas Highway and Transportation Department's Standard Specifications for Highway Construction Edition of 1996 and 2003 (AHTD Standard Specifications). The portions of the AHTD Standard Specifications, which are referenced in these specifications, are hereby incorporated by reference.

All work shall conform to City of Springdale Code of Ordinances, Chapter 110, STREETS, SIDEWALKS AND OTHER PUBLIC PLACES. In case of discrepancy, the most stringent requirements will apply. The City of Springdale Code of Ordinances, Chapter 110, STREETS, SIDEWALKS AND OTHER PUBLIC PLACES is hereby incorporated by reference.

All work shall conform to City of Springdale Code of Ordinances, Chapter 107, STORMWATER POLLUTION PREVENTION, GRADING AND EROSION CONTROL. The City of Springdale Code of Ordinances, Chapter 107, STORMWATER POLLUTION PREVENTION, GRADING AND EROSION CONTROL is hereby incorporated by reference.

The Contractor shall not take advantage of any apparent error or omission on the plans or in the Contract Documents. The party discovering such error or omission shall notify the other party when the discovery is made. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications.

**105.05 Cooperation by Contractor.** The Contractor will be supplied with a minimum of two sets of approved plans and Contracts, one set of which shall be kept available on the project at all times.

The Contractor shall give the work the attention necessary to facilitate the progress thereof and shall cooperate fully with the Engineer/City Engineer, inspectors, and other Contractors.

The Contractor shall have on the project at all times an agent who is a competent superintendent capable of reading and thoroughly understanding the plans and specifications and thoroughly experienced in the type of work being performed. The Superintendent shall be satisfactory to the Owner and the Engineer, on the work at all times during working hours with

full authority to supervise and direct the work and who shall be the Contractor's agent responsible for the faithful discharge of the Contractor's obligations under the Contract. During working hours, the Contractor's superintendent shall be equipped with a mobile phone or other communication device suitable to the Engineer for contact by the Engineer or Owner. The superintendent shall receive instructions from the Engineer/City Engineer and shall have full authority to execute orders or directions of the Engineer/City Engineer without delay and to promptly supply such materials, labor, equipment, tools, and incidentals as may be required. Such superintendent shall be furnished regardless of the amount of work sublet.

The Owner shall have the authority to require the Contractor to remove from the work any incompetent or insubordinate superintendent.

**105.06 Coordination and Cooperation Between Contractors.** The Owner reserves the right at any time to contract for and perform other or additional work on or near the work covered by the Contract.

When separate contracts are let adjacent to or within the limits of any one project, the work of each Contractor shall be conducted so as not to interfere with or hinder the progress or completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other.

It is understood and agreed that the Contractor considered in the bid the status of the existing Contract or Contracts at the time of bidding and will arrange to coordinate and schedule the work jointly with the other affected Contractors in order to complete the work within the time allowed in the Contract.

If, through acts of neglect or through failure to comply with any applicable Government regulations by the Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the work, the Contractor shall settle with such other Contractor or Subcontractor by agreement or arbitration, if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor shall assert any claim against the Owner on account of any damage alleged to have been so sustained, the Owner will notify this Contractor, who shall defend at his own expense any suit based upon such claim, and, if any judgment or claims against the Owner shall be allowed, the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith.

Contractors involved shall assume all liability, financial or otherwise, in connection with their own Contracts and shall protect and save harmless the City of Springdale from any and all damages or claims that may arise because of inconvenience, delay, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.

Contractors shall arrange their work and shall place and dispose of the materials being used so as not to interfere with the operations of the other Contractors within the limits of the same project, and shall join their work with that of the others in an acceptable manner, and shall perform it in proper sequence with that of the others.

**105.07 Cooperation with Utilities.** The Plans indicate various utility items, some of which are to be relocated or adjusted by the utility owner, and others that are to be relocated or adjusted by the Contractor. The City will notify all known utility companies, all known pipe line owners, or other known parties affected, and endeavor to have all necessary adjustments of the public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction made before construction begins.

Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction that are to be relocated or adjusted are to be moved by the owners of such facilities except as otherwise provided for in the Contract or as noted on the plans.

The Contractor shall consider in the bid all of the permanent and temporary utility facilities and appurtenances in their present, relocated, or proposed positions. No additional monetary compensation will be allowed for any delays, inconveniences, or damages sustained due to any interference from the utilities or appurtenances or from the operations of relocating them.

It is the Contractor's responsibility to have all utility lines located before construction begins. Any costs incurred due to damaged utility lines shall be borne by the Contractor with no exceptions.

All work in this contract shall be in accordance with the Arkansas Underground Facilities Damage Prevention Act. The Contractor shall abide by the most current edition of this Act.

**105.08 Inspection and Observation of Work.** All materials and each part or detail of the Work shall be subject to inspection by the Owner. All materials and each part or detail of the Work shall be subject to observation by the Engineer. The Engineer and Owner and their designated representatives shall be provided acceptable access to all parts of the Work and shall be furnished with such information and assistance by the Contractor as is necessary to for the Engineer's observation and/or the Owner's observation and inspection.. Neither observations by Engineer/City Engineer nor inspection, tests or approvals by others shall relieve Contractor from his obligation to perform the work in accordance with the Contract Documents.

The Contractor shall notify the Engineer sufficiently in advance of backfilling or concealing any facilities to permit proper observation. If the facilities are concealed without approval or consent of the Engineer, the Contractor shall uncover for observation and recover such facilities all at his own expense, when so requested by the Engineer.

Observation of materials and appurtenances to be incorporated in the Improvements embraced in this Contract may be made at the place of production, manufacture or shipment, whenever the quantity justifies it, and such observation and acceptance, unless otherwise stated in the Technical Specifications, shall be final, except as regards (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the observation of materials as a whole or in part will be made at the project site.

All condemned or rejected work shall be promptly taken out and replaced by satisfactory work. Should the Contractor fail or refuse to comply with the instructions in this respect, the Owner may, upon certification by the Engineer, withhold payment, proceed to terminate the Contract, or perform work as provided herein.

When requested by the Engineer/City Engineer at any time before acceptance of the Work, the Contractor shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications.

Should the work thus exposed or examined prove acceptable, the uncovering or removing and the replacing of the covering or making good of the parts removed will be paid for as extra work. Should the work so exposed or examined prove unacceptable, the uncovering or removing and the replacing of the covering or making good of the parts removed shall be at the Contractor's expense.

Any work performed or materials used without inspection by the Engineer/City Engineer may be ordered exposed, and/or removed and replaced, at no cost to the Owner unless the Engineer/City Engineer or inspector failed to inspect after having been given reasonable notice that the work was to be performed.

When any unit of government, political subdivision, railroad corporation, or other agency is to pay a portion of the cost of the Work covered by the Contract, its respective representatives shall have the right to inspect the Work. Such inspection shall in no sense make any unit of government, political subdivision, railroad corporation, or other agency a party to the Contract, and shall in no way interfere with the rights of either party thereunder.

**105.09 Removal of Unacceptable or Unauthorized Work.** All work that does not comply with the requirements of the Contract will be considered unacceptable. Unacceptable work, whether the result of poor workmanship, use of unacceptable materials, damage through carelessness, negligence, or any other cause, found to exist before the final acceptance of the Work, or during the warranty period specified in Subsection 109.18 "Warranty and Guarantee", shall be removed and replaced in an acceptable manner at no cost to the Owner. Work performed contrary to any instructions of the Engineer/City Engineer; work performed beyond the lines shown on the plans or as established, except as herein specified; or any extra work performed without authority will be considered as unauthorized and will not be paid for under the provisions of the Contract. Work so performed may be ordered removed or replaced at no cost to the Owner.

Should the Contractor fail to comply with any order of the Engineer/City Engineer, the Engineer/City Engineer will have the authority to cause unauthorized work to be removed and unacceptable work to be corrected or removed and replaced and to deduct the costs from any moneys due or to become due the Contractor.

**105.10 Authorized Changes.** All changes to the Plans performed in the field shall be reviewed, approved and authorized by the Owner prior to proceeding with the work. Any

changes to the Plans without authorization may result in removal of such item at the Contractor's expense and/or nonpayment for the work, at the discretion of the Owner.

Verbal authorized changes to the Plans in the field will not be considered for additional quantities or compensation, unless they are followed by written documentation within 24 hours. Any authorized changes to the Plans which are approved by the Owner for additional compensation shall be in written form indicating all items of work involved and the cost for each item, and will be submitted to the Owner prior to proceeding with the work involved.

**105.11 Substitution of Materials and Equipment.** If the Contractor desires to use a material, method or type of equipment other than those specified in the Contract, authority from the Engineer/City Engineer to do so must be requested. The request shall be in writing and shall include a full description of the materials, methods and equipment proposed to be used and an explanation of the reasons for desiring to make the change.

Prior to proposing any substitute material, method or type of equipment, the Contractor shall satisfy itself that the material, method or type of equipment proposed is, in fact, equal to that specified, that such material or type of equipment will fit into the space allocated, that such material or type of equipment affords comparable ease of operations, maintenance and service, that the appearance, longevity and that by reason of cost savings, reduced construction time, or similar demonstrable benefit, the substitution material, method or type of equipment will be in Owner's interest.

The burden of proof of equality of a proposed substitution for a specified material, method or type of equipment shall be upon the Contractor. Contractor shall support its request in writing with sufficient test data and other means to permit the Owner to make a fair and equitable decision on the merits of the proposal. Contractor shall submit drawings, samples, data and certificates for proposed substitute materials. Any material or type of equipment by a manufacturer other than those specified or brand name or model number or of generic species other than those specified will be considered a substitution. The Owner will be the sole judge of whether or not the substitution is equal in quality, utility and economy to that specified.

Approval of a substitution shall not relieve the Contractor from responsibility for compliance with all requirements of the Contract. Contractor shall bear the expense for any changes in the parts of the Work caused by any substitutions.

Substitutions will not be permitted in those instances where the product is intended to accommodate artistic design, specific function or economy of maintenance.

No change will be made in basis of payment for the construction items involved nor in contract time as a result of an authorized change in methods or equipment under these provisions.

**105.12 Construction Layout.** The Engineer/City Engineer will establish a limited number of control points and associated benchmarks for the contractor's use in establishing lines, grades, profiles, structures, and other associated items of work. In general, the control

points will be located approximately 500 feet apart along the project. All other construction staking will be the responsibility of the Contractor. The Contractor shall provide a sufficient workforce skilled in construction layout to establish all lines, slopes, profiles, and structure locations necessary to construct the project according to the plans.

When section 111, "Roadway Construction Control" is included in the proposal then the Contractor shall comply with the requirements and provisions of such.

**105.13 Maintenance During Construction.** The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces, to the end that the roadway or structures are kept in satisfactory condition at all times.

The Contractor shall be responsible for the maintenance of existing drainage ditches and channels within the right-of-way limits, including construction easements if any, from the date all work is begun on the project to the date of its final acceptance. This is not a requirement that the Contractor improve existing drainage ditches and channels, except as shown on the plans or directed by the Engineer/City Engineer. The Contractor shall maintain waterways in such condition that damage to the work or to abutting property will not result from the Contractor's operations. Obstruction of natural flow in waterways by stockpiling or storing materials, or by placement of equipment or supplies without provision for adequate bypassing of such natural flow, will not be permitted. Collections of sediment or debris that prohibits or inhibits normal function of drainage facilities shall be removed promptly.

All costs of maintenance work during construction and before the project is accepted will not be paid for separately, but full compensation therefore will be considered included in the contract unit prices bid for the various items in the Contract.

If the Contractor, at any time, fails to comply with the provisions of this subsection, the City will immediately notify the Contractor of such noncompliance. If the Contractor fails to remedy unsatisfactory maintenance within 24 hours after receipt of such notice, the City may immediately proceed to maintain the project and the entire cost of this maintenance will be deducted from moneys due or to become due the Contractor on the Contract.

All roadway cuts shall be temporarily or permanently repaired in accordance with Section 405, "Asphalt Concrete Patching For Maintenance of Traffic" within 24 hours of the completion of trench backfill for the work, or segment of work, which required the excavation and/or cut.

## **Section 106. Control of Material**

**106.01 Quality Requirements.** The materials used in the work shall meet all quality requirements of the Contract. Quality control, to insure that materials and workmanship, prior to and after, being incorporated into the work meets the requirements of the Contract, is the sole responsibility of the Contractor. Testing required for Contractor's quality control,

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certificates of compliance, mix designs and manufacturing of materials, and as needed for Contractor's operations shall be provided by the Contractor and the costs therefore will not be paid separately but full compensation will be considered included in the contract unit prices bid for associated items.

All Quality Assurance testing, to insure that the materials and workmanship as a final product meets the requirements of the Contract, will be accomplished and paid for by the Owner. The costs for any retesting required in areas failing to meet the specified requirements shall be paid for by the Contractor.

The materials furnished and used shall be new, except as may be provided elsewhere in these specifications, on the plans or in the Special Conditions. The materials shall be manufactured, handled, and used in a workmanlike manner to ensure completed work in accordance with the plans and specifications.

Also, refer to Section 107 "Quality Control Requirements".

**106.02 Sources of Supply.** To expedite the inspection and testing of materials, the Contractor shall notify the Engineer/City Engineer of proposed sources of materials before delivery. The Contractor shall furnish without charge such samples as may be required. Inspection and tests may be performed by the Engineer or Owner's designated testing firm, but it is understood that such inspections and tests, if made at any point other than the point of incorporation in the work, in no way shall be considered as a guarantee of acceptance of such materials nor of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made.

The Contractor shall assume full responsibility for ordering materials of the quality and quantity required and for the delivered costs of such materials. Materials needed in the work shall be furnished by the Contractor unless otherwise stated in the Contract.

**106.03 Samples, Tests, and Cited Specifications.** All materials will be inspected and tested by the supplier or Contractor as required by these specifications before incorporation in the Work. Work in which untested materials are used without the approval or written permission of the Engineer/City Engineer shall be treated as provided in Subsection 105.09 "Removal of Unacceptable or Unauthorized Work."

Whenever a reference is made in the specifications to a Federal Specification, or to a specification or test designation of the American Association of State Highway and Transportation Officials, the American Society for Testing and Materials, American Water Works Association, or any other recognized national organization, it shall mean the year of adoption or latest revision of the specification or test designation in effect on the day the advertisement for bids is dated. When a specific reference is made to a dated specification or test designation, the revision in effect on that date shall apply.

When requested, the Contractor shall furnish a complete certified statement of the origin, composition, and/or manufacture of materials that are to be used in the Work.

**106.04 Certification of Compliance.** The Engineer/City Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance stating that such materials or assemblies fully comply with the requirements of the Contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the Project must be accompanied by a Certificate of Compliance and clearly identified.

Materials or assemblies used on the basis of Certificates of Compliance may be sampled and tested and if found not in conformity with Contract requirement will be subject to rejection whether in place or not.

The form and distribution of Certificates of Compliance shall be as approved by the Engineer/City Engineer.

**106.05 Plant Inspection.** The Engineer/City Engineer may undertake the observation of materials at the source. In the event plant observation is undertaken the following conditions shall be met:

- The Engineer/City Engineer shall have the cooperation and assistance of the Contractor and of the producers of materials for the Work.
- The Engineer/City Engineer shall have full entry at all times to such parts of the plant as may concern the manufacture or production of the materials being furnished.

Adequate safety measures shall be provided and maintained.

It is understood that the Engineer/City Engineer reserves the right to retest all materials prior to incorporation into the Work which have been tested and accepted at the source of supply after the sample have been delivered and to reject all materials which, when retested, do not meet the requirements of these specifications or contract documents.

**106.06 Storage of Materials.** Materials shall be so stored as to assure the preservation of their quality and fitness for the work and in accordance with requirements of the Specifications; or if not covered in the Specifications, in accordance with the manufacturer's recommendations. Stored materials, even though approved before storage, may again be inspected before their use in the work. Stored materials shall be located so as to facilitate their prompt inspection. Portions of the right-of-way not required for public travel may be used for storage purposes and for the placing of the Contractor's plant and equipment, if approved by the Engineer, but any additional space required therefore must be provided by the Contractor, and at no cost to the Owner. Private property shall not be used for storage purposes without written permission of the owner or lessee, and if requested by the Engineer, copies of such written permission shall be furnished. All storage sites shall be restored to their original condition by Contractor at his expense. Construction materials may not be stored in the roadway for more than five (5) days after unloading.

**106.07 Handling Materials.** All materials shall be handled in such manner as to preserve their quality and fitness for the work. Aggregates shall be transported from the storage site to

the Work in tightly covered vehicles so constructed as to prevent loss or segregation of materials after loading and measuring so that there may be no inconsistencies in the quantities of materials intended for incorporation in the Work as loaded and the quantities as actually received at the place of operations.

**106.08 Unacceptable Material.** All materials not conforming to the requirements of the specifications at the time they are used shall be considered as unacceptable and all such materials will be rejected and shall be removed immediately from the site of the work unless otherwise instructed by the Engineer/City Engineer. No rejected material, the defects of which have been corrected, shall be used until approval has been given.

**106.09 Owner-Furnished Material.** The Contractor shall furnish all materials required to complete the Work, except those specified to be furnished by the Owner. Material furnished by the Owner will be delivered or made available to the Contractor at the points specified in the Special Provisions.

The cost of handling and placing all materials after they are delivered to the Contractor will not be paid for separately, but full compensation therefore will be considered included in the contract unit price(s) bid for the item(s) with which they are used.

The Contractor will be held responsible for all material delivered by the Owner through this arrangement. Deductions will be made from any moneys due the Contractor to make good any shortages and deficiencies, from any cause whatsoever; for any damage that may occur after such delivery; and for any demurrage charges.

**106.10 Salvaged Materials.** All salvaged materials in reusable condition, including pavement millings, water and drainage pipe, valves, fittings and other items, remain the property of the City of Springdale. Contractor shall deliver items to location directed by Engineer/City Engineer or designated in specifications. Items not considered of value shall be disposed of by the Contractor at his expense.

**106.11 Automatically Controlled Equipment.** Whenever a breakdown or malfunction of the automatic controls occurs on scales, scale printers, batch plants, or mixing plants, the equipment may be operated manually or by other methods for a period not to exceed two working days, provided that such alternate methods of operation produce results otherwise meeting the Specifications.

## **Section 107. Quality Control Requirements**

**107.01 Description.** This section shall set forth the requirements for Quality Control, including material testing and submittal requirements.

### **107.02 Submittal Requirements.**

Submittals shall comply with subsection 105.02, "Plans and Submittals" and the following:

All submittals required by the contract shall be submitted and approved before associated work is begun. Sufficient copies shall be submitted for the Engineer to retain two copies, the City to receive two copies and the Contractor to receive a minimum of one approved copy.

The following submittals are required:

- 1) Project Schedule
- 2) Concrete Mix Design(s)
- 3) Asphalt Mix Design(s)
- 4) Concrete Pipe Certifications
- 5) Precast Box Culvert Shop Drawings and Hydraulic Design
- 6) Listings of Project Personnel and Contact Phone Numbers
- 7) Traffic Control Plan
- 8) Striping Material
- 9) Reinforcing Steel Fabrication Drawings
- 10) Signal Equipment
- 11) Other Submittals as requested by the Engineer/City Engineer

The Engineer/City Engineer will review all submittals promptly and notify the contractor of their approval or denial. The contractor shall have approved submittals before beginning any associated work. Any work accomplished before approved submittals are received is subject to rejection and removal from the job at the contractor's expense.

**107.03 Material Submittals.** As a minimum, the following material submittals will be required:

- 1) Samples of on-site soils, if these soils are to be used as fill in the roadway. The Engineer/City Engineer will determine the number of samples to be taken.
- 2) Samples of soils to be used as borrow material.
- 3) Samples of material to be used as aggregate base under the roadway. One sample will be required initially. Additional samples will be taken during placement of aggregate base if deemed necessary by the Engineer/City Engineer.
- 4) Samples of material to be used as topsoil. Alternatively, the Engineer/City Engineer will inspect the site from which the topsoil is to be taken to determine its acceptability. All material samples shall be taken in the presence of a representative

from the Quality Assurance (QA)/Quality Control (QC) Laboratory. Other submittals may be required as determined by the Engineer/City Engineer.

#### **107.04 Testing, Observation and Inspection Requirements**

**(a) Field Observations and Inspections..** The City's field representative will be on-site during all work, which is to be paid for under the contract. The contractor shall provide one person as its on-site representative to receive instructions from the Engineer/City Engineer. This person shall be qualified and experienced in job superintendence.

The Contractor's representative shall be on-site during all work, which is to be paid for under the contract. If the Contractor's representative is not on-site, the Engineer/City Engineer may order all work be stopped until such time as the contractor's superintendent returns to the job site.

The Contractor shall provide the City's field representative with at least 24 hours of advance notice for any concrete placement.

The City will provide, at its expense, an independent quality assurance/quality control (QA/QC) laboratory to accomplish quality assurance testing. All testing will be scheduled with the QA/QC lab and the Contractor by the City. The Contractor shall provide or make available samples of all material as required by these specifications as well as any other materials deemed necessary by the Engineer/City Engineer.

**(b) Testing Requirements.** The Contractor shall inform the City's field representative at least 24 hours in advance of any required testing. The following is the minimum sampling and testing frequency required:

- 1) **Cross Drain Backfill:** minimum of one density test per layer of material placed per pipe or box culvert location.
- 2) **Storm drain backfill:** minimum of one density test per 500 lineal feet of pipe or portion thereof when the storm drain is located in the street or under the curb and gutter.
- 3) **Embankment:** minimum of one density test per layer per 500 lineal feet of roadway or portion thereof.
- 4) **Subgrade:** minimum of one density test per 500 feet of roadway with a minimum of three density tests per project, and one sieve analysis and plasticity index test per project per material type for subgrade soil classification.
- 5) **Aggregate base course:** minimum of one density test and one depth measurement (depth sounding) per 500 lineal feet of roadway, with a minimum of three density tests and three depth measurements per project. Also, there will be a minimum of one gradation test per project.

- 6) **Asphalt Concrete Hot Mix.** Testing shall be as specified in Section 403. Core holes shall be filled with non-shrink grout mix by the Contractor. All holes shall be protected from traffic until the grout has cured.
- 7) **Concrete for Drainage Structures.** A minimum of one set of three concrete cylinders per day's concrete placement will be required for drop inlets and junction boxes. Other placements will be sampled at the rate of 1 set of cylinders per 30 cubic yards of concrete placed. Slump and air entrainment tests will be conducted at the time of cylinder preparation. One cylinder will be broken at seven days and the other two will be broken at 28 days.
- 8) **Concrete for Curb and Gutter.** A minimum of one set of three concrete cylinders per 500 lineal feet of curb and gutter or portion thereof. One cylinder will be broken at seven days and the other two will be broken at 28 days.
- 9) **Concrete Pavement.** A minimum of one set of three concrete cylinders per 500 lineal feet of pavement or portion thereof, with a minimum of one set per project. The set shall be broken in seven and 28 days as described above. Also, one core and depth measurement per 500 lineal feet of complete pavement with a minimum of one per project. Core holes shall be filled with non shrink grout mix. All holes shall be protected from traffic until the grout has cured.

(c) **Provisions for Acceptance of Nonspecification Materials.** This section provides for corrective actions to be taken when test results indicate nonspecification materials or workmanship have been incorporated into the project. Any penalties, which are assessed, will be deducted from the contract price.

- 1) **Density for Embankment, Subgrade, Pipe Backfill, and Crushed Stone Base Course:** Recompact until the minimum density is obtained.
- 2) **Depth of Crushed Stone Base Course:** The depth of the crushed stone base shall be within plus or minus one-half inch ( $\pm 1/2''$ ) of the required depth. If the deficient depth is greater than one-half inch ( $1/2''$ ), additional material shall be added to reach the required depth. This material shall be incorporated into the existing material by the use of rippers or other equipment extending a minimum of 3 inches into the existing material.
- 3) **Depth and Density of ACHM Binder and Surface:** Depth and density requirements shall be as specified in Section 403 "Asphalt Concrete Hot Mix" of these specifications.
- 4) **Surface Tolerance of ACHM Surface:** Surface tolerance of ACHM Surface shall be as specified in Section 403 "Asphalt Concrete Hot Mix" of these specifications.
- 5) **Concrete Strength:** The average 28-day compressive strength of the two cylinders of a set shall be at least the required strength of the concrete specified. If the average strength is lower, the following penalties will be assessed:

<b>% of Minimum Strength</b>	<b>% Reduction in Contract Price</b>
92-100	10
85-92	25
Below 85%	Remove and Replace

- 6) **Concrete Pavement Depth:** The concrete pavement depths shall be within plus or minus three-eighths inch ( $\pm 3/8''$ ) of the required depth plus any additional depth required as a result of a deficient subbase depth. The average of all depth measurements shall not be less than the required depth, and any depth in excess of plus three-eighths inch ( $\pm 3/8''$ ) will not be used in computing the average depth. If the average depth is less than the required depth, the following penalties shall be assessed:

<b>Deficient Depth</b>	<b>% Reduction in Contract Price</b>
Req. depth to 1/8 inch	1
1/8 inch to 1/4 inch	3
1/4 inch to 3/8 inch	7
3/8 inch to 1/2 inch	15
1/2 inch to 5/8 inch	25
5/8 inch to 3/4 inch	40
More than 3/4 inch	Remove and Replace

- 7) **Concrete Pavement Surface:** The finished pavement surface shall have a maximum deviation of 1/4" when tested with a 10' straight edge parallel to the flow of traffic. Pavement cross slope shall vary by no more than 1/8" in 10' when tested with a straightedge.

Grinding shall be performed, if necessary, to remove any deviations in excess of 1/4". The grinding equipment shall be power driven and specifically designed to smooth and texture portland cement concrete by means of diamond blades. Areas that have been ground shall be re-grooved by grooving in accordance with subsection 601.16 for Class 7 surface finish, to provide a uniform texture equal in roughness to the surrounding pavement.

In addition to these requirements, if any individual test falls below the minimum requirements, the area represented by this test shall be assessed the appropriate penalty under the applicable section above.

**107.05 Testing and Material Specification.** These Specifications reference AASHTO Standards for testing and material. Unless specifically stated otherwise, the corresponding ASTM Standard will be allowed in lieu of the AASHTO Standard.

## **Section 108. Legal Relations and Responsibility to the Public**

**108.01 General.** The Contractor shall keep fully informed of all Federal and State laws, all local laws, ordinances, and regulations, and all orders and decrees of bodies or tribunals having any jurisdiction or authority which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. Further, the Contractor shall at all times observe and comply with all such laws, ordinances, regulations, quarantines, orders, and decrees; and shall protect and indemnify the City and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's employees.

All work pertaining to Electrical, Plumbing, and/or Building Crafts shall be performed in strict accordance with governing Federal, State, City, and Local Codes and Ordinances, with particular attention to the current editions of the Arkansas State Plumbing Code and the National Electrical Code as adopted by the National Fire Protection Association.

The Contractor shall comply with applicable Federal, State, and local laws governing safety, health, and sanitation. The Contractor shall provide safeguards, safety devices, and protective equipment and take any other action necessary to protect the life and health of employees on the project and the safety of the public and to protect property in connection with the performance of the work covered by the Contract.

Unless specified elsewhere in these specifications, the work involved or the delay or cost incident to compliance with these regulations will not be paid for separately, but full compensation therefore will be considered included in the contract unit prices bid for the various items of the Contract.

**108.02 Hazardous Substance.** If the release of a suspect hazardous substance has occurred, the Contractor shall notify the Engineer/City Engineer. This will not relieve the Contractor or responsible parties of the obligation to notify other appropriate agencies and will not relieve responsible parties of any liability.

Commonly used materials which could be potentially hazardous substances if they are spilled or enter waterbodies are: asphalt materials, concrete, cement, paint, solvents, petroleum products, fertilizers, concrete curing compound, lime, linseed oil, asphalt additives, and concrete additives. This list is not all inclusive.

Notification should be made if, at any time, there is an indication of a spill. Indicators could be:

- Leaking or empty containers, surface staining, chemical odors, vegetation damage, etc.
- Oil, grease or petrochemical substances, which produce residue, coat the banks and/or bottoms of a waterbody, or produce a visible, colored film on the surface.

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- Distinctly visible solids, scum, or foam of a persistent nature, or slime, bottom deposits, or sludge banks in a waterbody.

**108.03 Permits, Licenses, and Taxes.** Unless specified otherwise in this subsection and/or subsection 108.09, “Work Within Regulated Floodways”, the Contractor shall procure all permits and licenses, pay all charges, fees and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the work. These costs will not be paid for directly, but will be considered included in the contract unit prices bid for the various items of the Contract.

The Owner will obtain any railroad and Arkansas Highway and Transportation Department permits when required.

The Contractor shall obtain and pay for all permits, design fees and related costs resulting from a request by the Contractor to substitute materials or designs for those shown on the drawings or specified in these specifications.

**108.04 Patented Devices, Materials, and Process.** Contractors employing any design, device, material, or process covered by letters of patent or copyright shall provide for such use by suitable legal agreement with the patentee or owner. Contractors and their Sureties shall indemnify and save harmless the Owner, any affected third party, or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material, or process, or any trademark or copyright, and shall indemnify the City of Springdale for any costs, legal expenses, and damages that it may incur by reason of any infringement, at any time during the prosecution of or after the completion of the work.

**108.05 Restoration of Surfaces Opened by Permit.** The right to construct or reconstruct any utility service in the highway or street, or to grant permits for such work, at any time, is hereby expressly reserved by the City of Springdale or the proper authorities of the political entity in whose jurisdiction the work is done and the Contractor shall not be entitled to any damages either for the digging up of the street or for any delay occasioned thereby.

Any individual, firm, or corporation wishing to make an opening in the roadway must secure a permit from the proper authority. The Contractor shall allow parties bearing such permits, and only those parties, to make openings in the roadway. When ordered by the Owner, the Contractor shall make in an acceptable manner all necessary surface repairs due to such openings and such necessary work will be paid for as extra work, or as provided in these specifications, and will be subject to the same conditions as original work performed.

**108.06 Sanitary Provisions.** The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of the employees as may be necessary to comply with the requirements of the State and local Boards of Health, or of other bodies or tribunals having jurisdiction. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or

satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

**108.07 Public Safety and Convenience.** The Contractor's work shall at all times be conducted so as to assure the least possible obstruction to traffic. The safety and convenience of the general public and the residents along the street and the protection of persons and property shall be provided for by the Contractor as specified by these Specifications and as directed by the Owner..

All roadway cuts shall be temporarily or permanently repaired in accordance with Section 405, "Asphalt Concrete Patching For Maintenance of Traffic" within 24 hours of the completion of trench backfill for the work, or segment of work, which required the excavation and/or cut.

The Contractor shall be responsible for providing a fence to control livestock and pets in areas where existing fencing is altered under the Contract. The City may elect to include temporary fencing as a pay item under subsection 512, "Fences" of these Specifications. If temporary fencing is not included as a pay item within the proposal, then temporary fencing that is suitable for the required use shall be supplied, shall be a subsidiary item, and no separate payment shall be made for this temporary fencing. Additionally, if temporary fencing is not included as a pay item within the proposal then permanent fence if included within the plans and/or the proposal may be constructed initially, or in lieu of temporary fencing.

The Contractor shall not create a public nuisance while performing the various operations of the work. Excessive noise between the hours of 10 P.M. and 6 A.M., dust from haul roads, County roads, or State roads, and mud tracked onto City, County or State roads or streets by equipment may be considered by the City to be a public nuisance.

The Contractor will be responsible for maintaining U.S. mailboxes within the project limits in such a manner that the public may receive continuous mail service according to U.S. Postal Service regulations. Unless otherwise provided, upon completion of the project, mailboxes will be replaced as near as practicable to their original location.

**108.08 Railway Provisions.** All work on railroad property shall be accomplished in strict compliance with the plans, these specifications, and such Special Provisions as are appropriate to the Contract. If the work near the railway requires a permit, the Contractor shall be responsible for acquiring this permit and adhering to the permit requirements.

All work to be performed by the Contractor in construction on the railroad right-of-way shall be performed at such times and in such manner as not to unnecessarily interfere with the movement of trains or traffic upon the track of the Railway Company. The Contractor shall use all care and precaution to avoid accidents, damage, or unnecessary delay or interference with the Railway Company's trains or other property.

Plans for all sheeting or cofferdams for foundation work adjacent to operated track, and plans of falsework, staging, protective sheeting, or other temporary construction near the operated

track shall be approved by the Railway Company. The Contractor shall construct the work according to the approved plans.

**108.09 Work Within Regulated Floodways.** All work within regulated floodways shall be accomplished within the requirements of all permits issued by the Federal Emergency Management Agency (FEMA), Corps of Engineers (COE), The State of Arkansas, the City, or other applicable agencies, and with Section 110 of the AHTD Standards “Protection of Water Quality and Wetlands.”

**(a) Responsibility for FEMA Permit.** Within regulatory floodways all permanent and temporary fills/structures must be in accordance with FEMA and local governmental requirements. The Owner obtains all required permits and/or variances for essential work in the regulated floodway before the Contract is awarded. The Owner will apply for Contractor requested variances which it determines are necessary. The Contractor should be aware that requested temporary fills/structures may not be approved or may require mitigation.

**(b) Corps of Engineers Section 404 Permit Requirements.** Placement of temporary fills/structures within a regulatory floodway may also require alteration of the existing COE 404 Permit.

**(c) Compensation and Extension of Contract Time.** The Contractor will not be granted additional compensation or contract time due to requested floodway variances that are considered by the Engineer/City Engineer to be for the convenience of the Contractor. If, however, due to no fault of the Contractor, a floodway variance is deemed by the Engineer/City Engineer to be necessary, additional contract time and/or compensation may be considered according to the provisions of Subsection 109.10 “Claims for Adjustment and Disputes.”

All permits issued to the Contractor by the U.S. Army Corps of Engineers, or other applicable agencies, for the convenience of the Contractor in accomplishing the Work, shall be complied with in full and the Project will not be accepted until the permittor has accepted the work covered by permit. The Contractor will be responsible for obtaining a release from the permittor before acceptance.

**108.10 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 comply with all laws and ordinances regarding the use of explosives; further, the Contractor shall be responsible for all damage resulting from the use of explosives.

All explosives shall be stored in a secure manner in compliance with all laws and ordinances, and all such storage places shall be clearly marked. Where no local laws or ordinances apply, storage shall be provided satisfactory to the City and in accordance with the Occupational Safety and Health Act of 1970, and the Safety and Health Regulations for Construction promulgated thereunder, but not closer than 1,000’ from the road or from any building or camping area or place of human occupancy.

The Contractor shall notify the Fire Marshal of any explosive storage sites.

The Contractor shall notify each public utility company having structures in proximity to the site of the work of any intention to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property from injury.

**108.11 Protection and Restoration of Property and Landscape.** The Contractor shall be responsible for the preservation of all public and private property and shall protect carefully from disturbance or damage all land monuments and property marks until the Engineer/City Engineer has witnessed or otherwise referenced their location, and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character:

- 1) during the prosecution of the work, resulting from any act, omission, neglect, or misconduct in the manner or method of executing the work, or
- 2) at any time, due to defective work or materials, and said responsibility will not be released until the project has been completed and accepted.

Property shall include but not be limited to street and roadway signs, right-of-way monuments, roadway lighting, traffic signal equipment, and any conduits and wiring. Should it become evident that any item, such as listed above, is in conflict with the proposed work, the Contractor will notify the Engineer/City Engineer so that proper steps can be taken to adjust, remove, or otherwise eliminate the conflict.

Trees located outside of the easements or as indicated on the plans shall be retained and protected. Any roots 2" or larger in diameter are to be clean cut with a hand saw where they conflict with excavation work.

When or where any direct or indirect damage or injury is done to public or private property by or as a result of any act, omission, neglect, or misconduct in the execution of the work, or in consequence of the non-execution thereof, the Contractor shall restore, or bear the expense of restoring, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as may be directed, or shall make good such damage or injury in an acceptable manner. Failure to do so within a period of time deemed reasonable by the Owner shall constitute noncompliance, and the City may cause the entire cost of the restoration to be deducted from moneys due or to become due the Contractor on the Contract.

**108.12 Load Restrictions.** The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads being maintained for the traveling public. A special permit will not relieve the Contractor of liability for damage that may result from construction equipment operations. The operation of equipment of such weight or so loaded as to cause damage to structures or the roadway or to any other type of construction will not be permitted.

When hauling materials over the base or surface courses under construction, the Contractor shall limit the hauling as necessary to prevent damage. No loads will be permitted on bases, pavements, or structures before the expiration of the specified curing period controlling such operations. The Contractor shall be responsible for repair of all damage resulting from construction operations. No separate payment will be made for such repairs.

**108.13 Opening Section of Roadway to Traffic.** Whenever any roadway, or portion thereof, is in an acceptable condition for travel, it shall be opened to traffic, as may be directed, and such opening shall not be held to be in any way an acceptance of the roadway, or any part of it, or as a waiver of any of the provisions of these specifications and the Contract. Necessary repairs or renewals made on any section of the roadway opened to travel under instructions from the Engineer/City Engineer, due to defective material or work, or to natural causes, other than normal wear and tear, pending completion and acceptance of the roadway, shall be performed at no cost to the Owner.

If the Contractor is dilatory in completing shoulders, drainage structures, or other features of the work, the Engineer may give notification in writing and establish therein a reasonable period of time in which the work should be completed. If the Contractor is dilatory or fails to make a reasonable effort toward completion in this period of time, the Engineer/City Engineer may take action as provided in subsection 105.01 "Authority of the Engineer." On such sections that are so ordered to be opened, the Contractor shall conduct the remaining construction operations so as to cause the least obstruction to traffic and shall not receive any added compensation due to the added cost of the work by reason of opening such section to traffic.

**108.14 Contractor's Responsibility for Work.** Until final acceptance of the project by the City, the Contractor shall have the charge and care thereof and shall take every precaution against injury, theft, or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries, thefts, or damages to any portion of the work occasioned by any of the above causes before final acceptance, and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God, of the public enemy, or of governmental authorities.

In case of suspension of work from any cause whatever, the Contractor shall be responsible for the project and shall take such precautions as may be necessary to prevent damage to the project, provide for normal drainage and maintenance of the traveled way, and shall erect any necessary temporary structures, signs, or other facilities. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seedings, and soddings furnished under the Contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

The protection of the work shall be accomplished at no cost to the City.

In case of errors or negligence on the part of the Contractor, any expenses incurred by the City for engineering, observation, inspection, testing, design, or evaluation relative to correction of the work will be assessed against the Contractor.

**108.15 Contractor's Responsibility for Utility Facilities and Services.** At points where the Contractor's operations are adjacent to railroad or utility facilities, damage to which may result in loss or inconvenience, work shall not begin until all arrangements necessary for the protection thereof have been made.

The Contractor shall cooperate with the owners of any utility facilities in their removal and rearrangement operations so that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

In the event of interruption of utility services, as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with the said authority in the restoration of service. If utility service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the Owner..

**108.16 Furnishing Right-of-Way.** The City will be responsible for the securing of all necessary rights of way in advance of construction within the limits indicated on the plans. Acquisition of right-of-way by the City does not include areas required by the Contractor for material sources (borrow, gravel, topsoil, sod, etc.), plant sites, equipment storage, stockpiles, disposal of waste or excess material, or any other areas required for the proper prosecution of the work. The Contractor is responsible for obtaining, at no cost to the City, areas outside the right-of-way required for such purposes and shall, at the City's request, furnish copies of agreements with the property owners. The Contractor may, with the approval of the City, use areas within the right-of-way that are outside the construction limits for these purposes. Erosion control, prevention of water pollution, and restoration of all such areas, both inside and outside the right-of-way, shall be performed by the Contractor according to the specifications and at no cost to the City.

**108.17 Personal Liability of Public Officials.** In carrying out any of the provisions of these specifications, or in exercising any power or authority granted to them by or within the scope of the Contract, there shall be no liability upon the City or its authorized representatives, either personally or as officials of the City, it being understood that in all such matters they act solely as agents or representatives of the City of Springdale.

**108.18 No Waiver of Legal Rights.** Final acceptance according to Subsection 109.15(b) "Final Acceptance" shall not preclude the City from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the City be precluded from recovering from the Contractor or the Surety, or both, such overpayment as it may sustain, or by failure on the part of the Contractor to fulfill obligations under the Contract. A waiver on the part of the City of any breach of any part of the Contract shall not be held to be a waiver of any other or subsequent breach.

The Contractor, without prejudice to the terms of the Contract, shall be liable to the City for any or all of the following: fraud or such gross mistakes as may amount to fraud, the City's rights under any warranty or guaranty, or any latent defects in the work.

### **108.19 Responsibility for Damage Claims.**

#### **(a) Contractor's and Subcontractor's Indemnification Provision to the Owner.**

The Contractor shall indemnify and save harmless the City of Springdale and its officers and employees from all suits, actions, or claims of any character, and the legal expenses incurred regarding same, brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the Work; or because of any act or omission, neglect, or misconduct of the Contractor; or because of any claims or amounts recovered from any infringement of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workman's Compensation Act," or any other law, ordinance, order, or decree; and so much of the money due the Contractor under and by virtue of the Contract as may be considered necessary by the Owner for such purpose may be retained for the use of the Owner; or in case no money is due, the Surety may be held until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the Owner; except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that adequate protection is provided by public liability and property damage insurance.

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

It is specifically agreed between the parties executing the Contract that it is not intended by any of the provisions of any part of the Contract to create the public or any member thereof a third party beneficiary thereunder, or to authorize anyone not a party to the Contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the Contract.

#### **(b) Contractor's and Subcontractor's Indemnification Provision to the Engineer.**

(1) INDEMNIFICATION: The CONTRACTOR and/or SUBCONTRACTOR shall indemnify and hold harmless the ENGINEER, ENGINEER'S Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage (i) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and (ii) is caused in whole or in part

by a negligent act or omission of the Contractor, any Subcontractor or Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work.

(2) **NO LIMITATION UPON LIABILITY:** In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representative or such employee) of CONTRACTOR, any Subcontractor or Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph (1) shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefits acts or other employee benefit acts.

(3) **ENGINEER/ARCHITECT EXCLUSION:** The indemnification obligations of CONTRACTOR under paragraph (a) shall not extend to the liability of ENGINEER and ENGINEER'S Consultants, officers, directors, employees, or agents caused by the professional negligence, errors or omissions of any of them, arising out of: the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications.

## **Section 109. Prosecution and Progress**

**109.01 Subletting of Contract.** The Contractor will be permitted to sublet a portion of the Contract, except that work amounting to not less than 40% of the total Contract amount must be performed by the Contractor's organization. If the Bidder intends to sublet any portion of the Work, the Bidder shall furnish a list of subcontractors as a material part of his sealed proposal on the form provided, listing the description of work to be performed by each subcontractor. The experience, past performance, and ability of each proposed Subcontractor will be considered in the evaluation of bids. Upon request, the bidder shall furnish experience statements, with reference to any requested Subcontractor, prior to Notice of Award. If there being no objection in writing by the Owner to the listed subcontractors prior to the award of the Contract, the subcontractors will be deemed acceptable to the Owner. If bidder does not intend to sublet any part of the work, he shall insert the word "NONE" on the form provided. The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the contract or any portion thereof, of his right, title, or interest therein, without prior written consent of the Owner and of the surety. The Contractor shall not remove and/or substitute the listed subcontractors without prior written consent of the Owner.

Consent to sublet, assign, or otherwise dispose of any portion of the contract shall not be construed to relieve the Contractor of his liability under the contract and bonds.

The Contractor shall perform with his own organization, unless otherwise authorized by the Special Conditions, work amounting to not less than 40% of the total Contract amount. No subcontractor shall further subcontract any portion of the work without the written consent of the Contractor and acknowledgement of the Owner.

The Owner will not recognize any subcontractor on the Work as a party to the contract. Nothing contained in any subcontract shall create any contractual relation between the subcontractor and the Owner. The Contractor will be held responsible for the progress of the subletted work in accordance with the contract progress required.

**109.02 Preconstruction Conference.** A preconstruction conference, when applicable, will be held for each contract within fourteen (14) days after the execution of the Contract and prior to the start of work. The Engineer will notify the Contractor, utility companies, and other interested parties of the date and place for the conference.

**109.03 Notice to Proceed or Work Order.** The Contract Time will commence to run on the day indicated in the Notice to Proceed or Work Order. Commencement of work by Contractor will not be allowed prior to receipt of the Notice to Proceed.

The Contractor shall begin the work to be performed under the Contract not later than ten (10) calendar days after the Notice to Proceed date. If the Contractor is unable to begin the work within this time period, the Engineer/City Engineer shall be so notified in writing. Unless the Engineer/City Engineer gives written approval for the delay in beginning the work, contract time will be assessed according to Subsection 109.08 "Determination of Contract Time and Extension of Contract Time."

The Owner allocates its resources to a contract based on the total time allowed in the Contract. The Contractor may propose an accelerated work schedule indicating an early completion date; however, the Owner cannot guarantee the Owner's resources will be available to meet the accelerated schedule. If an accelerated work schedule is approved, no additional compensation or extension of time will be allowed if the Contractor is unable to meet the accelerated schedule due to the unavailability of the Owner's resources or for other reasons beyond the Owner's control.

**109.04 Prosecution and Progress.** Contractor shall be responsible for planning, scheduling and reporting the progress of the work to ensure timely completion of the Contract. For Contracts under \$2 million, or where specified in the Special Conditions, the following schedule requirements shall apply: Prior to or at the Preconstruction Conference, the Contractor shall submit two copies of his proposed schedule of operations for acceptance by the Engineer/City Engineer. The proposed Schedule shall be a bar chart or schematic (arrow) diagram showing the work stages and operations for all major activities required by the Contract, including the starting and completion of date of each part, and shall include dates of any proposed road closure, and any significant or required milestone events. Unless approved by the Engineer/City Engineer, activities shown on the Schedule shall not exceed 15 working days in length. The Schedule shall be of sufficient detail to allow day-to-day monitoring of Contractor's progress.

For Contracts over \$2 million, the following Critical Path Schedule requirements shall apply: Prior to or at the Preconstruction Conference, the Contractor shall submit a preliminary network analysis system defining the Contractor's planned operations during the first sixty calendar days after the date of the Notice to Proceed. The Contractor's general approach to the remainder of the Project shall be indicated. Within 30 calendar days of the Notice To

Proceed, the Contractor shall submit a complete network analysis system, consisting of logic diagrams, computer mathematical analysis, calendar, and narration, to cover the Contractor's anticipated time schedule for the complete Project. As a minimum, the network analysis system shall include the following features:

- 1) Shall be time-scaled in calendar days with activities plotted on their early start and finish dates. Unless approved by the Engineer/City Engineer, activities shown on the Schedule shall not exceed 30 working days in length.
- 2) Network diagram shall show the order and interdependence of activities and the proposed sequence in which the work is to be accomplished as planned by the Contractor in coordination with all subcontractors. The sequence and logic shall be clear. The critical path activities shall be prominently distinguished.
- 3) Network diagram shall show for each activity the preceding and following activity, activity description, the total float, and the duration of the activity.
- 4) Activities shown shall include, in addition to construction activities, such tasks as submittal review and delivery times for long-lead time items, franchise utility work, subcontractor work, and owner-furnished equipment delivery.

The Contractor shall submit monthly updated Schedules with their pay estimate requests. The Contractor shall indicate on such updated Schedule actual construction progress, extra work added to Contract, and any proposed changes to the operation sequence. If the progress of the Work is significantly behind schedule, the updated Schedule shall also reflect any revised operation sequence, changes in equipment, labor forces, or working shifts, or other pertinent factors by which insufficient progress will be made up to allow the Contract completion within the time set forth in the Contract, including time extensions granted to date.

All submitted schedules and updated schedules shall be reviewed and accepted by the Engineer/City Engineer. If after review, the Engineer/City Engineer determines that the schedule is not acceptable per the requirements listed above, the Contractor shall make adjustments and resubmit the schedule within 30 calendar days. Failure of the Contractor to submit an acceptable Schedule or monthly updated Schedule as required will be grounds for Owner to withhold an additional ten percent on the monthly progress payments, in addition to the normal retention, until Contractor is in compliance. Additional money withheld will be paid, upon compliance, in the next scheduled monthly estimate.

Acceptance of Contractor's schedules by Engineer/City Engineer shall not be construed as relieving Contractor of the obligation to complete the Work within the Contract Time; or as granting, rejecting, or in any other way acting on Contractor's requests for adjustments to the date for completing Contract Work, or claims for additional compensation. Such requests shall be processed in strict compliance with other relevant provisions of the Contract.

No measurement or direct payment will be made for Contractor costs relating to preparation and submission of schedules, updates and revisions thereto, the cost being considered as included in the prices paid for Contract items.

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Contractor shall carry on the work and maintain the progress schedule during all disputes or claims with Engineer/City Engineer. No work shall be delayed or postponed pending resolution of any disputes or claims, except as Contractor and the Owner may otherwise agree in writing.

Float time is not for the exclusive use or benefit of either the Owner or Contractor. Extension of time for performance may be granted, as allowed in subsection 109.08, for delays caused solely by action or inaction by the Owner to the extent that equitable time adjustment for the activity affected exceeds the total float of the project, or where an impact on the contract completion date can be shown.

**109.05 Limitations of Operations.** The Contractor shall conduct the work at all times in such a manner and in such sequence as will assure the least interference with traffic and utility services. Due regard shall be given to the location of detours, bypasses, and to the provisions for handling traffic and utility services. No work shall be opened up to the prejudice or detriment of work already started. The Engineer/City Engineer may require the Contractor to finish a section on which work is in progress before work is started on any additional sections if the opening of such section is essential to public convenience. For roadway overlay projects and drainage projects, each individual street or section of drainage must be completed, including all site restoration, within 45 days of the start of work operations within that street or section, unless otherwise authorized by the Engineer/City Engineer.

Except in connection with the safety or protection of persons or the work or property at the site, and except as otherwise indicated in the Contract Documents, all work that requires inspection shall be performed during City of Springdale regular working hours, and Contractor will not permit overtime work or the performance of work on Saturday, Sunday, or any legal holiday as designated in Subsection 101(c) "Definitions" without Engineer/City Engineer's written consent. Contractor to submit a written request to the Engineer/City Engineer for non-regular working hours 48 hours in advance of the start of such work.

**109.06 Character of Workers, Methods, and Equipment.** The Contractor shall at all times provide sufficient materials, equipment, and labor to guarantee the completion of the Project according to the Plans and Specifications within the contract time. The Contractor shall advance the Work so that the available time is appropriately utilized in order to complete the Work within the contract time.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform all work properly and satisfactorily.

Any person employed by the Contractor or by any subcontractor who, in the opinion of the Engineer, does not perform work in a proper and skillful manner, or is intemperate, belligerent or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without the approval of the Engineer.

Should the Contractor fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, the Owner may suspend the work by written notice and withhold moneys due until such orders are complied with.

All equipment that is proposed to be used on the Work shall be of sufficient size and in such mechanical condition as to meet requirements of the work and to produce a satisfactory quality of work. Equipment used on any portion of the project shall be such that no injury to the roadway, adjacent property, or other facilities will result from its use.

When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the Contract, the Contractor is free to use any methods or equipment that are demonstrated to the satisfaction of the Engineer as being capable of accomplishing the Contract work in conformity with the requirements of the Contract.

When the Contract specifies that the construction be performed by using certain methods and/or equipment, such methods and/or equipment shall be used unless others are authorized by the Engineer in accordance with Subsection 105.11 "Substitution of Materials and Equipment."

**109.07 Temporary Suspension of Work.** The Engineer/City Engineer will have the authority to suspend the work wholly or in part for such period or periods necessary, due to unsuitable weather or other conditions unfavorable for the suitable prosecution of the work. If it should become necessary to stop work for an indefinite period, the Contractor shall store all materials in such manner that they will not obstruct or impede the traveling public nor become damaged in any way, and shall take every reasonable precaution to prevent damage or deterioration of the work performed; provide suitable drainage of the roadway by opening ditches and shoulder drains; maintain water and sewer services; maintain the traveled way; erect temporary structures where directed; etc.

If the performance of all or any portion of the work is suspended or delayed by the Engineer/City Engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the Contractor shall submit to the Engineer/City Engineer in writing a request for adjustment within fifteen (15) days of the receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.

Upon receipt, the Engineer/City Engineer will evaluate the Contractor's request. If the Owner agrees that the cost and/or time required for the performance of the Contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the Owner will make an adjustment (excluding profit) and modify the Contract in writing accordingly. The Owner will notify the Contractor of a determination whether or not an adjustment of the Contract is warranted.

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No Contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time prescribed.

No Contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of the Contract.

### **109.08 Determination of Contract Time and Extension of Contract Time.**

**(a) General.** The time allowed for the completion of the Work included in the Contract will be stated in the Proposal and Contract, and will be known as the "Contract Time". The contract time will be specified as a fixed completion date or as calendar days.

The Contractor shall take into consideration all normal conditions considered unfavorable to the normal progress of the Work and place a sufficient work force and equipment on the project to ensure completion of the Work within the contract time.

The Engineer/City Engineer will determine the date upon which the Contract is substantially complete and time assessment will cease. In the event cleanup is necessary or items found at the final inspection are to be corrected, the Contractor shall complete this work in a timely manner as defined in subsection 109.15 or the Engineer/City Engineer will resume time charges.

**(b) Fixed Completion Date.** When the contract time is specified as a fixed date, it will be the date on which all work on the project shall be substantially complete.

**(c) Calendar Day.** Calendar day contract time includes delays for normal weather-related events, such as rain, snow, and freezing temperatures that may affect the progress of the construction in the following amounts on a per-month basis as hereinafter set out. Only weather-related delays in excess of these amounts will be considered for time extensions, if requested by the Contractor. Days Included in Contract Times for Normal Weather-Related Events are: (On A Monthly Basis)

<b>Month</b>	<b>Normal Weather-Related Events</b>
January	11
February	9
March	8
April	8
May	8
June	8
July	7
August	7
September	7
October	7
November	7
December	8

No changes in contract times will be allowed for any reason without a request in writing from the contractor. This request shall include reasons for the request with supporting documentation as proof of extraordinary delays beyond the contractor's control. Normal rainfall amounts and soil conditions will not be considered as reasons for extensions of time, nor will workload of the Contractor. The request must be submitted for to the Engineer/City Engineer within 5 days of the end of the month to be considered. No compensation will be made for monetary damages due to weather delay(s).

**(d) Working Day.** When the contract time is specified in working days, time will be assessed for each day on which, in the judgment of the Engineer/City Engineer and subject to the limitations below, conditions allow the Contractor to effectively utilize 60% of normal forces and equipment to prosecute the work required at that time, for at least 60% of the Contractor's normal working hours, regardless of whether the Contractor actually works.

The Engineer/City Engineer will not assess a working day when conditions exist beyond the control and without the fault of the Contractor that prevent the utilization of forces and equipment as defined above. Also, for the purpose of assessment of working days, inaccessibility to a portion of the work due to utility conflict or utility work, either of which prevents utilization of forces and equipment as defined above, will be considered as an adverse working condition for the time exceeding that specified in the Contract for the utility adjustment. The ability of vendors, suppliers, and subcontractors to provide materials and/or services is considered within the Contractor's control for the purpose of assessment of working days.

Time from December 21 through January 15, inclusive, will not be assessed against the contract time.

Saturdays and City recognized holidays, other than those designated above, which may be declared by the City for certain special or unusual circumstances, will be optional to the Contractor as working days, and time will not be assessed unless work is performed that requires inspection. If work is performed, contract time assessment will be based upon the same conditions as a normal working day.

Contract time will not be assessed during a full suspension of the work as ordered by the Engineer/City Engineer. During a partial suspension of the work as ordered by the Engineer/City Engineer, the contract time will be assessed in direct proportion to the ratio of the money value of the items not suspended to the total contract amount.

Each pay estimate will state the each working day charged during the preceding period and the total number of working days charged to date. If the Contractor disagrees with the working days charged by the Engineer/City Engineer, then the Contractor shall, within 10 calendar days of signing the pay estimate, give the Engineer/City Engineer written notice of such disagreement and the reasons therefore. If the Contractor does not provide written notice within 10 calendar days of signing the pay estimate, no subsequent request for review will be considered.

**(e) Extension of Contract Time.** The Contract Time may only be changed by a Change Order. Any claim for an extension in the Contract Time shall be based on written notice delivered to the Engineer within fifteen days of the occurrence of the event giving rise to the claim. This request must contain specific dates and the detailed circumstances relative to the time extension desired. The Contractor's contention that insufficient time was specified is not a valid reason for an extension of time. All extensions of time will be documented by Change Order. Any extended time for completion shall be in full force and effect the same as though it were the original contract time. An extension of time will be considered, based upon documented evidence submitted by the Contractor, if:

- 1) The Engineer suspends the work according to Subsection 109.07 "Temporary Suspension of Work".
- 2) The Contract requires the furnishing of critical materials and the Contractor experiences a delay in delivery because of Federal priorities for defense needs or because of nationwide shortages. Additional contract time may be allowed in an amount equal to the actual lost time resulting from such delay. To obtain additional contract time, the Contractor shall document and file with the Engineer/City Engineer all evidence pertaining to the original agreement with the material supplier or manufacturer. This evidence must indicate that delivery would be made at or before the time the materials would be needed in the normal sequence of construction operations for incorporation in the work. In the event that no prior agreement has been made for furnishing a critical material, and the Contractor is unable to locate a supplier or manufacturer that can deliver the material when needed, the Engineer shall be advised of this situation in writing, indicating the date that delivery will be made and the date of the original request for such material. In either of these situations, when work has progressed to the point that critical materials not delivered are delaying progress of the project, the Contractor may make a written request to the Engineer/City Engineer for additional contract time.
- 3) If delays beyond the Contractor's control are caused solely by action or inaction of the Owner based upon the effect of delays to the Project as a whole and will not be granted for non-controlling delays to minor included portions of work, unless it can be shown that such delays did, in fact, delay the progress of the Project as a whole.
- 4) Preparatory work to be performed by the Owner or by others specified in the Contract has not been accomplished and the delay is not the fault of the Contractor.
- 5) Inaccessibility to a portion of the work due to utility conflict or franchise utility work will be considered as an adverse working condition, for time exceeding that specified in the Contract for the franchise utility work, based upon the effect of delays to the Project as a whole and will not be granted for non-controlling delays to minor included portions of work, unless it can be shown that such delays did, in fact, delay the progress of the Project as a whole.
- 6) The Change Order involves extra work which effects delay to the Project as a whole and will not be granted for non-controlling delays to minor included portions of work,

unless it can be shown that such extra work did, in fact, delay the progress of the Project as a whole.

- 7) All the Work, or the portion of the Work which is the currently controlling operation, is suspended due to such conditions as are considered unfavorable to the suitable prosecution of the work, if the following conditions are satisfied:
  - The weather experienced at the project site during the contract period must be found to be unusually severe, that is more severe than the adverse weather normally anticipated according to Subsection 109.08 (c) “Calendar Day” and the weather must prevent work on critical activities for 50 percent or more of the Contractor’s scheduled work day; or
  - The Engineer orders the suspension of the work in the interest of public safety or health or due to specification requirements.
- 8) The work was delayed because of conditions not described herein that were beyond the control and without fault of the Contractor.

**109.09 Extra Work.** The Contractor, when directed, shall perform unforeseen work which is not shown on the plans or in the specifications for which there is no quantity and price included in the Contract, whenever it is deemed necessary or desirable to further complete the Work as contemplated. Such extra work shall be performed according to the specifications and as directed. However, before any extra work is performed, a Change Order shall be signed by both contracting parties, or a written order procured from the Owner directing the Contractor to do the work on a Force Account basis as provided in Subsection 109.12 “Extra and Force Account Work.”

**109.10 Claims for Adjustment and Disputes.** If, in any case, the Contractor deems that additional compensation is due for work or material not clearly covered in the Contract or not ordered by the Owner as extra work, as defined in Subsection 109.09 “Extra Work” the Contractor shall notify the Engineer/City Engineer in writing of intention to make claim for such additional compensation before beginning the work on which the claim is based. If such notification is not given and the Engineer/City Engineer is not afforded proper time and facilities by the Contractor for keeping accurate account of the actual costs of the work, the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the Engineer/City Engineer has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. If the claim, after consideration by the Owner, is found to be just and adequately supported, an adjustment will be made to the Contract. If the Contract does not contain a pay item for which the adjustment can be made, the adjustment will be made according to Subsection 109.12”Extra and Force Account Work.”

Nothing in this subsection shall be construed as establishing any claim contrary to the terms of Subsection 104.02 “Alteration of Plans or Character of Work”. Contractor shall carry on the Work and maintain the progress schedule during all disputes or claims with Owner. No

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work shall be delayed or postponed pending resolution of any disputes or claims, except as Contractor and the Owner may otherwise agree in writing.

All claims shall be in sufficient detail to enable the Owner to determine the basis for entitlement and the costs incurred, excluding loss of anticipated profits, organization or overhead expense, or interest. All claims shall include a detailed factual statement providing all necessary dates, locations, items of work affected, amount of compensation requested, and a breakdown of that amount. If an extension of time is also sought, the specific days for which it is sought and the basis for such claim.

When submitting a claim, the Contractor must certify in writing that the claim is made in good faith, supporting data are accurate and complete to the Contractor's best knowledge and belief, and that the amount of the claim accurately reflects the Contract adjustment for which Contractor believes Owner is liable. Subcontractor claims shall not be considered except as submitted and certified by Contractor as Contractor's claim.

All disputes arising under this Contract or its interpretation, whether involving law or fact or both, or extra work, and all claims for alleged breach of Contract shall within ten (10) days of commencement of the dispute be presented by the Contractor to the Owner for decision. All papers pertaining to claims shall be filed in quadruplicate. Such notice need not detail the amount of the claim, but shall state the facts surrounding the claim in sufficient detail to identify the claim, together with its character and scope. In the meantime, the Contractor shall proceed with the work as directed. Any claim not presented within the time limit specified within this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is not given within ten (10) days of its commencement, the claim will be considered only for a period commencing ten (10) days prior to the receipt by the Owner of notice thereof.

The Contractor shall submit in detail his claim and his proof thereof. Each decision by the governing body of the Owner will be in writing and will be mailed to the Contractor by registered mail, with return of receipt requested.

If the Contractor does not agree with any decision of the Owner, he shall in no case allow the dispute to delay the work, but shall notify the Owner promptly that he is proceeding with the work under protest, and he may then except the matter in question from the final release.

**109.11 Claims Limitations.** The Contractor acknowledges and agrees that in no event shall a claim be submitted to the Owner after the receipt of the Final Payment for the Project and the Contractor acknowledges and agrees that any claim submitted after receipt of the Final Payment shall be deemed waived by the Contractor.

### **109.12 Extra and Force Account Work.**

**(a) Extra Work.** Extra work performed shall be agreed upon by both the Owner and the Contractor and shall be documented by an approved Change Order before the work is performed. When the Owner deems it impractical to handle extra work on a unit price basis, payment specified in the Change Order may be by any method agreed upon by both the

Owner and the Contractor. Mutual agreement between the Owner and the Contractor as to the amount to be paid and method of payment for Extra Work may be based on an estimate of the costs of performing the work; detailed information such as required for Force Account work; or any other logical method to which both parties agree which estimates costs incurred, excluding loss of anticipated profits and organization or overhead expense. Estimates of cost for extra work submitted for approval shall include detailed information as determined sufficient by the Engineer to analyze the estimate. Percentages used for overhead and profit shall be the same as those allowed under Item (b) "Force Account" below.

**(b) Force Account.** Work ordered and accomplished by Force Account shall be documented by a signed Construction Field Change prior to beginning the work. Payment for work accomplished on a Force Account basis, shall be made according to the following:

- 1) **Labor.** For all labor and foremen employed on the specific operation, the Contractor will receive the current local rate of wage, or the wage stipulated in the Contract, for each and every hour that said labor and foremen are actually engaged in such work, to which will be added an amount equal to 20% thereof for overhead and profit. Only the actual amount of insurance and payroll taxes imposed by law and paid by the Contractor on the labor used will be allowed. No charge shall be made by the Contractor for organization or overhead expense. The number of laborers and foremen employed in the work shall be subject to approval by the Engineer, and the number so employed shall not exceed the number the Engineer deems most practical and economical for the work.
- 2) **Materials.** For all materials used, if furnished by the Contractor, the Contractor will receive the actual cost of such materials, including freight, hauling, and handling charges, as shown by original receipted bills or certified statements, to which cost will be added a sum equal to 15% thereof for overhead and profit.
- 3) **Equipment.** For any Contractor owned machinery or special equipment (other than small tools) which has been authorized by the Engineer, the Contractor shall receive the rental rates specified in the Construction Field Change authorizing the work. The hourly rental rates shall be established by the Engineer based upon the prevailing commercial rates in the area. The established hourly rental rate shall be equal to the monthly rate for the basic equipment plus the monthly rate for applicable attachments, both divided by 176.

Equipment that must be rented or leased specifically for extra work required by the Construction Field Change shall be authorized in writing by the Engineer/City Engineer. The Contractor shall be paid the invoice price for the rented or leased equipment.

When it is necessary to obtain equipment from sources beyond the project limits exclusively for extra work of less than one month duration, the cost of transferring the equipment to the site of the work and return will be allowed as an additional item of expense. Where the move requires the use of a hauling unit, the move-in allowance will be limited to the rental rate, as computed above, for the hauling unit plus operator

wages. In the event that the move-out is to a different location, payment will in no instance exceed the amount of the move-in. Move-in allowance shall not be made for equipment brought to the project for extra work but which is subsequently retained on the project and utilized for completion of other contract items or related work.

Time will be recorded to the nearest one quarter hour for purposes of computing compensation to the Contractor for equipment utilized under these rates.

The equipment rates as determined above shall be full compensation for providing the required equipment and no additional compensation will be made for other costs such as, but not limited to, fuels, lubricants, replacement parts, or maintenance costs. Cost of repairs, both major and minor, as well as charges for mechanic's time utilized in servicing equipment to ready it for use before moving to the project, and similar charges will not be allowed. To the Contractor's actual cost shall be added the sum of 5% for the Contractor's profit and overhead with no further compensation therefore.

- 4) **Specialized Work.** Whenever the Contractor is required to perform extra work of a specialized nature (electrical, plumbing, landscaping, etc.) for which he is not properly equipped, he may upon approval of the Owner have the performed by a local firm or specialist who is proficient in the type of work to be performed. Payment for this work shall be the Contractor's actual cost as evidenced by copies of invoices from the subcontractor. To the Contractor's actual cost shall be added the sum of 5% for the Contractor's profit and overhead with no further compensation therefore.
- 5) **General.** The compensation as herein provided shall be received by the Contractor as payment in full for extra work done on a Force Account basis, and shall include the proper supervision of the work as well as furnishing small tools and equipment required by the labor employed, without additional compensation other than provided in clauses (1), (2), (3), and (4) of this subsection.

The amount of credit to be allowed by Contractor to Owner for any such Construction Field Change which results in a net decrease in cost will be the amount of the actual net decrease plus a deduction in overhead and profit by an amount equal to 10% of the net decrease. When both additions and credits are involved in any one change, the adjustment in overhead and profit shall be computed on the basis of the net change.

The Contractor's representative and the Inspector shall compare records of the extra work done on a Force Account basis, at the completion of certain units of the work or at intervals considered most practical. Copies of those records shall be made in duplicate, upon suitable forms provided for this purpose, and signed by both the Inspector and Contractor's representative, one copy each being forwarded to the Engineer and to the Contractor. All claims for extra work done on a Force Account basis, shall be submitted to the Engineer by the Contractor upon certified statements, to which shall be attached original receipted bills or certified statements covering the cost of and the freight charges on all materials used in such work, and said statements shall be filed not later than the tenth day of the month following that in which the work was actually performed, and shall include all labor, equipment, and material

accounts properly chargeable to the work. Payment will then be made on the next regularly scheduled estimate following receipt of all required documents.

**109.13 Rights in and Use of Materials Found on the Work.** The Contractor, with the approval of the Engineer, may use on the Project such stone, gravel, sand, or other material, determined suitable by the Engineer, as may be found in the planned excavation and will be paid both for the excavation of such materials at the corresponding contract unit price and for the pay item for which the excavated material is used. However, the Contractor shall replace with other acceptable material at no cost to the Owner all of that portion of the excavation material so removed and used that was needed for use in the embankments, backfills, approaches, or otherwise. No charge for the material so used will be made against the Contractor. The Contractor shall not excavate or remove any material from within the roadway location that is not within the grading limits, as indicated by the slope and grade lines, without written authorization from the Engineer.

Planned excavation, for the purposes of this subsection, is defined as all excavation shown on the plans and/or as changed by the Engineer for any purpose other than obtaining additional material lying within the planned typical sections and slopes. Planned excavation also includes any excavation made beyond the ends of the Project for the purpose of blending the new construction into the existing roadway.

Unless otherwise provided, any material from any existing structures designated salvageable that is to remain the property of the owner, may be used temporarily by the Contractor in the erection of the new structure. Such material shall not be cut or otherwise damaged. Material thus used and subsequently cut or damaged by the Contractor's action or inaction shall be replaced in kind with new material of like dimension at no cost to the Owner.

**109.14 Final Clean Up.** Upon completion of the Work and before acceptance and final payment will be made, the Contractor shall remove from the right-of-way, from any temporary plant sites, and from any temporary equipment and material storage sites, all construction equipment, falsework, discarded material, rubbish, debris, temporary structures, footings, and all surplus material. The Contractor shall restore in an acceptable manner all property, both public and private, that has been damaged during the prosecution of the work and shall leave the waterways unobstructed and the roadway in a neat and presentable condition throughout the length of the work under contract.

No burning will be permitted on City of Springdale property, right-of-way, or easement without an approved burn permit issued by the City of Springdale Fire Department and concurred with by the Engineer. It is the Contractor's responsibility to determine prior to bidding whether or not a burn permit will be approved and issued. When perishable material is burned, it shall be under the constant care of a competent watcher. Burning shall be accomplished at such times and in such manner that the surrounding vegetation, adjacent property, or anything designated to remain on the right-of-way will not be jeopardized. Contractor shall cease all burning when meteorological conditions are unsuitable for burning operations. Materials and debris that cannot be burned shall be removed from the right-of-way and disposed of at locations off the project.

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Contractor shall have proposed dump sites for waste material approved by the City of Springdale prior to disposition of any waste onto these sites.

The materials, labor, equipment, and expense of the final cleaning up of the Project will not be paid for separately, but full compensation therefore will be considered included in the contract unit prices bid for the various items in the Contract.

### **109.15 Acceptance.**

**(a) Substantial Completion.** When the Contractor considers the entire Project ready for its intended use the Contractor shall notify the Engineer. The Engineer shall then make an inspection of the Project to determine the status of completion. If the Engineer/City Engineer considers the Project substantially complete and can be utilized for its intended use without further disruption to the public or occupants of the facility, excepting minor corrections (punch list items) and clean-up, the Engineer will fix the date of Substantial Completion. On the date of the Notice of Substantial Completion, the contract time will be stopped. There shall be developed a list of items to be completed or corrected before final acceptance and payment. Thereafter, the Contractor shall complete all work on the “punch list” and required clean-up within 30 calendar days or other time as agreed to by the Contractor and the Engineer/City Engineer. If the ‘punch list” and required clean-up is not completed within 30 calendar days or other time as agreed to by the Contractor then contract time charges will begin and liquidated damages will be assessed as applicable and in accordance with the contract documents.

**(b) Partial Acceptance.** The City may accept units or substantially completed portions of a project when it is in the best interest of the City. Such partial acceptance shall in no way void or alter any of the terms of the Contract.

**(c) Final Acceptance.** Upon notice from the Contractor of presumptive completion of the entire project, including receipt of record drawings and all required documentation, the Engineer will make a final inspection with the Contractor. If all construction and final cleanup provided for and contemplated by the Contract is found to have been satisfactorily completed, that inspection shall constitute the final inspection and the Engineer will so advise the Owner’s Governing Body. The Contractor will then be notified in writing of the acceptance of the contract as of the date of the final acceptance by the Owner.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the Engineer will advise the Contractor of the work requiring correction. The Contractor shall immediately make the required corrections. Upon correction of the work, another inspection will be made which shall constitute the final inspection provided the work has been satisfactorily completed.

**(d) Liquidated Damages.** Liquidated damages as specified by the Contract Documents will be in effect after the date established in the Notice to Proceed until the project is substantially complete as noted in 109.15(a) above. Liquidated damages will also be in effect from 30 days after the final inspection or other time as agreed to by the Contractor and Engineer/City Engineer as noted in 109.15(a) above, until all of the deficiencies are satisfactorily corrected.

**109.16 Failure to Complete Work on Time.** Time is an essential element of the Contract and it is important that the Work be pressed vigorously to completion. The cost to the Owner of the administration of the Contract, including engineering, inspection, and supervision, will be increased as the time occupied in the Work is lengthened. The public is subject to detriment and inconvenience when full use cannot be made of the Project.

The Owner shall be entitled to recover from the Contractor all ascertainable damages arising from the delay in completion. Said damages shall include, without limitation, all engineering, inspection, supervision, and legal expenses directly incurred by the Owner because of such delay.

Additionally, Contractor agrees that the Owner and/or public will suffer other damage or financial loss if the Work is not completed on time or within any time extensions allowed in accordance with Subsection 109.08, "Determination of Contract Time and Extension of Contract Time" above. Contractor and Owner agree that proof of the exact amount of any such damage or loss is difficult to determine. Accordingly, Contractor agrees to pay the sums stated in the proposal and Contract as liquidated damages and not as penalty for each calendar day or part thereof that the Work remains uncompleted after the contract time has expired.

Should the amount otherwise due the Contractor be less than the amount of such damages provided above, the Contractor and the Surety shall be liable to the Owner for such deficiency.

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.

**109.17 Default and Termination of Contract.** The Owner will give written notice of delay, neglect, or default to both the Contractor and the Surety if the Contractor:

- 1) Fails to begin the Work under the Contract within the time specified in the Notice to Proceed, or
- 2) Fails to perform the work with sufficient workers, equipment, or materials to assure prompt completion of the Work, or
- 3) Performs the work negligently or unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable or unsuitable, or
- 4) Discontinues the prosecution of the work, or
- 5) Fails to resume work that has been discontinued within 10 calendar days after notice to do so, or

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- 6) Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or fails to provide a replacement bond within 10 calendar days, containing all the guarantees of the original bond, if the Surety should be declared in default and/or liquidation, or
- 7) Fails to settle all valid claims for materials, labor, or supplies in an expedient manner, or
- 8) Allows any final judgment to stand unsatisfied for a period of 10 calendar days, or
- 9) Makes an assignment for the benefit of creditors, or
- 10) Fails to appropriately cooperate with the Owner, the public, or others associated with the Work or to provide proper superintendence of the Work, or
- 11) Fails to comply with contract requirements, or
- 12) Is a party to fraud, or
- 13) For any other cause whatsoever, fails to carry on the work in a manner acceptable to the Owner.

If the Contractor or Surety, within a period of 10 calendar days after written notice from the Owner, does not proceed according to the notice, the Owner will, upon written notification from the Engineer of the facts relative to delay, neglect, or default, and the Contractor's failure to comply with the written notice, have full power and authority, without violating the Contract, to take the prosecution of the work out of the hands of the Contractor. The Owner may appropriate or use any or all materials and equipment associated with the Project as may be suitable and acceptable and may enter into an agreement for the completion of the Contract according to the terms and provisions thereof, or use such other methods as in the opinion of the Engineer will be required for the completion of the Contract.

All costs and charges incurred by the Owner due to any of the above will be deducted from any moneys due or which may become due the Contractor. If such expense exceeds the sum that would have been payable under the Contract, the Contractor and the Surety shall be liable and shall pay to the Owner the amount of such excess.

The Owner may, by written order, terminate the Contract or any portion thereof after determining that for reasons beyond either Owner or Contractor control the Contractor is prevented from proceeding with or completing the Work as originally contracted for, and that termination would be in the public interest. Reasons for termination may include, but need not be necessarily limited to: executive orders of the President relating to prosecution of war or national defense; national emergency that creates a serious shortage of materials; orders from duly constituted authorities relating to energy conservation; and restraining orders or injunctions obtained by third-party citizen action resulting from national or local environmental protection laws or where the issuance of such order or injunction is primarily caused by acts or omissions of persons or agencies other than the Contractor.

When contracts, or any portion(s) thereof, are terminated before completion of all items of work in the Contract, payment will be made for the actual number of units or items of work completed at the contract unit price, or as mutually agreed for items of work partially completed or not started. No claim for loss of anticipated profits will be considered.

Reimbursement for organization of the work (when not otherwise included in the Contract) and moving equipment to and from the project will be considered where the volume of work completed is too small to compensate the Contractor for these expenses under the contract unit prices, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained by the Contractor for the Work, that have been inspected, tested, and accepted by the Engineer, and that are not incorporated in the Work may, at the option of the Owner, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Owner.

Termination of a contract or a portion thereof shall not relieve the Contractor of responsibilities for the completed Work, nor shall it relieve the Surety of its obligation for and concerning any just claims arising out of the work performed.

**109.18 Warranty and Guarantee.** The Contractor shall obtain and assign to the Owner all transferable manufacturer's warranties or guarantees on all materials and equipment as required in these specifications. The Contractor shall guarantee satisfactory in-service operation of all materials and equipment furnished for the project, and all completed Work under the contract, including repair of all defects or failures, regardless of cause of defect or failure unless caused by engineering design. All warranties and guarantees shall be for a period of one year after the Date of Final Completion, or such longer period of time as may be prescribed by Law or Regulation or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents. If, within the above time frames, any Work is found to be defective Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, either correct such defective Work, or, if it has been rejected by Owner, remove it from the Site and replace it with non-defective Work. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or the rejected Work removed and replaced, and all direct, indirect, and consequential costs of such removal and replacement including but not limited to fees and charges or engineers, architects, attorneys, and other professionals will be paid by Contractor.

In special circumstances where a particular item of Equipment or portion of the project is placed in continuous service before Final Completion of all Work, the warranty period for that item or portion may start to run from the earlier date if so provided in the Specifications or by Written Amendment.

**109.19 Termination of Contractor's Responsibility.** The Contract will be considered complete when all work has been finished, the final inspection made by the Engineer/City Engineer, the Project accepted by the Owner, and all the provisions of the contract have been fulfilled including the requirement that the Contractor has delivered to Owner all

maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance required by specifications, certificates of inspection, marked-up record drawings and other documents as specified.

At the project's completion, the Contractor shall execute and/or provide all items as further specified in subsection 110.04, "Payments to Contractor", including, but not limited, to the Release and Lien Waiver/Affidavit in the form acceptable to the Engineer and the Owner, The Release and Lien Waiver Affidavit shall release all claims against the Owner arising under and by virtue of his Contract. The date of the Release shall be that agreed to for the final acceptance of the project with the Owner.

The Contractor's responsibility shall then cease, except as may be required by law or as set forth in the contract payment and performance bonds and insurance policies.

## **Section 110. Measurement and Payment**

**110.01 Measurement of Quantities.** Work acceptably completed under the Contract will be measured by the Engineer/City Engineer according to United States Standard measures. Only actual quantities will be paid for unless otherwise specified. Unless otherwise specified, the following listed methods will be used:

- 1) For computing volumes of excavated materials specified for measurement by the cubic yard, the average end area method will be used.
- 2) Structures will be measured to the neat lines as shown on the plans or as finally constructed at the direction of the Engineer/City Engineer.
- 3) Items that are measured by the linear foot, such as pipe culverts, guardrail, underdrains, etc., will be measured parallel to the base or foundation upon which such structures are placed.
- 4) In determining the area for items bid on a square yard or acre basis, except as noted below, the longitudinal measurement will be made along the actual surface of the item and not horizontally, and transverse measurements shall conform to the dimensions shown on the plans or as directed by the Engineer/City Engineer.
- 5) In determining the area for all seeding and mulch cover items bid on an acre basis, when the area is a strip of varying width running approximately parallel to the centerline of the roadway, the longitudinal dimension will be measured horizontally and the transverse dimension will be measured parallel to the surface of the area seeded and/or mulched. For other areas of seeding and mulch cover items, all measurements will be made parallel to the surface of the area seeded and/or mulched. The area will be computed to the nearest 0.01 acre.
- 6) Materials that are specified for measurement by the ton shall be hauled in approved vehicles bearing a plainly legible identification number and weighed on accurate,

approved scales furnished by the Contractor and inspected by a registered scale mechanic at least once a year and before their use after each move. Scales shall be located at the loading point or other approved location.

- 7) The scales shall be an automatic weighing system, with digital or springless dials, and equipped with an automatic ticket printer. An automatic ticket printer is defined as a device connected to the weighing system in such manner that it automatically detects the weight determined by the system. It shall store and recall the TARE weight when the operator enters the truck identification. It shall print the following information on the ticket:

- Gross, Tare, and Net weights.
- Identification of the truck.
- Current date.
- For asphalt mixtures, the time of loading or weighing.
- A unique ticket number (may be preprinted on the tickets).

The NET weight should be computed by the weighing system; however, it may be computed manually and keyed in for printing. When the net weight of the material is determined by batch weights, the scales used shall meet all applicable requirements specified for truck scales, including automatic ticket printing, except that the GROSS and TARE weights will not be required. The ticket shall accompany each load delivered to the project. In addition to the items shown above that must be printed by the ticket printer, the following information shall also be shown on each ticket:

- Identification of the project.
  - Identification of the material being delivered, including mix design numbers for asphalt mixtures. The ton shall be the short ton of 2000 pounds. Vehicles used to haul materials measured by weight shall be weighed empty for each load, or shall be weighed daily or from time to time during the day as the Engineer may direct, to establish the tare weight of each load. The scales furnished shall be capable of weighing the entire loaded vehicle at one time. Deduction will be made for the weight of moisture in aggregates in excess of 5% of the oven-dry weight of the material.
- 8) A station when used as a definition or term of measurement will be 100 linear feet measured horizontally.
- 9) The term "lump sum" when used as an item of payment will mean complete payment for the work described in the Contract.
- 10) When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

- 11) When mutually agreed, the plan quantity of any item may be taken as the Final Contract Quantity. Items to be paid at plan quantity shall be agreed upon in writing before work begins.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gage, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

Of necessity the items described and shown as components are discussed in a general manner only, describing the major pieces of equipment and/or materials. Any item and/or appurtenance not specifically mentioned shall be considered a portion of the bid item to which, in the opinion of the Engineer, its function is most directly related. Failure to list all items and/or appurtenances does not relieve the Contractor from furnishing all apparatus, devices, labor or materials of whatever nature required for a complete installation in accordance with the intent of the Drawings, approved Shop Drawings and these Specifications.

The successful Contractor shall, as soon as possible after award of the Contract, submit a list itemizing the components of each lump sum bid item and their respective costs to be used as an aid in the preparation of partial payments.

**110.02 Scope of Payment.** Payments to the Contractor will be made for the actual quantities of contract items completed and accepted according to the plans and specifications and if, upon completion of the construction, these actual quantities show either an increase or decrease from the quantities given in the proposal schedule, the contract unit prices will still prevail, except as provided in Subsection 110.03, "Payment and Compensation for Altered Quantities" below.

The Contractor will receive and accept the compensation herein provided as full payment for furnishing all materials, labor, equipment, tools, and incidentals necessary to the completed work; for performing all work contemplated and embraced under the Contract; for all loss or damage arising out of the nature of the work, or from the action of the elements, or from any unforeseen difficulties or obstructions that may arise or be encountered during the prosecution of the work until its final acceptance by the City; for all risks of every description connected with the prosecution of the work; for all expenses incurred by, or in consequence of, the temporary suspension or discontinuance of the work as herein specified; for any infringement of patent, trade mark, or copyright; for all costs of permits, licenses, fees, and taxes; and for completing the work in an acceptable manner according to the plans and specifications. The payment of current or final estimate, or of retained percentage, shall in no degree prejudice or affect the obligation of the Contractor, at no cost to the City, to repair, correct, renew, or replace any defects or imperfections in the construction of the roadway and its appurtenances, or in the strength of or quality of materials used therein or thereabouts, or relieve the Contractor from the payment of all damages due to such defects; provided such defects, imperfections, or damages shall be discovered on or before the final inspection or acceptance of the entire work. No retained percentage payable under the Contract, or any part thereof, shall become due and payable, if the City so elects, until the

City is satisfied that the Contractor has fully settled or paid for all materials and equipment used in or upon the work, and for all labor done in connection therewith, and the City, if it so elects, may pay any or all such accounts wholly or in part and deduct the amount or amounts so paid from the final estimate.

Any overpayments made to the Contractor or Surety, from whatever cause, are due and payable to the City upon receipt by the Contractor or Surety of a request setting forth the particulars, regardless of pending claims or intention of the Contractor or Surety to file a claim.

**110.03 Payment and Compensation for Altered Quantities.** When alterations in plans or quantities of work not requiring a change order are ordered and performed as provided in Subsection 104.02, "Alterations of Plans or Charter of Work" or 104.03, "If and Where Directed Items and when such alterations result in an increase or a decrease of the quantity of work to be performed, the Contractor shall accept payment in full at the contract unit prices for the actual quantities of work accomplished, except as provided in Subsection 104.02, "Alterations of Plans or Charter of Work" or 104.03, "If and Where Directed Items, and no allowance will be made for anticipated profits, organization or overhead expense, or interest.

Increased or decreased work involving change orders will be paid for as stipulated in such change orders.

#### **110.04 Payments to Contractor**

(a) General. The Engineer will prepare (with the required assistance from the Contractor) the application for partial payment. If the bid contains lump sum prices, the Contractor shall furnish to the Engineer, upon request, a detailed cost breakdown of the several items of work involved in the lump sum prices. The Engineer will use this cost breakdown to determine the amount due the Contractor as progress payment. A cut-off time shall be established near the last day of the month such as to allow sufficient time for the application to be prepared, approved by the Contractor, and submitted by the Engineer to the Owner by the first day of the successive month. The amount of the payment due to the Contractor shall be determined by the total value of work completed to date, deducting ten percent (10%) for retainage, adding the value of submitted paid invoices covering construction materials, properly stored on the site, and deducting the amount of all previous payments. After the project is fifty percent (50%) complete, no additional retainage beyond ten percent (10%) of the first fifty percent (50%) of the project cost will be withheld provided that the Contractor is making satisfactory progress and there is no specific cause for greater withholding until completion of the project at which time the retainage will be released with the final payment. The total value of work completed to date shall be based on the estimated quantities of work completed and on the unit and lump sum prices contained in the Proposal. The value of materials properly stored on the site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of paid invoices, covering construction materials for which material payments are made, shall be furnished to the Engineer before such material payments are made.

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Note: It has been the policy of the Owner to make payments for properly stored materials/equipment based upon invoice price and allow the Contractor to submit paid invoices within 30 days (or the next partial payment period). If paid invoices are not provided within the time allowed, then the materials/equipment so paid for will be removed from the next partial payment.

Monthly or partial payments made by the Owner to the Contractor are monies advanced for the purpose of assisting the Contractor to expedite the work of construction. All material and complete work covered by such monthly or partial payments shall remain the property of the Contractor, and he shall be responsible for the care and protection of all materials and work upon which payments have been made. Such payments shall not constitute a waiver of the right of the Owner to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the Owner in all details.

(b) Withholding Payments: The Owner may withhold from any payment otherwise due the Contractor so much as may be necessary to protect the Owner and if it so elects may also withhold any amounts due from the Contractor to any Subcontractors or material dealers, for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the Owner and will not require the Owner to determine or adjust any claims or disputes between the Contractor and his Subcontractors or material dealers, or to withhold any monies for their protection unless the Owner elects to do so. The failure or refusal of the Owner to withhold any monies from the Contractor shall not impair the obligations of any Surety or Sureties under any bond or bonds furnished under this Contract. Such withholding may also occur as a result of the Contractor's failure or refusal to prosecute the work with such diligence as will insure its completion within the time specified in these Contract Documents, or as modified as provided in these Contract Documents, or if the Contractor fails to comply with any applicable regulations promulgated by the U.S. Government or any other Government agencies.

(c) Final Payment: After final inspection and acceptance by the Owner of all work under the Contract, the application for final payment shall be prepared which shall be based upon the carefully measured or computed quantity of each item of work at the applicable unit and lump sum prices stipulated in the Unit Price Schedule. The total number of the final payment due the Contractor under this Contract shall be the amount computed as described above less all previous payments. All prior payments shall be subject to correction in the final payment. Final payment to the Contractor shall be made subject to the Contractor furnishing the Owner with all documentation called for in the Contract Documents, including but not limited to the evidence of insurance as specified, consent of the surety, if any, to final payment, and complete and legally effective releases or waiver satisfactory to the Owner of all liens arising out of or filed in connection with the work. The Contractor shall further furnish to the Owner a release in satisfactory form of all claims against the Owner arising under and by virtue of his Contract, other than such claims, if any, as may be specifically excepted by the Contractor from the operation and providing a Lien Waiver/Affidavit in the form acceptable to the Engineer and the Owner. The date of the Release shall be that agreed to for the final acceptance of the project with the Owner.

The Owner, before paying the final estimate, may require the Contractor to furnish releases or receipts from all Subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project), and services to the Contractor, if the Owner deems the same necessary in order to protect its interest. The Owner, however, may, if it deems such action advisable, make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments so made shall not impair the obligations of any Surety or Sureties furnished under this Contract.

Withholding of any amount due the Owner under any provisions of the Contract shall be deducted from the payments due the Contractor.

(d) Each payment to the Contractor by the Owner shall be made subject to submission by the Contractor of all written certifications required of him.

## **Section 111. Roadway Construction Control**

**111.01 Description.** When this item is included in the proposal, it shall consist of furnishing and maintaining all lines, grades, and measurements necessary for the proper execution of the roadway work under the Contract, all according to the plans and specifications.

**111.02 Materials.** The Contractor shall furnish all stakes, templates, straightedges, surveying equipment, and other devices necessary for establishing, setting, checking, marking, and maintaining points, lines, grades, and layout of the work called for on the plans and in the specifications.

### **111.03 Construction Requirements.**

**(a) City Responsibilities.** The Engineer/City Engineer will establish the benchmarks and horizontal control points referenced on the plans, certified correct by the Engineer, and furnish the data to the Contractor at the beginning of work.

Any additional information provided by the Engineer shall be verified by the Contractor before use and the Contractor shall accept full responsibility for any costs incurred as the result of the use of such additional information. Any checking performed by the Engineer/City Engineer will not relieve the Contractor of the responsibility for the final results.

The City will be responsible for taking all measurements to establish both current estimate and final estimate pay quantities, including any horizontal and vertical control points necessary to complete such measurements. When making these measurements, the Engineer/City Engineer may use any points, stakes, lines, or elevations that have been set by the Contractor.

**(b) Contractor Requirements.** Roadway Construction Control shall include use by the Contractor of the plans and the vertical and horizontal control points established by the City

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as described above to perform all required construction surveying and layout. The Contractor shall make all necessary calculations and set all stakes including, but not limited to: centerline stakes; offset stakes; reference point stakes; additional bench marks as needed; slope stakes; pavement lines; curb lines; grade stakes; roadway drainage; pipe culverts; box culverts; underdrains; clearing and grubbing limits; guardrail; fence; blue tops for subgrade, subbase, and base courses; and any other points, lines, or elevations deemed necessary for proper control of the work.

On projects that include an ACHM overlay and/or Asphalt Surface Treatment, the Contractor shall mark the stationing by setting a stake at least every 200 feet along the roadway. These stakes shall be placed on the shoulder or slope so that they will not interfere with the construction operations, but will be usable for determining locations along the roadway. On projects with widening sections where a grade line is not shown on the plans, the Contractor shall profile the existing pavement at the centerline and edges of pavement. This profile data shall be furnished to the Engineer/City Engineer for use in the establishment of the finished grade line. This finished grade line will be furnished to the Contractor for use in computing and setting all grades required to construct the finished roadway section. The Contractor shall be responsible for joining the work to contiguous roadways and/or bridges in an acceptable manner. This shall include making minor adjustments to the plan grade and/or typical section as necessary to construct a smooth transition from the new work to match the existing roadway.

The Contractor shall provide sufficient qualified personnel to complete the work accurately. The supervision of the Contractor's surveying and personnel shall be the responsibility of the Contractor, and any errors resulting from the operations of such personnel shall be adjusted or corrected by the Contractor at no cost to the City.

The Contractor shall maintain adequate survey notes as the work progresses and make them available to the Engineer/City Engineer on request. Copies of survey notes designated by the Engineer/City Engineer shall be provided for the City's permanent project records. The Contractor shall be responsible for the accuracy and uniformity of the construction stakes, lines, grades, and layouts. Any errors in the work constructed due to errors in the Contractor's Roadway Construction Control shall be adjusted or corrected by the Contractor at no cost to the City.

**111.04 Method of Measurement.** Roadway Construction Control will be measured as a complete unit.

**111.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract lump sum price bid for Roadway Construction Control, which price shall be full compensation for furnishing and maintaining all necessary lines, grades, and measurements; and for furnishing all engineering personnel, equipment, materials, tools, and incidentals necessary to complete the work.

No adjustments in the lump sum price bid will be made for Roadway Construction Control required due to normal increases or decreases in Contract quantities. However, if the

amount of Roadway Construction Control required is increased or decreased in connection with a Change Order, compensation will be adjusted accordingly.

Partial payments for Roadway Construction Control will be made in proportion to the amount of work accomplished on this item. No additional payment will be made for re-staking needed to maintain the control.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Roadway Construction Control	LS

## **Section 112. Trench and Excavation Safety Systems**

**112.01 Description.** This item covers trench and excavation safety systems required for constructing improvements that necessitate open excavations on the project. All work under this item shall be in accordance with the current edition of the “Occupational Safety and Health Administration Standard for Excavation and Trenches Safety System, 29 CFR 1926, Subpart P”, a copy of which may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

**112.02 Notifications Required.** The Contractor, prior to beginning any excavation, shall notify the State Department of Labor (Safety Division) that work is commencing on a project with excavations greater than five feet.

The contractor shall notify all Utility Companies and Owners in accordance with OSHA Administration 29 CFR 1926.651(b)(2) for the purpose of locating utilities and underground installations.

**112.03 Existing Structures and Utilities.** Where the trench or excavation endangers the stability of a building, wall, street, highway, utilities or other installation, the Contractor shall provide support systems such as shoring, bracing, or underpinning to ensure the stability of such structure or utility.

The Contractor may elect to remove and replace or relocate such structures or utilities with the written approval of the owner of the structure or utility and the Engineer/City Engineer.

**112.04 Method of Measurement.** After award of the contact, the Contractor shall submit to the Engineer/City Engineer a breakdown of costs for work involved in the lump sum price bid for “Trench and Excavation Safety Systems” and shall, with each periodic payment request, submit a certification by the Contractor’s “competent person” as defined in Subpart P 1926.650(b) that the Contractor has complied with the provisions of “Occupational Safety and Health Administration Standard for Excavation and Trenches Safety System”, 29 CFR 1926 Subpart P for work which payment is requested.

**112.05 Basis of Payment.** The work required by this item will be paid for at the lump sum price for “Trench and Excavation Safety Systems”.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Trench and Excavation Safety Systems	LS

## **DIVISION 200. EARTHWORK**

### **Section 201. Clearing and Grubbing**

**201.01 Description.** This work consists of clearing, grubbing, removing, and disposing of all vegetation, obstructions and debris within designated limits of the Right-of-Way and easement areas. Vegetation and objects designated to remain shall be preserved free from injury or damage.

**201.02 Definitions.** Clearing and Grubbing shall be defined as follows:

Clearing shall consist of: cutting, removing, and disposing of trees, snags, stumps, shrubs, brush, limbs, and other vegetative growth; removal and disposal of existing fences, drainage structures, abandoned pipelines or utilities, paving, curbs and gutters, rubbish and trash, and other objectionable material(s). Clearing shall also include the preservation of trees, shrubs, and vegetative growth, which are not designated for removal.

Grubbing shall consist of the removal and disposal of wood or root matter below the ground surface remaining after clearing and shall include stumps, trunks, roots, or root systems greater than 2 inches in diameter to a depth of two feet below the natural ground surface.

**201.03 Construction Requirements.** All surface objects, trees, stumps, roots, and other protruding obstructions designated for removal shall be cleared and grubbed, including required mowing. Undisturbed and sound stumps and nonperishable solid objects located more than two feet below subgrade and slope of embankments may remain in place. When authorized, stumps and nonperishable solid objects that are located more than 1 foot below the ground line may remain if they are located outside the construction limits of excavation and embankment areas.

Existing pipes, culverts, bridges, and other drainage structures shall be removed to the natural stream bottom and those parts outside the stream shall be removed to 1 foot below natural ground surface. Materials designated as City salvaged material shall be dismantled without damage and stored at designated locations. All other structures shall be removed from the Right-of-Way.

All concrete pavement, base course, sidewalks, curbs, gutters, buildings, foundations, slabs, ballast, gravel, bituminous material, and pavement materials shall be disposed of unless specifically stated otherwise in the Plans or by the Engineer/City Engineer.

Concrete designated for use as rip rap shall be broken into pieces not to exceed 150 pounds and stockpiled at designated locations or promptly placed where specified on the project.

Ballast, gravel, bituminous material, or other surfacing or pavement materials designated for salvage shall be stockpiled at designated locations without contaminating the material with dirt or foreign materials. Old concrete pavement, sidewalks, curbs, gutters, and similar structures to be left in place shall be sawed to a straight and true vertical line or removed to an existing joint as shown on the plans or as directed by the Engineer/City Engineer.

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In embankment areas, cavities resulting from removal of obstructions shall be backfilled and compacted with suitable material under Subsection 202.03.

Disposal of material and debris shall be done under applicable Federal, State, County, and City laws, ordinances, and regulations. Perishable material if burned shall be under constant care of a watchman so the surrounding vegetation, adjacent property, and anything designated to remain is not jeopardized.

Materials and debris may be disposed of by burial at locations acceptable to the City within the project limits, if at least 12 inches of cover material is provided and the area is graded, shaped, and seeded according to these specifications or otherwise restored to present a pleasing appearance. Said burial and restoration shall be at the Contractor's expense.

**201.04 Measurement and Payment.** No measurement of this item will be made. Payment will be made on a lump sum basis.

### Pay Item

### Pay Unit

Clearing and Grubbing

LS

## **Section 202. Excavation and Embankment**

**202.01 Description.** This work consists of excavation, hauling, disposal, placement, consolidation and compaction of all materials encountered within the limits of the work that is not covered under another item.

Excavation will be classified as one of the following:

**(a) Unclassified Excavation.** Unclassified Excavation consists of the removal and disposal of all material of whatever character encountered in the work not covered under other items. This shall include removal of material in existing ditch lines along roadways to a depth of 1 foot below existing grade in the ditches. This shall also include stripping of vegetation and topsoil as required to a depth of one (1) foot below existing grade in embankment areas.

**(b) Rock Excavation.** Rock Excavation includes removal and disposal of rock material that by actual demonstration cannot be excavated with a Caterpillar Model No. 215D LC track-mounted hydraulic excavator equipped with two rippers or similarly approved equipment. Rock excavation also includes boulders one-half cubic yard or more in volume.

**(c) Undercut Excavation.** Undercut excavation includes removal and disposal of material not suitable for use as embankment material that is below the proposed subgrade elevation and that is more than 1' below existing ground within the roadway.

Embankment shall be defined as all material placed within the limits of the proposed roadway to achieve subgrade elevation. Embankment material may include approved on-site or approved off-site material.

**202.02 Materials.**

(a) **General.** Samples of material to be used as embankment material shall be submitted for approval per the requirements of these specifications. All material shall meet the requirements of Chapter 110 of The City of Springdale Code of Ordinances.

(b) **Stone backfill.** Stone backfill shall be as defined and specified in subsection 205, Undercut and Stone Backfill.

**202.03 Construction Requirements.**

(a) **General.** Excavations and embankments shall be finished to smooth and uniform surfaces. No excavation material shall be wasted without permission of the Engineer/City Engineer. Excavation and embankment operations shall be conducted without disturbing material outside the staked construction limits. Before beginning excavation, grading, and embankment operations, all necessary clearing, grubbing and top soil removal in that area shall be completed.

Excess or unsuitable excavated material, including topsoil, rock and boulders, shall be disposed of at locations acceptable to the Engineer/City Engineer. All approved surplus material shall be used to uniformly widen embankments and flatten slopes within the Right-of-Way. Rocks and boulders shall be covered with a minimum of 1 foot of embankment material.

Demolition of old roadways shall include filling of all ditches and grading to restore the original contour of the ground producing a pleasing appearance by forming natural, rounded slopes. Removal and disposal of pavements and base courses shall be performed under Section 201.

(b) **Rock Excavation.** Material classified as rock shall be excavated to a minimum depth of 6 inches and a maximum depth of 12 inches below proposed subgrade within the limits of the roadbed. The excavation shall be backfilled and compacted with material designated in the Contract or approved by the Engineer/City Engineer. Rock excavation removed in excess of 12 inches below subgrade will not be measured and paid for. Rock excavation backfill of the depth in excess of 12 inches below proposed subgrade is at the Contractor's expense.

Undrained pockets shall not be left in the rock surface. Depressions shall be drained. Bore holes shall be drilled along the slope line, maintaining the drill holes at the angle designated on the plans and ensuring that all drill holes are in the same plane. The diameter, spacing, and loading of presplit holes shall result in a neat break. The presplitting holes shall be drilled for the full depth of the ledge. The initial presplitting of a geological formation shall be accomplished utilizing a 100-foot test section. After drilling, loading, and shooting this test section, the material shall be removed to determine if the diameter, spacing, and loading of the presplit holes are adequate to give an acceptable backslope. If the results are determined to be acceptable, the presplitting may continue throughout the geological formation using those methods and procedures. If the presplitting is determined to be unsatisfactory, adjustments shall be made in the spacing, diameter and loading of the presplit holes utilizing another 100-foot test section.

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Presplitting holes shall be loaded with explosives as per the manufacturer's recommendations. The cost of presplitting shall be included in the unit bid price for rock excavation.

**(c) Undercut Excavation.** If and where directed by the Engineer/City Engineer, unsuitable material encountered at the proposed subgrade elevation shall be removed to the depth specified or directed by the Engineer/City Engineer and backfilled and compacted with approved off-site material, in accordance with this section or in accordance with subsection 205, Stone Backfill as indicated or directed. Excavation operations shall be conducted so necessary measurements can be taken before replacing unsuitable material with approved backfill.

No payment will be made for this item if:

The contractor does not notify the Engineer/City Engineer of potential areas requiring undercut before excavating these areas.

An area that was previously stable becomes unstable due to actions of the contractor. These causes include, but are not limited to, ponding of water and construction traffic.

The Contractor does not allow the Engineer/City Engineer sufficient time to measure the undercut excavation volume before placing backfill material.

In addition, no payment will be made to remove and replace any embankment material placed on unsuitable soil that subsequently requires removal and replacement.

**(d) Embankment Construction.** Embankment construction includes the preparation of the areas where embankments are placed, placement and compaction of approved embankment material for replacement of unsuitable material, and placement and compaction of embankment material in all cavities and depressions within the roadway area.

Rocks, broken concrete, and other solid materials shall not be placed in embankment areas where piling is to be placed or driven.

Benching shall be required when embankment is placed on hillsides or against existing embankment with slopes that are steeper than 6-to-1 when measured at right angles to the roadway and shall be continuously benched in loose lifts not to exceed 12 inches. Benching shall be wide enough to permit the operations of placement and compaction equipment. All horizontal cuts shall begin at the intersection of the ground line and the vertical side of the previous bench. Existing slopes shall also be stepped to prevent wedging action of the embankment against structures. Excavation from benching shall be compacted with the new embankment material and the cost for benching and recompaction shall be included in the unit bid price for excavation.

When natural ground is within 4 feet of the subgrade, all sod and vegetable matter shall be removed from the surface where embankment is placed. The cleared surface shall be completely broken up by plowing, scarifying, or stepping to a minimum depth of 6 inches and shall then be compacted to the specified embankment density. Sod not requiring

removal shall be thoroughly disked prior to embankment construction. Wherever a compacted road surface containing granular material lies within 3 feet of the subgrade, the old road surface shall be scarified to a minimum depth of 6 inches and compacted to the specified embankment density.

If embankment can only be placed on one side of abutments, wing walls, piers, or culvert headwalls, compaction shall be accomplished without overturning of or placing excessive pressure against the structure. The fill adjacent to the end bent of a bridge shall not be placed higher than the bottom of the backwall until the superstructure is in place. When embankment is placed on both sides of a concrete wall or box-type structure, the embankment shall be brought up equally on both sides of the structure. Embankment that is adjacent to structures or inaccessible to normal compaction equipment shall be placed in 4" loose lifts and compacted with mechanical equipment to 95% of maximum density as determined by AASHTO T99.

Roadway embankment shall be placed in horizontal lifts not to exceed 8 inches (loose measurement) and compacted to the specified density before the next lift is placed. Spreading equipment shall be used to obtain uniform lift thickness prior to compaction. As the compaction progresses, leveling and manipulating shall be continuous to assure uniform density. Moisture content shall be increased or decreased as necessary to obtain the required density and stability. Construction equipment shall be routed uniformly over the entire embankment surface.

When the excavated material consists predominantly of rock too large to be placed in 8-inch lifts, the material may be placed in thicknesses up to the average rock dimension not to exceed 3 feet. Each lift shall be leveled and smoothed by distribution of spalls and finer fragments of earth. Rock shall not be end dumped directly on the previously completed lift of embankment. Rock shall be dumped in the lift of embankment being constructed and pushed into place. The lifts shall not be constructed above an elevation 2 feet below the finished subgrade.

A minimum of 2 feet of compacted embankment shall be placed over structures before rock is placed.

**(e) Moisture and Density Requirements.** All lifts in embankment areas shall be compacted to not less than 95 percent of the maximum density. The moisture content of the material shall be uniformly increased or decreased to within 2% of optimum moisture content before compaction.

Maximum density will be determined using AASHTO T 99 or ASTM D698 (Standard Proctor). In-place field density measurements shall be determined using AASHTO T 191, T233 , or T 310.

Density requirements do not apply to portions of embankments constructed of materials such as rock that cannot be tested by approved testing methods.

**202.04 Method of Measurement.**

(a) Undercut and Backfill will be measured by the cubic yard of material placed and compacted according to the specifications and as directed by the Engineer/City Engineer. Measurements of the excavated area will be taken by the Engineer/City Engineer after excavation and before backfilling. The quantity of Undercut and Backfill will be measured as In Place quantities. Measurement for undercut will begin at subgrade elevation or one (1) foot below existing ground, whichever is lower.

(b) Rock Excavation will be measured by the cubic yard of rock in place actually removed according to the specifications. Measurements taken after the rock is removed and before any associated backfilling will be used to calculate rock excavation quantities.

(c) Unclassified Excavation will not be measured and the plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made. In such case, the revised quantity shall be agreed upon prior to beginning any work associated with the change.

(d) Embankment will not be measured and the plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made. In such case, the revised quantity shall be agreed upon prior to beginning any work associated with the change.

**202.05 Basis of Payment.** Quantities of earthwork completed, accepted and measured as provided above will be paid for at the Contract Price bid as follows:

(a) Undercut Excavation shall be paid for at the Contract Price bid per cubic yard (CY) for Undercut and Backfill. Said price shall be full compensation for excavation, disposal, furnishing, hauling, placing, and compacting approved off-site material according to the plans and specifications. This price shall not include final compaction and finish grading to subgrade elevation. Final compaction and finish grading will be paid for under the item "Subgrade Preparation."

(b) Rock excavation shall be paid for at the Contract Price bid per cubic yard (CY) for Rock Excavation. Said price shall be full compensation for rock removal and disposal to the lines and depths shown on the plans and according to these specifications, and for furnishing, hauling, placing, and compacting approved material in the excavated area as required.

(c) All earthwork not paid for under other items will be paid for under the separate items (1) Unclassified Excavation or (2) Embankment as follows:

(1) Excavation shall be paid for at the Contract Price bid per cubic yard (CY) for Excavation. Said price shall be full compensation for excavation, hauling off, and disposal of all materials on the project that are not required for completion of the project; and any other excavation, grading or other miscellaneous earthwork items not included in other items of work. The plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made.

(2) Embankment shall be paid for at the Contract Price bid per cubic yard (CY) for Embankment. Said price shall be full compensation for placement of materials on the jobsite, whether from on-site or off-site sources, to establish the lines and grades shown on the plans; placement of embankment as backfill for excavated areas to 1 foot below existing ground in roadway areas; and any other embankment, grading or other miscellaneous earthwork items not included in other items of work. The plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made.

<u>Pay Item</u>	<u>Pay Unit</u>
Undercut and Backfill	CY
Rock Excavation	CY
Unclassified Excavation	CY (Plan Quantity)
Embankment	CY (Plan Quantity)

### **Section 203. Subgrade Preparation**

**203.01 Description.** This work consists of preparing the subgrade for placement of the base course, curb and gutter, and asphalt courses. The intent of this specification is to provide a stable subgrade consisting of approved material compacted as specified.

**203.02 Materials.** Materials not specified.

**203.03 Construction Requirements.** Material at subgrade will receive one or a combination of the following treatments as directed by the Engineer/City Engineer:

(a) Unsuitable material will be excavated to a depth as directed by the Engineer/City Engineer, disposed of, and replaced with off-site material approved by the Engineer/City Engineer. This material shall be placed and compacted to conform to Subsection 202.03.

(b) If the material is acceptable for use as subgrade material, the subgrade will be scarified to a depth of 8 inches and recompactd to conform to Subsection 202.03 of these Specifications.

(c) In areas requiring fill to achieve subgrade elevation, the subgrade shall consist of approved on-site or off-site material compacted in accordance with Subsection 202.03 of these Specifications.

The subgrade shall be shaped for its full width to the required grade and cross section. The finished subgrade shall not vary at any point by more than .02 foot from the prescribed elevation.

Finished sections damaged by construction operations shall be corrected by the contractor at no cost to the City.

**203.04 Method of Measurement.** Measurement for this item will be as follows:

(a) Excavation and backfill of any areas of subgrade requiring undercut will be measured as specified in Section 202.04.

(b) Subgrade Preparation will be measured by the square yard. Measurement will include all subgrade area including areas up to 1' behind proposed back of curbs. Measurement will include areas of undercut, areas that receive scarification and recompaction of existing acceptable material, and areas where fill material is required to achieve subgrade elevation. The plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made. In such case, the revised quantity shall be agreed upon prior to beginning any work associated with the change.

(c) Fill material required to achieve subgrade elevation will be measured as specified in Section 202.4.

**203.05 Basis of Payment.** Quantities of earthwork completed, accepted and measured as provided above will be paid for at the Contract Price bid as follows:

(a) Undercut Excavation shall be paid for as stated in Section 202.5a. This price shall not include final compaction and finish grading to subgrade elevation. Final compaction and finish grading will be paid for under the item "Subgrade Preparation."

(b) Subgrade preparation will be paid for at the Contract Price per square yard (SY) for Subgrade Preparation. Said price shall be full compensation for scarification (if required), compaction, and finish grading of subgrade areas.

<u>Pay Item</u>	<u>Pay Unit</u>
Subgrade Preparation	SY (Plan Quantity)

**Section 204. Select Grading**

**204.01 Description.** This work consists of excavating, placing, and compacting material between the back of the roadway curb and the limits of the work. It also includes grading and placing topsoil in this area or other disturbed areas.

**204.02 Materials.**

(a) **General.** Material used for backfilling curbs and grading for sidewalk shall be free of trash, organics, and other deleterious materials.

(b) **Topsoil.** Topsoil may be obtained from sources outside the right-of-way limits or from areas within the project limits that will be occupied by cuts and/or embankments. When topsoil is furnished from sources outside the right-of-way, the Contractor shall be responsible for locating and obtaining the material and for performing all work, including erosion

control, prevention of water pollution, and restoration, according to the specifications. The cost of such work will be considered included in the contract unit price bid for Topsoil Furnished and Placed. At the request of the City, the Contractor shall furnish copies of agreements with the property owners.

Topsoil shall be good quality, fertile, friable, surface soil and consist of loamy sand, sandy loam, clay loam, or sandy clay loam and shall be clean, rich, dark soil that contains adequate organic material. River sand will not be accepted as topsoil. Topsoil shall be reasonably free from subsoil, slag, weeds, grasses, roots, or stones greater than:

- 1/4 inch for residential/commercial lawn areas, or
- 1 inch for all other areas.

Topsoil shall have a pH suitable for intended use areas. Obtain soil only from naturally well-drained sites where topsoil occurs in depths greater than 4". Do not obtain from bogs, marshes or steep clayey slopes. Do not strip, collect, or deposit topsoil while soil is wet.

In no case shall topsoil be excavated more than 12" from the original ground level. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sods and herbaceous growth, such as grass and weeds, shall not be removed but shall be thoroughly broken up and intermixed with the soil during handling operations.

### **204.03 Construction Requirements.**

**(a) Curb Backfill and Grading.** After curbs have set sufficiently, they shall be backfilled with approved material and graded so that no ponding will occur. Areas on which sidewalk or driveways are to be constructed shall be compacted to 90% of maximum density as measured by AASHTO T99 or ASTM D698 (Standard Proctor).

Upon completion of the construction of sidewalks, driveways, and other items of construction within the construction limits, all areas to receive topsoil shall be excavated, graded, backfilled and compacted as necessary to remove all depressions, ridges, soft areas, waste concrete, and other items that will interfere with placement of the topsoil layer. All slopes shall be excavated to a maximum slope of 1 vertical foot in 3 horizontal feet unless otherwise noted in the plans or directed by the Engineer.

**(b) Topsoil Placement.** After the areas to receive topsoil have been prepared to the satisfaction of the Engineer/City Engineer, topsoil placement may begin.

Topsoil shall be placed on all earth areas to a minimum depth of 4 inches unless shown otherwise on the plans or directed by the Engineer/City Engineer. Topsoil shall be graded to within 1 inch of finished elevation, and lightly compacted. Before placing seed all topsoiled areas shall be lightly scarified and raked to remove rocks, sticks, roots, and other undesirable materials as outlined in Section 204.02b.

**204.04 Method of Measurement.**

(a) **Curb Backfill and Grading.** Backfilling of curbs and grading of areas between the back of curb and the construction limits will be measured by the Station. A Station for the purposes of this Section is defined as 100' in length for both sides of the roadway, with a width reaching to the outer construction limits on both sides of the road.

(b) **Topsoil.** Topsoil furnished and placed will be measured by the square yard based on the location. Measurement will be made to the permanent street right-of-way or permanent easement or to the toe or top of slopes as shown on the plans. Areas outside these limits disturbed by the Contractor shall be topsoiled and restored at no cost to the City.

**204.05 Basis of Payment.** Quantities completed, accepted, and measured as provided above will be paid for at the Contract Price bid as follows:

(a) Curb backfill and grading will be paid for at the unit price per station (Sta). Said price shall be full compensation for excavation, hauling, placing, and compacting approved material to the lines and grades shown on the plans.

(b) Topsoil will be paid for at the unit price bid per square yard (SY). Said price shall be full compensation for excavating, stockpiling, hauling, placing, grading, and all other labor, tools, and equipment to provide a layer of topsoil in accordance with the specifications.

<u>Pay Item</u>	<u>Pay Unit</u>
Curb Backfill and Grading	Sta
4" Topsoil Placement (Yard Areas)	SY
4" Topsoil Placement (Other Areas)	SY

**Section 205. Undercut and Stone Backfill**

**205.01 Description.** This item shall consist of excavation and disposal of unsuitable materials and furnishing, hauling, placing, spreading, consolidating and compacting stone materials as specified at locations designated on the Plans or as designated by the Engineer/City Engineer.

If and where directed by the Engineer/City Engineer, unsuitable material encountered at the proposed subgrade elevation shall be removed to the depth specified or directed by the Engineer/City Engineer and backfilled with Stone Backfill as further defined herein.

**205.02 Materials.**

a) **Stone Backfill.** Stone for Stone Backfill shall be hard, durable, crushed stone aggregate, as manufactured by local quarries, ranging in size from 1 1/2" (40mm) minimum to 6" (150mm) maximum. Stone Backfill shall not contain more than 5% by weight of shale, slate or other deleterious matter. The stone shall be uniformly graded and the amount passing the 1 1/2" (37.5 mm) sieve shall be not more than 10% by weight.

**b) Aggregate Base Course Cap.** When backfilling with Stone Backfill to subgrade elevation, or to an elevation below subgrade when directed by the Engineer/City Engineer, the top 4" to 6" (100 mm to 150 mm) shall be material complying with subsection 401, "Aggregate Base Course" for Class 7 Aggregate Base Course.

**205.03 Construction Requirements.**

**(a) Excavation.** Excavation operations shall be conducted so necessary measurements can be taken before replacing unsuitable material with approved backfill.

**(b) Stone Backfill.** The area shall be excavated and the Stone Backfill shall be placed within the limits shown on the Plans or as designated by the Engineer/City Engineer. The excavated materials shall be disposed of by the Contractor in compliance with these Specifications. The stone may be dumped into the areas undercut without regard to depth of layer. The stone shall be spread, shaped, and consolidated to the line and grade determined in the field by the Engineer to provide a firm and unyielding foundation for the subgrade and/or subbase course and/or base course.

**(c) Aggregate Base Course Cap.** The Class 7 Aggregate Base Course Cap shall be compacted per the requirements of subsection 401, "Aggregate Base Course".

**205.04 Method of Measurement.**

**(a)** Undercut and Stone Backfill will be measured by the ton of material placed and consolidated or compacted according to the specifications and as directed by the Engineer/City Engineer. Measurements of the excavated area will be taken by the Engineer/City Engineer after excavation and before backfilling. The quantity of Undercut and Backfill will be measured as In Place quantities. Measurement for undercut will begin at subgrade elevation or one (1) foot below existing ground, whichever is lower.

**(b)** Aggregate Base Course Cap shall not be measured for separate payment but shall be measured and paid for as Stone Backfill.

**205.05 Basis of Payment.**

**(a)** Undercut Excavation and Stone Backfill shall be paid for at the Contract Bid Price per ton for Undercut and Stone Backfill. Said price shall be full compensation for excavation and disposal of unsuitable material; for furnishing, hauling, placing, shaping and consolidating or compacting material according to the plans and specifications; and for all labor, equipment, tools, and incidentals necessary to complete the work. Excavation and backfill authorized by the Engineer/City Engineer that is in excess of the volume occupied by the Stone Backfill will be measured and paid for under the appropriate subsections of these Specifications for the appropriate classifications of material.

**(b)** No payment will be made for this item if:

The contractor does not notify the Engineer/City Engineer of potential areas requiring undercut before excavating these areas.

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An area that was previously stable becomes unstable due to actions of the contractor. These causes include, but are not limited to, ponding of water and construction traffic.

The Contractor does not allow the Engineer/City Engineer sufficient time to measure the undercut excavation volume before placing backfill material.

In addition, no payment will be made to remove and replace any embankment material placed on unsuitable soil that subsequently requires removal and replacement.

**Pay Item**

**Pay Unit**

Undercut and Stone Backfill

Ton

## **DIVISION 300. STORM DRAINAGE**

### **Section 301. Storm Drainage Pipe**

**301.01 Description.** This work consists of the construction or reconstruction of pipe culverts, including excavation and backfill of storm sewer trenches.

**301.02 Materials.** All materials supplied under the requirements of this section shall meet the requirements of Section 606 of AHTD Specifications. All reinforced concrete pipe shall be Class III unless otherwise shown on the Plans or directed in the Specifications. Sizes and gauges of corrugated metal pipe shall be as shown on the plans.

#### **301.03 Construction Requirements.**

**(a) General.** Unsuitable material excavated for storm sewer placement shall be disposed of under Subsection 202.03(a). Suitable surplus excavated material shall be used in the construction of embankments. Unsuitable excavated material below the designed bottom of pipe elevation shall be replaced and compacted using approved material. Rock, hardpan, and other unyielding material shall be excavated below the designed grade for a depth of 6 inches minimum and 8 inches maximum. This extra depth excavation shall be backfilled with approved bedding material. Trenches shall be excavated to a minimum width that allows for proper jointing of the pipe and compaction of backfill material under and around the pipe. The completed trench bottom shall be firm for its full length and width.

**(b) Bedding.** All storm sewer pipe shall be bedded with a minimum of 4 inches of approved granular material. Bedding shall be placed to the required depth and shaped to conform to the bottom configuration of the pipe.

**(c) Laying Pipe.** Pipe placement shall begin at the downstream end. Pipe shall be in contact with the shaped bedding throughout its full length. Bell or groove ends of concrete pipe and outside circumferential laps of flexible pipe shall be placed facing upstream. Flexible pipe shall be placed with longitudinal laps or seams at the sides.

Paved or partially lined pipe shall be laid so the longitudinal centerline of the paved segment coincides with the flow line. Elliptical pipe shall be installed so the orientation of a vertical plane through the longitudinal axis of the conduit does not vary more than 5 degrees from the design orientation.

Pipe that is not in true alignment or that shows settlement after placement shall be removed and re-laid at no cost to the City.

**(d) Joining Pipe.** The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even.

Pipe protruding through structure walls shall be cut off flush with the inside face of wall and grouted.

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All surfaces of the joint upon or against which joint seal gaskets may bear shall be smooth, free of spalls, cracks, fractures, and imperfections that would adversely affect the performance of the joint. A primer shall be applied if recommended by the manufacturer.

When preformed rubber gasket is selected by the Contractor, the gasket shall be the sole element depended upon to make the joint flexible and watertight. The gasket shall be a continuous ring that fits snugly into the annular space between the overlapping surfaces of the assembled pipe joint to form a flexible watertight seal.

The gasket shall not be stretched more than 30% of its original circumference when seated on the spigot or tongue end of the pipe.

When bitumen/butyl plastic gasket is selected by the Contractor, the following procedure shall be used. The protective wrapping shall be removed from one side of the gasket. The gasket shall be pressed firmly to the vertical shoulder of the pipe joint, end to end continuing around the entire circumference of the joint. The remaining protective wrapping shall be removed and the pipe forced into connection until material fills the joint space.

For either type of gasket used and to ensure an even and well filled joint, the final joining of the pipe shall be accomplished by either pushing or pulling, by approved mechanical means, each joint of the pipe as it is laid. In cold weather, when directed, the joint material shall be warmed in a hot water bath, or by other approved methods, to the extent required to keep the material pliable for placement without breaking or cracking.

**(e) Backfilling.** The pipe shall be backfilled with bedding material in 4 inch compacted lifts to the springline. Pipe placed under roadways or driveways will then be backfilled with aggregate base material meeting the requirements of Section 401 placed in 4 inch lifts compacted to 95% of maximum density near optimum moisture as determined by AASHTO T180 or ASTM D1557. Flowable fill in accordance with these specifications may be used as an alternate to the aggregate base material. For the purpose of this section, roadway shall be defined as back of curb to back of curb.

All other areas shall be backfilled with material free from lumps or clods placed in layers not to exceed 6" at or near optimum moisture content and compacted with mechanical equipment to 90% of the maximum density, as determined by AASHTO T 99 or ASTM D698, to the limits shown on the plans. Pipe damaged during construction operations shall be replaced at no cost to the City.

When the existing material excavated for the pipe trench is declared by the Engineer/City Engineer as unsuitable for pipe backfill, this material shall be placed at other locations on the job and used to backfill behind curbs and/or placed on the fill slopes. If the Engineer/City Engineer determines that no suitable location exists on the job to utilize this material, the Engineer/City Engineer may approve the material to be wasted at an appropriate location outside the job limits. Material declared unsuitable for backfill shall be replaced with suitable material from roadway excavation and/or off-site sources.

**(f) Curtain walls for Flared End Sections.** The foundation for curtain walls shall be prepared to the required depth. For cast-in-place curtain walls, the forming, placement of

reinforcing steel, and placement, finishing, and curing of concrete shall be according to the applicable requirements of subsections 601' "Cast-in-Place Concrete" and 602, "Reinforcing Steel". Precast curtain walls shall be installed according to the applicable requirements for laying concrete pipe. Curtain walls shall not be measured for separate payment but shall be included with and subsidiary to Flared End Sections.

**(g) Temporary Repairs** for Roadway Cuts. All roadway cuts shall be temporarily or permanently repaired in accordance with Section 405, "Asphalt Concrete Patching For Maintenance of Traffic" within 24 hours of the completion of trench backfill for the work, or segment of work, which required the excavation and/or cut.

**301.04 Method of Measurement.** Storm drainage pipe of the type and size specified will be measured by the linear foot (LF) measured parallel to the flowline of the pipe. Where inlets, junction boxes, or other structures are included in lines of pipe, that length of pipe extending to and flush with the inside of the structure wall will be included for measurement but no other portion of the structure length or width will be so included. Whenever possible, the lengths shown on the plans may be adjusted by the Engineer/City Engineer to accommodate the pipe lengths available from the supplier that most nearly match the plan lengths. Flared end sections for pipe culverts will be measured by the unit and will include the curtain wall, complete in place.

**301.05 Basis of Payment.** Work completed, accepted, and measured as provided above will be paid for at the Contract Price bid as follows:

**(a)** Pipe will be paid for at the unit price per linear foot (LF) for each type and size of pipe and type of backfill specified; which price shall be full compensation for furnishing, hauling, and installing the pipe; for material including joint filler for concrete pipe and connection bands for metal pipe; for excavation and backfilling, including class 7 base as required, and for all other labor, tools, and equipment necessary to complete the work.

**(b)** Flared End Sections (FES) will be paid for at the unit price per each (EA) for the type and size of the flared end section specified; which price shall be full compensation for furnishing, hauling, and installing the flared end sections; for material including joint filler for concrete pipe and connection bands for metal flared end sections; for curtain walls complete in place; for excavation and backfilling, including compacted backfill, and for all other labor, tools, and equipment necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
__” (Pipe Type and Material) Within Roadway	LF
__” (Pipe Type and Material) Outside Roadway	LF
__” (FES Type and Material)	EA

## **Section 302. Drop Inlets and Junction Boxes**

**302.01 Description.** This item shall consist of the construction of drop inlets, junction boxes, and drop inlet extensions with rings and covers or grates and frames.

### **302.02 Materials.**

(a) All concrete for this section shall conform to the requirements for Class A Concrete as provided in Section 601.

(b) Reinforcing steel shall conform to the requirements of Section 602.

(c) Steel for welded steel grates and frames shall conform to the requirements of ASTM A 36.

(d) Iron castings for rings and covers, grates and frames, and other appurtenances shall conform to the requirements of ASTM A 48, Class 30A. Bearing surfaces between rings and covers or grates and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the perimeter area of contact. Castings shall be of the weight shown on the plans. Minimum weight of ring and lid shall be 275 pounds. The lid shall include the standard City of Springdale logo according to the Standard Details.

(e) Precast concrete units of the type, size, and designation shown on the plans may not be used unless written permission is given by the City. Precast units shall be subject to the requirements of AASHTO M 199. Units so manufactured must be certified by a professional engineer registered in the State of Arkansas that they have been designed and manufactured according to AASHTO M199 and that they meet the requirements for HS20 loading. Joint materials shall conform to Subsection 301.02.

(f) Curing Materials. Curing materials shall meet the requirements of Subsection 601.15.

**302.03 Construction Requirements.** Drop inlets, junction boxes, and drop inlet extensions shall be constructed with either reinforced or non-reinforced concrete, as shown on the plans.

Concrete shall not be placed until the Engineer/City Engineer has inspected the forms and the placement of reinforcing steel and rings or frames.

Round monolithic drop inlets may have the floors cast monolithically with the walls. All other concrete floors shall be placed at least 24 hours before beginning construction of the walls. A longer period of time may be required if weather conditions make it necessary.

When completed, the concrete shall be cured as specified in Subsection 601.15.

Walls shall be constructed to form a tight joint with the floor and around the inlet and outlet pipes. Pipes shall be cut flush with the inside surfaces of the wall.

Utility lines that are carried through the walls shall be protected in an approved manner to avoid damage.

Faces of drop inlets and drop inlet extensions shall be placed as a part of the curb in order to preserve the proper alignment.

Precast concrete drop inlets or junction boxes may be used only by special permission of the City. Inlet and extension tops and throats will be cast-in-place with no exceptions.

Precast reinforced concrete drop inlet or junction box sections shall be carefully set with joints conforming to the requirements of Subsection 301.03(d).

Metal rings or frames shall be set accurately to the finished elevations so that no subsequent adjustments will be necessary. They shall be set in a full mortar bed with firm bearing on the walls or securely fastened to the forms so that no movement will occur when concrete is placed around them.

Welded steel grates and frames shall be welded with ¼" fillet welds, and painted in accordance with the plans.

**302.04 Backfilling.** Backfill around inlets and junction boxes shall be with approved material as defined in the following paragraphs. Backfilling of inlets and junction boxes shall not begin until results of concrete cylinder tests demonstrate that concrete has reached 75% of specified strength. Backfill material shall be placed in layers not to exceed 4" in depth and shall be compacted to 95% of maximum density as measured by AASHTO T 99 for soil materials or by AASHTO T 180 for aggregate base materials.

All structures or parts of structures that fall within the limits of the roadway (defined as centerline to 1' behind the backs of curbs) shall be backfilled with aggregate base material unless otherwise allowed in writing by the Engineer/City Engineer.

Structures in other areas shall be backfilled with approved material provided from on-site or off-site areas.

Structures shall be cleaned of any accumulation of silt, debris, or foreign matter of any kind, and shall be reasonably free of such accumulations at the time of final inspection.

**302.05 Method of Measurement.** Drop inlets, junction boxes, and drop inlet extensions will be measured by the unit. One drop inlet extension unit is measured at a 4' length. Each

unit shall consist of the concrete frame, the ring and grate, and any pipe required to form the vertical portion of the drain including a standard elbow or tee.

**302.06 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid each for Drop Inlets, Drop Inlet Extensions, or Junction Boxes, of the size and type specified, which price shall be full compensation for constructing drop inlets, drop inlet extensions, or junction boxes; for furnishing, installing, and painting (if required), of rings and covers or grates and frames; for excavation and backfill; and for all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
(Size) Drop Inlets (Type)	EA
(Size) Junction Boxes (Type)	EA
(Size) Drop Inlet Extension	EA

### **Section 303. Concrete Box Culverts**

**303.01 Description.** This work consists of constructing reinforced concrete box culverts, in accordance with the details shown on the plans, and to the lines, grades, and dimensions shown on the plans. This work also includes associated wingwalls and aprons at the ends of the box culvert.

**303.02 Materials.** Concrete for reinforced concrete box culverts shall be class B in accordance with Section 601 unless specified otherwise. Reinforcing steel shall be in accordance with Section 602. Precast concrete box culverts shall be subject to the requirements of AASHTO M 259-98 and AASHTO M 273-00. Units so manufactured must be designed and certified by a professional engineer registered in the State of Arkansas that the precast culvert(s) have been designed and manufactured according to AASHTO M 259-988 and/or AASHTO M 273-00 for the site specific conditions and the requirements for minimum HS20 live load.

**303.03 Construction Requirements.** Concrete box culverts shall be constructed on firm, unyielding material. Unsuitable material found at the planned elevation of the box bottom shall be removed and replaced with material acceptable to the Engineer/City Engineer to provide an adequate foundation for construction of the box culvert. No concrete shall be placed before approval of the subgrade by the Engineer/City Engineer.

Reinforcing steel and concrete for box culverts shall be provided and placed in accordance with Sections 601 and 602 and as detailed on the plans. All concrete shall be placed in the dry unless otherwise directed by the Engineer/City Engineer.

Precast box culverts shall be placed in accordance with Section 301.03.

Backfill material placed within the roadway limits (defined as centerline of roadway to 1' behind the back of curb) or under driveways and parking lots shall be AHTD Class 7 aggregate base material or gravelly clay material, generally known as "hillside". Aggregate base shall be placed in layers not to exceed 4" loose depth and shall be compacted to 95% of maximum density as determined by AASHTO T 180 or ASTM D1557. "Hillside" material shall be placed in layers not to exceed 8" loose depth and shall be compacted to 95% of maximum density as determined by AASHTO T 99 or ASTM D698.

Backfill material placed in other areas shall be "hillside" material or other material that may be approved by the Engineer/City Engineer. Backfill in these areas shall be placed in layers not to exceed 8" loose depth and shall be compacted to 90% of maximum density as determined by AASHTO T 99 or ASTM D698.

No backfill shall be placed against box culvert walls or on box culvert tops until the concrete has cured for 14 days and until test cylinders show that the minimum specified strength has been obtained.

Backfill shall be placed and compacted on both sides of the box culvert simultaneously.

**303.04 Method of Measurement.** Measurement will be by one of the following methods as detailed below. The method to be used will be stated in the bid form.

**(a) Lump Sum Method.** No measurement will be made for this item. Payment will be on a lump sum basis.

**(b) Unit Price Method.** Concrete box culverts will be measured by the linear foot (LF) of box culvert constructed. Measurement will be taken at the centerline of the box culvert. Wingwalls, headwalls, and other appurtenances will not be measured under this item but will be considered as a separate lump sum item.

**303.05 Basis of Payment.**

**(a) Lump Sum Method.** Payment using this method will be on a lump sum basis. The lump sum price shall include all labor, materials, equipment, and incidentals necessary to completely construct each box culvert. Payment shall also include construction of all wingwalls, headwalls, and other appurtenances, as shown on the plans, excavation, backfill, and over excavation as necessary to provide a stable subgrade for box culvert construction.

**(b) Unit Price Method.** Payment using this method will be made at the per linear foot price (LF) for box culvert completed, accepted and measured as provided above. The per linear foot price shall include all labor, materials, equipment, and incidentals necessary to completely construct each box culvert. Payment shall also include excavation, backfill, and over excavation as necessary to provide a stable subgrade for box culvert construction. This per linear foot price shall not include construction of headwalls, wingwalls, and other appurtenances. They will be paid on a lump sum basis for each box culvert.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
(Size) Cast-in-Place Concrete Box Culvert	LS or LF
(Size) Precast Concrete Box Culvert	LS or LF
Wingwalls & Appurtenances	LS

## **Section 304. Vacant**

## **Section 305. Open Channels**

**305.01 Description.** This work consists of construction of open channels, including earthen and concrete channels.

**305.02 Channel Excavation.** Channels shall be excavated to the lines and grades shown on the plans. All constructed grades and slopes shall be within  $\pm 0.1$  feet of the plan grade. Ponding or standing water in the constructed channel will not be allowed.

**305.03 Earthen Channel Finishes.** Earthen channels shall receive a 4" minimum layer of topsoil meeting the requirements of Section 204. Topsoil shall be firmly compacted, then the surface scarified in preparation for seed or sod. All rocks and clods larger than 1 inch in diameter shall be removed before seeding or sodding operations begin. Seeding or sodding as specified on the plans shall be accomplished according to the requirements of Section 505.

Erosion control fabric, if specified, shall be placed according to manufacturer's specifications. Fabric shall be of the type specified unless an alternate type is approved in writing by the City. The Contractor shall submit a sample of the alternate fabric type along with specifications before such approval is granted.

### **305.04 Concrete Ditch Paving.**

**(a) Materials.** Concrete for ditch paving shall be Class A concrete in accordance with section 601.

#### **(b) Construction Requirements.**

- 1) Subgrade.** The subgrade shall be excavated or filled to the required grade. Soft and yielding material shall be removed and replaced with suitable material and the entire subgrade shall be thoroughly compacted.
- 2) Forms.** Forms shall be constructed of metal or wood, free from warp, and of sufficient strength to resist springing during the process of depositing concrete. They

shall be securely staked, braced, set, and held firmly to the required line and grade. Forms shall be cleaned and oiled before concrete is placed against them.

- 3) **Placing and Finishing.** The concrete shall be deposited in the forms upon a wetted subgrade to such depth that when it is compacted and finished, the flow line shall be at the required elevation and the sides at required widths, slopes, and thicknesses. The concrete shall be thoroughly compacted and the edges along the forms spaded to prevent honeycomb. The flow lines and sides shall be struck off with a straightedge and tamped sufficiently to flush mortar to the surface, after which it shall be finished with a wood float to a smooth and even surface. Edges shall be rounded with a ¼” edger.

Transverse joints ¼” wide shall be tooled or sawed perpendicular to the flow line at intervals not greater than 15’ measured longitudinally along the flow line. Joints shall continue across the bottom and up the slope to form a continuous joint. 3” diameter weepholes shall be spaced at 10’ intervals along the channel. These weepholes shall be constructed in both channel walls a minimum of 6 inches and a maximum of 1 foot above the channel flowline. Weepholes will not be required if the channel wall is less than 1’ tall.

When completed, the concrete shall be cured as specified in Section 601.

- 4) **Backfilling.** Immediately after the forms have been removed, the spaces on each side of the paving shall be backfilled with suitable material and compacted with mechanical equipment. Solid sodding shall be placed in conjunction with backfill when provided on the plans.
- 5) **Expansion Joints.** When a section of ditch paving terminates at a drop inlet or other structure, a space not less than ½” wide shall be left between the end of the paving and the structure. This space shall be filled with joint filler conforming to the requirements of AASHTO M 213. Expansion joints shall also be placed between successive placements or as directed by the Engineer/City Engineer.
- 6) **Placement on Slopes.** Slope paving shall begin at the toe of the slope and be constructed to the lines and dimensions as shown on the plans or as directed.
- 7) **Toewalls.** Concrete toewalls shall be constructed at the ends of all paved channels that do not terminate at a concrete structure. Toewalls shall be a minimum of 8” thick and 3’ deep below the flowline of the channel, and shall be placed monolithically with the concrete channel.

### **305.05 Method of Measurement.**

(a) Excavation for earthen or concrete channels shall be measured by the cubic yard (CY) of material removed. Quantities will be measured by cross sections taken before and after excavation operations. Payment for plan quantity of channel excavation will be made unless a change in the channel profile or cross section is made.

(b) Concrete channels will be measured by the square yard (SY) of concrete placed.

(c) Erosion control fabric will be measured by the square yard (SY) of area covered by fabric. Overlaps, splices, and other additional fabric required for proper placement of fabric according to manufacturers' specifications will not be measured.

**305.06 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price per square yard for concrete channels and per square yard for erosion control fabric. Said price shall be full compensation for placement and finishing of concrete as specified, placement of erosion control fabric per manufacturer's specifications, and all other labor, equipment, and materials necessary for a complete installation of each item as detailed on the plans.

Excavation will be paid on a CY basis. The plan quantity will be considered the final quantity for purposes of final payment, unless changes to the original design are made. Payment for excavation shall include excavation and removal of material as required, grading to proposed elevations, and all other items of work required to prepare proposed channel areas for concrete or topsoil as required. Topsoil, seeding, and sodding as specified or shown on the plans will be paid for under other items of work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Channel Excavation	CY (Plan Quantity)
Concrete Channel Paving	SY
Erosion Control Fabric	SY

## **Section 306. Filter Blanket and Riprap**

**306.01 Description.** This item consists of a protective layer of riprap, including filter blanket.

**306.02 Materials.** Stone for riprap shall be from an approved source and shall consist of a durable material with a percent of wear not greater than 45 by the Los Angeles Abrasion Test (AASHTO T96). Riprap stone shall have angular or fractured faces, and shall not weigh less than 140 pounds per cubic foot.

Riprap stone shall be well graded to produce a minimum of voids. The maximum size of each piece shall be no greater than 18" in any dimension, and approximately 50% of material shall consist of pieces weighing 35 pounds or more.

Filter blanket material shall consist of crushed stone reasonably well graded from coarse to fine as approved by the Engineer/City Engineer, or shall be a synthetic geotextile filter fabric meeting the requirements of AASHTO M288 for Erosion Control Class A.

**306.03 Construction Requirements.**

**(a) General.** Prior to placing filter blanket and riprap, the slopes shall be shaped as shown on the plans. When rock or hard shale is encountered at the toe of the slope, the riprap shall be keyed into this material the depth of the riprap.

Riprap shall be placed immediately following construction of the embankment in order to provide slope protection.

**(b) Filter Blanket.** Granular filter blanket material shall be spread uniformly on the previously prepared and approved surface to the thickness and location shown on the plans. Placement of the material by methods that will cause segregation or cause damage to the surface will not be permitted. Compaction of filter blanket will not be required, but it shall be finished to present a reasonably even surface free from mounds or windrows.

When fabric is used in lieu of granular material, it shall be placed directly on the prepared surface. Fabric sections may be placed vertically or horizontally on the slope. Adjacent fabric sections shall be joined by overlapping a minimum of 2' at the edges and pinning the overlapped strip with U-shaped wire pins, single shaped steel pins with metal disc heads, or similar fasteners. The fasteners shall be 6" or more in length and shall hold the fabric firmly in place. Fasteners shall be inserted through both strips of overlapped fabric at intervals of approximately 4' along the overlap. Additional pins shall be installed as necessary to prevent displacement of the fabric.

Fabric shall be overlapped in the direction of water flow. The fabric shall be turned down and buried approximately 12" at the exterior limits.

No construction equipment will be permitted directly on the fabric.

**(c) Dumped Riprap.** Stone or broken concrete for dumped riprap shall be placed in such a manner as to produce a reasonably well graded mass of rock with the minimum practicable percentage of voids and shall be constructed to the lines and grades shown on the plans or as directed by the Engineer/City Engineer. Unless otherwise specified, the minimum rip-rap depth shall be 18 inches. Material shall be placed in such a manner as to avoid displacing the underlying material. The larger pieces shall be well distributed throughout the entire mass and the finished riprap shall be free from objectionable pockets of small or large pieces. Hand placing, to a limited extent, may be required, but only to the extent necessary to secure the results specified above. Placing riprap by dumping into chutes or by similar methods likely to cause segregation of various sizes will not be permitted.

Riprap stone shall not be deposited in a manner that will cause damage to the filter blanket. Any damage to fabric during placement of riprap shall be corrected by the Contractor at no cost to the City prior to proceeding with the work. Damaged fabric shall be repaired by placing a piece of fabric large enough to cover the damaged area, overlapping, and pinning in accordance with this section.

**306.04 Measurement and Payment.** Quantities of 18" thick rip-rap will be measured by the square yard (SY). Filter blanket will not be measured.

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Payment for quantities of rip-rap completed and accepted and measured as provided above will be paid for at the unit contract price bid per square yard. Said price shall be full compensation for excavation and grading, placement of filter fabric, and placement of the rip-rap to the lines, grades, and depth specified.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Rip Rap	SY

### Section 307. Flowable Select Material

**307.01 Description.** This item shall consist of the furnishing, mixing, and placing a flowable mixture of portland cement, fly ash, sand, and water for backfilling bridge abutments, pipe culverts, box culverts, structural plate pipe and arches, or other uses as approved by the Engineer/City Engineer. The material shall be placed in close conformity with the lines, grades, dimensions, and details shown on the plans or established by the Engineer.

**307.02 Materials.** The materials used in the flowable select material shall conform to the applicable requirements of Section 601. The portland cement, fly ash, and chemical admixtures shall be listed on the QPL.

**(a) Mix Design.** The mix design will be prepared by the Contractor. The mixture will be proportioned to produce a flowable mixture without segregation. Material for one cubic yard, absolute volume, shall be as follows:

Cement 80 - 100 lbs.

Fly ash 220 - 300 lbs.

Sand Variable to equal one cubic yard

Water Approximately 65 gallons

The minimum flow of the mixture shall be 8" as determined by the test method described herein. The unit weight shall be a minimum of 110 lbs./cubic foot. The mix design shall be accompanied by the following documentation:

- A listing of the weights of all components of the proposed mix (water and admixtures may be measured by volume);
- Certified test results for flow and unit weight.

When unsatisfactory results or other conditions make it necessary, a new mix design will be established.

**(b) Sampling and Testing.** Sampling and testing will be performed by the City. The flow test shall consist of filling a 3" diameter x 6" high open-ended cylinder to the top with the flowable material mixture. If necessary, the top of the mixture will be struck off level. The cylinder will then be pulled straight up and the flow will be measured by the approximate diameter of the mixture. There shall be no evidence of segregation in the mixture. The unit weight shall be determined according to AASHTO T 121, except that rodding and tapping shall not be done.

**307.03 Construction Requirements.** The Contractor shall provide sufficient supervision, labor, equipment, tools, and materials to assure proper production, delivery, and placement. When deemed necessary by the Engineer/City Engineer, the flowable select material shall be contained within the designated area by metal or wood forms that are sufficiently tight as to keep the loss of material to a minimum, or by other means as approved by the Engineer/City Engineer. The flowable select material shall be discharged from the mixer and conveyed into the space to be filled according to Section 601. The fill material shall be brought up uniformly to the fill line shown on the plans or as directed by the Engineer/City Engineer. Placing of other material over flowable select material may begin after the flowable select material has taken its initial set, is stable, and does not displace under equipment.

**307.04 Method of Measurement.** Flowable Select Material will be measured by the cubic yard. The quantities shown included in the proposal will be considered the final quantities and no further measurement will be made unless, in the opinion of the Engineer or upon evidence furnished by the Contractor, substantial variations exist between the planned quantities and actual quantities due to changes in alignment or dimensions or to apparent errors.

**307.05 Basis of Payment.** Work completed, accepted, and measured as provided above will be paid for at the contract unit price bid per cubic yard for Flowable Select Material, which price shall be full compensation for designing the mix; for furnishing, mixing, and placing the material; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Flowable Select Material	CY

## **DIVISION 400. BASE AND PAVING**

### **Section 401. Aggregate Base Course**

**401.01 Description.** This work consists of preparing an aggregate base course on a prepared foundation.

**401.02 Materials.** Materials for aggregate base course shall meet the requirements of the AHTD Standard Specifications (2003) Section 303 for Class 7.

**401.03 Construction Requirements.** The base course material shall be placed on a completed and approved subgrade or existing base that has been bladed to substantially conform to the grade and cross section shown on the plans.

The subgrade shall be prepared as specified in Section 203 and shall be free from an excess or deficiency of moisture at the time of placing base course material. The subgrade shall also comply, where applicable, with the requirements of other items that may be contained in the Contract that provide for the construction, reconstruction, or shaping of the subgrade or the reconstruction of the existing base course. Base course material shall not be placed on a frozen subgrade or subbase.

The aggregate shall be placed on the subgrade or other base course material and spread uniformly to such depth and lines that when compacted it will have the thickness, width, and cross section shown on the plans. Unless otherwise specified or directed, base material shall extend full depth to 1' beyond the planned back of curb line.

If the specified compacted depth of the base course exceeds 8" the base shall be constructed in two or more layers of approximately equal thickness.

The material shall be spread the same day that it is hauled. Spreading shall be performed in such a manner that no segregation of coarse and fine particles nor nests or hard areas caused by dumping the aggregate on the subgrade will exist. Care shall be taken to prevent mixing of subgrade or unspecified material with the base course material in the blading and spreading operation.

When the base course is placed adjacent to an existing or newly constructed asphalt surface course or portland cement concrete pavement, the aggregate shall not be dumped or mixed on the pavement surface. Mechanical spreading equipment shall be used, if necessary, to place the base course on the subgrade.

Each course shall be thoroughly mixed for the full depth of the course and shall be compacted by any satisfactory method that will produce the density specified. The aggregate shall be maintained substantially at optimum moisture during the mixing, spreading, and compacting operations. The specified grade and cross section shall be maintained by blading throughout the compaction operation. The material in each course shall be compacted to a density, not less than 95% of the maximum density determined in the laboratory by

AASHTO T 180 or ASTM D1557. The aggregate shall be compacted across the full width of application.

The compacted base course shall be tested for depth and any deficiencies corrected by scarifying, placing additional material, mixing, reshaping, and recompacting to the specified density, as directed. The base course shall be shaped for its full width to the required grade and cross section. The finished base course layer shall not vary at any point by more than .02 foot from the prescribed elevation.

The Contractor shall maintain the base course in a satisfactory condition until accepted.

**401.04 Method of Measurement.** Aggregate base course will be measured in square yards of material in place per the plans. Measurement will include areas up to 1' behind the backs of curbs if required on the plans. Aggregate base course placed beyond 1' behind the back of curbs will not be measured.

**401.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per square yard for Aggregate Base Course, which price shall be full compensation for preparing the subgrade; for furnishing material; for spreading; finishing, watering, manipulating, and compacting; and for all labor, equipment, tools, and incidentals necessary to complete the work.

<u>Pay Item</u>	<u>Pay Unit</u>
(Depth) Aggregate Base Course	SY

## **Section 402. Prime and Tack Coats**

**402.01 Description.** This work consists of preparing and treating an existing surface with asphalt or emulsified petroleum products and, if required, blotter material.

### **402.02 Materials.**

(a) **Asphalt.** Asphalt cement shall meet the requirements of AASHTO M 20 or M 226.

(b) **Emulsified Asphalt.** Emulsified asphalt shall meet the requirements of AASHTO M 140 or M 208.

(c) **Emulsified petroleum products.** Emulsified petroleum products, "EPR-1 Prime" or approved equal, may be used as the Prime Coat when indicated on the Plans or approved by the Engineer/City Engineer.

(d) **Blotter Material.** Aggregate for blotter material shall meet the requirements of AASHTO M 43 for size 10.

Asphalt will be conditionally accepted at the source. Blotter material may be accepted in the stockpile, at the source, or at the roadway prior to placement.

#### **402.03 Construction Requirements.**

**(a) Weather Limitations.** Prime and tack coats shall not be applied on a wet surface, when the surface temperature is below 45 degrees F, or when weather conditions would prevent the proper construction of the prime or tack coat.

**(b) Equipment.** The contractor shall provide equipment for heating the asphalt and uniformly applying the asphalt and blotter material. The distributor shall be capable of uniformly distributing prime and tack coats at even temperatures on variable surface widths at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard. Distributor equipment shall include a tachometer, pressure gages, volume measuring devices or a calibrated tank, and a thermometer for measuring temperatures of tank contents.

**(c) Preparation of Surface.** Surfaces to be primed shall be shaped to the required grade and section, free from all ruts, corrugations, segregated material, or other irregularities and uniformly compacted and broomed. Surfaces to receive tack coat shall be free of dirt, gravel, and other debris and shall be thoroughly washed and broomed to produce a clean and dry surface.

**(d) Application of Asphalt.** Asphalt shall be applied by a pressure distributor in a uniform, continuous spread. When traffic is maintained, not more than ½ the width of the section shall be treated in one application. Care shall be taken so the application of asphalt at the junctions of spreads is not in excess of the specified amount. Excess asphalt shall be squeegeed from the surface. Skipped areas or deficiencies shall be corrected. Building paper shall be placed over the end of the previous applications, and the joining application shall start on the building paper. Building paper used shall be removed and satisfactorily disposed of.

When traffic is maintained, one-way traffic shall be permitted on the untreated portion of the roadbed. After the asphalt has been absorbed by the surface and will not pick up, traffic shall be transferred to the treated portion and the remaining width of the section shall be primed.

The quantities, rate of application, temperatures, and areas to be treated shall be approved before application of the prime or tack coat.

**(e) Emulsified petroleum products** Emulsified petroleum products, “EPR-1 Prime” or approved equal, where indicated on the Plans or approved by the Engineer/City Engineer as the Prime Coat shall be installed per the Manufacturer’s recommendations and as follows:

Required Field Dilution Rate – 3 parts water to 1 part EPR-1 PRIME (Note: Verification samples will be obtained prior to dilution); (b) Minimum required Application Rate – 0.30 gallons per square yard.

**(f) Application of Blotter Material.** If the prime coat fails to penetrate within the time specified and the roadway must be used by traffic, blotter material shall be spread in the quantities required to absorb any excess asphalt.

**(g) Prime Coats not required.** Unless indicated or directed otherwise, prime coats will not be required when the initial asphalt course placed upon the aggregate is a minimum of 4 inches in thickness.

**402.04 Measurement and Payment.** Prime coat, when required, will be measured and paid for per square yard of material placed at the required application rate. Tack coat will not be measured and will be subsidiary to other items. Blotter material will not be measured but will be subsidiary to other items.

<u>Pay Item</u>	<u>Pay Unit</u>
Prime Coat	SY

### **Section 403. Asphalt Concrete Hot Mix**

**403.01 Description.** This item consists of furnishing and placing asphalt concrete hot mix of the type specified on a prepared foundation.

#### **403.02 Materials, Design, and Quality Control of Marshall Mixes**

**(a) Materials.** Materials for Asphalt Concrete Binder Course shall meet the requirements of Section 406 of the AHTD Standard Specifications Edition of 1996. Materials for Asphalt Concrete Surface Course shall meet the requirements of Section 407 of the AHTD Standard Specifications Edition of 1996 and as follows:

All surface courses serving as wearing courses in travel lanes and not covered with a friction course shall contain not more than 60% limestone aggregate in the course mineral aggregate fraction. If and where so indicated in the Plans and the Bid for Unit Price Contract, and where the surface course is installed by two or more lifts, then the surface course(s) which shall be installed beneath the final lift of the wearing course may be an all limestone course aggregate mix otherwise complying with Section 409 of the AHTD Standard Specifications Edition of 1996 and subject to the review and acceptance by the Engineer and Owner.

**(b) Design and Quality Control Requirements** Design and quality control of Marshall mixes shall be as specified in Section 404 of the AHTD Standard Specifications Edition of 1996.

**(c) Materials and Equipment for Asphalt Concrete Plant Mix Courses** Materials and equipment for asphalt concrete plant mix courses shall meet the requirements of Section 409 of the AHTD Standard Specifications Edition of 2003.

### **403.03 Materials, Design, and Quality Control of Superpave Mixes**

**(a) Materials.** Materials for Asphalt Concrete Binder Course shall meet the requirements of Section 406 of the AHTD Standard Specifications Edition of 2003. Materials for Asphalt Concrete Surface Course shall meet the requirements of Section 407 of the AHTD Standard Specifications Edition of 2003 and as follows:

All surface courses serving as wearing courses shall comply with Section 409 of the AHTD Standard Specifications Edition 2003. If and where so indicated in the Plans and the Bid for Unit Price Contract, and where the surface course is installed by two or more lifts, then the surface course(s) which shall be installed beneath the final lift of the wearing course may be an all limestone course aggregate mix otherwise complying with Section 409 of the AHTD Standard Specifications Edition 2003 and subject to the review and acceptance by the Engineer and Owner.

**(b) Design and Quality Control Requirements.** Design and quality control of Superpave mixes shall be as specified in Section 404 of the AHTD Standard Specifications Edition of 2003.

**(c) Materials and Equipment for Asphalt Concrete Plant Mix Courses.** Materials and equipment for asphalt concrete plant mix courses shall meet the requirements of Section 409 of the AHTD Standard Specifications Edition of 2003, except for the requirements of Section 409.04(b) is at the contractor's option. If a material transfer device is used, the requirements of Section 409.04(b) shall apply.

### **403.04 Construction Requirements.**

**(a) Description.** The methods employed in performing the work shall be at the Contractor's option. When the production and/or placement of the material does not comply with the specifications, the Contractor shall make the changes necessary to bring the work into compliance.

**(b) Pre-Placement Conference.** Unless waived by the Engineer, prior to the start of paving operations the Contractor shall conduct a Pre-Placement Conference involving the Contractor's personnel and the Engineer and City's personnel. The Contractor's proposed plant, delivery, laydown, compaction, and equipment shall be discussed and, if deemed necessary by the City, all the equipment inspected. The accepted mix designs and materials to be used shall be discussed. The proposed mixing and compaction temperatures, sampling and testing plan, haul route, rolling pattern, and other pertinent information shall be discussed. The Pre-Placement Conference and all items discussed shall be documented by the Contractor and furnished to the Engineer within ten calendar days after the Pre-Placement Conference.

**(c) Preparation of Mixture.** The aggregates, mineral filler, and asphalt binder shall be measured separately and accurately mixed in the proper proportions according to the mix design. The aggregates shall be thoroughly coated and the mixture shall not show an excess or deficiency of asphalt binder, injury or damage due to burning or overheating, or an improper combination of aggregates. The continuous production of ACHM shall be within

plus or minus 25° F (14° C) of the mixing temperature shown on the approved mix design. Momentary temperature spikes shall be kept to a minimum.

**(d) Preparation of Base or Existing Surface.** Newly constructed base courses or subgrade shall be prepared as set forth in the specification item covering such items.

Prior to placing asphalt base, binder, or surface courses, all required corrections of the existing pavement or base, such as filling potholes, sags, and depressions, or alterations of the existing pavement crown, shall be made. Such corrections shall be accomplished by placing asphalt binder or surface course mixtures at the location and in a manner as directed by the Engineer/City Engineer. Asphalt material used for wedging or leveling courses, or for fillings holes, may be placed by hand, blade grader, or mechanical spreader methods. The mixture shall be featheredged to a smooth and even surface around the edges of these areas.

Prior to arrival of the mixture on the work, the prepared surface shall be cleaned of all loose and foreign materials and primed or tack coated as specified. Excessive joint and crack filler shall be removed before application of the prime or tack coat. The mixture shall not be placed on a surface that shows evidence of free moisture.

Contact surfaces of curbing, gutters, manholes, and other structures shall be painted with a thin coating of rapid curing cutback asphalt or emulsified asphalt. No direct compensation will be made for this work.

If the earlier course has been contaminated with dirt or other foreign materials, or when the time lapse between courses is in excess of 72 hours, the earlier course shall be cleaned and given a tack coat prior to placing the succeeding course. If directed by the Engineer/City Engineer, a tack coat shall be used even though the lapsed time has been less than 72 hours.

**(e) Transporting.** The mixture shall be transported from the mixing plant to the work in vehicles with clean tight beds.

When the mixture is being hauled more than 15 miles or when the mixture is being placed between November 1 and April 1, the beds of the vehicles shall be covered with canvas or other suitable material to retard loss of heat. The cover shall extend over the sides and ends of the truck bed and shall be securely fastened. When the mixture is being hauled less than 15 miles the cover shall be stored on the truck at all times to be utilized when overtaken by sudden rains.

No loads shall be sent so late in the day as to interfere with spreading and compacting the mixture during daylight hours unless adequate artificial lighting is provided.

Sufficient haul vehicles and plant production rate shall be maintained to the project to provide a continuous operation on the roadway.

Only non-petroleum release agents approved by the Engineer/City Engineer shall be used in haul trucks.

**(f) Spreading and Finishing.** The mixture shall be placed on an approved surface, spread, and struck off to the line, grade, and elevation established. The mixture shall be placed only on a base that shows no evidence of free moisture, and only when weather conditions are suitable.

The mixture from all types of plants should be delivered to the paver within the recommended compaction temperature range as shown on the approved job mix design. These recommended temperatures should be used in placing and compacting the material. In addition, surface and binder course mixtures shall not be placed on the roadway at a temperature lower than 250° F.

The paver shall uniformly distribute and compact the mixture in front of the screed for the full width being paved. The screed or strike-off assembly shall effectively produce a finished surface of smooth and uniform texture without tearing, shoving, or gouging the mixture. The paver shall be operated at forward speeds consistent with satisfactory laying of the mixture. The speed of the paver shall be matched with the plant production rate and number of hauling units. Stop and go operation of the paver is to be avoided.

The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6". In general, the joint in the top layer shall be at the centerline of the pavement if the asphalt is placed in 2 passes or less, or at lane lines if the asphalt is placed in more than 2 passes.

**(g) Rolling and Density Requirements and Joints.** The mixture, after being spread, shall be thoroughly compacted by rolling as soon as it will bear the weight of the rollers without undue displacement.

At the beginning of placement of each mix design, the Contractor shall establish an optimum rolling pattern that will achieve the specified density for the mix being placed. The Contractor may continue with paving operations while the optimum rolling pattern is being established. The established rolling pattern shall be used for compacting all mix placed unless a change in the job mix formula occurs or unacceptable results are obtained. Whenever a change in the job mix formula occurs, or when the compaction method or equipment is changed, or when unacceptable results are obtained, a new optimum rolling pattern shall be established.

The number, weight, and type of rollers, and the optimum rolling pattern shall be such that the specified density and surface requirements are consistently attained while the mixture is in a workable condition. Final approval of the rollers and the rolling pattern will be based upon satisfactory performance and the ability to compact the mixture to the specified density and surface requirements. Rollers that produce excessive crushing of aggregate particles will not be permitted.

When using vibratory rollers, the Contractor shall exercise due caution to prevent any deterioration of the material caused by excessive rolling or vibration. Vibratory rollers shall be operated in such a manner that overlap of adjacent passes shall be held to a minimum. Vibration shall not be used on courses less than 1 ½ " thick.

Rolling shall start longitudinally at the low edge and proceed toward the higher portion of the mat. When paving in echelon or abutting the previously placed lane, the longitudinal joint shall be rolled first followed by the regular rolling procedure. Alternate passes of the roller shall be terminated at least 3' from any preceding stop. Rolling on superelevated curves shall progress from the low side. Rollers shall not be stopped perpendicular to the centerline of the traveled way.

The speed of the roller shall be slow enough to avoid displacement of the hot mixture, and in no case more than 3 mph. The roller shall be operated in such a manner that no displacement of the mat will occur. Rolling shall proceed continuously until the required density is attained and all roller marks are eliminated, leaving the surface smooth and uniform and the required density attained. To prevent adhesion of the asphalt mixture to the rollers, the rollers shall be kept moist for the full width of the rollers, but excess water will not be permitted.

Rollers shall not pass over the unprotected end of a freshly laid mixture. Transverse joints shall be formed by cutting back on the previous run to expose the full depth of the course. A brush coat of asphalt material shall be used on contact surfaces of transverse joints just before additional mixture is placed against the previously placed material.

**(h) Weather Limitations.** Bituminous mixtures shall not be placed on any wet or frozen surface or when weather conditions otherwise prevent the proper handling and finishing of the mixture.

Bituminous mixtures may only be placed when either the ambient air temperature or the road surface temperature is equal to or greater than that shown in the table.

Regardless of the temperatures herein specified, paving will not be allowed unless specific density, either by percent of field mold density or by rolling procedure, can be achieved before the bituminous mixture cools to 175 degrees Fahrenheit.

Bituminous Placement Temperature Limitations:

<b>Paving Course</b>	<b>Thickness (Inches)</b>	<b>Min. Air Temperature (Degrees F.)</b>	<b>Min. Road Surface Temperature (Degrees F.)</b>
Surface	All	45	45
Subsurface	Less than 3	40	45
Subsurface	3 or more	30	35

**403.05 Acceptance of Pavement and Adjustments in Payment.**

**(a) Marshall Mixes.** Acceptance of asphalt payment designed using the Marshall Method shall be according to Section 410.09 of the AHTD Standard Specifications Edition of 1996 except as modified herein.

**(b) Superpave Mixes** Acceptance of asphalt payment designed using Superpave Methods shall be according to Section 410.09 of the AHTD Standard Specifications Edition of 2003 except as modified herein.

**403.06 Modifications and Augmentations of AHTD Standard Specifications.** Modifications and augmentations of AHTD Standard Specifications detailed in this subsection apply to both the 1996 and 2003 Editions of the Standard Specifications.

Samples for all properties except density, thickness, and the investigation of segregation shall be obtained from trucks at the plant. The contractor/testing agency shall clearly mark the load ticket of each sampled truck to indicate that the load has been sampled.

The Contractor shall provide the straight-edge for use in pavement smoothness testing.

Sublot sizes for density and depth measurements will be 500 tons, and lot sizes will be 3000 tons. Locations for cores to be taken for density and depth testing will be determined using AHTD Test Method #465.

Compliance, price reduction, and rejection limits for density will be in accordance with Table 410-1 of the AHTD Standard Specifications. Calculations of price reductions will be in accordance with 410.09(d)(5) of the AHTD Standard Specifications. For asphalt that is outside the limits shown as lot rejection limits but within the limits shown as sublot rejection limits in Table 410-1, the City shall determine if that mix shall be removed at the contractor's expense or left in place without pay to contractor.

All asphalt that is outside the limits shown as sublot rejection limits shall be removed in accordance with this section.

For small projects (less than 1500 tons total) price reduction amounts shall be reduced to 50% of the amounts specified in Section 410 of the AHTD Standard Specifications.

Thickness of the finished asphalt will be monitored by measuring the thickness of the density cores taken. The average of all depth measurements shall not be less than the required depth shown on the plans. Depth of any core in excess of plus three-eighths inch (+ 3/8") will not be used in computing the average depth. If the average depth is less than the required depth, it will be corrected by overlaying with additional ACHM surface, or as directed by the Engineer/City Engineer.

In addition, thickness of individual cores shall not be less than 3/8" less than the plan depth.

The method for determining the limits of removal for density or depth is as follows: If a single core test falls outside of the limits shown as "Sublot Rejection Limits" in 410-1, two additional tests shall be run in close proximity (within three feet). If the average of these three tests is within the sublot rejection limits in Table 410-1, then this average shall become the value for the density of this sublot. If the average of the three tests is still outside of the sublot rejection limits, tests shall be run at 50-foot intervals in both directions until results are found that are within the sublot rejection limits.

All asphalt that is outside of the limits shown as subplot rejection limits as determined by the above method shall be removed and replaced. After replacement, a core shall be taken in the replacement asphalt and the density determined. The average of this density test and the two isolation tests shall become the density for the subplot.

The contractor shall do all coring and testing for density and depth at no additional cost to the City. The City may require additional cores cut for verification of the contractor's test. Verification testing will be paid for by the City.

When lots and subplot divisions for initial and final courses do not coincide, the Contractor may be required to take additional samples (full-depth) at his expense to determine asphalt thickness. Locations of such cores shall be approved by the Engineer.

Section 410.10 of the AHTD Standard Specifications will not be used under this contract.

**403.07 Method of Measurement.** Measurement will be by one of the following methods as detailed below. The method to be used will be stated in the bid form.

Asphalt concrete hot mix (ACHM) will be measured by either:

- (a) the ton, or
- (b) the square yard (SY)

of material in place and as indicated on the Plans and the Bid for Unit Price Contract.

Asphalt concrete hot mix (ACHM) where indicated to be measured by the ton will be substantiated by weight tickets, which shall be submitted to the City at the time of asphalt delivery. Deductions for asphalt placed in areas not designated in the plans and not directed by the Engineer/City Engineer or for asphalt placed at depths more than 1/8" over plan depth will be made at the discretion of the Engineer/City Engineer. Measurement of these deductions will be by a method deemed appropriate by the Engineer/City Engineer.

Asphalt concrete hot mix (ACHM) where indicated to be measured by the square yard (SY) will be substantiated by surface area measurements of asphalt concrete hot mix in place. Deductions for asphalt placed in areas not designated in the plans and not directed by the Engineer/City Engineer will be made at the discretion of the Engineer/City Engineer. Measurement of these deductions will be by a method deemed appropriate by the Engineer/City Engineer.

**403.08 Basis of Payment.** Payment will be based upon the method of measurements and by one of the following methods as detailed below.

Asphalt concrete hot mix will be paid for by either:

- (a) Per ton: at the contract unit price bid per ton of material placed in plan locations; said price shall include furnishing mix designs, furnishing material, for heating, mixing,

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hauling, placing, rolling, finishing, and for all other labor, equipment, tools, and incidentals necessary to complete the work, or

(b) Square yard (SY): at the contract unit price bid per (depth asphalt concrete hot mix) square yard (SY) of material placed in plan locations; said price shall include furnishing mix designs, furnishing material, for heating, mixing, hauling, placing, rolling, finishing, and for all other labor, equipment, tools, and incidentals necessary to complete the work,

as indicated on the Plans and the Bid for Unit Price Contract.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Asphalt Concrete Hot Mix Binder Course (ACHMBC)	Ton
Asphalt Concrete Hot Mix Surface Course/Wearing Course (ACHMSC/WC)	Ton
Asphalt Concrete Hot Mix Surface Course not Wearing Course (ACHMSC/NWC)	Ton

**OR**

<u>Pay Item</u>	<u>Pay Unit</u>
(Depth) Asphalt Concrete Hot Mix Binder Course (ACHMBC)	SY
(Depth) Asphalt Concrete Hot Mix Surface Course/ Wearing Course (ACHMSC/WC)	SY
(Depth) Asphalt Concrete Hot Mix Surface Course not Wearing Course (ACHMSC/NWC)	SY

**Section 404. Asphalt Concrete Hot Mix Base Course**

**404.01 Description.** This item shall consist of a base course constructed on an accepted course according to these specifications and in substantial conformity with the lines, grades, and typical cross sections shown on the plans.

**404.02 Materials.** The materials and equipment shall comply with the requirements of Asphalt Concrete Hot Mix Base Course (Section 405 of the AHTD Standard Specifications).

**404.03 Construction Requirements.** Construction requirements shall comply with the requirements of Asphalt Concrete Hot Mix Base Course (Section 405 of the AHTD Standard Specifications).

**404.04 Method of Measurement.** Measurement will be by one of the following methods as detailed below. The method to be used will be stated in the bid form.

Asphalt concrete hot mix base course will be measured by either:

- (a) the ton, or
- (b) the square yard (SY)

of material in place and as indicated on the Plans and the Bid for Unit Price Contract.

Asphalt concrete hot mix base course where indicated to be measured by the ton will be substantiated by weight tickets, which shall be submitted to the City at the time of asphalt delivery. Deductions for asphalt placed in areas not designated in the plans and not directed by the Engineer/City Engineer or for asphalt placed at depths more than 1/8" over plan depth will be made at the discretion of the Engineer/City Engineer. Measurement of these deductions will be by a method deemed appropriate by the Engineer/City Engineer.

Asphalt concrete hot mix base course where indicated to be measured by the square yard (SY) will be substantiated by surface area measurements of asphalt concrete hot mix in place. Deductions for asphalt placed in areas not designated in the plans and not directed by the Engineer/City Engineer will be made at the discretion of the Engineer/City Engineer. Measurement of these deductions will be by a method deemed appropriate by the Engineer/City Engineer.

**404.05 Basis of Payment.** Payment will be based upon the method of measurements and by one of the following methods as detailed below.

Asphalt concrete hot mix base course will be paid for by either:

(a) Per ton: at the contract unit price bid per ton of material placed in plan locations; said price shall include furnishing mix designs, furnishing material, for heating, mixing, hauling, placing, rolling, finishing, and for all other labor, equipment, tools, and incidentals necessary to complete the work, or

(b) Square yard (SY): at the contract unit price bid per (depth asphalt concrete hot mix) square yard (SY) of material placed in plan locations; said price shall include furnishing mix designs, furnishing material, for heating, mixing, hauling, placing, rolling, finishing, and for all other labor, equipment, tools, and incidentals necessary to complete the work,

as indicated on the Plans and the Bid for Unit Price Contract.

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Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Asphalt Concrete Hot Mix Base Course	Ton

OR

<u>Pay Item</u>	<u>Pay Unit</u>
(Depth) Asphalt Concrete Hot Mix Base Course	SY

### **Section 405. Asphalt Concrete Patching for Maintenance of Traffic**

**405.01 Description.** This item shall consist of an asphalt concrete material composed of mineral aggregate and asphalt binder for use in patching to maintain traffic including temporary repairs for roadway cuts. This item shall be placed for all roadway cuts unless directed otherwise by the Engineer/City Engineer. This item will be placed for other maintenance of traffic if and where directed on the plans or by the Engineer/City Engineer.

**405.02 Materials and Composition.** Materials and equipment shall conform to the requirements of ACHM Surface Course (Standard Specification Section 403) or Asphalt Concrete Cold Plant Mix (Section 411 of AHTD Standard Specifications).

**405.03 Construction Requirements.** Construction requirements shall conform, insofar as possible, to Section 406 and as follows:

All roadway cuts shall be temporarily or permanently repaired within 24 hours of the completion of trench backfill for the work, or segment of work, which required the excavation and/or cut.

Temporary roadway cut repairs shall be a minimum of two (2) inches and a maximum of three (3) inches of asphalt and shall comply with Specification Section 405 and 406.

Permanent roadway cut repairs shall comply with the plans and specifications and as directed by the Engineer/City Engineer.

Temporary roadway cut repairs shall be maintained by the contractor.

Temporary roadway cut repairs shall be removed and disposed of by the Contractor as necessary during installation of permanent roadway cut repairs or new roadway construction.

**405.04 Method of Measurement.** Asphalt Concrete Patching for Maintenance of Traffic will be measured by the ton of mix placed as directed by the Engineer/City Engineer. In no

case shall measurement of the Temporary Repairs for Roadway Cut extend beyond the pay limit shown on the details on the Plans. Temporary Repairs for Roadway Cut with depths less than two (2) inches and all depths greater than three (3) inches shall not be measured for payment.

**405.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per ton for Asphalt Concrete Patching for Maintenance of Traffic, which price shall be full compensation for furnishing materials; for heating, mixing, hauling, placing, and compacting; and for all labor, equipment, tools, and incidentals necessary to complete the work. No payment will be made for:

Material placed with out authorization of Engineer/City Engineer.

Material placed beyond the pay limits shown on the detail for each type of pavement repair.

Material placed to repair previously patched areas unless approved by the Engineer/City Engineer.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Asphalt Concrete Patching for Maintenance of Traffic	Ton

## **Section 406. Asphalt Concrete Hot Mix Patching of Existing Roadway**

**406.01 Description.** This item shall consist of patching the existing roadway using asphalt concrete material composed of mineral aggregate and asphalt binder.

**406.02 Materials and Composition.** Materials shall conform to the requirements of Section 402, Tack Coat and Section 403.

**406.03 Construction Requirements.** Unstable areas in existing roadways and shoulders, designated by the Engineer/City Engineer to be repaired, shall be removed to provide firm vertical sides and a firm, stable, bottom generally parallel with the existing surface. All loose or foreign material shall be removed from the hole. A tack coat of emulsified asphalt shall be applied to the sides of the hole. Asphalt Concrete Hot Mix Binder or Surface Course shall be placed in the hole in uniform layers, not to exceed 4 inches loose measurement. Compaction, satisfactory to the Engineer/City Engineer, shall be accomplished with a mechanical tamper or other approved methods. The finished surface shall be smooth and level with the surrounding surface.

**406.04 Method of Measurement.** Asphalt Concrete Hot Mix Patching of Existing Roadway will be measured by the ton of mix.

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**406.05 Basis of Payment.** Work completed and accepted and measured as provided above, will be paid for at the contract unit price bid per ton for ACHM Patching of Existing Roadway, which price shall be full compensation for excavation of the existing roadway; for removal and disposal of excavated material; for compacting and tacking the excavated area; for furnishing materials; for heating, mixing, hauling, placing, and compacting the materials; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Asphalt Concrete Hot Mix Patching of Existing Roadway	Ton

## **DIVISION 500. MISCELLANEOUS CONSTRUCTION**

### **Section 501. Concrete Curb and Gutter**

**501.01 Description.** This item shall consist of the construction of integral curb, concrete curb, or concrete combination curb and gutter according to these specifications and in conformity with the locations, lines, and grades shown on the plans or as directed.

**501.02 Materials.** The Concrete shall be Class A or B Concrete as provided in Section 601. The maximum allowable slump shall be 4 inches.

When an extrusion machine is used, the Contractor may modify the concrete mix design, upon approval of the Engineer/City Engineer, to improve workability while maintaining the requirements for Class A or B Concrete.

Material for joint filler shall comply with AASHTO M 213.

#### **501.03 Construction Requirements.**

**(a) Subgrade.** The subgrade shall be shaped to the required depth below the finished surface, according to the dimensions shown on the plans, and shall be compacted to a firm, even surface. Where curb is to be placed as part of a street, the compaction requirements of the street shall apply to the subgrade and base course underneath the curb.

#### **(b) Placing and Finishing.**

1) **Integral Curb.** After the concrete pavement has been struck off, the curb forms shall be clamped or otherwise securely fastened in place to the slab form and additional concrete for the curb shall then be deposited and thoroughly tamped. The concrete shall be placed within 30 minutes after the pavement slab has been finished and care shall be taken to secure monolithic construction. The concrete shall be spaded or vibrated sufficiently to eliminate voids and shall be tamped to bring the mortar to the surface. It shall then be finished smooth and even with a wood float and given a Class 6 finish according to Section 601.16. The edges shall be rounded with an approved finishing tool to the radius shown on the plans.

2) **Concrete Curb or Concrete Combination Curb and Gutter.** The concrete shall be deposited in the forms upon wetted subgrade and vibrated and spaded until mortar entirely covers the surface, after which it shall be finished smooth and even by means of a wood float and given a Class 6 finish according to Section 601.16. Edges shall be rounded as shown on the plans while the concrete is still plastic.

**(c) Joints.** Expansion joints for concrete curb or concrete combination of curb and gutter shall be installed at stationary structures such as catch basins, drop inlets, etc., and at ends of curb returns. Where curb and gutter is constructed adjacent to or on rigid pavements, the location and width of joints shall coincide with those in the pavement, where practicable. Expansion joints shall have a thickness of ½” and shall be filled with joint filler according to

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Section 601.11 shaped to the cross section of the curb and constructed at right angles to the curb line.

Contraction joints for concrete curb or concrete combination curb and gutter shall be 1/8" to 3/8" wide x 1 1/2" deep and shall be constructed at 15' intervals. They shall be constructed at right angles to the centerline and perpendicular to the surface of the curb and gutter. Where curb and gutter is constructed adjacent to or on rigid pavements, the location and width of joints shall coincide with those in the pavement, where practicable. Contraction joints shall be formed by sawing, unless otherwise specified, and filled according to the requirements for Joint Seals as specified in Section 601.11, or with a commercially available silicone product approved by the City.

**(d) Surface Tests.** Before the concrete is given the final finishing, the surface of the gutter and the top of the curb shall be true to line and grade. The maximum variation in 10' shall not exceed 3/8".

**(e) Curing.** When completed, the concrete shall be cured as specified in Section 601.15.

**(f) Backfilling.** After the concrete has set sufficiently, the space behind the curb shall be refilled to the required elevation with suitable material, free from topsoil, leaves, twigs, or other organic material, trash, large rocks, or other deleterious materials. This material shall be firmly compacted to 90% of the material's maximum density as determined by AASHTO T99 or ASTM D698 by means of approved mechanical equipment and neatly graded.

**501.04 Method of Measurement.** Curbing will be measured by the linear foot (LF) along the face of the curb at the gutter line. Integral curb placed with concrete pavement will not be measured separately, but shall be included in the price bid for concrete pavement. Modified curbs across driveways and streets will be measured as curb. Curbs placed as part of commercial asphalt driveway construction will also be measured as curb.

**501.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot (LF) for Concrete Curb or Concrete Curb and Gutter, which price shall be full compensation for furnishing materials, including joint filler; for forms; for mixing, placing, and finishing concrete; and for excavation and backfilling when not included in other items.

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Curb and Gutter	LF

## Section 502. Concrete Sidewalks

**502.01 Description.** This item shall consist of the construction of concrete walks according to these specifications and in conformity with the dimensions, locations, lines, and grade shown on the plans or as directed.

**502.02 Materials.** The concrete shall comply with the requirements for Class A or B Concrete as provided in Section 601. The maximum allowable slump shall be 4 inches.

**502.03 Construction Requirements.**

**(a) Subgrade.** The subgrade shall be excavated or filled to the required grade. Unacceptable material shall be removed and replaced with suitable material, free from topsoil, leaves, twigs, or other organic material, trash, large rocks, or other deleterious materials, and the entire subgrade shall be thoroughly compacted with approved mechanical equipment to not less than 90% of the material's maximum density as determined by AASHTO T99 or ASTM D698.

**(b) Placing and Finishing.** The concrete shall be deposited in the forms upon the wetted subgrade to such depth that when it is compacted and finished, the top shall be at the required elevation. It shall be thoroughly consolidated and the edges along the forms spaded to prevent honeycomb. The top shall then be struck off with a straightedge and tamped or vibrated sufficiently to flush mortar to the surface, after which it shall be given a Class 6 finish according to Section 601.16. Edges shall be rounded with a ¼" radius, including edges at joints.

Transverse joints in the walks shall be cut with a ¼" jointer at intervals not greater than the width of the walk being constructed, or as directed.

When completed, the concrete shall be cured as specified in Section 601.15.

**(c) Backfilling.** After the forms have been removed, the spaces on each side of the walk shall be backfilled with suitable material, which shall be firmly compacted and neatly graded. Topsoil meeting the requirements of Section 204 shall be used when areas adjacent to the sidewalk are to be seeded or sodded.

**(d) Expansion Joints.** A space not less than ½" wide shall be left between the sidewalks and adjacent structures, except that no space shall be left between the sides of the walks and adjacent curbs. This space shall be filled with approved joint filler complying with AASHTO M 213.

**502.04 Method of Measurement.** Concrete sidewalk will be measured by the square yard (SY).

**502.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per square yard (SY) for Concrete Sidewalks, which price shall be full compensation for furnishing materials including joint filler; constructing the concrete sidewalk; for excavation and backfilling where not included in other contract items; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
(depth) Concrete Sidewalk	SY

## **Section 503. Driveway Construction or Reconstruction**

**503.01 Description.** This work consists of reconstructing existing driveways or constructing new driveways with concrete, asphalt, aggregate base course, or other materials as shown on the Plans or as directed by the Engineer/City Engineer.

**503.02 Materials.** Concrete for driveway reconstruction shall be Class A or B according to the requirements of Section 601. Asphalt shall be Surface Course per the requirements of Section 403. Aggregate base course shall meet the requirements of Section 401. All other materials shall be as specified or as directed by the Engineer/City Engineer.

### **503.03 Construction Requirements.**

**(a) General.** Aprons and driveways shall be constructed in the locations, to the lines and grades, and of the material type shown on the Plans, or as directed by the Engineer/City Engineer. Construction of driveways with greater than 8% slope perpendicular to the street will not be allowed except as approved by the Engineer. Driveway widths shall match widths of existing driveways, with a minimum driveway width of 14'. All driveways designated as commercial driveways shall be constructed with concrete curb and gutter along each side of the driveway.

Driveways and aprons shall be constructed on a compacted subgrade consisting of material approved by the Engineer/City Engineer.

**(b) Driveway Removal.** Existing driveways shall be removed to the locations shown on the plans or as directed by the Engineer to create a smooth transition from the roadway to the adjacent property. The back limit of the driveway shall be sawed if required to produce a neat line.

**(c) Concrete Apron.** Concrete apron shall be constructed on all driveways beginning at the back of curbs and extending to the back of sidewalk, or to 6' behind the back of curb, which ever is greater. Concrete aprons shall be of a residential or commercial type as shown on the plans. The apron thickness shall be as shown on the Plans, but not less than six inches (6"). Mixing, placement, and finishing of concrete shall be as required in Section 601. Contraction joints shall be constructed so that slabs are no more than 15' in any dimension. One half-inch (1/2") expansion material meeting the requirements of Section 601.11 shall be placed between the backs of curbs and the apron. Joints shall be tooled or sawed at 10' intervals perpendicular to the street. These saw joints shall be filled with joint sealant meeting the requirements of Section 601.11.

**(d) Concrete Driveways.** Concrete driveways shall be constructed where shown on the Plans or as directed by the Engineer/City Engineer. The driveway thickness shall be as shown on the Plans, but not less than six inches (6”). Mixing, placement, and finishing of concrete shall be as required in Section 601. Contraction joints shall be constructed so that slabs are no more than 15’ in any dimension. When concrete driveways are constructed monolithically with concrete apron, a contraction joint shall be constructed at the interface between the apron and the driveway. All joints shall be sealed according to Section 601.11.

**(e) Asphalt Driveways.** Asphalt driveways shall consist of approved Surface Mix. Construction of asphalt driveways shall meet the requirements of Section 403. The thickness of the asphalt driveway section shall be as shown on the Plans, but in no case shall be less than 3” of asphalt constructed on 4” of aggregate base course.

**(f) Aggregate Base Driveways.** All existing driveways constructed of soil or gravel shall be reconstructed with aggregate base meeting the requirements of Section 401. Placement of base material shall be according to the lines and grades shown on the plans or as directed by the Engineer/City Engineer. Thickness of base shall be as shown on the plans, but in no case shall be less than 6”. Compaction requirements are as specified in Section 401.

**503.04 Method of Measurement.** Asphalt or concrete driveway removal shall be measured by the square yard (SY) from the existing roadway edge to the limits of the driveway removal. Removal of other driveways will not be measured. Concrete aprons and all driveways shall be measured by the square yard (SY). Curb constructed as part of concrete aprons or concrete driveways will be measured as driveway. Curb for asphalt driveways will not be measured as part of this item.

**503.05 Basis of Payment.** Work completed and measured as provided above will be paid for at the contract unit price bid per square yard for the various items. This price shall be full compensation for furnishing and placing materials, for excavation and subgrade preparation; for shaping and finishing; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Aprons	SY
Concrete Driveway	SY
Asphalt Driveway	SY
Aggregate Base Course Driveway	SY
Asphalt/Concrete Driveway Removal	SY

## **Section 504. Headwalls and Retaining Walls**

**504.01 Description.** This item consists of constructing concrete headwalls and retaining walls at the locations and to the lines and grades shown on the plans. Modular Block retaining walls, and/or Mechanically Stabilized Earth retaining structures with facing, when so indicated in the plans or the proposal shall be specified in a Special Provision supplemental to these Standard Specifications.

**504.02 Materials.** Concrete shall meet the requirements of Section 601 for Class A or B for headwalls, and Class B for retaining walls.

Reinforcing steel shall meet the requirements of Section 602.

**504.03 Construction Requirements.** The subgrade on which the footing is to be placed shall be prepared by excavating to the required grade and thoroughly compacting the existing material. If the existing material at the elevation of the bottom of the footing is soft and yielding, and the Engineer/City Engineer so directs, it shall be removed and replaced with suitable material according to Section 202.

Reinforcing steel shall be placed as shown on the plans. Weepholes of the size shown on the plans shall be set in the forms before concrete is placed.

Concrete shall be furnished, placed, finished, and cured according to the requirements of Section 601.

**504.04 Method of Measurement.** Concrete headwalls and concrete retaining walls will be measured by the cubic yard of concrete placed and accepted. . Concrete, reinforcing steel, filter fabric, compacted drainage stone backfill, expansion joint materials, weep holes, weephole screens, compacted earth backfill and all other items indicated on the Plans or required for a complete headwall and/or retaining wall shall not be measured for separate payment but will be considered subsidiary to the items involved.

Additional undercut excavation as required under footings will be measured by the cubic yard compacted in place.

**504.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per cubic yard (CY). Concrete Headwalls or Concrete Retaining Walls. Said price shall be full compensation for furnishing all materials, including reinforcing steel; for structural excavation and compaction; for all forming and bracing; for mixing, transporting, placing, finishing, and curing; and for all equipment, tools, labor, and incidentals necessary to complete the work.

Additional excavation and embankment under footings will be paid for at the unit price bid for Undercut Excavation. No payment for additional excavation will be made unless such excavation is directed by the Engineer/City Engineer.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Headwalls	CY
Concrete Retaining Walls	CY

**Section 505. Seeding and Sodding**

**505.01 Description.** This item shall consist of furnishing and applying lime, fertilizer, seed, mulch cover, and water according to these Specifications at locations shown on the plans or as directed.

The work under this item shall be accomplished as soon as practicable after the grading in an area has been completed in order to deter erosion of the roadway and siltation of streams.

**505.02 Materials.**

**(a) Lime.** Lime shall be agricultural grade ground limestone or equivalent as approved by the City.

**(b) Fertilizer.** Fertilizer shall be a commercial grade, uniform in composition, free flowing, and suitable for application with mechanical equipment. It shall be delivered to the site in labeled containers conforming to current Arkansas fertilizer laws and bearing the name, trademark, and warranty of the producer.

**(c) Seed.** Except as modified herein, the seed shall comply with the current rules and regulations of the Arkansas State Plant Board and the germination test shall be valid on the date the seed is used. It shall have a minimum of 98% pure seed and 85% germination by weight, and shall contain no more than 1% weed seeds. A combined total of 50 noxious weed seeds shall be the maximum amount allowed per pound of seed with the following exceptions: Johnson grass seed, wild onion seed, wild garlic seed, field bindweed seed, nut grass seed, sickle pod seed, sesbania seed, indigo seed, morning-glory seed, and cocklebur seed will not be allowed in any amount. Seed shall be furnished in sealed, standard containers. Seed that has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable.

Seed planted between June 16 and August 31 may require more water than that specified in Subsection 505.03 in order to survive. Therefore, watering shall continue after germination until growth is established.

The seeding mixture may be altered if authorized or directed by the Engineer/City Engineer. The actual mix and varieties used shall be submitted to the City before seed is placed.

Seed shall be provided at the following mix and rates:

<b>SEED TYPE</b>	<b>LB/AC</b>
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### MARCH 15 – JUNE 15

Turf Fescue	250
Bermuda Grass (common) unhulled	10
Annual Rye	50

### JUNE 15 – AUGUST 31

Turf Fescue	200
Bermuda Grass (common) hulled	5
Bermuda Grass (common) unhulled	10

### AUGUST 31 – MARCH 15

Turf Fescue	250
Annual Rye	50

At the Contractor's option, annual rye only may be seeded at a minimum rate of 30 pounds per acre between the dates of October 31 to March 15. The Contractor shall return between the dates of March 15 and May 1 and reseed with the mix specified for the March 15 – June 15 time period. Preparation for reseeding shall be in accordance with Section 204.

**(d) Sod.** Sod shall be composed of either field grown grass or approved nursery grown grass and shall consist of a densely rooted growth of grass substantially free from noxious weeds and undesirable grasses. Sod type shall be as specified on the plans. When sod is placed to repair damaged areas, the sod shall be of the same type and variety as the existing grass.

The sod shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh, and uninjured at the time of placing. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be placed as soon as possible after being cut and shall be kept moist from the time it is cut until it is placed in its final position.

The source of field grown sod shall be inspected and approved by the City before being cut for use in the work. After approval, the area from which the sod is to be harvested shall be closely mowed and raked as necessary to remove excessive top growth and debris.

Approved devices, such as sod cutters, shall be used for cutting the sod and due care shall be exercised to retain the native soil intact. The sod shall be cut in uniform strips approximately 300 mm (12") in width and not less than 300 mm (12") in length, but not longer than can be conveniently handled and transported.

**(e) Mulch.** Mulch cover shall consist of straw from threshed rice, oats, wheat, barley, or rye; of wood excelsior; or of hay obtained from various legumes or grasses, such as lespedeza, clover, vetch, soybeans, bermuda, carpet sedge, bahia, fescue, or other legumes or grasses; or a combination thereof. Mulch shall be dry and reasonably free from Johnson grass or other noxious weeds, and shall not be excessively brittle or in an advanced state of decomposition. All material will be inspected and approved prior to use.

**(f) Tackifiers.** Tackifiers used in mulch anchoring shall be of such quality that the mulch cover will be bound together to form a cover mat that will stay intact under normal climactic conditions.

All tackifiers used shall have prior approval or be listed on the AHTD Qualified Products List (QPL). The type and brand of tackifier to be used shall be submitted to the City for approval.

**(g) Water.** Water shall be of irrigation quality and free of impurities that would be detrimental to plant growth.

### **505.03 Construction Requirements.**

**(a) Seeding.** Areas to be seeded shall be dressed to the shape and section shown on the plans. A 4" layer of topsoil, if required, shall be furnished, placed, and prepared as specified in Section 204.

Fertilizer shall be applied at the rate of 800 pounds per acre of 10-20-10, or the equivalent amount of plant food. Fertilizer shall be uniformly incorporated into the soil alone or in conjunction with the required lime. If the Contractor so elects, the fertilizer may be combined with the seed in the hydro-seeding operation.

Broadcast sowing may be accomplished by hand seeders or by approved power equipment. Either method shall result in uniform distribution and no work shall be performed during high winds. The area seeded shall be lightly firmed with a cultipacker immediately after broadcasting.

If a hydro-seeder is used for seeding, fertilizer and seed may be incorporated into one operation but a maximum of 800 pounds of fertilizer shall be permitted for each 1500 gallons of water. If the Contractor so elects, the fertilizer may be applied during preparation of the seedbed. The area shall be lightly firmed with a cultipacker immediately before hydro-seeding.

Mulch cover shall be applied immediately after seeding and shall be spread uniformly over the entire area. If the Contractor so elects, an approved mulching machine may be used whereby the application of mulch cover and tackifier may be combined into one operation. Mulch shall be placed so that the ground is completely covered to a thickness of approximately 2 inches. Care shall be taken to prevent tackifier materials from discoloring or marking structures, pavements, utilities, or other plant growth. Removal of any objectionable discoloration shall be at no cost to the City.

Immediately following or during the application of the mulch cover on seeded areas, the mulch shall be anchored by one of the following methods:

**Tracking or Roller Method.** The mulch shall be effectively pressed into the soil using steel cleated track or cleated roller equipment. The anchoring shall be performed so that the grooves formed are perpendicular to the flow of water down backslopes and foreslopes. The equipment and method used shall produce acceptable results.

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**Other Tackifiers.** An approved tackifier shall be applied according to the rates recommended by the manufacturer. Asphalt tackifier will not be allowed.

The method used shall be at the Contractor's option unless otherwise specified or directed. In lieu of separate application of tackifiers, the Contractor may use equipment that combines the application of mulch and tackifier into one operation. Application shall be at the specified rates.

After application of the mulch cover, water shall be applied in sufficient quantity, as directed by the Engineer/City Engineer, to thoroughly moisten the soil to the depth of pulverization and then as necessary to germinate the seed.

When directed by the Engineer/City Engineer, the Contractor shall apply water in an amount such that, in conjunction with any rainfall, the seeded and mulched areas will receive an amount equivalent to a minimum of 1" of water each week beginning the week after seeding and continuing for a minimum of three (3) weeks. Water applied at this rate will not be paid for separately but shall be considered subsidiary to seeding. If directed by the Engineer/City Engineer, additional water shall be applied to sustain grass growth.

Failure to meet this requirement will result in a partial withholding and/or recovery of payments for the seeding and mulch cover. Additional work and materials required due to the Contractor's negligence in maintaining completed work or failure to water grass as directed shall be accomplished at no cost to the City.

For all areas seeded, final acceptance will be delayed until an acceptable stand of grass of uniform color and density is established to the satisfaction of the City. Before final acceptance, the Contractor shall repair or replace any seeding or mulching that is defective or damaged. If the defect or damage is due to the Contractor's negligence, the work shall be done at no additional cost to the City. If the damage or defect is not the Contractor's fault, the work will be measured and paid for according to these Specifications.

**(b) Sod.** Areas to be sodded shall be dressed to the shape and section shown on the plans and the top and bottom of slopes shall be rounded to a radius of approximately 3' unless otherwise directed. The finished slopes shall be prepared with 4" of topsoil meeting the requirements of Section 204. Water may be applied before, during, and after slope preparation, as directed by the Engineer/City Engineer, in order to maintain the desired moisture content in the soil.

Immediately before placement of sod, fertilizer shall be broadcast at the rate of 250 pounds per acre of 10-20-10, or the equivalent amount of plant food, and incorporated into the top 1" of soil.

Sod shall be moist and shall be placed on a moist earth bed. Sod strips shall be laid along contour lines, by hand, commencing at the base of the area to be sodded and working upward. The transverse joints of sod strips shall be broken, and the sod carefully laid to produce tight joints. At the top of slopes the sod shall be turned into the embankment slightly and a layer of earth placed over it and compacted to conduct surface water over and onto the sod. The sod shall be firmed, watered, and refirmed immediately after it is placed.

The firming shall be accomplished by use of a lawn roller or approved tamper, with care being taken to avoid tearing end strips of sod.

When sodding is completed, the sodded areas shall be cleared of loose sod, excess soil, or other foreign material; a thin application of topsoil shall be scattered over the sod as a top dressing; and the areas thoroughly moistened. Water shall be applied as necessary at the direction of the Engineer/City Engineer for a period of at least 3 weeks. The time required for application of water will not be included in the computation of contract time for completion of the project provided all other work under the Contract has been completed.

The Contractor shall maintain sodded areas from the time of completion until final acceptance of the project by the City. Additional work and materials required because of the Contractor's negligence in maintaining the work shall be accomplished at no cost to the City.

**505.04 Method of Measurement.** Seeding will be measured by the acre of actual area covered. Sod will be measured by the SY yard of actual area covered. Additional watering if so directed will be measured by thousands of gallons (MG) applied.

**505.05 Basis of Payment.** Seeding completed and accepted and measured as provided above will be paid for at the contract unit price bid per acre for Seeding, which price shall be full compensation for seedbed preparation; for furnishing and applying fertilizer, lime, seed, mulch, and tackifier; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payments for seeding will be made according to the following schedule:

50 % On the first regularly scheduled estimate after the Seeding and Mulch Cover are completed.

25% On the next regularly scheduled estimate, provided that the Engineer/City Engineer determines that the seeded and mulched areas have received at least the amount of water specified in Section 505.03 above.

25% On the succeeding regularly scheduled estimate, provided that the Engineer/City Engineer determines that a dense lawn of permanent grass has been established.

Sodding completed and accepted and measured as provided above will be paid for at the contract unit price bid per square yard for Sodding, which price shall be full compensation for bed preparation; for furnishing and applying fertilizer, topsoil, and sod; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Additional watering above and beyond the 1" per week for the first three weeks will be paid for at the unit price per thousand gallons (M.G.) of water applied. This work will be paid for only when directed to by the Engineer/City Engineer. Any watering to be paid for under this item shall be conducted in the presence of the Engineer/City Engineer.

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Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Seeding	Acre
Sodding	SY
Additional Watering	MG

### **Section 506. Mailboxes**

**506.01 Description.** This item shall consist of furnishing and erecting mailbox posts and installing existing mailboxes on the new posts. When required, it shall also include furnishing and installing new mailboxes. It shall also include maintenance of existing mailboxes during construction to ensure uninterrupted mail service in the construction limits.

**506.02 Materials.** The mailbox post shall be either metal or coniferous wood. All mailbox posts placed under the contract shall be of the same type. Wood posts shall be 4" x 4" square and shall be pressure treated with creosote, pentachlorophenol or chromated copper arsenate. Metal posts shall be 2" in diameter and shall be galvanized.

Mailbox support hardware, including shelf, platform and bracket shall be as shown on the plans. Anti-twist plate, clamps, spacers, nuts, bolts, and washers shall be galvanized steel.

New mailboxes, when specified on the plans or directed by the Engineer/City Engineer, shall comply with the U.S. Postal Service and shall be the same size as the existing mailbox.

**506.03 Construction Methods.** Mailboxes shall be constructed in the same locations as the existing mailboxes. It is the Contractor's responsibility to note the locations of existing mailboxes before construction begins. The bottom of the box shall be set at an elevation 3'-6" above the roadway surface. The roadside face of the box shall be 6" from the face of the curb. Where a mailbox is located at a driveway entrance, it shall be placed on the far side of the driveway in the direction of the delivery route. Where a mailbox is located at an intersecting road, it shall be located a minimum of 100' beyond the center of the intersecting road in the direction of the delivery route. If requested by the local postmaster, height and placement of mailboxes may vary slightly as directed by the Engineer/City Engineer.

No more than two mailboxes may be mounted on one post. Post spacing for multiple mailbox installations shall be a maximum of 36".

The mailbox post shall be embedded a minimum of 24" into the ground. A metal post shall have an anti-twist plate that extends no more than 10" below the ground surface.

The existing mailbox shall be separated from the existing post and attached to the new post. If the existing mailbox is damaged beyond repair by the Contractor, the mailbox shall be replaced at no cost to the City. If the existing mailbox cannot physically be removed from the existing post and re-used, the mailbox shall be replaced under the item Mailboxes. When a mailbox is replaced, the Contractor shall be responsible for placing identification markings on the new mailbox corresponding to the markings on the original mailbox.

Unless otherwise specified, all existing mailbox supports shall be removed and replaced with new supports. If directed by the Engineer/City Engineer the existing mailbox shall be restored under the Contract item Remove and Replace Mailboxes. If directed by the Engineer/City Engineer, the existing support and mailbox shall be removed and protected until placement in its planned location. This work shall be paid for under the item Mailbox/Support Relocation.

**506.04 Method of Measurement.** Mailbox Supports, Mailboxes, Remove and Replace Mailboxes, and Mailbox/Support Relocation will be measured by the unit.

**506.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Mailbox Supports of the type specified, for Mailboxes, or for Remove and Replace Mailboxes, or for Mailbox/Support Relocation; which price shall be full compensation for furnishing all materials: for setting posts; for removing and reattaching existing mailboxes; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Mailbox Supports (single)	EA
Mailbox Supports (double)	EA
Mailboxes	EA
Remove and Replace Mailboxes	EA
Mailbox/Support Relocation	EA

## **Section 507. Pavement Markings**

**507.01 Description.** This item shall consist of furnishing and placing pavement markings, including words, arrows, and emblems, of the color, type and material specified, in accordance with these specifications and to the dimensions and at the locations shown on the plans or as directed.

The markings are to be placed under existing traffic conditions. The work shall meet the requirements of the MUTCD except as modified by these specifications.

**507.02 Materials. (a) Paint.** Paint shall be a ready mixed white and yellow paint suitable for application on concrete and bituminous pavements. All paints used for this application shall be listed on the AHTD Qualified Products List (QPL). The manufacturer shall furnish a certification for each lot certifying that the materials supplied conform to all the requirements specified and stating that the material is formulated the same as the material tested for QPL listing.

**(b) Thermoplastic Material.** Thermoplastic material used shall meet all requirements of Section 719.02 of the AHTD Standard Specifications.

**(c) Pavement Marking Tape.** Pavement marking tape shall be a preformed tape conforming to Section 720.02 of the AHTD Standard Specifications for Type 5.

### **507.03 Construction Requirements.**

**(a) General Requirements.** All pavement markings shall be applied to clean, dry surfaces. If necessary, the Contractor shall clean the surface of the pavement to receive markings before beginning marking operations. Cleaning of the pavement is considered subsidiary to other items of work and will not be paid for separately.

Pavement markings shall be placed at the locations shown on the plans, or as directed by the Engineer/City Engineer. All markings shall have well defined edges, shall be uniform in thickness, and shall be straight and true. No stripe shall be less than the specified width. Any corrections of variations in width or alignment of the stripes shall not be made abruptly. Markings that cannot be corrected to meet these requirements shall be removed at the Contractor's expense and will not be paid for.

Removal of markings shall be performed in such a manner that no conflicting pavement marking will be left in place. Removal of the pavement marking by a means that will gouge the surface will not be permitted.

**(b) Reflectorized Paint.** Reflectorized paint shall be applied at a minimum wet film thickness of 15 mils (a minimum of 16.5 gallons per mile of 4" line). The painted line shall be uniform in thickness and appearance across the width of the stripe. Glass beads shall be placed on the surface of the wet paint in the amount of not less than 6 pounds per gallon.

**(c) Thermoplastic Markings.** The thermoplastic compound shall be screed or ribbon extruded to the pavement surface unless a specific application method is specified.

The thermoplastic material shall be dispensed at a temperature recommended by the manufacturer. The applicator shall include a cutoff device remotely controlled to provide clean, square stripe ends and to provide a method for applying skip lines.

Beads applied to the surface of the completed stripe shall be applied by an automatic bead dispenser attached to the pavement marking equipment in such a manner that the beads are immediately dispensed upon the completed line. The bead dispenser shall be equipped with an automatic cutoff control, synchronized with the cutoff of the pavement marking equipment.

Thermoplastic markings shall not be applied to the pavement surface when the pavement surface temperature is less than 50° F or when the pavement shows evidence of moisture.

On pavements where no pavement markings exist or where the existing pavement markings are paint or thermoplastic and do not conflict with the proposed pavement markings, blasting with water or sand or a combination thereof will be required to remove any curing

compound, oxidized paint or thermoplastic, or dirt to ensure a good bond. This blasting is considered surface preparation and will not be paid for separately.

Conflicting pavement markings that exist shall be removed by blasting with water and/or sand or by grinding. This blasting or grinding is considered pavement marking removal.

The thickness of all thermoplastic markings above the roadway surface shall be 90 mils (a minimum of 1584 pounds per mile of 4" line). The minimum thickness will be measured in the center of the line. The minimum ½" from the edges shall not be less than 75% of the thickness required in the center. Maximum thickness of markings is 3/16".

On concrete pavements, paint pavement markings meeting the requirements of this section shall be applied as a primer for the thermoplastic markings, except where thermoplastic markings are to be applied over existing thermoplastic markings. Paint applied to concrete pavement solely as a primer will not be measured or paid for separately, but full compensation therefore will be considered included in the contract unit prices bid for the various items of Thermoplastic Pavement Markings. A primer other than paint may be used when recommended by the thermoplastic manufacturer.

**(d) Pavement Marking Tape.** The placement of the pavement marking tape shall comply with the manufacturer's recommendations.

Air temperature shall be a minimum of 60° F and rising or the road temperature shall be a minimum of 70° F before installation of marking tape will be allowed.

The roadway surface shall be cleaned by the Contractor with high pressure air or by sweeping. The roadway shall then be marked where the pavement marking polymer is to be applied.

The polymer can then be applied by hand or with a manual or mechanical highway tape applicator designed for that purpose. Only butt splices will be allowed with no overlapping.

After application, the tape shall be firmly tamped with a minimum 200 lb. Load or by slowly (2-3 mph) driving over the tape with a vehicle tire. The Contractor shall ensure that all edges are firmly adhered.

**507.04 Method of Measurement and Basis of Payment.** Pavement markings will be measured as follows:

**(a)** 4" center lines, skip lines, lane lines, and edge lines will be measured by the linear foot (LF) of markings actually placed.

**(b)** Words, arrows, and other symbols will be measured by the unit.

**(c)** Crosswalks and stop bars will be measured by the linear foot (LF) of crosswalk markings actually placed.

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(d) Pavement marking removal, when specified on the plans, will be measured by the square foot of marking actually removed.

Work completed, accepted, and measured as provided above will be paid for at the contract price bid per linear foot for 4" lines, per each for symbols, per linear foot for crosswalks, and per square foot for pavement marking removal.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
4" Striping (Thermoplastic)	LF
Pavement Symbols (Thermoplastic)	EA
Crosswalks (Thermoplastic)	LF
Pavement Marking Removal	SF

### Section 508. Street Signs

**508.01 Description.** This item shall consist of installing new signs and supports supplied by the City, and relocating existing signs as shown on the plans, or as directed by the Engineer/City Engineer.

#### 508.02 Materials.

(a) **Signs.** Materials used in the fabrication of street signs shall comply with the latest edition of the AHTD Standard Specifications, AHTD Standard Drawings, and the MUTCD. Signs and equipment manufactured in accordance with the above mentioned specification will not be required to be submitted for approval.

(b) **Supports.** Materials used for new and relocated street sign supports shall comply with the AHTD Standard Specifications and the AHTD Standard Drawings.

**508.03 Construction Requirements.** The City will furnish any new signs and supports and the Contractor shall install the signs at the locations as shown in the plans or as directed by the Engineer/City Engineer. The Contractor will maintain existing signs during construction, and install the signs at the locations as shown in the plans or as directed by the Engineer/City Engineer. Should the sign or support become damaged during construction, the Contractor will furnish the replacement.

Any sign not indicated to be relocated as shown on the plans, or as directed by the Engineer/City Engineer shall be salvaged and delivered to the Springdale Street Department.

**508.04 Method of Measurement.** Signs that are relocated or installed new shall be measured by a complete unit in place (including required footings).

No payment will be made for salvaged signs delivered to the City.

**508.05 Basis of Payment.** Work completed and accepted under this item and measured as provided above shall be paid for at the Contract unit price bid for each sign, which price shall be full compensation for the relocation, or erection of each sign, including support and footing; and for tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Street Sign Installation	EA

## **Section 509. Erosion Control**

**509.01 Description.** This item shall consist of Temporary Erosion Control Measures to limit, control, and contain fill materials, soil erosion, sedimentation, and other wastes resulting from construction activities that could result in harm to private properties as well as public properties, streams and waterways.

This item shall also include the requirement of the Contractor to produce, implement, and maintain a specific Stormwater Pollution Prevention Plan (SWP3/SWPPP) and to request, obtain and comply with all necessary approvals and permits.

### **509.02 Standards.**

All work for this item shall comply with all Federal and State requirements including the Clean Water Act (33 U.S.C. 1251 et seq.), the National Pollutant Discharge Elimination System, and the Arkansas Water and Air Pollution Control Act (Act 472 of 1949 , as amended, Ark. Code Ann. 8-4-101 et seq.) and the regulations, orders or decrees issues pursuant thereto.

All work for this item shall further comply with all Local and Municipal requirements including the City of Springdale Code Chapter 107. "STORMWATER POLLUTION PREVENTION, GRADING, AND EROSION CONTROL" except as modified or augmented herein.

Best management Practices shall be based upon the "CITY OF SPRINGDALE Stormwater Pollution Prevention Grading and Erosion Control BEST MANAGEMENT PRACTICES MANUAL (BMPs)"

### **509.03 Application.**

The requirements of this item shall apply to all construction activities under the Contract. The Contractor shall produce, implement and maintain a SWP3 for all construction activities under the contract without regard to size of land area disturbance.

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The Contractor's operations on lands located off the right-of-way, such as borrow pits, plant sites, waste sites, or other facilities, may require compliance with this specification or NPDES permit. Determination may be based upon location, jurisdiction and area of land disturbance.

### **509.02 Responsibilities of the Contractor.**

#### **(A) General.**

The Contractor shall comply with City of Springdale Code Chapter 107. "Stormwater Pollution Prevention, Grading and Erosion Control" except as modified or augmented herein.

The Contractor shall comply with all applicable Federal, State, Local and Municipal regulations and requirements.

The Contractor shall request and obtain all necessary Federal, State, Local and Municipal approvals and permits.

The Contractor shall pay any and all fees associated with Federal, State, Local and Municipal permit requirements.

The Contractor shall produce, implement and maintain a specific SWP3.

The Contractor shall submit two copies of the SWP3 to the City for review and approval.

The Contractor shall stabilize the land and comply with all requirements in the permit including any additions or revisions thereto.

Upon completion of the construction activities the Contractor shall file a Notice of Termination with the City.

#### **(B) NPDES Requirements.**

Construction activities that will disturb soil or remove vegetation on one (1) or more acres of land during the life of the construction project shall also comply with the applicable NPDES Permit requirements as administrated by the Arkansas Department of Environmental Quality (ADEQ).

Construction activities authorized under NPDES GENERAL PERMIT NO. ARR150000 with the ADEQ shall comply with Section 509.02. "Responsibilities of the Contractor" (a) General (above), and the following:

The Contractor shall receive approval of the SWP3 (SWPPP) from the City.

After receiving approval of the SWP3 (SWPPP) from the City, the Contractor shall then file the appropriate applications, information, Notice of Intent, SWP3 (SWPPP) and other information as required by NPDES GENERAL PERMIT NO. ARR150000 with the ADEQ.

The Contractor shall comply with applicable permit requirements which include, but are not limited to, Best Management Practices (BMP's) and Bi-Monthly Inspections.

The Contractor shall submit to the City one copy of the Notice of Intent and/or copy of other information provided by the Contractor to ADEQ.

The Contractor shall submit to the City one copy of the permit and/or other correspondence received from ADEQ.

The Contractor shall file the ADEQ Notice of Termination when the site has been finally stabilized and all storm water discharges from construction activates authorized by the permit are eliminated. The Contract shall provide one copy of this Notice of Termination to the City.

### **509.03 Construction Methods**

The Contractor shall be responsible to prepare and submit for approval the detailed SWP3 (SWPPP) in compliance with this specification.

Where temporary erosion control measures are shown on the plans, such temporary erosion control measures are provided to the Contractor as minimum controls and guidance. The temporary erosion control measures where shown in the plans do not represent the extent of work and coordination required by the Contractor. The Contractor shall be responsible to incorporate and expand as necessary the temporary erosion control measures where shown in the plans for the Contractor's detailed SWP3 (SWPPP).

All work required due to the violation of provisions of Corps of Engineers (COE) Section 404 Permits, NPDES Permits, or other requirements of these specifications which results from Contractor negligence, carelessness, or failure to perform work as scheduled, shall be performed by the Contractor at no cost to the City. In addition, the Contractor will be assessed the amounts of any and all fines and penalties assessed against and costs incurred by the City which are the result of the Contractor's failure to comply with a COE Section 404 Permit or NPDES Permit.

Failure to comply with the conditions of the COE Section 404 Permit may result in the Corps of Engineers issuing a cease and desist order for all permitted activities. To obtain a new COE Section 404 Permit may require 60-120 plus calendar days processing time.

The City will not be responsible for any delays or costs due to the Contractor's failure to comply with the conditions of the COE Section 404 Permit. The Contractor will not be granted additional compensation or contract time due to loss of Permits for noncompliance.

In the event that pollutant spills occur which are the result of the Contractor's actions or negligence, the clean up shall be performed by the Contractor at no cost to the City.

### **509.04 Method of Measurement and Basis of Payment.**

No measurement of this item will be made.

Temporary erosion control acceptably completed will be paid for at the contract lump sum price bid for “Erosion Control”, which prices shall be full compensation for furnishing all materials, tools, equipment, labor, incidentals and all other items necessary to implement, maintain and complete the work. Payment for “Erosion Control” shall also include producing, implementing, maintaining and compliance with the Stormwater Pollution Prevention Plan (SWP3/SWPPP) including design, inspections, fees, report preparation, housekeeping practices, cleaning, maintenance and all other actions outlined in the SWP3 (SWPPP) as prepared by the Contractor and necessary to execute the SWP3 (SWPPP). Periodic payments will be made under this item in proportion to the amount of work accomplished as determined by the Engineer/City Engineer.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Erosion Control	LS

## **Section 510. Traffic Control and Maintenance**

**510.01 Description.** This work consists of furnishing, installing, and maintaining necessary traffic signs, barricades, lights, signals, cones, concrete barriers, pavement marking, and other traffic control devices and shall include flagging, pilot car operations, and other means for guidance of traffic through the work zone. The work shall be done according to the MUTCD, AHTD Standards, The Standard Specifications and the Contractor’s approved Traffic Control plan. An approved Traffic Control plan provided by the Contractor shall be required before any construction begins. This item shall also include maintenance of roadway surface.

This item shall also include the temporary relocation of traffic and street signs, the maintenance of the temporarily relocated signs through the construction of the project, and the permanent relocation of any sign relocated due to construction signage after the construction is complete. Permanent relocation of any salvaged signs shall consist of furnishing new sign post, new support hardware, and new concrete bases, where required, in accordance with the dimensions and details shown in the Plans and at the locations shown in the Plans, or as directed by the Engineer. New sign posts shall comply with the Standard Specifications and Standard Drawings.

(a) Contractor’s Plan. Traffic Control or Maintenance of Traffic when shown in the Plans is provided to the Contractor as guidance. The Contractor shall prepare and submit for approval a detailed Traffic Control or Maintenance of Traffic Plan including adherence to the specified schedule of construction phases when so indicated in the Contract Documents to the Engineer and Owner. The Contractor’s Traffic Control or Maintenance of Traffic Plan shall include and expand as necessary the Traffic Control or Maintenance of Traffic when indicated in the Plans and Specifications, and shall be complete with all proposed traffic control or traffic maintenance

devices including proposed temporary roadway widening. The Contractor shall prepare and submit the detailed Maintenance of Traffic Plan to the Engineer and Owner 7 days prior to the preconstruction conference and in accordance with these Specifications.

Upon approval of the Contractor's Maintenance of Traffic Plan by the Owner in writing, the Contractor shall supply the City Engineer, the Fire Chief and the Police Chief one (1) copy each for their files. Two (2) copies shall be supplied to the Engineer.

The Contractor shall initiate and maintain all necessary labor and materials necessary to construct the project in a manner which will guarantee public safety with a minimum of inconvenience. Additional work, at no additional costs to the Owner, shall be performed by the Contractor during construction as directed by the Owner or Engineer if necessary to insure the above standards.

(b) Contractor personnel. The Contractor shall designate a traffic control supervisor to furnish continuous surveillance over traffic control operations. This supervisor shall be available at night and weekends to respond to calls involving traffic control. The name of the traffic control supervisor shall be provided at the preconstruction conference and to local police.

The Contractor's personnel who are used to maintain traffic flow, such as flagmen or any other person, who verbally communicates with or gives directions to the motorized public, shall speak English fluently.

(c) Driveways. Maintenance of driveways shall be as approved by the Engineer/City Engineer. Unless indicated otherwise, it shall be the Contractor's responsibility to maintain adequate access to private and commercial property at all times, except as required for construction across the driveway as approved by the Engineer. During the construction of driveways or at any time that a property owner cannot use his driveway, the Contractor shall notify the property owner (one week in advance, minimum) when the driveway will be closed and the approximate length of time that it will be closed. The intent of this section of the Specifications is to cause as little inconvenience as possible to private property owners.

(d) Relocation and replacement of Traffic Signs and Pavement Striping. During the construction of the project, the temporary relocation of street signs and traffic control signs will be performed by the Contractor. The Contractor shall maintain the signs at highly visible locations as near as practicable to the original locations. The latest edition of the Manual of Uniform Traffic Control Devices published by the Federal Highway Administration shall be used as a guide to the placement of signs during construction.

Immediately after the construction of any part of the project reaches a stage of completion such that the relocation of the street signs and traffic control signs is no longer necessary, the Contractor shall permanently relocate the street signs and traffic control signs. Removing any construction signage must be approved by the Engineer.

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Street signs and traffic control signs shall be removed from such area of work as necessary to permit work on the project. Each sign shall be temporarily relocated in a secure manner by driving the sign into the ground with equipment approved by the Engineer, or otherwise installed as approved to prevent damage to underground utilities. Street signs no longer necessary shall be salvaged in good condition and restored to their original use or returned to the Owner if no longer needed.

Existing striping shall be removed and new temporary stripes and other pavement markings shall be provided by the Contractor. Work shall be performed in accordance with SECTION 720 (for Type 4) – PERMANENT PAVEMENT MARKING TAPE of the Standard Specifications. Pavement markings not necessary to the phased construction patterns shall be removed or obliterated with black paint, as approved by the Engineer. Striping shall be maintained and restored as necessary during construction.

(e) Suspension of Work. If the Owner or the Engineer determines that provisions for safe traffic control are not being provided or maintained, the work will be suspended. In cases of serious or willful disregard for safety of the public or construction workers, the Owner will place the traffic control devices in proper condition and deduct the costs from monies due the Contractor.

**510.02 Maintenance Requirements.** Unless approved otherwise by the City, the road, while undergoing improvements, shall be kept open by the Contractor to all traffic. When so provided on the plans, or the Contractor's approved plan, the Contractor may bypass traffic over an approved detour route. The Contractor shall keep the portion of the project being used by public traffic, whether it is through or local traffic, in such condition that will permit the safe, continuous flow of two-way traffic at all times. When a part of the plans or when approved by the City, areas where the nature of the work restricts or prohibits two-way flow, one-way operation may be maintained by using flaggers or timed signalization. The Contractor shall also provide and maintain in a safe condition temporary approaches, crossings and intersections with trails, roads, streets, businesses, parking lots, residences, garages, farms, etc.

As part of regular traffic maintenance, the Contractor shall remove all snow and ice accumulated on the traveled roadway. Exposed soil that becomes muddy due to rains or other precipitation shall be removed or covered with aggregate base material to the satisfaction of the City. Dust shall be controlled at all times. In the event that watering does not satisfactorily control the dust, other methods of dust control will be required.

Necessary traffic control devices shall be properly placed and in operation before starting construction. When work of a progressive nature is involved, such as resurfacing, the appropriate traffic control devices shall be kept current and placed only in the areas of actual work activities. All traffic control devices shall meet the requirements of the AHTD Standard Specifications Section 604.02 and the most current version of the MUTCD.

If the City determines that provisions for safe traffic control are not being provided or maintained, the work will be suspended. In cases of serious or willful disregard for safety of

the public or construction workers, the City will place the traffic control devices in proper condition and deduct the costs from monies due the Contractor.

Types of barricade supports or devices not specifically described in the MUTCD shall not be used. The methods used to control traffic for lane changes or other diversions shall meet the MUTCD and the traffic control plan.

Portable changeable message signs meeting the requirements of Section 604 of the AHTD Standard Specifications shall be used if and where directed by the City.

**510.03 Method of Measurement.** Aggregate base for traffic maintenance, if specifically included as a bid item, will be measured by the ton of material placed for traffic control. No payment will be made under this item unless base placement is specifically directed by the Engineer/City Engineer. No base so directed shall be placed without the Engineer/City Engineer or authorized representative present. The tonnage of material placed shall be substantiated by truck tickets delivered along with the base material and presented to the Engineer/City Engineer at the time of base placement. If an item for aggregate base for traffic control is not included, it shall be considered subsidiary to other items.

When directed or approved for use by the City, portable changeable message signs meeting the requirements of Section 604 of the AHTD Standard Specifications will be measured for payment by the number of days each sign is required and authorized by the City. Payment for a full day will be made for any portion of a day that the panel or sign is used, but the measurement shall not exceed one per sign on any calendar day.

No other traffic control items will be measured.

**510.04 Basis of Payment.** Payment for aggregate base for roadway maintenance as measured above will be made at the unit price bid per ton.

All other traffic control and maintenance materials and activities will be paid for at the lump sum price bid for traffic control.

Payment will be made under:

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Traffic Control	LS
Aggregate Base for Roadway Maintenance	Ton
Portable Changeable Message Sign	Day

## **Section 511. Mobilization**

**511.01 Description.** This item shall consist of preparatory work and operations, including those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site.

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This item shall also include other work and operations that must be performed, or for expenses incurred, before beginning work on the various Contract items on the project site. It shall also include pre-construction costs which are necessary direct costs to the project and are of a general nature rather than directly attributable to other pay items under the Contract.

**511.02 Measurement and Payment.** Mobilization will be measured as a complete unit and will be paid for at the contract lump sum price bid. In computing the allowable partial payments from the schedule below, the percentage of the original Contract earned will be based on all items exclusive of the item of Mobilization, and payment for this item at any of the listed stages of completion will be made on the basis of the percentage of the item allowed less all payments made.

### **PARTIAL PAYMENT SCHEDULE**

<b>Percent of Original Contract Amount Earned</b>	<b>Percent of Bid Price for Mobilization Allowed</b>
First Pay Estimate	25%
10%	50%
25%	100%

This item will be paid for on regular estimates. Payments on percentages of the original Contract amount other than those set out above will not be considered. No adjustment in the amount bid for this item will be made for additional quantities or items of work required to satisfactorily complete the Contract.

IN NO CASE SHALL THE AMOUNT BID FOR THE ITEM OF "MOBILIZATION" EXCEED 5% OF THE TOTAL CONTRACT AMOUNT FOR ALL OTHER ITEMS LISTED IN THE PROPOSAL. Should the amount entered in the Proposal for this item exceed 5%, the City will reduce it to the maximum allowed amount to determine the correct total bid.

Payment will be made under:

#### **Pay Item**

#### **Pay Unit**

Mobilization

Lump Sum

## **Section 512. Fences**

**512.01 Description.** This item shall consist of furnishing and erecting wire fence, chain link fence, wood privacy fence and gates according to the plans and these specifications, and in reasonably close conformity to the lines, grades, and alignment shown on the plans or as directed.

**512.02 Materials.**

**(a) General.** All materials used shall be new and shall comply with the requirements for the class and type of material specified. Previously used materials will be allowed for temporary fencing.

Concrete for setting posts shall comply with Section 601 for Class A Concrete.

**(b) Wire Fence.** Wood posts and braces shall be pressure treated, seasoned, sound, and reasonably straight southern pine or Douglas Fir of the West Coast Region. The posts shall be round and free from excessive end splits. Before pressure treatment, the posts and braces shall have the bark removed, the knots trimmed flush, and the ends cut square. Posts that are to be driven shall have the small end tapered. Posts shall be treated by a standard empty cell or full cell process according to AWWA practice using creosote and retaining a minimum of 8 pounds per cubic foot of wood; or using pentachlorophenol, or chromated copper arsenate and retaining a minimum of 0.4 pounds per cubic foot of wood.

Metal posts and braces shall be of good commercial quality iron or steel and may be tubular, T, U, Y, or other shape manufactured for use as fence posts or braces.

Woven Wire Farm Fence shall be AASHTO Design Number 1047-6-11 AASHTO M 279 or ASTM A116, Class 3 galvanizing.

Barbed wire shall be 12 ½ gauge with 4-point barbs and shall comply with AASHTO M 280, Class 3 galvanizing.

As an alternate to the barbed wire specified above, high tensile wire having the same galvanizing and breaking strength as Class 3, 12 ½ gauge wire, and complying with the remaining requirements of AASHTO M 280 for a four point barb may be used.

The minimum gage of the high tensile barbed wire shall be as follows:

Strand wire gage                      15 ½

Barb wire gage                         17

Staples used to attach the wire fencing to wood posts shall be galvanized 9 gage, 38 mm (1 ½") in length.

Steel line posts shall be galvanized or painted and comply with AASHTO M 281. Tubular steel posts shall comply with Grade 1 or Grade 2 of AASHTO M 181, or an approved alternate of Grade 2.

Hardware and fittings shall comply with ASTM F 626. Any miscellaneous hardware or fittings not mentioned in ASTM F 626 shall be galvanized according to the applicable requirements of AASHTO M 111 or M 232.

**(c) Chain Link Fence.** Material for chain link fence shall comply with AASHTO M 181 Types I, II, or III. Steel members for posts, rails, expansion sleeves, and gate frames may be either Grade 1 or Grade 2. The shape, size, and length of posts and rails, and the height of fabric shall be as shown on the plans.

Hardware and Fittings shall comply with ASTM F 626. Any miscellaneous hardware or fittings not mentioned shall be galvanized according to AASHTO M 111 or M 232. Tension wire shall be minimum 7 gauge.

Aluminum alloy fabric shall be used only with aluminum posts. Aluminum coated steel fabric and galvanized steel fabric, Class C, shall be used only with Grade 1 or Grade 2 steel posts. Fence fabric shall be minimum 9 gauge wire for 6' fencing and 12 gauge wire for 4' fencing.

Frames for gates shall be galvanized steel or aluminum of the type and length shown on the plans. Frames shall be Grade 1 or Grade 2. Welds shall be galvanized. Commercial gates may be used if they are equal to or better than the planned gates as determined and approved by the Engineer/City Engineer.

The gate fabric shall be of the same type material and be in accordance with the same specifications as the adjoining fence.

**(d) Wood Privacy Fence** All pine wood material shall be pressure treated with pentachlorophenol or chromated copper arsenate and shall retain a minimum of 0.4 pounds per cubic foot of wood. Cedar panels shall be reasonably straight and free from knots, warping, and other defects.

**(e) Temporary Fencing** Materials for temporary fencing shall be appropriate for the use intended.

### **512.03 Construction Requirements.**

**(a) General.** The fence shall be erected parallel to the right-of-way line, or as directed. Unless otherwise specified, the fence shall be a minimum of 6" and a maximum of 1' behind the right-of-way line. The fence grade shall generally follow the ground contour, but shall present a uniform appearance. Minor grading along the fence line may be necessary to obtain the desired uniformity in fence grade. The fence alignment may be adjusted by the Engineer/City Engineer to preserve trees, land monuments, and property corner markers.

**(b) Wire Fence.** Line posts and pull assemblies shall be spaced as shown on the plans. Wood corner, gate, and pull posts may be driven in place provided the driving does not damage the post; or they may be set in dug holes and set in concrete. Metal corner, gate, end, and pull posts shall be set in concrete. Wire shall not be stretched onto posts set in concrete until seven days after placement of posts. Posts shall be set plumb.

The Contractor has the option of using wood or steel posts and braces unless otherwise specified, but shall use the same material on the entire project. Wood end, corner, and pull posts may be used with steel line posts.

When solid rock is encountered, the posts shall be set into the rock a minimum of 10" for line posts and 16" for end, corner, gate, and pull posts. The hole in the rock shall have a minimum cross section dimension 1" greater than the post to be set. The posts shall be cut before setting to give the proper length above ground surface. The hole shall be filled with Concrete or a grout consisting of 1 part portland cement and 3 parts concrete sand.

Wire tension braces for wood pull, end, and corner assemblies shall consist of a 9 gauge wire passed around the posts to form a double wire. The wire shall be fastened to each post and the ends fastened together to form a continuous wire. The wires shall then be twisted together until the wire is in tension.

Where the new fence joins an existing fence, the two shall be attached in a satisfactory manner, with end posts being set as directed. Where the proposed fence intersects an existing fence, the end post shall be set for the existing fence clear of the proposed fence line as shown on the plans. The wire of the existing fence shall be stapled to the end post.

Pull post assemblies shall be placed at intervals of not more than 300' in straight alignment on level or uniformly sloping ground. Pull posts shall also be placed at all sharp vertical angle points in the line.

Corner post assemblies shall be placed at all horizontal angle points of 15° or more in the fence. When the distance from a corner post to the next corner or pull post is less than 165', one approach span on the corner assembly may be omitted.

End post assemblies at fence ends, gates, bridge abutments, and on banks of streams shall be erected in the same manner as corner construction. Extra length posts shall be provided for crossing small streams, ditches, ravines, or soft ground. Additional depth of set shall be secured in soft ground as directed.

The wire shall be attached to the face of the post away from the street. The wire shall be attached to wood line posts with staples driven at right angles to the grain and at a slight downward angle to attain the best anchorage. The staples shall not be driven tightly against the wire but shall leave free space for adjustment in tension due to changes in temperature. Wire shall be attached to steel line posts with approved galvanized clips. All barbed wire and alternate line wires of woven fabric shall be fastened to each line post. Barbed wire and all line wires of woven fabric shall be fastened to end, corner, and pull posts by wrapping the wire around the posts and tying the wire back on itself with not less than 3 tightly wrapped twists. Splicing of barbed wire and woven wire shall be done according to the plans. Gates of the same width and material type shall be placed at locations of existing gates as shown on the plans. Gates may be re-used if they have not been damaged during the construction period. If existing gates are not in satisfactory conditions for reuse, they shall be replaced at no cost to the City.

**(c) Chain Link Fence.** All posts shall be set in concrete as shown on the plans, plumb, and true to line and grade. Concrete shall comply with Section 601 for Class A and shall be thoroughly tamped around the posts. The posts shall be equally spaced in the line of fence not to exceed a spacing of 10 feet. The top of the footing shall be domed to drain water away

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from the post. Concrete in post footings shall be at least 7 days old before stretching and securing fabric to posts, bracing, or hanging gates.

Top rails shall pass through post caps and shall be securely fastened to end, brace, pull, and corner posts. Joints in top rails shall be made with expansion sleeve couplings to provide a substantial connection and allow for expansion and contraction of the rail.

Before the fence fabric is placed, the tension wire shall be placed at the proper location; stretched taut; securely anchored to each end, corner, or intermediate brace post; and satisfactorily fastened to each line post.

The fence fabric shall be attached to the face of the post facing the street.

The end of the fabric shall be attached to the posts by means of a stretcher bar threaded through the end loops of the fabric and secured to the posts with clamps and bolts. The fabric shall be stretched to remove all slack with approved stretching equipment. The stretched fabric shall be secured to line posts, top rail, braces, and tension wire with specified fabric fasteners. Fabric fasteners shall be placed on line posts at not greater than 24" centers. Stretching operations shall be repeated at approximately every 100' for each run of fence. The use of trucks, tractors, and similar equipment will not be permitted in the stretching operation, except as anchors.

Splicing of the fabric shall be done by interweaving a wire picket through each end loop of each piece of fabric in a manner that will neatly and securely fasten the lengths of fabric together.

**(d) Wood Privacy Fence** Wood privacy fence shall be constructed at all locations where existing privacy fence is required to be removed, at other locations shown on the plans, or as directed by the Engineer/City Engineer.

Wood privacy fence shall be constructed as shown on the plans or shall match the existing fence in materials and configuration as closely as possible. Materials and workmanship of wood privacy fences, including gates, shall be of the same or better quality as the existing fence.

**(e) Gates.** Gates of the length and type of existing gates shall be constructed at the locations shown on the plans or as directed.

**(f) Temporary Fencing.** Temporary fencing shall be installed as required to contain livestock, pets, and to maintain safety and security of adjacent properties. Fences shall be installed and maintained that their intended purpose is accomplished.

### **512.04 Method of Measurement.**

**(a)** Fence will be measured by the linear foot in place along the midpoint in height of the fence from outside to outside of the end posts. The lengths of gates will be excluded from this measurement.

(b) Gates will be measured by the Linear Foot.

(c) Temporary fencing, if included as a bid item, will be measured by the linear foot (LF). If this item is not included as a pay item, temporary fencing will be considered subsidiary to other items and will not be measured.

**512.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for as follows:

Barbed Wire Fence will be paid for at the contract unit price bid per linear foot for Barbed Wire Fence. Barbed and Woven Wire Fence will be paid for at the unit contract price per linear foot for Woven and Barbed Wire Fence. Chain Link Fence will be paid for at the contract unit price bid per linear foot for Chain Link Fence of the height specified. Wood Privacy Fence will be paid for at the contract unit price bid per linear foot for Wood Privacy Fence of the height specified. Gates will be paid for at the contract unit price bid per linear foot for Gates of the type and dimensions specified. Temporary fencing will be for at the contract price per linear foot for temporary fencing of appropriate materials and heights.

The contract unit prices mentioned above shall be full compensation for clearing, grading, setting posts, erecting fence, and removing temporary fences; for excavation and backfill; for furnishing materials; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Barbed Wire Fence	LF
Woven and Barbed Wire Fence	LF
Woven Wire Fence	LF
Chain Link Fence	LF
Chain Link Gates	LF
Wood Privacy Fence	LF
Gates for Wood Privacy Fence	LF
Temporary Fencing	LF

**Section 513. Handicap Ramps**

**513.01 Description.** This item shall consist of the construction of handicap ramps in accordance with these specifications and the Standard Drawings at the locations shown on the plans or as directed by the Engineer/City Engineer.

**513.02 Materials.** Concrete used shall meet the requirements for Class A or B Concrete as provided in Section 601. The maximum allowable slump shall be 4 inches. The maximum water-cement ratio for the mix selected shall not be exceeded.

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Cast-in-place tactile panels used shall be composed of a vitrified polymer composite material. The color of the tactile panels shall conform to Federal Color No. 33538, and shall be homogeneous throughout the product. The tactile panels shall be cast into the wet concrete. Surface applied products shall not be allowed. The cast-in-place tactile panels shall meet the size and spacing requirements shown in the plans.

**513.03 Construction Requirements.** When a ramp is to be constructed on an existing sidewalk, any items that are planned to be retained but are damaged during the removal or construction operations shall be repaired at no cost to the City.

Handicap Ramps shall be constructed in accordance with Section 502 and the current City of Springdale Standard Drawings. Cast-in-place tactile panels shall be installed into the wet concrete per the manufacturer's specifications.

**513.04 Method of Measurement.** Cast-in-place tactile panels will be measured by the square foot. Concrete used in Handicap Ramps will be measured by the square yard. Limits of measurement will be as shown on the Plans.

**513.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per square foot for Cast-in-Place Tactile Panels and per square yard for Handicap Ramp Concrete of the type specified, which price shall be full compensation for excavation and backfilling; for furnishing materials including joint filler; for constructing the ramp, for furnishing and placing cast-in-place tactile panels; and for all equipment, tools, labor, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Cast-in-Place Tactile Panel	SF
Handicap Ramp Concrete	SY

## Section 514. Project Signs

**514.01 Description.** This item shall consist of installing new project signs and supports furnished by the Contractor as shown on the plans, or as directed by the Engineer/City Engineer. The layout of the sign must be submitted to the Engineer for approval prior to installation.

**514.02 Materials and Construction Requirements.** (a) **Signs.** Materials used in the fabrication of project signs shall comply with the latest edition of the AHTD Standard Specifications, AHTD Standard Drawings, and the MUTCD. Signs and equipment manufactured in accordance with the above mentioned specification will not be required to be submitted for approval.

**(b) Supports.** Materials used for new project sign supports shall comply with the AHTD Standard Specifications and the AHTD Standard Drawings.

Installation of the signs shall be according to the Standard Details included in the Plans. The signs shall be maintained, cleaned, repaired and/or refinished as necessary throughout the project so that they are easily readable from the traveled way. Any damage to the project signs shall be repaired immediately at no additional cost to the City.

**514.03 Construction Requirements.** The Contractor will furnish new project signs and supports and shall install the signs at the locations as shown in the plans or as directed by the Engineer/City Engineer. The Contractor will maintain the signs during construction. Should the sign or support become damaged during construction, the Contractor will furnish the replacement. The project signs shall be installed within two days after commencement of mobilization. Project signs are to be removed following the announcement of the project's Final Completion by the Engineer/City Engineer. Final payment will be withheld until project signs have been removed.

**514.04 Method of Measurement and Basis of Payment.** Projects signs will be measured on a per each basis. Payment will be made for each sign constructed and installed according to the Plans and Specifications in the locations designated by the City. The price bid for each sign will be full compensation for all construction, installation, and maintenance of the signs.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Project Signs	EA

## **Section 515. Handrail**

**515.01 Description.** This item shall consist of furnishing and erecting galvanized steel handrail on box culverts, headwalls, retaining walls, sidewalks, or steps, where shown on the Plans, or as directed by the Engineer/City Engineer, in accordance with the details shown on the Plans and with these specifications.

### **515.02 Materials.**

**(a) General.** All materials used shall be new and shall comply with the requirements for the class and type of material specified.

All handrail materials shall be galvanized steel, coated at the rate of 2.0 ounces of zinc per square foot of surface coated, and in accordance with the current provisions of the following ASTM Designations:

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Galvanize – A 123.

Pipe – A53, Type E or S, Grade B

Plates – A36

**515.03 Construction Requirements.**

(a) **General.** All welding shall be in accordance with current provisions of Specifications for Welded Highway and Railroad Bridges, American Welding Society. Welding shall be done by the shielded arc method and shall be done only by certified welders. Welding rods shall be low hydrogen suitable for use with the metal being welded. Welds joining sections of handrail shall be ground smooth prior to field galvanizing. All welds shall be field galvanized, and all galvanized areas which have been damaged shall be repaired as follows: All galvanizing that has been chipped off or damaged in handling or transporting or in welding or riveting shall be repaired by field galvanizing by the application of a paste compound of approved zinc powder and flux with a minimum amount of water. The places to be coated shall be thoroughly cleaned, including removal of slag on welds before the paste is applied. The surface to be coated shall first be heated with a torch to a sufficient temperature so that all metallics in the paste are melted when applied to the heated surface. Extreme care shall be taken to see that the galvanized surfaces are not damaged by the torch. The flux in the paste will cause a black substance to appear on the surface of the coated parts, and this black substance shall be removed by wiping off with waste or by quick application of cold water.

Other galvanizing methods may be used if approved by the Engineer/City Engineer.

Prior to installation, the Contractor shall contact the Engineer/City Engineer for his inspection of the Handrail.

**515.04 Method of Measurement.**

(a) Galvanized steel handrail will be measured by the linear foot, completed and accepted.

**515.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for as follows:

Galvanized steel handrail acceptably completed and measured as provided above, will be paid for at the contract unit price per linear foot bid for “Galvanized Steel Handrail,” which price shall be full compensation for furnishing and installing all materials, including sleeves with plates, grout; and for all equipment, tools, labor, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Galvanized Steel Handrail	LF

**Section 516. Cold Milling Asphalt Pavement**

**516.01 Description.** This item shall consist of cold milling the asphalt pavement at the locations designated on the plans or by the Engineer/City Engineer and removing the resulting material from the street right-of-way. Unless otherwise provided, the reclaimed pavement shall become the property of the Contractor. The pavement remaining after milling shall provide a surface suitable for maintaining traffic.

**516.02 Equipment.**

**(a) General.** The Contractor shall provide self-propelled equipment with sufficient power, traction, and stability to maintain an accurate depth of cut and slope. The equipment shall be capable of accurately and automatically establishing profile grade along each edge of the machine by referencing from the existing pavement by means of a ski or matching shoe, or from an independent grade control and shall have an automatic system for controlling cross slope at a given rate. The milling machine shall have an effective means for preventing dust resulting from the operation from escaping into the air.

Provision shall be made, either integrally with the milling machine, or by the use of additional equipment, to remove the material being cut from the surface of the roadway.

**516.03 Construction Requirements.**

**(a) General.** The existing pavement shall be cold milled to a minimum depth as shown on the plans.

**516.04 Method of Measurement.**

**(a)** Cold Milling Asphalt Pavement will be measured by the square yard (SY) of pavement milled to the depth specified.

No separate payment will be made for repair or replacement of manholes, valve boxes, or other appurtenances which are located and identified in advance of the cold milling operation and which are damaged by the Contractor.

**516.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per square yard for Cold Milling Asphalt Pavement, which price shall be full compensation for all work as prescribed herein, and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Cold Milling Asphalt Pavement	SY

## **DIVISION 600. MATERIALS**

### **Section 601. Cast-in-Place Concrete**

**601.01 Description.** This item shall consist of concrete in pavements, culverts, and miscellaneous structures, prepared and constructed in accordance with these specifications and conforming to the lines, grades, dimensions, and designs shown on the plans. Concrete shall consist of approved portland cement, fine aggregate, coarse aggregate, water, and any approved chemical admixtures mixed in the proportions specified for the various classes of concrete. All concrete shall be from a supplier approved by the Arkansas State Highway and Transportation Department.

**601.02 Materials.** The materials used in concrete shall conform to the requirements of AHTD Standard Specifications Section 802.02. Coarse aggregate gradation shall conform to the requirements for Class A, S, S(AE), and Seal Concrete in Section 802.02.

Admixtures shall be used to improve certain characteristics of the concrete when specified on the plans. They may also be used when requested by the Contractor and approved by the City. The Contractor's request shall be supported with the manufacturer's certified formulation of the proposed admixture and with sufficient evidence that the proposed admixture has given satisfactory results on other similar work. Permission to use the admixture may be withdrawn at any time by the City when satisfactory results are not being obtained.

Admixtures shall be approved by the City. Admixtures shall be compatible with each other, as advised by the manufacturer. The admixture dosage rate range as recommended by the manufacturer shall be used. Should the dosage rate for any admixture not yield desirable characteristics in the concrete, the dosage of admixture used shall be based on test results obtained by trial batches.

Admixtures shall be added to the mixing water by means of a mechanical dispenser that will accurately meter the additive throughout the mix water cycle. The dispenser shall be constructed and connected so that the Engineer/City Engineer can readily determine the amount of admixture entering the mixing water.

Fly ash may be used as a partial cement replacement not exceeding 20% by weight of the cement when approved by the City. When fly ash is used, the total weight of both cement and fly ash will be used in design calculations. Fly ash used in concrete shall meet the requirements of ASTM C 618, Class C or F. Mixing of Class C and Class F fly ashes will not be permitted. Use of fly ash shall be discontinued immediately, as directed by the Engineer/City Engineer, when such use is determined to be causing the production of concrete that does not meet Specifications.

**601.03 Classes of Concrete.** Two classes of concrete are provided for in these specifications. The appropriate class of concrete shall be used as specified below or where designated by the Engineer/City Engineer.

The following requirements shall govern unless otherwise shown on the plans:

Class A concrete shall be used in curb and gutter, sidewalks, drop inlets, junction boxes, and miscellaneous concrete items.

Class B concrete shall be used in box culverts, bridges and concrete pavement.

These classes of concrete shall not be used if concrete is to be placed underwater. Concrete to be placed under water shall meet AHTD Specifications for Seal Concrete.

**601.04 Classification and Proportioning.** The concrete mixture shall be proportioned to insure a workable and durable concrete, as specified in the following table:

Characteristic	Class A	Class B
Minimum Compressive Strength (psi at 28 days)	3000	4000
Minimum Cement Content (bags per cu. yd.)	5.5	6.0
Maximum Net Water Content Per Bag (94 lb.) of Cement (Gallons)	6.5	5.5
Slump Range (Inches)	1-4*	1-4*
Air Content Range (%)	4-7	4-7
Maximum Fly Ash Content	20%	20%

\*Maximum slump shall be 2” when slip form paving methods are used.

For all classes of concrete, the concrete materials shall be using the Absolute Volumes method in accordance with the requirements for the class specified.

The Contractor shall submit a mix design meeting the requirements of these Specifications. Certification that all materials used in the concrete mix meet the requirements of these Specifications shall be included with the mix design. No concrete shall be placed until a mix design is approved by the City.

Compressive strengths for all classes of concrete will be determined from test cylinders made in accordance with AASHTO T 23. If the strength required for the class of concrete being produced is not obtained with the minimum cement content specified, additional cement shall be used at no extra cost to the City.

**601.05 Sampling and Testing.** During the progress of work, concrete test specimens will be made by the City or its authorized representative in accordance with American Concrete Institute testing procedures. Sampling frequency will be as specified in Section 103.04.

Slump will be determined using AASHTO T 119. Air content will be determined using AASHTO T 152. Compressive strength specimens will be made in accordance with AASHTO T 23 and tested in accordance with AASHTO T 22.

Specimens for determining when forms may be removed, when a structure may be put in service, or when concrete piling may be driven will be cured, as nearly as practicable, in the same manner as the concrete in the structure and in accordance with AASHTO T 23.

**601.06 Measurement of Materials.** Materials will be measured by weighing, except as otherwise specified or where other methods are specifically authorized by the Engineer/City Engineer. Aggregates shall be measured separately and accurately by weight. Measuring devices shall be operated in a manner that will consistently weigh the cement within  $\pm 1\%$  and the individual aggregates within  $\pm 2\%$  of the required weight. Measuring devices shall be so designed and plainly marked that the weights can be accurately and conveniently verified for the quantities of each component actually being used.

Cement in standard packages (sack) need not be weighed, but bulk cement shall be weighed.

The mixing water shall be measured by weight or by volume. The water measuring device shall be accurate to within 1%.

When the aggregates contain more water than the quantity necessary to produce a saturated surface-dry condition, representative samples shall be taken and the moisture content determined for each kind of aggregate.

**601.07 Mixing Concrete.** Concrete shall be thoroughly mixed in a mixer of an approved size and type that will insure a uniform distribution of the materials throughout the mass.

The concrete shall be mixed only in the quantity required for immediate use. Concrete that has developed an initial set shall not be used. Re-tempering concrete will not be permitted.

Mixers and agitators shall not be charged in excess of the manufacturer's rated capacity. Concrete shall be delivered and discharged from the truck mixer or agitator into the forms within 1½ hours after the introduction of the mixing water to the cement. In hot weather, or under other conditions contributing to quick setting of the concrete, the maximum allowable time may be reduced by the Engineer/City Engineer. Each mixture shall be accompanied by a truck ticket issued at the batch plant. This ticket shall include the following information:

- Unique ticket number.
- Identification of the truck.
- Date and time of batching.
- Total weights and/or volumes of each component.
- Total volume of mix.
- Total quantity of water added after batching.
- Time of discharge.

Plants and transit mix trucks shall be equipped with adequate water storage and a device for accurately measuring and controlling the amount of water used in each batch.

Truck mixers shall be capable of combining the ingredients of the concrete into a thoroughly mixed and uniform mass, and of discharging the concrete within the specified range of

consistency. The concrete shall be mixed not less than 70 nor more than 100 revolutions of the drum or blades at the rate of rotation specified by the manufacturer as the mixing speed. The pick-up and throw-over blades in the drum of all mixers shall be maintained in satisfactory condition to assure thoroughly mixed concrete.

If additional mixing water is required to maintain the specified slump, approximately 20 revolutions of the mixer drum at mixing speed shall be required before discharge of any concrete. No additional water shall be added without approval of the Engineer/City Engineer.

### **601.08 Handling and Placing Concrete.**

**(a) General.** The Contractor shall provide sufficient supervision, manpower, equipment, tools, and materials and shall assure proper production, delivery, placement, and finishing of the concrete for each placement in accordance with the specifications.

The time interval between batches of concrete in a continuous placement shall not exceed 20 minutes. The minimum placement rate shall be 20 cubic yards per hour in bridges, box culverts, and retaining walls.

In preparation for the placing of concrete, construction debris and extraneous matter shall be removed from the interior of forms. Struts, stays, and braces, serving temporarily to hold the forms in correct shape and alignment pending the placing of concrete, shall be removed when the concrete placement has reached an elevation rendering their service unnecessary.

**(b) Conveying.** Concrete shall be placed to avoid segregation of the materials and the displacement of the reinforcement. The use of long troughs, chutes, and pipes for conveying the concrete to the forms will be permitted only when authorized by the Engineer/City Engineer. In case an inferior quality of concrete is produced by the use of such conveyors, the Contractor shall cease the use of that conveyor until such corrections in procedure are made to insure work of the quality specified.

Open troughs and chutes shall be of metal or metal lined. Where steep slopes are required, the chutes shall be equipped with baffles or be in short lengths that reverse the direction of movement. Aluminum chutes, troughs, and pipes shall not be used for depositing concrete.

Chutes, troughs, and pipes shall be kept clean and free from coatings of hardened concrete by thoroughly flushing with water after each run. Water used for flushing shall be discharged clear of the structure.

When placing operations involve dropping the concrete more than 5', it shall be deposited through approved pipes. Walls of 10" thickness or less may be placed without the use of pipes, provided the concrete can be placed without segregation.

**(c) Placing.** Concrete shall be placed in horizontal layers not more than 18" thick except as hereinafter provided. When less than a complete layer is placed, it shall be terminated in a vertical bulkhead. Each layer shall be placed and consolidated before the preceding batch has taken initial set to prevent injury to the green concrete and avoid surfaces of separation

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between the batches. Each layer shall be consolidated so as to avoid the formation of a construction joint with a preceding layer that has not taken initial set.

Concrete in footings shall be placed in the dry unless natural conditions prohibit. In that case, concrete shall be placed in accordance with Subsection 601.10. In order to separate water from the concrete, it will be permissible to utilize polyethylene sheeting or tarpaulins to maintain a physical barrier between the water and the concrete.

When the placing of concrete is temporarily discontinued, the concrete, after becoming firm enough to retain its form, shall be cleaned of laitance and other objectionable material to a sufficient depth to expose sound concrete. To avoid visible joints as far as possible upon exposed faces, the top surface of the concrete adjacent to the forms shall be smoothed with a trowel. Where a "feather edge" might be produced at a construction joint, an inset form shall be used to produce an edge thickness of not less than 6 inches.

Immediately following the discontinuance of placing concrete, accumulations of mortar splashed upon the reinforcing steel and the surfaces of forms should be removed. Dried mortar chips and dust shall not be puddled into the concrete. If the accumulations are not removed prior to the concrete becoming set, care shall be exercised not to damage or break the concrete-steel bond at or near the surface of the concrete while cleaning reinforcing steel.

After initial set of the concrete, the forms shall not be jarred and no strain shall be placed on the ends of projecting reinforcing bars.

Concrete in walls and top slabs of box culverts shall not be placed less than 24 hours after the concrete in previous placements has set. Provision shall be made for bonding the walls to the bottom slab or footing and the top slab to the walls by means of roughened longitudinal keys. Before concrete is placed in the walls or top slabs, the bottom slab, footing, or walls shall be thoroughly cleaned of extraneous material. No horizontal construction joints will be allowed in any wall of a box culvert unless provided on the plans or approved by the Engineer/City Engineer.

**(d) Consolidating.** All concrete, during and immediately after depositing, shall be thoroughly consolidated. This shall be accomplished by mechanical vibration subject to the following provisions:

The vibration shall be internal unless special authorization of other methods is given by the Engineer/City Engineer.

Vibrators shall be of a type and design approved by the Engineer/City Engineer. They shall be capable of transmitting vibration to the concrete at rated frequencies of not less than 4500 impulses per minute.

The intensity of vibration shall be such as to visibly affect a mass of concrete over a radius of at least 18 inches.

The Contractor shall provide a sufficient number of vibrators to properly compact each batch immediately after it is placed in the forms and shall have in reserve at all times sufficient

vibratory equipment to guard against shut down of the work because of the failure of the equipment in operation.

Vibrators shall be manipulated to thoroughly work the concrete around the reinforcement and embedded fixtures and into the corners and angles of the forms.

Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. The vibrators shall be inserted and withdrawn out of the concrete slowly. The vibration shall be of sufficient duration and intensity to thoroughly consolidate the concrete, but shall not be continued so as to cause segregation. Vibration shall not be continued at any one point to the extent that localized areas of grout are formed. Application of vibrators shall be at points uniformly spaced and not farther apart than twice the radius over which the vibration is visibly effective.

Vibration shall not be applied directly or through the reinforcement to sections or layers of concrete that have hardened to the degree that the concrete ceases to be plastic under vibration. It shall not be used to make concrete flow in the forms over distances so great as to cause segregation, and vibrators shall not be used to transport concrete in the forms.

Vibration shall be supplemented by such spading as is necessary to insure smooth surfaces and dense concrete along form surfaces and in corners and locations impossible to reach with the vibrators.

These provisions shall apply to precast products except that, if approved by the Engineer/City Engineer, the manufacturer's methods of vibration may be used.

**601.09 Pumping.** Concrete may be placed by pumping. The equipment for pumping shall be arranged and operated so that no vibrations result that might damage freshly placed concrete.

The Contractor will be permitted to furnish coarse aggregate for concrete that is to be pumped in a size smaller than that specified provided that a suitable mix can be produced that will conform to the requirements for the class specified.

Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall be adequate in capacity for the work. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipe, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients.

Concrete for slump and air content requirements shall be obtained at the discharge end of the pipe.

The use of aluminum pipe as a conveyance for the concrete will not be permitted.

**601.10 Depositing Concrete Under Water.** Concrete shall not be deposited in water except when shown on the plans or with the approval of the Engineer/City Engineer. No

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concrete shall be placed underwater without an approved mix design which meets the AHTD requirements for Seal Concrete.

The supply of concrete shall be maintained at the rate necessary to raise the elevation over the entire seal by a minimum of 1' per hour or an approved retarder shall be used as necessary for lesser placement rates.

For parts of structures under water, seal concrete shall be placed continuously from start to finish. The surface of the concrete shall be kept as nearly horizontal as practicable. The Contractor shall provide equipment and personnel to sound the top of the seal in the presence of the Inspector in order to verify the location of the seal at all times. Previously placed seal concrete shall not have taken its initial set prior to the placement of adjacent concrete.

Concrete shall be carefully placed by means of a tremie or other approved method. Still water shall be maintained at the point of deposit. Concrete shall be deposited in such a manner that the planned horizontal concrete flow shall be no more than 15 feet.

A tremie shall consist of a tube having a diameter of not less than 10", constructed in sections having flanged couplings fitted with gaskets and an approved foot valve. The tremie shall be supported so as to permit rapid lowering when necessary to retard or stop the flow of concrete. The discharge end shall be closed at the start of the work so as to prevent water from entering the tube and shall be entirely sealed. The tremie tube shall be kept sufficiently full to prevent the loss of the concrete seal. When a batch is dumped into the tube, the flow of concrete shall be induced by slightly raising the discharged end, always keeping it in the deposited concrete. If at any time the seal is lost, the tremie shall be raised, the discharge end closed for a new start, and then lowered into position with the discharge end in the previously deposited concrete. Aluminum tremies will not be permitted.

Dewatering may proceed when the seal concrete has been allowed to cure for a minimum of 72 hours at a water temperature above 45 degrees F. All laitance or other unsatisfactory materials shall be removed from the exposed surfaces that are to support other structural loads.

### **601.11 Joints.**

**(a) Construction joints.** Construction joints shall be made only where located on plans or shown in the placement schedule, unless otherwise approved by the Engineer/City Engineer.

The placing of concrete shall be carried continuously from joint to joint. The face edges of all joints that are exposed to view shall be carefully finished true to line and elevation.

The surface of the hardened concrete shall be roughened in a manner that will not leave loosened particles of aggregates or damaged concrete at the surface. It shall be thoroughly cleaned of foreign matter and laitance and saturated with water.

If not detailed on the plans, or in the case of emergency, construction joints shall be placed as directed by the Engineer/City Engineer. Shear keys or inclined reinforcement shall be used

where necessary to transmit shear or bond the two sections together. When shear keys or inclined reinforcement is not provided, the concrete shall be roughened as directed.

**(b) Expansion and Fixed Joints.** Joints shall be constructed according to the details shown on the plans.

- 1) **Open Joints.** Open joints shall be placed in the locations shown on the plans and shall be constructed by the insertion and subsequent removal of a wood strip, metal plate, or other approved material. The insertion and removal of the template shall be accomplished without chipping or breaking the corners of the concrete. Reinforcement shall not extend across an open joint unless specified on the plans.
- 2) **Filled Joints.** Poured expansion joints shall be constructed similar to open joints. When premolded types are specified, the filler shall be in the correct position when the concrete on the second side of the joint is placed. An approved joint sealer meeting the requirements of Subsection 601.11(d) is required in addition to the joint filler. The cavity for the sealer shall be formed by the insertion and subsequent removal of a wood strip, metal plate, or other approved material.

All faces of the joint to be sealed shall be thoroughly cleaned by sand blasting, water blasting, or other approved methods prior to placing the joint seal material.

Preformed expansion joint filler, non-extruding and resilient types, shall meet the requirements of AASHTO M 153. Type 2 (sponge rubber) shall be required to have a minimum expansion of 125% and be within  $\pm 0.1$ " of the specified plan thickness.

Other types of joint fillers may be allowed if approved by the Engineer/City Engineer.

**(c) Contraction Joints.** Contraction joints shall be constructed according to the dimensions specified in the plans and these specifications. The joints shall continue continuously across the full width of the concrete surface. Contraction joints shall be 1/8" to 3/8" wide and shall extend to a depth equal to 1/4 to 1/3 of the thickness of the concrete being placed. All contraction joints shall be sealed with an approved sealant meeting the requirements of Subsection 601.11(d) for types 3, 4 or 5.

**(d) Joint Materials.** Materials for filling and sealing joints shall be as shown on the plans and shall comply with the following requirements, as applicable:

**Type 1.** A joint filler that is a uniform mixture of sawdust and asphalt material in the proportion of one part asphalt to four parts sawdust, by volume. Asphalt material used shall be either MC-250 or SS-1. When this material is specified, the joint shall be filled to within 25 mm (1") of the pavement surface. The top 1" shall be sealed with a material complying with the requirements of AASHTO M 173.

**Type 2.** A joint filler that is preformed, non-extruding, and resilient type, complying with AASHTO M 153 Type I (sponge rubber).

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The material for filling and sealing longitudinal, warping, contraction, and other specified joints shall be as shown on the plans and shall comply with the following requirements:

Backer rod filler for Types 3, 4, and 5 joint shall be of resilient material approximately 3 mm (1/8") larger in diameter than the width of the joint to be sealed. All components of the joint sealant system, including the backer rod, shall be compatible. No bond shall occur between the backup material and the sealant system for types 3 and 4 joint sealer.

**Type 3.** A joint sealer that is a one part silicone formulation that does not require a primer for bond to concrete. The compound shall be compatible with concrete. Acetic acid cure sealants are not acceptable. The material shall be one that has been approved by the Engineer.

**Type 4.** A joint sealer that is a one part silicone formulation that does require a primer for bond to concrete. The compound shall be compatible with concrete. Acetic acid cure sealants are not acceptable. The material shall be one that has been approved by the Engineer.

**Type 5.** A joint sealer that is a hot poured elastomeric joint sealant. The material shall comply with AASHTO M 282. The appendix of that specification shall be considered a part of this specification.

**Type 6.** A joint sealer that is a 2 component, cold poured, synthetic polymer, complying with ASTM D 1850 with the exception of penetration, which shall not exceed 100, and resilience, both original cured sample and oven aged, which shall be a minimum of 70%.

**Type 7.** A joint sealer that is a hot poured elastic type complying with AASHTO M 173.

**601.12 Forms.** Forms shall be mortar-tight and of sufficient rigidity to prevent distortion due to the pressure of the concrete and other loads incident to the construction operations. Forms shall be constructed and maintained so as to prevent warping and the opening of joints due to shrinkage of the lumber.

The forms shall be substantial and unyielding and shall be so designed that the finished concrete will conform to the proper dimensions and contours. The design of the forms shall take into account the effect of vibration of concrete as it is placed.

Forms for exposed surfaces shall be made of dressed lumber or plywood of uniform thickness, steel, or other approved materials that will provide a smooth surface, and shall be mortar-tight. Forms shall have a 3/4" chamfer at all sharp corners unless otherwise directed. In the case of projections, such as girders and copings, forms shall be given a bevel or draft to insure easy removal.

Metal snap-ties within the forms shall be so constructed as to permit their removal to a depth of at least 1" from the face of the concrete. Metal inserts or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 1" from the face of the concrete or be covered by being embedded a minimum of 1" in the concrete. In case ordinary wire ties are permitted, all wires, upon removal of the forms, shall be cut back at

least ¼” from the face of the concrete. All cavities shall be filled with cement mortar and the surface left sound, smooth, even, and uniform in color.

Forms shall be set and maintained true to the line designated until the concrete is sufficiently hardened. Before depositing new concrete on or against concrete that has hardened, the forms shall be re-tightened. Forms shall remain in place for the periods specified in Subsection 601.13. When forms appear to be unsatisfactory in any way, either before or during the placing of concrete, the Engineer/City Engineer shall order the work stopped until the defects have been corrected.

The shape, strength, rigidity, watertightness, and surface smoothness of re-used forms shall be maintained at all times. Any warped or bulged lumber must be re-sized before being re-used.

Forms shall be cleaned before being set to line and grade and shall be oiled prior to placing reinforcing steel in the vicinity of the forms. Materials or methods used in oiling the forms shall not result in the discoloration of the concrete.

**601.13 Removal of Forms.** In the determination of the time for the removal of forms and the discontinuance of heating, consideration shall be given to the location and character of the structure, the weather and other conditions influencing the setting of the concrete, and the materials used in the mix.

Removal of forms shall be in accordance with the following schedule:

<b>Item</b>	<b>Minimum Time</b>	<b>Strength Requirement</b>
Top Slabs of RC Box Culverts	7 days	80% Specified
Forms for Columns and Vertical Walls	24 hours	N /A
Side Forms for Parapets, Median Barriers, and Curb Faces	6 hours	N/A

Forms on surfaces that will require a Class 2 finish in accordance with Subsection 601.16 shall be removed at the earliest time permitted under these Specifications in order to begin finishing operations.

Forms and their supports shall not be removed without the approval of the Engineer/City Engineer. Supports shall be removed in such a manner as to permit the concrete to uniformly and gradually take the stresses due to its own weight. Methods of form removal likely to cause overstressing of or damage to the concrete shall not be used.

**601.14 Weather and Temperature Limitations.**

**(a) Hot Weather.** When the internal temperature of the plastic concrete reaches 85° F, the Contractor shall take the necessary precautions to insure that the temperature of succeeding batches does not exceed 90° F. Concrete batches with temperatures in excess of 90° F will be rejected. The method used to control the concrete temperature shall be approved in

writing by the Engineer. The temperature of the plastic concrete shall be determined immediately prior to its being deposited in the forms by inserting a thermometer to a depth consistent with the capabilities of the thermometer being used to obtain a true reading. Prior to beginning placement, the Contractor shall insure that sufficient materials, labor, and equipment are available during placement to implement the previously approved cooling process.

**(b) Cold Weather.** Concreting operations will not be permitted when a descending air temperature falls below 40° F nor resumed until an ascending air temperature reaches 35° F without specific authority from the Engineer/City Engineer. Under no circumstances will the placing of concrete on a frozen subgrade be permitted. No concrete shall be placed unless the temperature of the concrete is more than 50° F when placed. If heating of the ingredients is necessary to meet this criterion, it shall be accomplished by a method such as dry heat or steam and not by direct flame. Water shall not be heated to more than 180 degrees F, and shall be combined with the aggregate before the addition of cement. Frozen aggregates may not be used.

After concrete is placed, it shall be protected by insulated forms, blankets, enclosing and heating, and/or any other method approved by the Engineer/City Engineer that will maintain the temperature adjacent to the concrete at a minimum of 50° F for at least 5 days. Concrete that has been frozen or damaged due to weather conditions shall be removed and replaced by the Contractor at no cost to the City.

**(c) Protection Against Rain.** In order that concrete may be properly protected against the effects of rain before the concrete is sufficiently hardened, the Contractor shall have available at all times materials for the protection of the edges and surface of the unhardened concrete. Such protective materials shall consist of standard metal forms or wood planks having a nominal thickness of not less than 2" and a nominal width of not less than the thickness of the pavement at its edge for the protection of the pavement edges, and covering material such as burlap or cotton mats, or plastic sheeting material for the protection of the surface of the pavement. When rain appears imminent, all paving operations shall stop and all available personnel shall begin protection of the sides of the pavement and covering the surface of the unhardened concrete with the protective covering. Any surface finish damaged by rain shall be repaired or replaced to the satisfaction of the City at no cost to the City.

### **601.15 Curing Concrete.**

**(a) Materials.** Materials used in curing concrete shall conform to one of the following types:

Burlap-polyethylene sheeting shall meet the requirements of AASHTO M 171.

Polyethylene sheeting shall meet the requirements of AASHTO M 171.

Copolymer/synthetic blanket shall meet the requirements of AASHTO M 171. Copolymer/synthetic blankets shall be a composite of a copolymer membrane material coated over a layer of absorbent nonwoven synthetic fabric weighing at least 6 ounces per square yard, uniform in appearance, and free from visible defects.

Other approved sheeting materials shall meet the requirements of AASHTO M 171.

Membrane curing compound shall meet the requirements of AASHTO M 148, Type 1-D or Type 2.

**(b) Application.** The exposed concrete, immediately after finishing, shall be covered with one of the curing materials listed above and shall be kept continuously and thoroughly wet for a period of not less than 5 days after the concrete is placed. Membrane curing does not require the application of additional moisture.

Membrane curing compound shall not be used on surfaces requiring a Class 2 finish.

When membrane curing is used, the exposed concrete shall be thoroughly sealed by applying the membrane curing solution immediately after the free water has left the surface. The concrete inside the forms shall be sealed immediately after the forms are removed and necessary finishing has been done. For uniform application in the field on vertical concrete surfaces, the specified rate of application may be achieved by two coats applied at an interval of approximately 1 hour.

The Contractor shall provide satisfactory equipment and means to properly control and assure the direct application of the curing solution on the concrete surface so as to result in a uniform coverage at the rate of 1 gallon for each 125 square feet of area.

If rain falls on the newly coated concrete before the film has dried sufficiently to resist damage, or if the film is damaged in any other manner, a new coat of the solution shall be applied to the affected portions equal in curing value to that specified above.

**601.16 Finishing Concrete Surfaces.** Surface finishes shall be classified as follows:

- Class 1. Ordinary Surface finish.
- Class 2. Rubbed finish.
- Class 3. Sprayed finish.
- Class 4. Exposed Aggregate finish.
- Class 5. Tined Surface finish.
- Class 6. Broomed finish.
- Class 7. Grooved finish.

All concrete shall be given a Class 1, Ordinary Surface Finish. In addition, if further finishing is required, such other types of finish will be as specified herein.

Payment for finishes will be considered a part of the applicable item of concrete used.

The following surfaces shall be given a Class 2 finish except when a Class 3 finish is specified in the plans:

Exposed surfaces of retaining walls and box culvert wingwalls, surfaces of concrete rails, rail posts, rail end posts, rail bases, and parapets, including the outside face.

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At the option of the Contractor, a Class 3 finish may be used on all surfaces requiring a Class 2 finish provided the same class of finish is used on the entire job.

Sidewalks, curbs, exposed horizontal surfaces of inlets and junction boxes, and exposed horizontal faces of miscellaneous concrete items shall be given a Class 6 finish.

Concrete pavement surfaces shall be given a Class 5 finish.

The various classes of surface finish are defined as follows:

**(1) Class 1, Ordinary Surface Finish.** Immediately following the removal of forms, fins and irregular projections shall be removed from all surfaces except from those that are not to be exposed or are not to be waterproofed. On all surfaces, the cavities produced by form ties and all other holes, broken corners or edges, and other defects shall be thoroughly cleaned, and after having been thoroughly saturated with water, shall be carefully pointed and trued with a mortar of cement and fine aggregate mixed in the proportion of 1:2. Mortar used in pointing shall be not more than 1 hour old. The concrete shall then be rubbed or sprayed, if required, and cured as specified under Subsection 601.15. Construction and expansion joints in the completed work shall be left carefully tooled and free of mortar and concrete. The joint filler shall be left exposed for its full length with clean and true edges.

The resulting surfaces shall be true and uniform. Repaired surfaces, the appearance of which is not satisfactory to the City, shall be rubbed as specified under Class 2 finish.

Exposed surfaces not protected by forms shall be struck off with a straightedge and finished with a wood float to a true and even surface. The use of additional mortar to provide a plastered or grout finish will not be permitted.

The tops of caps in the area of the bridge seat shall be finished with a steel trowel or by grinding to a smooth finish and true slope at the proper elevation.

**(2) Class 2, Rubbed Finish.** After removal of forms, the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work the concrete shall be thoroughly saturated with water. Sufficient time shall have elapsed before the wetting down to allow the mortar used in the pointing of rod holes and defects to thoroughly set. Surfaces to be finished shall be rubbed with a medium coarse carborundum stone, using a small amount of mortar on its face. The mortar shall be composed of cement and fine sand mixed in proportions used in the concrete being finished. Rubbing shall be continued until form marks, projections, and irregularities have been removed, voids filled, and a uniform surface has been obtained. The paste produced by this rubbing shall be left in place at this time.

After concrete above the surface being treated has been cast, the final finish shall be obtained by rubbing with a fine carborundum stone and water. This rubbing shall be continued until the entire surface is of a smooth texture and uniform color.

After the final rubbing is complete and the surface has dried, it shall be rubbed with burlap to remove loose powder and shall be left free from all unsound patches, paste, powder, and objectionable marks.

**(3) Class 3, Sprayed Finish.** The material furnished for sprayed finish shall be a commercial paint type texturing product produced specifically for this purpose, and shall consist of a synthetic non-alkyd resin containing mica, perlite, non-biodegradable fibers, and durable tinting pigments. The material shall be approved by the City. Unless otherwise specified in the Contract, the color of the sprayed finish shall be concrete gray, equal or close to Shade 36622 of the Federal Color Standard 595 A.

Surfaces to be coated shall be free from efflorescence, flaking, coatings, dirt, oil, and other foreign substances. The sprayed finish shall not be applied over surfaces cured with membrane curing compound until 30 days has elapsed from application of the membrane. Prior to application of spray finish, the surfaces shall be free of moisture, as determined by sight and touch, and in a condition consistent with the manufacturer's published recommendations.

The spray finish shall be applied at a rate as recommended by the manufacturer and as approved by the Engineer/City Engineer. The spray finish shall be applied with heavy duty spray equipment capable of maintaining a constant pressure as necessary for proper application.

The completed finish shall be tightly bonded to the structure and shall present a uniform appearance and texture equal to or better than that required for rubbed finish. If necessary, an additional coat or coats shall be applied to produce the desired surface texture and uniformity. Upon failure to adhere positively to the structure without chipping or cracking, or to attain the desired surface appearance, the coating shall be removed from the structure and the surface given a rubbed finish, or another approved finish satisfactory to the City.

**(4) Class 4, Exposed Aggregate Finish.** This type of finish shall be produced by scrubbing the surface of green concrete with stiff wire or fiber brushes, using a solution of muriatic acid in the proportion of 1 part acid to 4 parts water, or by sand blasting, until the cement film or surface is completely removed and the aggregate particles are exposed. The amount of aggregate exposure will be specified on the plans or designated by the Engineer/City Engineer. Any surface treated with muriatic acid shall be thoroughly washed with water to which a small amount of ammonia has been added to remove all traces of the acid. The resulting surface shall be an even pebbled texture.

**(5) Class 5, Tined Roadway Surface Finish.** The concrete roadway surface shall be given a finish with a burlap drag, followed by tining.

The surface shall be finished by dragging a seamless strip of damp burlap over the full width of the roadway surface. The burlap drag shall consist of sufficient layers of burlap and have sufficient length in contact with the concrete to slightly groove the surface, and shall be moved forward with a minimum bow of the lead edge. The drag shall be kept damp, clean, and free of particles of hardened concrete.

The final finish shall be accomplished by using the drag finish as described above with the further application of a metal tine finishing device. The tine shall be approximately 0.032" by 0.125" of steel flat wire, 2" to 5" in length, and spaced on 1/2" to 3/4" centers. The grooves produced in the concrete shall be substantially from 1/8" to 3/16" in depth. The grooves shall be transverse to the centerline of the surface. The metal tine device shall be operated by approved mechanical or manual means. Other texturing equipment may be approved by the Engineer/City Engineer provided it produces a texture equivalent to that produced by the metal tine.

The tining shall be terminated with a transition in depth 18" from the gutter line. The outer 18" of the tined surface shall receive a Class 6, broomed finish.

**(6) Class 6, Broomed Finish.** After the concrete has been deposited in place, it shall be consolidated and the surface shall be struck off by means of a strike board, floated, and broomed. An edging tool shall be used on edges and expansion joints. The surface shall not vary more than 1/4" under a 10' straightedge. The surface shall have a granular or matte texture.

**(7) Class 7, Grooved Finish.** The roadway surface shall be grooved perpendicular to the centerline with grooves extending across the slab to within 18" of the gutter line. The grooves shall be cut using a mechanical sawing device that will leave grooves 1/8" to 3/16" in depth and spaced on 1/2" to 3/4" centers.

## **Section 602. Reinforcing Steel**

**602.01 Description.** This item shall consist of reinforcing steel and miscellaneous accessories of the quality, type, size, and quantity designated, which shall be furnished and placed in concrete according to these specifications and in conformity with the details shown on the plans, or as directed.

### **602.02 Materials.**

**(a) Bar Reinforcement.** Bar reinforcement for concrete in sizes up to and including #18 shall conform to the requirements of AASHTO M 31 or M 53.

**(b) Wire and Wire Fabric.** Wire, when used as reinforcement in concrete, shall conform to the requirements of AASHTO M 32 or M 225.

**(c) Bar Mat Reinforcement.** Bar mat reinforcement for concrete shall conform to the requirements of AASHTO M 54.

**(d) Epoxy Coating.** When specified, reinforcing steel bars shall be coated according to AASHTO M 284 using a coating material that meets the requirements of Annex A1 of AASHTO M 284.

The Contractor shall supply to the Engineer a written certification that properly identifies the number of each batch of coating material used in the order; the material, quantity represented, date of manufacture, and name and address of the manufacturer; and a statement that the supplied coating material meets the requirements of Annex A1 of AASHTO M 284.

Patching material, compatible with coating material, inert in concrete, and meeting the requirements of Annex A1 of AASHTO M 284, shall be provided by the epoxy coating manufacturer.

**602.03 Bar Lists and Bending Diagrams.** All reinforcing steel shall be fabricated to conform to the details shown on the plans. Pins used for bending reinforcing steel shall be equal to or larger than that shown on the plans. Bar lists and bending diagrams for reinforcing steel and bar supports will not be reviewed or approved by the Engineer. The Contractor shall be responsible for the accuracy of the fabricated reinforcing steel.

**602.04 Fabrication.** Bar reinforcement shall be bent to the shapes shown on the plans.

Bars shall be bent cold, unless otherwise permitted by the Engineer. No bars partially embedded in concrete shall be field bent, except as shown on the plans or specifically permitted by the Engineer.

Radii for bends shall be as shown on the plans. When not shown on the plans, radii bends on the inside of bars shall be as specified below.

Bar Number	Minimum Radii
Stirrups and Ties	4 bar diameters
3,4,5,6,7, or 8	6 bar diameters
9,10, or 11	8 bar diameters
14 or 18	10 bar diameters

The Engineer/City Engineer or his representative shall have free access to the shop for inspection, and every facility shall be extended to him for this purpose. On a random basis, samples of bars, other than the additional test bars, may be taken by the Engineer.

Epoxy coating applicators shall be CRSI certified. The Contractor shall inform the Engineer, in writing, at least 10 days prior to performing any of the cleaning or coating operations. The Contractor shall furnish to the Engineer the coating applicator's certification certifying that all materials used, the preparation of the bars, coating, and curing were done according to these specifications and that no bars contain more than six holidays per yard. The certification shall include or have attached specific results of tests of coating thickness and flexibility of coating.

**602.05 Shipping, Handling, and Protection of Material.** Bar reinforcement shall be shipped in standard bundles, tagged and marked according to the *Code of Standard Practice* of the Concrete Reinforcement Steel Institute.

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Steel reinforcement shall be protected from damage. When placed in the work, it shall be free from dirt, detrimental rust or scale, paint, oil, or other foreign substance. Steel reinforcement shall be stored above the ground on skids, platforms, or other supports. Epoxy coated reinforcing steel that is not incorporated into the work within 90 calendar days after delivery to the project shall be protected from exposure to the sun.

Epoxy coating damaged during fabrication, shipping, or installation shall be repaired according to AASHTO M 284. Damaged areas less than 0.10 square inch need not be repaired but all areas larger than 0.10 square inch shall be repaired. The maximum amount of damage shall not exceed 2% of the surface area of each bar. All damaged areas shall be repaired according to the manufacturer's instructions. Repairs will be required on all sheared or cut ends of bars, end areas left bare during the coating process, and any areas where the entire coating is removed. All repairs shall be completed as soon as practicable and, in the case of bare end areas and sheared ends, before visible oxidation of the surface occurs. Epoxy coated bars shall not be flame cut.

The Contractor shall exercise caution when placing and vibrating concrete to prevent any damage to epoxy coated bars. In order to prevent the vibrator from damaging the coated bars, the head shall be covered with a sheet of rubber or a similar material as approved by the Engineer/City Engineer.

**602.06 Placing and Fastening.** Steel reinforcement shall be accurately placed in the positions shown on the plans and firmly held during the placing and setting of concrete. Bars shall be tied at all intersections except where spacing is less than 12" in each direction, in which case alternate intersections shall be tied. Bundled bars shall be tied together at not more than 6' centers.

Bar positions or clearances from the forms shall be maintained by means of stays, ties, hangers, or other approved devices. Reinforcing steel shall not be welded unless detailed on the plans or authorized in writing by the Engineer. Metal bar supports that are in contact with the exterior surface of the concrete shall have protection conforming with the CRSI Specifications, Class 1 for Plastic Protected Bar Supports or Class 2 for Stainless Steel Bar Supports, with the further provision that the plastic protection may be applied either by a dipping operation or by the addition of premolded plastic tips to the legs of the supports. Epoxy Coated Bar Supports that are coated according to the provisions of AASHTO M 284 using a coating material meeting the requirements of Annex A1 of AASHTO M 284 may be substituted for Plastic Protected Bar Supports or Stainless Steel Bar Supports. All high chairs and bar bolsters shall be metal. Any bar supports that deform under foot traffic or other construction activities shall not be used.

When concrete is to rest on an excavated surface, layers of bars shall be supported above the surface by metal chairs or by precast mortar or concrete blocks. The use of rocks, pieces of stone or brick, pipe, wooden blocks, or chunks of concrete will not be permitted as bar supports or spacers.

Reinforcement shall be placed by the Contractor and inspected and approved by the Engineer/City Engineer before the placing of concrete begins. Concrete placed in violation

of this provision may be rejected and removal required. Unless otherwise shown on the plans, the spacing of supports shall conform to the recommendations of CRSI.

Epoxy coated bars shall be placed on plastic coated or epoxy coated metal supports and shall be held in place by use of plastic coated tie wires or molded plastic clips especially fabricated for this purpose. Bar supports for epoxy coated bars shall be fully coated metal supports. Epoxy coated bar supports shall be coated according to the provisions of AASHTO M 284 using a coating material meeting the requirements of Annex A1. In placing epoxy coated bars, care shall be maintained to prevent coated bars from being damaged.

After the coated bars are secured to bar supports, a final visual inspection shall be made and all uncoated or damaged areas coated or repaired as required by the Engineer/City Engineer.

**602.07 Splicing.** Reinforcing steel shall be furnished in the full lengths specified on the plans. Bars spliced as a result of unforeseen construction conditions or sequences will require the written approval of the Engineer. Splices shall meet the requirements of the current edition of the AASHTO *Standard Specifications for Highway Bridges*.

Secondary reinforcing used for distribution of loads, such as longitudinal bars in box culverts and retaining walls may be lapped 32 bar diameters minimum if bars are #6 or smaller. Primary reinforcing for columns and retaining walls which require splicing as a result of the lowering of footings shall be spliced at the upper end of the original bars. Required lengths of splices for primary reinforcing will be determined by the Engineer.

In lapped splices, the bars shall be placed in contact and fastened together in such a manner as to maintain the minimum distance to the surface of the concrete as shown on the plans.

Sheets of wire fabric or bar mat reinforcement shall overlap each other sufficiently to maintain a uniform strength and shall be securely fastened at the ends and edges. The lap shall be not less than one space of wire fabric or bar.

## **DIVISION 700. TRAFFIC CONTROL FACILITIES**

### **Section 701. Actuated Controller**

**701.01 Description.** This item shall consist of furnishing and installing an actuated controller and other associated equipment according to these specifications and at the locations shown on the plans or as directed. All requirements of Standard Specifications for Highway Construction, AHTD Edition of 2003 Division 700 Traffic Control Facilities, and specifically Section 701 Actuated Controller, shall apply. Subject to approval of Engineer/City Engineer. Portions of the AHTD Standard Specifications may be superseded by these provisions.

The Contractor shall pretest all electronic equipment at the Springdale Public Works Signalization Division Offices before installing any such electronic equipment.

**701.02 Materials.** Materials shall be in accordance with the AHTD Standard Specifications with the following exceptions:

(a) **General.** The existing system consists of a PEEK system coordinated through Spread Spectrum radio system. System software is currently licensed to the City and to the State. All equipment shall be completely compatible with existing hardware and software.

(b) **Fan and Ventilation.** The second sentence of the third paragraph of Subsection 701.02 Materials (c) Cabinet (5) Fan and Ventilation is hereby deleted and the following substituted therefore:

The fan shall be thermostatically controlled and shall be manually adjustable to turn on between 70°F (32°C) and 150°F (66°C).

(c) **Power Panel.** Subsection 701.02 Materials (d) Cabinet Auxiliary Equipment (7) Power Panel is hereby deleted and the following substituted therefore:

The cabinet shall have a power distribution panel containing a 50 amp radio interference suppressor, a 30 amp main circuit breaker, a 15 amp auxiliary equipment circuit breaker, a 15 amp circuit breaker for a GFCI receptacle, fan, and light, and a 15 amp circuit breaker for a non-GFCI protected receptacle.

(d) **Subsection 701.02 (d) (10) Wiring Diagrams and Controller Manual.** is hereby deleted and the following substituted therefore:

Three copies of the Cabinet wiring Diagram and one copy of the controller manual shall be supplied with each cabinet. One diagram and the manual shall be placed in the "Cabinet Drawer Assembly". The "Cabinet Drawer Assembly" shall be fabricated to the approximate dimensions shown on the plans. Included with the "Cabinet Drawer Assembly" will be all hardware necessary to fasten and install the Assembly to the underside of a cabinet shelf roughly at the midpoint of the Cabinet vertically. One diagram shall be delivered to the City before final inspection of the intersection. One diagram shall be given to the Engineer.

**701.03 Construction Requirements.**

(a) **General.** Construction shall be in accordance with the AHTD Standard Specifications.

(b) **Pretesting.** The Contractor shall pretest all electronic equipment at the Springdale Public Works Signalization Division Offices before installing any such electronic equipment. The Contractor shall arrange the pretesting through the Engineer/City Engineer. Unless approved otherwise by the Owner, the pretesting shall include a minimum of seven (7) consecutive days of test operation. No separate payment shall be made for any and all pretesting but such pretesting shall be considered subsidiary to the applicable equipment.

**701.04 Method of Measurement.** Actuated Controllers will be measured by the unit. One unit shall include the controller, the controller cabinet; the pad on which the cabinet is installed, when required; and all hardware required for installing the cabinet.

**701.05 Basis of Payment.** Work competed and accepted and measured as provided above will be paid for at the contract unit price bid per each Actuated Controller of the phases and the NEMA TS type specified, which price shall be full compensation for furnishing the Actuated Controller and mounting the controller cabinet; for installing, wiring and testing the controller; for excavation and backfilling; for construction of the mounting pad; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Actuated Controller TS1 (___ Phases)	EA
Actuated Controller TS2-Type 2 (___ Phases)	EA

**Section 702. Traffic Signal Head**

**702.01 Description.** This item shall consist of furnishing and installing 300 mm (12") diameter Traffic Signal Heads and components based on Light Emitting Diode (LED) technology according to these specifications as well as **SECTION 706, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer/City Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

**702.02 Materials.** The LED modules shall be suitable for span wire and mast arm mounted signals. Units must meet the following specifications to be accepted.

**(a) General.** Acceptable units shall be pre-approved as indicated on the Arkansas Highway and Transportation Department's most current "Qualified Products List" (QPL). The LED modules shall be suitable for span wire and mast arm mounted signals. Units must meet the following specifications to be accepted.

**(b) Physical and Mechanical.** LED traffic signal modules designed shall not require special tools for installation. Retrofit replacement LED signal modules shall fit into existing traffic signal housings built to the VTCSH Standard without modification to the housing. Installation of a retrofit replacement LED signal module into an existing signal housing shall only require the removal of the existing optical unit components, i.e., lens, lamp, and gaskets; shall be weather tight and fit securely in the housing; and shall connect directly to existing electrical wiring utilizing spade connectors. It shall not be necessary to remove reflector or lamp module. Reflector and lamp module is not required where new housings are provided.

**(c) Optical Requirements.** The RED and GREEN modules shall be measured per ITE specifications, and are required to meet luminous values that are a minimum of 115 percent greater than the required minimum values in the specifications at the time of production. The YELLOW modules shall be tested for luminous output at 25°C, allowing the modules to achieve thermal equilibrium for 60 minutes, while the modules are energized at nominal operating voltage, at a 8.3% (or 1/12) duty cycle or 5 sec on/55 sec off). The yellow modules shall meet all other ITE specifications.

**(d) Optical Unit.** LED signal modules shall meet the following requirements:

- 1) **Optical Unit Replacement.** The LED module shall be constructed to allow the replacement of the outer lens and/or the light engine when needed.
- 2) **Lens Surface.** The external lens shall be smooth on the outside to prevent excessive dirt/dust buildup.
- 3) **Tinting.** The RED, YELLOW and optionally on GREEN lens shall be tinted or shall use transparent film or materials with similar characteristics.
- 4) **Chromaticity.** The measured coordinates of LED signal modules shall conform to the chromaticity requirements of Section 8.04 and Figure 1 of the VTCSH standard.
- 5) **Environment.** The LED signal module shall be rated for use in the ambient operating temperature range, measured at the exposed rear of the module, of -40° C (-40° F) to +74° C (+165° F). The LED sign module shall be protected against dust and moisture intrusion per the requirements of NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for Type 4 enclosures to protect all internal LED, electronic, and electrical components. The LED signal module lens shall be UV Stabilized.
- 6) **Pre assembly.** The LED signal module shall be a single, self-contained device, not requiring on-site assembly for installation into an existing traffic signal housing. The power supply for the LED signal module may be either integral or packaged as a separate module. The power supply may be designed to fit and mount inside the

traffic signal housing adjacent to the LED signal module. The assembly and manufacturing process for the LED signal assembly shall be designed to assure all internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

- 7) **LED Drive Circuitry (parallel).** The individual LED light sources shall be wired so that a catastrophic failure of one LED light source will result in the loss of only that one LED light source, and the loss of no more than 1% of the total LED'S within the LED signal module.
- 8) **Material Composition.** Materials used for the lens and signal module construction shall conform to ASTM specification for the materials where applicable. Enclosures containing either the power supply or electronic components of the signal modules shall be made of UL94VO flame retardant materials. The lens of the signal module is excluded from this requirement.
- 9) **Identification Markings.** Each individual LED signal module shall be identified for warranty purposes. Each LED signal module shall be identified on the backside with the manufacturer's name and serial number. The following operating characteristics shall be identified: nominal operating voltage, power consumption, and Volt-Ampere. Modules shall have a prominent and permanent vertical indexing indicator, i.e. UP ARROW or the word UP or TOP, for correct indexing and orientation inside a signal housing. Modules conforming to this specification may have the following statement: "Manufactured in Conformance with the Interim Purchase Specification of the ITE for LED vehicle Traffic Signal Modules" on an attached label.

(e) **Manufacturer's Warranty.** The standard contract warranty shall apply with time extensions applied to materials. The contractor shall provide a written manufacturer's guarantee to the City. Warranty shall provide the following stipulations:

- Isolated Failures Warranty Period not less than 7 Years
- Design Failure Warranty Period not less than 5 Years

Warranty for isolated lens failure shall include replacement LED module at no cost for materials and shipping for a period of 7 years from the date the intersection is considered substantially complete by the engineer. An LED module shall be considered failed when the luminosity drops below the ITE requirements listed above.

A product "Design Failure" is considered to have occurred if, within a period of 5 years or less, a total of ten percent (10%) of the LED modules supplied on a particular Job are considered failed as described above. The supplier shall then "recall" the entire shipment at no cost to the agency maintaining the equipment. This shall include labor and equipment necessary to replace the units.

**702.03 Construction Requirements.** Construction shall be in accordance with the AHTD Standard Specifications.

**702.04 Method of Measurement.** LED Traffic Signal Heads will be measured by the unit. One unit shall include the number of faces and sections specified, together with all mounting brackets and hardware; signs, where required; and other incidentals to provide a signal head complete in place.

**702.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Traffic Signal Head of the type and size specified, which price shall be full compensation for furnishing and installing all materials and signs; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Traffic Signal Head, LED (3-Section)	EA
Traffic Signal Head, LED (5-Section)	EA

### **Section 703. Pedestrian Signal Head**

**703.01 Description.** This item shall consist of furnishing and installing 300 mm (12") diameter Traffic Signal Heads and components based on Light Emitting Diode (LED) technology according to these specifications as well as **SECTION 707, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer/City Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

**703.02 Materials.** The LED modules shall be suitable for span wire and mast arm mounted signals. Units must meet the following specifications to be accepted.

**(a) Physical and Mechanical.** LED pedestrian signal modules designed shall not require special tools for installation. Retrofit replacement LED signal modules shall fit into existing pedestrian signal housings built to the VTCSH Standard without modification to the housing. Installation of a retrofit replacement LED signal module into an existing signal housing shall only require the removal of the existing optical unit components, i.e., lens, lamp, and gaskets; shall be weather tight and fit securely in the housing; and shall connect directly to existing electrical wiring utilizing spade connectors. It shall not be necessary to remove reflector or lamp module. Reflector and lamp module is not required where new housings are provided.

**(b) Optical Requirements.** The modules shall be measured per ITE specifications, and are required to meet luminous values that are a minimum of 115 percent greater than the required minimum values in the specifications at the time of production. The YELLOW modules shall be tested for luminous output at 25°C., allowing the modules to achieve thermal equilibrium for 60 minutes, while the modules are energized at nominal operating voltage, at

a 8.3% (or 1/12) duty cycle or 5 sec on/55 sec off). The yellow modules shall meet all other ITE specifications.

(c) **Optical Units.** LED signal modules shall meet the following requirements:

- 1) **Optical unit replacement.** The LED module shall be constructed to allow the replacement of the outer lens and/or the light engine when needed.
- 2) **Lens Surface.** The external lens shall be smooth on the outside to prevent excessive dirt/dust buildup.
- 3) **Chromaticity.** The measured coordinates of LED signal modules shall conform to the chromaticity requirements of Section 8.04 and Figure 1 of the VTCSH standard.
- 4) **Environment.** The LED signal module shall be rated for use in the ambient operating temperature range, measured at the exposed rear of the module, of -40° C (-40° F) to +74° C (+165° F). The LED sign module shall be protected against dust and moisture intrusion per the requirements of NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for Type 4 enclosures to protect all internal LED, electronic, and electrical components. The LED signal module lens shall be UV Stabilized.
- 5) **Pre assembly.** The LED signal module shall be a single, self-contained device, not requiring on-site assembly for installation into an existing pedestrian signal housing. The power supply for the LED signal module may be either integral or packaged as a separate module. The power supply may be designed to fit and mount inside the pedestrian signal housing adjacent to the LED signal module. The assembly and manufacturing process for the LED signal assembly shall be designed to assure all internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.
- 6) **LED Drive Circuitry (parallel).** The individual LED light sources shall be wired so that a catastrophic failure of one LED light source will result in the loss of only that one LED light source, and the loss of no more than 1% of the total LED'S within the LED signal module.
- 7) **Material Composition.** Materials used for the lens and signal module construction shall conform to ASTM specification for the materials where applicable. Enclosures containing either the power supply or electronic components of the signal modules shall be made of UL94VO flame retardant materials. The lens of the signal module is excluded from this requirement.
- 8) **Identification Markings.** Each individual LED signal module shall be identified for warranty purposes. Each LED signal module shall be identified on the backside with the manufacturer's name and serial number. The following operating characteristics shall be identified: nominal operating voltage, power consumption, and Volt-Ampere. Modules shall have a prominent and permanent vertical indexing indicator, i.e. UP ARROW or the word UP or TOP, for correct indexing and orientation inside a signal housing. Modules conforming to this specification may have the following

statement: “Manufactured in Conformance with the Interim Purchase Specification of the ITE for LED vehicle Pedestrian signal Modules” on an attached label.

**(d) Manufacturer’s Warranty.** The standard contract warranty shall apply with time extensions applied to materials. The contractor shall provide a written manufacturer’s guarantee to the City. Warranty shall provide the following stipulations:

- Isolated Failures Warranty Period not less than 7 Years
- Design Failure Warranty Period not less than 5 Years

Warranty for isolated lens failure shall include replacement LED module at no cost for materials and shipping for a period of 7 years from the date the intersection is considered substantially complete by the engineer. An LED module shall be considered failed when the luminosity drops below the ITE requirements listed above.

A product “Design Failure” is considered to have occurred if, within a period of 5 years or less, a total of ten percent (10%) of the LED modules supplied on a particular Job are considered failed as described above. The supplier shall then “recall” the entire shipment at no cost to the agency maintaining the equipment. This shall include labor and equipment necessary to replace the units.

**703.03 Construction Requirements.** Construction shall be in accordance with the AHTD Standard Specifications. No distinction is made for span-wire installations, post mount, mast arm mount, or other mounting methods as described on the plan sheet(s).

**703.04 Method of Measurement.** LED Pedestrian Signal Heads will be measured by the unit. One unit shall include one complete signal assembly; pedestrian actuated push button detectors and signs; and all wiring except signal cable necessary to provide a complete functioning unit.

**703.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each LED Pedestrian Signal Head, which price shall be full compensation for furnishing and installing all materials and signs; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Pedestrian Signal Head w/ Push Button, LED	EA

## **Section 704. Countdown Pedestrian Signal Head**

**704.01 Description.** This item shall consist of furnishing and installing Countdown Pedestrian Signal Heads and components based on Light Emitting Diode (LED) technology according to these specifications as well as **SECTION 707 , Standard Specifications for**

**Highway Construction, Arkansas State Highway and Transportation Department of the latest edition.** Subject to approval of the Engineer/City Engineer. The basic configuration consists of the “filled”, symbolic single section design. Portions of the AHTD Standard Specifications will be superseded by these provisions.

**704.02 Materials.** The LED modules shall be suitable for span wire and mast arm mounted signals. Units must meet the following specifications to be accepted.

**(a) Physical and Mechanical.** LED pedestrian signal modules designed shall not require special tools for installation. Retrofit replacement LED signal modules shall fit into existing pedestrian signal housings built to the VTCSH Standard without modification to the housing. Installation of a retrofit replacement LED signal module into an existing signal housing shall only require the removal of the existing optical unit components, i.e., lens, lamp, and gaskets; shall be weather tight and fit securely in the housing; and shall connect directly to existing electrical wiring utilizing spade connectors. It shall not be necessary to remove reflector or lamp module. Reflector and lamp module is not required where new housings are provided.

The countdown feature will be displayed only during the flashing “Don’t Walk” segment of the pedestrian phase. This feature should be able to restart at the correct part of the signal cycle after a power outage or a signal pre-emption has been activated.

**(b) Optical Requirements.** The modules shall be measured per ITE specifications, and are required to meet luminous values that are a minimum of 115 percent greater than the required minimum values in the specifications at the time of production. The YELLOW modules shall be tested for luminous output at 25°C, allowing the modules to achieve thermal equilibrium for 60 minutes, while the modules are energized at nominal operating voltage, at a 8.3% (or 1/12) duty cycle or 5 sec on/55 sec off). The yellow modules shall meet all other ITE specifications.

**(c) Optical Unit.** LED signal modules shall meet the following requirements:

**Optical unit replacement --** The LED module shall be constructed to allow the replacement of the outer lens and/or the light engine when needed.

**Lens Surface –** The external lens shall be smooth on the outside to prevent excessive dirt/dust buildup.

**Chromaticity –** The measured coordinates of LED signal modules shall conform to the chromaticity requirements of Section 8.04 and Figure 1 of the VTCSH standard.

**Environment --** The LED signal module shall be rated for use in the ambient operating temperature range, measured at the exposed rear of the module, of -40° C (-40° F) to +74°C (+165° F). The LED sign module shall be protected against dust and moisture intrusion per the requirements of NEMA Standard 250-1991, sections 4.7.2.1 and 4.7.3.2, for Type 4 enclosures to protect all internal LED, electronic, and electrical components. The LED signal module lens shall be UV Stabilized.

**Pre assembly --** The LED signal module shall be a single, self-contained device, not requiring on-site assembly for installation into an existing pedestrian signal housing. The

power supply for the LED signal module may be either integral or packaged as a separate module. The power supply may be designed to fit and mount inside the pedestrian signal housing adjacent to the LED signal module. The assembly and manufacturing process for the LED signal assembly shall be designed to assure all internal LED and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

**LED Drive Circuitry (parallel)** – The individual LED light sources shall be wired so that a catastrophic failure of one LED light source will result in the loss of only that one LED light source, and the loss of no more than 1% of the total LED’S within the LED signal module.

**Material Composition** -- Materials used for the lens and signal module construction shall conform to ASTM specification for the materials where applicable. Enclosures containing either the power supply or electronic components of the signal modules shall be made of UL94VO flame retardant materials. The lens of the signal module is excluded from this requirement.

**Identification Markings** -- Each individual LED signal module shall be identified for warranty purposes. Each LED signal module shall be identified on the backside with the manufacturer’s name and serial number. The following operating characteristics shall be identified: nominal operating voltage, power consumption, and Volt-Ampere. Modules shall have a prominent and permanent vertical indexing indicator, i.e. UP ARROW or the word UP or TOP, for correct indexing and orientation inside a signal housing. Modules conforming to this specification may have the following statement: “Manufactured in Conformance with the Interim Purchase Specification of the ITE for LED vehicle Pedestrian signal Modules” on an attached label.

**(d) Manufacturer’s Warranty.** The standard contract warranty shall apply with time extensions applied to materials. The contractor shall provide a written manufacturer’s guarantee to the Agency (City, County or etc.) who provides electrical service and maintenance of the intersection. Warranty shall provide the following stipulations:

- Isolated Failures Warranty Period not less than 7 Years
- Design Failure Warranty Period not less than 5 Years

Warranty for isolated lens failure shall include replacement LED module at no cost for materials and shipping for a period of 7 years from the date the intersection is considered substantially complete by the engineer. An LED module shall be considered failed when the luminosity drops below the ITE requirements listed above.

A product “Design Failure” is considered to have occurred if, within a period of 5 years or less, a total of ten percent (10%) of the LED modules supplied on a particular Job are considered failed as described above. The supplier shall then “recall” the entire shipment at no cost to the agency maintaining the equipment. This shall include labor and equipment necessary to replace the units.

**704.03 Construction Requirements.** Construction shall be in accordance with the AHTD Standard Specifications. No distinction is made for span-wire installations, post mount, mast arm mount, or other mounting methods as described on the plan sheet(s).

**704.04 Method of Measurement.**

(a). **COUNTDOWN PEDESTRIAN SIGNAL HEAD, LED.** Work completed and accepted and measured as provided above will be measured by each unit.

(b) **PEDESTRIAN SIGNAL LED LENS RETROFIT (RET).** Work completed and accepted and measured as provided above will be measured by each unit.

**704.05 Basis of Payment.**

(a) **COUNTDOWN PEDESTRIAN SIGNAL HEAD, LED.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for PEDESTRIAN SIGNAL HEAD LED of the type, display and size specified, which price shall be full compensation for furnishing and installing all materials and signs; and for all labor, equipment, tools, and incidentals necessary to complete the work.

(b) **LED PEDESTRIAN SIGNAL LENS RET.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for PEDESTRIAN SIGNAL LED LENS RET of the type, number of sections, color and display specified, which price shall be full compensation for removing existing unnecessary hardware and modifying existing housing; and for furnishing and installing all materials; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Countdown Pedestrian Signal Head, LED	EA
Pedestrian Signal LED lens RET	EA

**Section 705. Traffic Signal Cable**

**705.01 Description.** This item shall consist of furnishing and installing traffic signal cable according to these specifications and at the locations shown on the plans or as directed.

**705.02 Materials.** The cable shall be #14 AWG copper with the number of conductors as shown on the plans and shall comply with the *International Municipal Signal Association Specification* 20-1 or 20-3 for 600 volt polyethylene insulated and jacketed signal cable.

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The Contractor shall furnish and install acceptable bands, ties, and other supports for the cable in poles and control boxes according to the best modern practice.

Cables shall be marked for phase identification according to the manufacturer's standards.

### **705.03 Construction Requirements.**

**(a) General.** Connections to signal heads shall be made with a polyethylene jacketed stranded wire cable. The Contractor will be allowed to make connections to the signal heads by the "line tapping" method.

Splices shall be moisture proof and have a dielectric strength at least equal to that of the original insulation. The sweating or soldering shall be accomplished by pouring, using solder hot enough to run properly. Splices shall be made according to the best modern practice and may be accomplished by methods approved by the Engineer. Splices will be allowed only at pole bases.

**705.04 Method of Measurement.** Traffic Signal Cable will not be measured and will be paid at a lump sum price.

**705.05 Basis of Payment.** Work completed and accepted as provided above will be paid for at the contract unit price bid per lump sum for Traffic Signal Cable, which price shall be full compensation for furnishing and installing all materials; making all splices and connections; and for all labor, equipment, tools, and incidentals necessary to complete the work:

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Traffic Signal Cable	LS

## **Section 706. Galvanized Steel Conduit**

**706.01 Description.** This item shall consist of furnishing and installing hot dipped galvanized steel conduit of the size and at the locations shown on the plans and according to these specifications as well as **SECTION 709, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer/City Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

**706.02 Materials.** Materials shall be in accordance with the AHTD Standard Specifications.

### **706.03 Construction Requirements.**

Construction shall be in accordance with the AHTD Standard Specifications.

**706.04 Method of Measurement.** Galvanized Steel Conduit will be measured by the linear foot (meter) measured along the axis of the conduit in its final position. It will not be considered complete until backfill and compaction have been satisfactorily performed. All necessary conduit fittings will be included as part of the conduit run and will not be measured separately.

**706.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot for Galvanized Steel Conduit of the size specified which price shall be full compensation for furnishing and installing conduit fittings, and drag rope; for jacking, drilling, excavation, backfill, compaction, removal of surplus material, and replacement of existing surfaces; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
____” Galvanized Steel Conduit	LF

## **Section 707. Non-Metallic Conduit**

**707.01 Description.** This item shall consist of furnishing and installing PVC (polyvinyl chloride) or PE (polyethylene) conduit according to these specifications as well as **SECTION 710, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer/City Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

**707.02 Materials.** Materials shall be in accordance with the AHTD Standard Specifications.

**707.03 Construction Requirements.** Construction shall be in accordance with the AHTD Standard Specifications with the following exceptions.

**(a) Depth.** The first sentence of the first paragraph of Subsection 710.03 Construction Requirements is hereby deleted and the following substituted therefore:

Conduit shall be installed in trenches or predrilled tunnels not less than 24” below final grade except where otherwise indicated on the plans or as directed by the Engineer/City Engineer.

**707.04 Method of Measurement.** Non-Metallic Conduit will be measured by the linear foot along the axis of the conduit in its final position. It will not be considered complete until backfill and compaction have been satisfactorily performed. All necessary conduit fittings will be included as part of the conduit run and will not be measured separately.

**707.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot for Non-Metallic Conduit, of the size specified, which price shall be full compensation for furnishing and installing the conduit, fittings, and drag rope; for excavation, backfill, compaction, removal of surplus material, and replacement of existing surfaces; and for all labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
____” Non-Metallic Conduit	LF

## **Section 708. Concrete Pull Box**

**708.01 Description.** This item shall consist of furnishing and installing at locations shown on the plans or as directed, a Concrete Pull Box of the type specified and according to these specifications as well as SECTION 711, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003. Subject to approval of the Engineer/City Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

**708.02 Materials.** Materials shall be in accordance with the AHTD Standard Specifications.

**Section 711** of the AHTD Standard Specification for Highway Construction, Edition of 2003, is hereby amended as follows:

**Subsection 711.02 Materials**, is hereby deleted and the following substituted therefore:

The pull boxes shall be constructed with portland cement concrete reinforced with welded wire or shall be polymer concrete reinforced with heavyweave fiberglass. No fiberglass shall be exposed. All exposed portions of the pull box shall be non-electrically conductive.

The minimum inside dimensions measured horizontally across the center of the box just below the lid support lip shall be as follows:

Concrete Pull Box -- Type 1 and 1 HD:

8 ¾" (220 mm) wide x 14 ¼" (360 mm) long

Concrete Pull Box -- Type 2 and 2 HD:

11" (280 mm) wide x 21" (530 mm) long

Concrete Pull Box -- Type 3 and 3 HD:

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15 ¼" (385 mm) wide x 28" (710 mm) long

The depth measured from the top of the lid shall be a minimum of 11 ½" (290 mm).

A non-metal electrically insulated cover shall be provided for each pull box. The covers shall have a skid resistant surface on top and a lifting eye.

The pull box and cover shall be constructed in such a manner that the assembly will support light vehicular traffic. The cover with pull box shall meet or exceed the following test loading:

Type	Load		Load Area	
	pounds	kg	Sq. inch	sq mm
1	3800	1720	10 (3.16" x 3.16")	6400 (80 mm square)
1 HD	7500	3400	10	6400
2	3800	1720	20 (4" x 5")	13,000 (100 mm x 130 mm)
2 HD	7500	3400	20	13,000
3	3800	1720	20	13,000
3 HD	7500	3400	20	13,000

Pull box with cover in place shall comply with the National Electric Code for exposed boxes rated at voltages up to 480 VAC.

All Type HD concrete pull boxes are to be installed as shown on the plans with a surrounding apron of concrete 12" (305 mm) wide and 6" (152 mm) in depth. The concrete shall comply with subsection 601, "Cast-in-Place Concrete" of these Standard Specifications for Class S Concrete. Acceptance testing shall be as specified elsewhere within these Standard Specifications. Reinforcing steel shall comply with subsection 602, "Reinforcing Steel" of these Standard Specifications for the size and grade shown in the plans and shall be placed as shown in the plans and in conformance with Subsection 602.

Pull boxes located within AHTD right-of-ways shall be permanently labeled with "AHTD", the manufacturer's name and model identifier. The permanent label "AHTD" shall be placed on the outside of the pull box lid.

Pull boxes located within the Owner’s right-of-ways shall be permanently labeled with “City of Springdale”, the manufacturer’s name and model identifier. The permanent label “City of Springdale” shall be placed on the outside of the pull box lid.

**708.03 Construction Requirements.** Construction shall be in accordance with the AHTD Standard Specifications.

**708.04 Method of Measurement.** Concrete Pull Boxes, in place with lids, will be measured by the unit.

**708.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Concrete Pull Box of the type specified, which price shall be full compensation for furnishing and installing the pull box; for excavation, backfill, compaction, removal of surplus materials and replacement of the existing surface; for furnishing and placing the bedding material; for furnishing and placing reinforcing steel and concrete for the HD pull box aprons; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Pull Box (Type ___ )	EA

## **Section 709. Traffic Signal Mast Arm with Pole and Foundation**

**709.01 Description.** This item shall consist of furnishing and erecting steel traffic signal mast arms and poles with foundations according to these specifications as well as **SECTION 714, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer/City Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

**709.02 Materials.** Materials shall be in accordance with the AHTD Standard Specifications with the following exceptions:

**a) Poles and Mast arms.** Paragraph (a) of subsection 714.02 is hereby deleted and the following substituted therefore:

(a) Poles and mast arms shall be ASTM A 1011, SS, Grade 50 (345), AASHTO M 270, Grade 50 (345), ASTM A 595 Grade A, or ASTM A 572 Grade 50 or Grade 65. Galvanizing shall comply with AASHTO M 111, Thickness Grade 100.

**(b) Ground Rods.** The first sentence of the first paragraph of Subsection 714.02 Materials (j) Ground Rods is hereby deleted and the following substituted therefore:

Ground rods shall be 3/4" x 10' or larger with cad welded ground wire.

**709.03 Construction Requirements.** Construction shall be in accordance with the AHTD Standard Specifications and as follows:

**a) Structural Design.** Structural design must be certified by a registered engineer representing the manufacturer:

(1) that the design complies with the plans and specifications and

(2) that the design meets or exceeds the standards found in the 1994 Edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals”, and interims, for the specific site conditions and as follows:

(a) Minimum wind load requirements shall be 90 MPH wind zone.

**709.04 Method of Measurement.** Traffic Signal Mast Arm and Pole with Foundation will be measured by the unit.

**709.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Traffic Signal Mast Arm and Pole With Foundation of the arm length specified, which price shall be full compensation for furnishing and installing the pole and arm; for excavation, backfill, compaction, and removal of surplus material; for furnishing and placing reinforcing steel and concrete; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
___' Traffic Signal Mast Arm and Pole With Foundation	EA

## **Section 710. Traffic Signal Pedestrian Pole with Foundation**

**710.01 Description.** This item shall consist of furnishing and erecting steel traffic signal mast arms and poles with foundations according to these specifications as well as **SECTION 715, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer/City Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

**710.02 Materials.** Materials shall be in accordance with the AHTD Standard Specifications with the following exceptions:

**(a) Ground Rods.** The first sentence of the first paragraph of Subsection 715.02 Materials (g) Ground Rods is hereby deleted and the following substituted therefore:

Ground rods shall be 3/4" x 10' or larger with cad welded ground wire.

**710.03 Construction Requirements.** Construction shall be in accordance with the AHTD Standard Specifications and as follows:

**a) Structural Design.** Structural design must be certified by a registered engineer representing the manufacturer:

(1) that the design complies with the plans and specifications and

(2) that the design meets or exceeds the standards found in the 1994 Edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals”, and interims, for the specific site conditions and as follows:

(a) Minimum wind load requirements shall be 90 MPH wind zone.

**710.04 Method of Measurement.** Traffic Signal Pedestal Poles with Foundation will be measured by the unit.

**710.05 Basis of Payment.** Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per each for Traffic Signal Pedestal Pole With Foundation, which price shall be full compensation for furnishing and installing the pole; for excavation, backfill, compaction, and removal of surplus material; for furnishing and placing reinforcing steel and concrete; and for all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Traffic Signal Pedestal Pole With Foundation	EA

## **Section 711. Traffic Signal Equipment Performance Test**

**711.01 Description.** This item shall consist of providing a 6 month guarantee and proving the soundness of all traffic signal equipment and related electrical components installed at each location according to these specifications and at locations shown on the plans or as directed.

The Contractor shall conduct a performance test, which shall consist of a continuous 30 day period of operation without a major malfunction. A major malfunction is considered to be any occurrence, other than a power failure beyond the Contractor’s control, that renders the installation inoperative either momentarily or for a longer period. Lamp burnouts are not

considered a major malfunction unless 2 or more bulbs in the same socket burn out within a 30 day period.

The contractor shall obtain and assign to the City transferable manufacturer's warranties or guarantees on all electrical and mechanical equipment, consistent with those provided as customary practice. The Contractor shall guarantee satisfactory in-service operation of the mechanical and electrical equipment and related components for a period of 6 months following completion of the 30 day performance test, at no cost to the City.

Defective equipment or accessories shall be repaired or replaced according to applicable specifications and to the satisfaction of the Engineer, within a reasonable period of time during the 30 day performance test and the 6 month guarantee period. Any equipment repaired or replaced within the 30 day performance test or the 6 month guarantee period shall have a 6 month guarantee period from the date that the equipment is repaired or replaced.

**711.04 Method of Measurement.** Work completed and accepted under this item will not be measured and paid for directly but will be considered a part of the traffic signal equipment involved at each installation.

## **Section 712. Video Detector with Radio Interface**

**712.01 Description.** This item shall consist of furnishing and installing a Video Detector, Video Processor, Cable, Video Monitor, Radio Interface and other hardware and software in accordance with these specifications as well as **SECTION 733, Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003.** Subject to approval of the Engineer/City Engineer. Portions of the AHTD Standard Specifications will be superseded by these provisions.

The Contractor shall pretest all electronic equipment at the Springdale Public Works Signalization Division Offices before installing any such electronic equipment.

**712.02 Materials.** Materials shall be in accordance with the AHTD Standard Specifications and as supplemented or modified as follows:

**Section 733** of the Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003, is hereby amended as follows:

**Subsection 733.02 Materials** is hereby amended by adding the following:

(i) **Video Processor, Edge Card** -- Unit shall insert into a standard NEMA Vehicle Detector Rack taking the position of **two-two channel rack mount vehicle loop detector card**. Unit shall output to the standard vehicle channels with the provision to add extender cards for additional detector channels. Units shall be available for one or two video detector (camera) inputs.

**(j) Video Edge Card Extender** -- Unit shall insert into a standard NEMA Vehicle Detector Rack taking the position of **one-two channel rack mount vehicle loop detector card**. Unit shall output to standard vehicle channels utilizing output channels from Video Processor Edge Card.

**(k) Vehicle Detector Rack** – Unit consists of a standard NEMA TS2 Type 2 card rack unit with power supply, of the number of channels specified. Unit shall be configured with two (2) channels occupying one card slot of the rack. Unit shall be wired to be suitable for use with two (2) or four (4) channel card rack loop detectors, edge card video detectors, or video edge card extenders.

**(l) Multi Port Edge Card Switch** – In lieu of providing a multi channel processor, contractor may utilize Video Processor, Edge Card with Extender Cards mounted in a Vehicle Detector Rack. When two or more Edge Cards are utilized, in order to achieve full functionality, the control and display of the Edge cards shall be combined into a single point switch allowing dial up, direct connect, and programming of the individual Edge Cards through a single unit.

**(m) Video Detector Alignment Unit** – One programming module per job, for Zoom and focus of camera, shall be provided for alignment and setup of Detector. The module shall be given to the local government upon completion of the installation. The price for this unit shall be considered included in other items of the contract.

### **712.03 Construction Requirements.**

**(a) General.** Construction shall be in accordance with the AHTD Standard Specifications.

**(b) Pretesting.** The Contractor shall pretest all electronic equipment at the Springdale Public Works Signalization Division Offices before installing any such electronic equipment. The Contractor shall arrange the pretesting through the Engineer/City Engineer. Unless approved otherwise by the Owner, the pretesting shall include a minimum of seven (7) consecutive days of test operation. No separate payment shall be made for any and all pretesting but such pretesting shall be considered subsidiary to the applicable equipment.

**(c) Subsection 733.03 Construction Requirements (C)** is hereby deleted and the following substituted:

**Software** -- Software required for monitoring, setup and programming of the system shall be supplied as subsidiary to this special provision for the item “Video Processor” or “Video Processor, Edge Card”, of the number of channels specified. Two licensed copies shall be required for the job. Software shall be windows based and operate from an IBM compatible, laptop with Intel Pentium II processor and Windows 98 or later operating system. If other programming device is required, one unit shall be supplied and it shall be considered subsidiary to this special provision.

**712.04 Method of Measurement.** Work completed and accepted under this item will be measured as follows:

- (a) Video Detector shall be measured by the unit.
- (b) Video Detector-RX shall be measured by the unit.
- (c) Video Detector Relocation shall be measured by the unit.
- (d) Video Radio Receiver of the number channels specified, shall be measured by the unit.
- (e) Video Processor, of the number of channels specified, shall be measured by the unit.
- (f) Video cable shall be measured by the lump sum.
- (g) Video monitor of the type specified will be measured by the unit.
- (h) Remote Video Site Modification shall be measured by the unit.
- (i) Video Processor, Edge Card of the number of inputs specified shall be measured by the unit.
- (j) Video Edge Card Extender shall be measured by the unit.
- (k) Vehicle Detector Rack of the number channels specified shall be measured by the unit.
- (l) Multi Port Edge Card switch is included in other items of the contract.

**712.05 Basis of Payment.**

**(a) Video Detector.** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each Video Detector; which price shall be full compensation for providing and installing the device, wiring and testing, aligning the zones; and shall also be for all labor, equipment, tools and incidentals necessary to complete the work.

**(b) Video Detector-RX.** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each for Video Detector-RX; which price shall be full compensation for providing and installing the device, brackets and extensions, wiring; for programming and testing the device; for furnishing and installing cabinet for separate radio transmitter unit installations; for furnishing and installing the antenna, antenna cable, wire and all necessary wiring; and for all labor, equipment, tools and incidentals necessary to complete the work.

**(c) Video Detector Relocation.** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each Video Detector Relocation; which price shall be full compensation for removing the device from present site, installing the device at the new location, and for furnishing and installing brackets and extensions, wiring and testing, and for all labor, equipment, tools, and incidentals necessary to complete the work.

**(d) Video Radio Receiver.** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each for Video Radio Receiver of the number of channels specified; which price shall be full compensation for providing and installing the device, brackets and extensions, wiring and testing the device; and for furnishing and installing the antenna, antenna cable, wire and all necessary wiring; and for all labor, equipment, tools and incidentals necessary to complete the work.

**(e) Video Processor.** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each Video Processor of the number channels specified; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; furnishing and installing wiring and wiring harness from the video processor unit to the traffic signal controller; and for all labor, equipment, tool and incidentals necessary to complete the work.

**(f) Video Cable.** Work completed and accepted under this item will not be measured and shall be paid for at the contract price bid per lump sum for Video Cable; which price shall be full compensation for providing and installing all cable, including video, power supply and data cable from the Video Processor to the Video Detector and shall include all labor, equipment, tools and incidentals necessary to complete the work.

**(g) Video Monitor.** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid per each for Video Monitor of the type specified; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; and for all labor, equipment, tools and incidentals necessary to complete the work.

**(h) Remote Video Site Modification.** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price bid for Remote Video Site Modification; which price shall be full compensation for removing all unnecessary equipment; modifying existing cabinet, wiring and conduit as needed; and for providing and installing any incidental devices, suppressors, brackets and wiring; and for programming and testing the device.

**(i) Video Processor, Edge Card --** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price for Video Processor, Edge Card of the number inputs specified; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; and shall also be for all labor, equipment, tools and incidentals necessary to complete the work.

**(j) Video Edge Card Extender --** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price for Video Edge Card Extender; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; and shall also be for all labor, equipment, tools and incidentals necessary to complete the work.

**(k) Vehicle Detector Rack –** Work completed and accepted under this item and measured as provided above, shall be paid for at the contract unit price for Vehicle Detector Rack of the

number channels specified; which price shall be full compensation for providing and installing the device, wiring, configuring, and testing the device; and shall also be for all labor, equipment, tools and incidentals necessary to complete the work. Controller cabinet modifications, and removal of equipment inside the cabinet, and other work necessary for installation of the device shall be considered included in the price of this item.

**(l) Multi Port Edge Card Switch** – Work completed and accepted under this item will not be paid separately, but shall be included in the cost of other items of the contract where two or more Video Processors, Edge Card are utilized in the cabinet.

**(m) Video Detector Alignment Unit** — Work completed and accepted under this item will not be paid separately, but shall be included in the cost of other items of the contract.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Video Detector	EA
Video Detector-RX	EA
Video Detector Relocation	EA
Video Radio Receiver (__ Channel)	EA
Video Processor (__ Channel)	EA
Video Cable	LS
Video Monitor (clr)	EA
Video Monitor (B/W)	EA
Remote Video Site Modification	EA
Video Processor, Edge Card ( 2 Camera)	EA
Video Edge Card Extender	EA
Vehicle Detector Rack (16 channel)	EA

## **Section 713. Radio Communication System**

**713.01 Description.** Radio Communication System shall be provided and installed by the Springdale Signalization Department.

**713.02 Materials.**

**713.03 Construction Requirements.**

**(a) General.** Contractor shall coordinate installation of the signal with the Springdale Signalization Department.

**713.04 Method of Measurement.** Work required for coordination of this item will not be measured and will be considered incidental to the other items.

## **Section 714. Electrical Conductors in Conduit**

**714.01 Description.** This item consists of furnishing and installing electrical conductors from point to point as indicated on the plan sheets.

**714.02 Materials.** The electrical conductors shall consist of cables of the gauge and number of conductors specified on the plan sheets, and shall be USE rated (single conductor) or UF rated, suitable for underground duct installation in wet or dry locations. Electrical conductors shall be solid or stranded copper unless otherwise approved by the Engineer/City Engineer.

Where specified "Equipment Ground Conductor" (EGC), conductor shall be a copper safety ground of either bare copper or green insulated of the size and quantity shown.

### **714.03 Construction Requirements.**

**(a) General.** Splices are allowed at pole bases or as approved by the Engineer. Unless waterproof quick disconnects are used, Splicing methods considered acceptable are: Soldered, compression connectors of proper size employing cyclic crimping devices, terminal strips, or other method approved by the Engineer. Splices on terminal strips shall utilize proper spade lugs. All splices shall be waterproof. When taping is required, the wire shall be covered with six (6) layers of plastic electrical tape and sealed with "Scotch-Coat" or other similar electrical sealing material. Where wire nuts are used, soldering, taping and sealing is still required. Electrical insulating putty may be used to round off sharp corners of wire or connectors before applying tape. Slack cable (3 ft. min.) shall remain at each splice location.

**714.04 Method of Measurement.** The work required by this item will be paid for at the lump sum price for "Electrical Conductors-In-Conduit".

**714.05 Basis of Payment.** Work completed and accepted as provided above will be paid for at the contract unit price bid per lump sum for Electrical Conductors-In-Conduit, which price shall be full compensation for furnishing materials, splicing and connections and for all tools, equipment, labor, and incidentals necessary to complete the work.

Payment will be made under:

<u><b>Pay Item</b></u>	<u><b>Pay Unit</b></u>
Electrical Conductors-In-Conduit	LS

## **Section 715. Luminaire Assemblies for Traffic Signals**

**715.01 Description.** This work shall consist of furnishing and installing luminaire assemblies on traffic signal poles, including the accessories, in accordance with these specifications and at the locations shown on the plans or as directed. Arms for luminaire

assemblies at traffic signals shall be subsidiary to subsection 709, "Traffic Signal Mast Arm with Pole and Foundation".

Unless indicated otherwise a minimum of two (2) luminaire assemblies shall be provided at each intersection.

### **715.02 Materials and Construction Requirements.**

**(a) Luminaire.** Each luminaire assembly shall consist of a "Cobra Head", power door style; "Cutoff" type flat glass refractor, 250-watt high-pressure sodium lamp with 27,500 lumens, and optics to produce a Medium Cutoff Type-III light distribution. As a minimum, 40% of Light Flux values shall be maintained on the Downward Street Side; with greater than 0.002 foot-candles per 1000 lamp lumens at a point of " 1 x 4 " mounting heights on the downward street side.

The luminaries shall be all aluminum die cast hinged construction with an "Alzak" aluminum reflector, single element refractor or sealed optical system design for tilted or level operation. Each luminaire assembly shall have a photocell and receptacle in top of the luminaire housing near the center and shall meet the requirements of the local utility company.

All luminaries shall contain built-in ballasts with power door assembly, and be of an approved streamlined design. Ballasts shall be of the auto regulated, 10 KV BIL type, multi-tap wired for line voltage as indicated on the plan sheets (plus or minus 10% line voltage, variation), 60-cycle, single phase, multiple circuit operation, with high power factor (90% or higher). The ballast shall be suitable for the proper operation of one 250-watt high pressure sodium lamp with a minimum open circuit voltage as specified on the plan sheets, and shall be an easily replaceable part of the luminaire assembly.

Luminaire assemblies (with accessories) shall be supplied in one style or model number from one manufacturer only. The contractor shall submit manufacturer's brochures with illustration and data to the Engineer/City Engineer for approval of luminaries, accessories and installation details.

**(b) Photo Cell.** Each luminaire assembly shall have a photocell and receptacle in the top of the luminaire housing. Photocell shall be Fisher-Pierce Model #7790-B (105-285 VAC) or as approved. Photocell shall operate at the same voltage rating as the luminaire ballast.

**715.03 Method of Measurement.** Completed and accepted Luminaire Assembly will be measured by the unit. Arms for luminaries at traffic signals shall be not measured for separate payment but shall be subsidiary to subsection 709, "Traffic Signal Mast Arm with Pole and Foundation".

**715.04 Basis of Payment.** Work completed and accepted under this item and measured as provided above shall be paid for at the contract unit price bid for each Luminaire

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Assembly, which price shall be full compensation for furnishing and installing the luminaries, lamps of the type described herein, ballast, photocell, and all materials, equipment, tools, labor and incidentals necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Luminaire Assembly	Each

### **Section 716. Electrical Conductors for Luminaires**

**716.01 Description.** This item shall consist of furnishing and installing electrical conductors as noted on the plans. This shall include conductors from the luminaire service point to the luminaire disconnect point and from the luminaire disconnect point to luminaires mounted on the traffic signal poles. Circuit breakers and weatherproof breaker boxes are considered subsidiary to "Electrical Conductors for Luminaires" and shall be provided and installed by the Contractor at the luminaire disconnect point.

#### **716.02 Materials**

The electrical conductors shall consist of two conductor cables (#12 AWG). Electrical conductors shall be stranded or solid copper UF rated 600 volt, suitable for underground duct installation in wet or dry locations. Electrical conductors shall comply with ASTM Specification B3. The insulation and sheath shall comply with ASTM Specifications D754 and D752. Circuit breakers shall be rated at 20 amps.

#### **716.03 Construction Requirements.**

The Contractor shall furnish and install a luminaire disconnect (20 amp circuit breaker assembly and weatherproof box) at the location designated on the plans that meets the requirements of the local utility company. The Contractor shall connect the circuit breaker assembly to the line side of the service point supplying the controller. Conductors for luminaires shall run directly from load side of luminaire disconnect to luminaires mounted on signal poles. Disconnect or trip of luminaire disconnect shall not effect power to controller. Luminaire disconnect shall be clearly labeled as "Street Light" circuit.

Splices are allowed at pole bases or as approved by the Engineer. Splicing methods considered acceptable are: Soldered, compression connectors of proper size employing cyclic crimping devices, terminal strips, or other method approved by the Engineer. Splices on terminal strips shall utilize proper spade lugs. All splices shall be waterproof. When taping is required, the wire shall be covered with six (6) layers of plastic electrical tape and sealed with "Scotch-Coat" or other similar electrical sealing material. Where wire nuts are used, soldering, taping and sealing is still required. Electrical insulating putty may be used to round off sharp corners of wire or connectors before applying tape. Slack cable of 0.7 meters

(2 ft. min.) shall remain at each splice location or at end of luminaire arm when luminaire is not to be installed by contractor. Final connection of power from the local utility to the service point will be made by others.

**716.04 Method of Measurement**

Electrical Conductors for Luminaires will be measured by the linear foot. Multiple conductors shall be measured together, not measured singularly.

**716.05 Basis for Payment.**

Work completed and accepted and measured as provided above will be paid for at the contract unit price bid per linear foot for Electrical Conductors for Luminaires of the type and size called for on the plans, which price shall be full compensation for furnishing materials, splicing and connections and for all tools, equipment, labor, and incidentals necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
Electrical Conductors for Luminaires	Linear Foot

**Section 717. Roadway Illumination Pole**

**717.01 Description**

This item shall consist of furnishing all materials, constructing and erecting same to insure a properly operating roadway lighting system in accordance with the plans and specifications.

**717.02 Materials**

Pole and arm may be of either steel or aluminum. Pole may be either round tapered, multisided tapered, square tapered, or as required by the Plans.

Pole and hardware, unless superseded by special provision, shall meet the minimum requirements under the Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003

Section 714 "Traffic Signal Mast Arm and Pole with Foundation" of the AHTD Standard Specifications shall apply to all units of steel design as well as hardware and foundation requirements for units of other material.

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Section 721 "Overhead, Bridge Mount, and Cantilever Sign Structure" of the AHTD Standard Specifications shall apply to poles and mast arms for units of aluminum design.

Aluminum alloy surfaces contacting concrete foundations and steel surfaces shall be coated with or bedded in, an aluminum caulking compound such as alumilastic or other suitable material approved by the Engineer/City Engineer.

### **717.03 Construction Requirements.**

(a) **Structural Design.** Structural design must be certified by a registered engineer representing the manufacturer to conform to the 1994 Edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals”, and interims, for the specific site conditions and as follows:

Minimum wind load requirements shall be 90 MPH wind zone with a 1.3 Gust Factor. The minimum diameter of the lower end of the shaft shall not be less than 8.0 inches with taper to a diameter of at least 3.4 inches at the top. Poles may be two-piece, slip-fitted of adequate design.

**Nut Covers** - - required for "shoe base" only.

**Hand Hole**, Size(Inside Dim.)- - 4in. wdt.x 6in. ht.

**Anchor Bolts.** Anchor bolts shall be of sufficient size and strength, and meet the requirements of Section 714 of the Standard Specifications for Highway Construction, Arkansas State Highway and Transportation Department, Edition of 2003

(b) **Transformer Base.** Where designated in the Unit Items as "T-Base", a breakaway transformer base shall be furnished and installed as per manufacturer's recommendation. Transformer base shall be permanent mold casting of Aluminum Alloy 356-T6 or equal as specified by the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Bases shall be a minimum of 16 inches high and basically square in cross section. The dimensions shall be approximately those dimensions shown on the plans. Any change in dimension, approved by the Engineer/City Engineer, shall not lessen the design load strength of the base.

A detail sheet illustrating the proper installation of the transformer base shall be supplied to the Engineer/City Engineer.

A written certification shall be supplied to the Department that the transformer base meets the minimum requirements for AASHTO 1994 breakaway specifications.

Poles not requiring T-Base shall be designated in the unit items as "Shoe Base".

(c) **Luminaire Wind Loading.** Design shall support the maximum luminaire properties for the pole type specified for attachment of the following luminaire(s):

**Cobra Head (where required)**

Luminaire Arm - All arms must be single member (no truss) and tapered if greater than 10 ft.  
 Length - - - - variable (see plan sheet)  
 Taper, arms 10 ft. or less - - - - optional  
 Taper, arms greater than 10 ft. - 0.14 in./ft.  
 Slip fit for luminaire - - 2 in. OD.  
 Upsweep angle, minimum - - 3°  
 Material - - - - same as pole shaft

Luminaire  
 Effective area - - 1.35 sq. ft.  
 Weight - - - - - 51 lb.

**Interstate (where required)**

Luminaire Arm -- NONE  
 Luminaire  
 Effective area - 2.30 sq.ft.  
 Weight - - - - - 53 lb.

**SHOEBOX (where required)**

Luminaire Arm -- NONE  
 Effective area - 2.44 sq. ft.  
 Weight - - - - - 58 lb.  
 Weight offset - - - 11 inches

**(d). Luminaire.** Luminaire shall be of the High Pressure Sodium Design (HPS) meeting the following requirements:

**1. Cobra Head Luminaire.** Each unit designated as "Cobra Head" in the unit item table shall include a luminaire assembly of the Cobra Head style of the wattage specified. The luminaire(s) shall be all-aluminum die cast hinged construction with an Alzak reflector, single element refractor of sealed optical system designed for tilted or level operation. Unit shall meet the photometric requirements of the Illumination Engineering Society (IES): Type III Medium Cutoff (M-C-III) unless otherwise designated on the plans.

**2. Interstate Luminaire.** Each unit designated as "Interstate" in the unit item table shall include a luminaire assembly of the "Interstate " style of the wattage specified. The luminaire(s) shall be all-aluminum die cast hinged construction with an Alzak reflector, single element Refractor of sealed optical system. Unit shall meet the photometric requirements of the Illumination Engineering Society (IES): Type II Medium Non-cutoff (M-N-II) or as designated on the plans, and be designed for use in a 45 degree tilt position.

Bracket assembly for interstate luminaire shall consist of an adjustable slip-fitter accommodating pipe tendons of 2-3/8" to 3" outside diameter. The assembly shall provide for 360 degree horizontal adjustment and 30 to 50 degree below level vertical adjustment of

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luminaire. The bracket shall be equipped with external leveling nuts for horizontal and vertical leveling. A pipe tendon shall be used to connect the luminaire bracket to the pole.

**3. Shoe Box Luminaire.** Each unit designated as "Shoe Box" in the unit item table shall include a luminaire assembly of the Shoe Box style of the wattage specified.

The luminaire(s) shall be all-aluminum die cast hinged construction with an Alzak reflector, single element refractor of sealed optical system designed for tilted or level operation. Unit shall meet the photometric requirements of the Illumination Engineering Society (IES): Type II Medium Cutoff (M-C-II) unless otherwise designated on the plans.

Bracket assembly for shoe box luminaire shall consist of an adjustable slip-fitter accommodating pipe tendons of 2-3/8" to 3" outside diameter.

**4. Lamp.** Luminaire shall include a clear lamp of the specified wattage. Where specified to be 250 watt high pressure sodium (250 HPS) shall provide not less than 27,500 lumens.

**5. Photo Cell.** Each luminaire assembly shall have a photo cell and receptacle in the top of the luminaire housing. Photo cell shall be Fisher-Pierce Model #7790-B (105-285 VAC) or as approved. Photo cell shall operate at the same voltage rating as the luminaire ballast.

**6. Ballasts.** All luminaires shall contain built-in ballast and be of an approved streamlined design. Ballasts shall be of the constant wattage (regulated output) type for 60-cycle electrical service of the voltage as specified on the plans (plus or minus 13% input range), multi-tap circuit operation, with high power factor (95% or higher) and shall start lamps at temperature of -20 degrees Fahrenheit. Ballasts shall have a minimum 10 kV BIL rating. Ballasts shall be easily replaceable part of the luminaire assembly.

Each luminaire type (with accessories) shall be supplied in one style or model number from one manufacturer only. The Contractor shall submit manufacturer's brochures with illustrations and data to the Engineer for approval of luminaires, accessories as well as manufacturer's recommended installation details.

**E. Wiring.** Poles with luminaires shall include wiring and connection of the source by means of two (2) #12 AWG copper or #10 AWG aluminum wires as shown in the details which shall run through the shaft to 10 ampere fused connectors located in the pull box. Wire shall be of a UF (underground feeder) or USE (underground service entrance) rating.

Service shall be connected by means of fused quick-disconnect plug-in type connectors which shall be of rubber, water-tight construction enclosing a cartridge type 10 ampere fuse and suitable for 240 volt (or greater) service. The leads for the connectors shall be attached in accordance with the connector manufacturer's instructions. All connectors shall be located in the pull box near the base of the pole.

When taping is required, contractor shall submit a detail to the engineer for approval. This shall include proper application of an electrical sealing compound, insulating putty or rubberized tape to round off corners, or other material to insure the connection is completely watertight.

All wire and wiring requirements for poles with luminaires shall be considered subsidiary to the special provision Roadway Illumination Pole.

**717.04 Method of Measurement**

Work completed and accepted under this item shall be measured by the unit. Pole "Type" shall refer to the requirement to furnish unit with Cobra Head Luminaire and Arm (Cobra Head), Interstate Luminaire (Interstate) or Shoe Box Luminaire (Shoe Box); of the wattage specified, and all associated hardware and wiring. Poles will be designated as either T-Base or Shoe Base meeting the requirements of this special provision. Height (Ht.) shall refer to the nominal height of the pole including base.

**717.04 Basis of Payment**

Equipment and labor supplied under this item shall be measured separately by the unit; which price shall be full compensation for furnishing and installing the pole and arm (where required), luminaire (where required), and T-Base (where required); for excavation, backfill, compaction, and removal of surplus material; for furnishing and placing reinforcing steel and concrete; and for all materials, equipment, tools, labor, and incidentals necessary to complete the work.

<b>Pay Item</b>	<b>Pay Unit</b>
Roadway Illumination Pole (Type, Base, Height)	Each