

INSTRUCTIONS TO BIDDERS

All Bidders submitting Bids in response to this Request for Bids (including its attachments and any Addenda) (“RFB”) shall follow these instructions. Failure to follow these instructions may result in the rejection of a Bid. Capitalized terms not defined in these instructions have the meaning assigned to them in the General Conditions.

1. Review of Contract Documents, Questions, Addenda, and Mandatory Pre-Bid Meeting and Site Visit.

- a. A mandatory pre-Bid meeting and site visit is not scheduled for this project.
- b. Questions or comments regarding this RFB must be received in writing by the date and time and to the recipient identified in the RFB. Responses to questions will be posted on the City’s website and on the Rocky Mountain E-Purchasing System (“RMEPS”) as Addenda to the RFB.
- c. Modifications to this RFB shall be made solely through Addenda posted on the City’s website and on the RMEPS. Bidders are solely responsible for obtaining Addenda. The City will not be bound by or responsible for any explanations or interpretations of the Contract Documents other than those given through an Addendum to this RFB.
- d. Before submitting a Bid, each Bidder must carefully examine the RFB (including any Addenda), all Contract Documents (including the RFB and any Addenda), and the site of Work and fully acquaint itself with all conditions and any matters that could in any way impact the Work (including the cost of performance). Each Bidder must satisfy itself as to the accuracy of the estimated quantities in the Contract Documents. If there is any conflict or inconsistency between or within the Contract Documents, Bidders shall advise the City at least forty-eight (48) hours before the deadline for the submission of Bids identified in the RFB. The failure or omission of any Bidder to do any of the foregoing shall in no way relieve the Bidder from any obligation with respect to its Bid or any provisions of the Contract Documents. After the submission of a Bid, Bidders shall not assert any misunderstanding concerning the quantities or nature of Work to be performed.

2. Bid Forms.

- a. Bids shall be submitted on the following forms (“Bid Forms”) provided in the RFB:
 - 1) BID PROPOSAL;
 - 2) UNIT PRICE FORM;
 - 3) LISTING OF MAJOR SUPPLIERS AND SUBCONTRACTORS; and
 - 4) BID SECURITY.

Bids shall also include a one-page preliminary schedule including the overall duration, key activities, and dates.

Bids shall include the following forms contained in Attachment G: CDOT Form 606 – Anti-Collusion Affidavit, CDOT Form 1413 – Bidders List, CDOT Form 1414 – Anticipated DBE Participation Plan. If these forms are not submitted, the bid is considered non-responsive and shall be rejected.

The following documents are due to the City of Commerce City by the low responsible bidder by 4:30 p.m. on the fifth calendar day after bid opening are: CDOT Form 605 – Contractors Performance Capability Statement, CDOT Form 621 – Assignment of Anti-Trust Claims, CDOT Form 1415 – Commitment Confirmation (For each DBE listed in the Form 1414), CDOT Form 1416 – Good Faith Effort Report (If the DBE goal has not been met).

- b. Each Bidder is solely responsible for the accuracy of its Bid.
- c. Alternative, conditional, or qualified Bids will not be considered.
- d. Each Bidder is required to state in its Bid its full name, legal office address and mailing address (if different), and e-mail address to receive communications relating to this RFB, and shall state the names of all persons interested with it in the Bid, and if no other person be so interested, the Bidder shall distinctly state the fact.
- e. If Bidder is an individual, he or she must sign in his or her individual capacity. Bids by partnerships shall be signed with the partnership name followed by the signature and title of one partner or authorized representative. Bids by corporations shall be signed with the name of the corporation followed by the signature and title of the president or other person authorized to bind the corporation. Bids by limited liability companies shall be signed by the manager or member authorized to bind the entity or other authorized representative. Bids by joint ventures shall be signed by each participant or its authorized representative. If an authorized representative signs any Bid Form for a Bidder, a copy of a resolution or other signature authorization shall be required for submission of the Bid. Failure to include a copy of the appropriate signature authorization, if required, may result in the rejection of the Bid.
- f. Bidders shall fully complete all Bid Forms (including all blank spaces and additive Bid items) by legibly printing the entire prices for the Work. Prices and the name of signatory shall be printed in ink or by typewriter. All signature(s) shall be in blue ink. Bids completed in pencil may be rejected.
- g. Bidders shall acknowledge receipt of all Addenda. Failure to acknowledge receipt of all Addenda may result in the rejection of a Bid.
- h. Bids shall be made on each separate item of work shown in the Bid Forms, with reasonable relation to the probable cost of doing the work included in such item. The unit price items in the Bid Forms are intended to cover all items of work to be done and materials to be furnished to fully complete the Work in accordance with the Contract Documents. The cost of appurtenant items of work, labor, materials and equipment, and all other costs (including without limitation sales and use tax, insurance, licenses, permits, profit, and other overhead) not listed separately, not shown on the Plans and Specifications, or not specified but necessary to complete the Work in accordance with the Contract Documents shall be considered as included in the unit price Bid.
- i. The quantities listed in the Bid Forms are approximate and are given only for use in comparing Bids and to indicate approximately the total amount of the Contract. The City does not expressly or by implication represent that the actual amounts of Work will correspond with the estimated quantities. Work under certain items may be materially greater or less than those estimated in the Bid Forms as may be necessary, in the judgment of the City, to complete the Project.
- j. Wherever additive Bid items are called for, Bidders shall submit the amount to be added to the total Bid amount if the alternate is selected. If a Bidder does not wish to provide a Bid for an

alternate item, Bidder should write “NO BID.” Additive Bid items, if any, will be selected by the City at the time of award. The City reserves the right to accept additive Bid items in any order or combination.

- k. Unit prices and extensions, written as numbers, shall be entered in the spaces provided on the Bid Forms on the line pertaining to each Bid item. The unit price shall govern if there is an error or discrepancy in the extension of the price or in the total Bid amount.
- l. Alterations, interlineations, erasures, strikethroughs, and other marks on any Bid Form will be disregarded unless initialed in blue ink by the person signing the Bid.
- m. Bidders shall list on the Bid Form “Listing of Major Suppliers and Subcontractors” any proposed subcontractor or supplier (other than employees) that the Bidder plans to hire to perform more than five percent (5%) the total Bid.
- n. The materials, products, equipment or processes described in the Contract Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. The materials, products, equipment or process specified shall be considered as the basis for the Bid. Substitutions in Bids shall not be considered unless approved prior to the receipt of Bids through an Addendum; failure to obtain advance approval for substitutions may result in the rejection of a Bid. Each request for a substitution shall include: the name of the item for which it is to be substituted; a complete description of the proposed substitute (including trade names, drawings, specifications, cuts, performance and test data and any other information necessary for evaluation); and a statement setting forth any changes in other materials, equipment or Work that incorporation of the substitute would require. The burden of proof concerning the merit of the proposed substitute is upon the selected contractor. The City’s decision of approval or disapproval of a proposed substitute shall be final.

3. Bid Security.

- a. Each Bid must be accompanied by a bid security of five percent (5%) of the total Bid (including all alternate bids, if any), in the form of a bid bond in the form provided with this RFB or a certified check or cashier’s check payable without condition to the City of Commerce City (“Bid Security”). The City may accept a bid bond written on the standard form of a recognized surety that includes the same terms and provides the same guaranty to the City and imposes no additional terms or conditions.
- b. Bid bonds shall be issued by a surety holding a license to act as a surety in the State of Colorado and having a rating not lower than A- in Best’s Insurance Guide, latest edition.
- c. Attorneys-in-fact who sign bid bonds must file with each bond a certified and effectively dated copy of their power of attorney.
- d. The Bid Security will be forfeited to the City as liquidated damages if the selected Bidder fails to enter a contract with the City or fails to sign the Notice of Intent to Award as provided in this RFB. The Bid Security of any Bidder involved in collusion or other illegal activities may be retained by the City as liquidated damages for the disruption of the bidding process. Bidders agree that the amount of the Bid Security is a reasonable estimate of damages and proportionate to the City’s anticipated loss or injury.
- e. The City will return the Bid Security to all Bidders except the three (3) lowest Bidders (based on the total Bid amount including any additive Bid items selected by the City) after Bid opening. The

City will return the Bid Security to all remaining Bidders after the execution of the Construction Contract Agreement and delivery of acceptable payment and performance bonds and a proposed Construction Schedule by the selected Bidder, except for any Bid Security that has been forfeited.

4. Bid Submission, Withdrawal, and Modification.

- a. Bids must be received by the City no later than the date and time and at the location stated in the RFB for the submission of Bids. It is the sole responsibility of each Bidder to ensure its Bid is received by the City at the proper location, date, and time. Bids not received at the proper location by the designated date and time will be considered late and will be returned unopened.
- b. Bids will be submitted to the “Rocky Mountain E-Purchasing System” website (<http://www.rockymountainbid system.com>).
- c. Bids shall consist solely of the Bid Forms, the Bid Security, and a one-page preliminary schedule including the overall duration, key activities, and dates.
- d. Bids will be submitted to the “Rocky Mountain E-Purchasing System” website (<http://www.rockymountainbid system.com>).
- e. No individual or entity shall make or file more than one Bid for the same Work unless alternate bids are required. Bids shall be made without connection with any other person or entity submitting a Bid for the Work, shall be fair in all respects, and shall be made without collusion or fraud. Notwithstanding the foregoing, a person or entity that has quoted prices to any Bidder is not disqualified from quoting prices to other Bidders or from submitting a Bid.
- f. Bids cannot be altered after submission.
- g. A Bidder may withdraw its Bid only by notarized written request signed by the same person who signed the Bid. A request to withdraw a Bid must be received by the City prior to the date and time stated in the RFB for the submission of Bids. E-mail, faxed, or oral requests for withdrawal will not be considered.
- h. All Bids are valid and, after the date and time stated in the RFB for the submission of Bids, cannot be withdrawn until the earlier of ninety (90) days after the bid opening or the date of execution of the Construction Contract Agreement and delivery of acceptable payment and performance bonds and a proposed Construction Schedule by the selected Bidder.
- i. Neither the City, nor any of its officers, employees, or agents, will be liable for the premature opening of, or any failure to open, any Bid that is not properly addressed or identified.

5. Bid Opening.

- a. The City will conduct a public bid opening at the date, time, and location identified in the RFB. Bids will be opened and read aloud but no selection or discussion will occur.

6. Contract Award.

- a. The City will select the lowest responsive and responsible Bidder, as determined to be the best value by the City in its sole discretion. The City’s determination of responsibility may include, without limitation, the Bidder’s financial resources, ability to comply with all legal and regulatory requirements, ability to perform the Work and complete the Project on time, history of performance, reputation, ability to obtain necessary equipment, data, and facilities, and any other factor deemed important by the City.

- b. The City's decision is final and without recourse to any Bidder. The issuance of a Notice of Intent to Award will be conditioned on approval of the Construction Contract Agreement by the City Council of the City of Commerce City if Contract Price is greater than \$250,000.00.
- c. If a Bid received from a Bidder located within the City ("Local Bidder") would provide the best value to the City but for the price and the Local Bidder's price does not exceed, by more than the lesser of five percent (5%) or \$5,000, the price of the Bidder whose Bid would otherwise provide the best value, the City may select the Local Bidder. At the time of award, the Local Bidder must be licensed with the City and must be in compliance with the City's sales and use tax code.
- d. The City may conduct any investigation it deems necessary to determine the responsibility of any Bidder, the ability of any Bidder to perform the Work, and the validity of the prices submitted by any Bidder. Bidders will furnish any information requested by the City for this purpose.
- e. By e-mail to the address on the Bid Proposal, the City will issue a Notice of Intent to Award to the selected Bidder and provide a Construction Agreement Contract to the selected Bidder.
- f. **Within ten (10) business days of the Notice of Intent to Award, the selected Bidder must:** (1) execute the Construction Contract Agreement; (2) provide payment and performance bonds of 100% of the total Bid price on the forms provided in this RFB or other forms acceptable to the City; (3) provide proof of insurance; and (4) provide a proposed Completion Schedule as directed in the General Conditions.
- g. If the selected Bidder fails to execute the Construction Contract Agreement and provide payment and performance bonds and a proposed Construction Schedule, the City may select another Bidder, in the City's discretion.
- h. The Construction Contract Agreement will not be binding on the City until executed by the City.

7. Miscellaneous.

- a. This RFB and the Work shall be governed by C.R.S. 8-17-101 *et seq.* (relating to Colorado labor employed on public works) and C.R.S 8-19-101 *et seq.* (relating to bid preferences for resident bidders).
- b. The City reserves the right to modify this RFB or the selection process, to cancel this RFB, to accept or reject any Bid for any reason (including without limitation Bidder responsibility and inadequate, unreasonable, or imbalanced Bids), and to waive any informalities or irregularities in any Bid, without liability, at any time. Neither the issuance of this RFB or the receipt and evaluation of Bids obligates the City to select any Bidder or enter into any agreement. No Bid shall constitute business terms of any eventual agreement except as expressly agreed by the City.
- c. All Bids shall become the property of the City, will not be returned, and will become a public record. The total cost of Bid preparation and submission shall be borne by the Bidder.
- d. Bidders should not include as a part of the response to the invitation to bid any information which the bidder believes to be a trade secret or other privileged or confidential data. If a Bidder wishes to include such material with a bid, then the material should be supplied in a separate envelope with "Confidential" marked on the envelope and the appropriate pages. The City will keep confidential only documents protected from disclosure under the Colorado Open Records Act ("Act"), C.R.S. § 24-72-201, *et seq.*, as determined by the City or any court. Under no circumstances may an entire Bid be marked or identified as proprietary. By submitting a Bid, each Bidder agrees to hold the City harmless from any claims arising from the release of proprietary

information not clearly designated as such by the Bidder and from any claims arising from the release of documents not protected from disclosure under the Act.

- e. Respondents are cautioned not to undertake any activities or actions to promote or advertise their Bids, other than discussions with City staff as described in this RFB. After the release of this RFB, Bidders are not permitted to make any direct or indirect contact with City personnel involved in this RFB, the City Council, or media on the subject of this RFB, except in the course of City-sponsored presentations or as authorized by this RFB. Violation of these rules is grounds for disqualification of the Bidder.
- f. The selected Contractor will be required to provide a warranty bond of 5% of the total Contract Price as a condition to Final Acceptance.
- g. The City does not discriminate on the basis of race, creed, color, religion, gender or sex, age, handicap, veteran status, national origin, or ancestry, in connection with this RFB.
- h. Unless specifically exempt, all construction within the City is taxable, including construction performed on behalf of an exempt institution or governmental, religious, charitable, private or any other type of owner, including the City.

**Commerce City Automated Traffic Signal
Performance Measure (ATSPM)
Improvements,
Project No. 2022-22-PW**

**TECHNICAL SPECIFICATIONS,
SPECIAL PROVISIONS, PLANS
AND DETAILS**

Commerce City, Colorado

**COMMERCE CITY AUTOMATED
TRAFFIC SIGNAL PERFORMANCE
MEASURE (ATSPM)
IMPROVEMENTS**

2022-22-PW

PROJECT TECHNICAL SPECIFICATIONS

STANDARD SPECIFICATIONS

All Work required for the Project shall be in accordance with the 2021 COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) Standard Specifications for Road and Bridge Construction, the CDOT M&S Standards, and the City of Commerce City's Engineering Standards and Specifications, except as modified herein.

PROJECT SPECIAL PROVISIONS

**CITY OF COMMERCE CITY DEPARTMENT OF PUBLIC WORKS
ENGINEERING CONSTRUCTION STANDARDS AND SPECIFICATIONS**

All changes to the City of Commerce City Engineering Construction Standards and Specifications to include revisions, additions, deletions, terms and definitions, are contained in these Project Special Provisions.

Insurance: ATTACHMENT D, CITY OF COMMERCE CITY GENERAL CONDITIONS, 15.3 Terms of Insurance. Section 15.3.1 Additional Insured shall be modified by insertion of the following: THE CITY AND CDOT SHALL BE LISTED AS ADDITIONALLY INSURED ON ALL CERTIFICATES OF INSURANCE. PAGE 75 OF (RFB).

Indemnification: ATTACHMENT D, CITY OF COMMERCE CITY GENERAL CONDITIONS, 16.1 shall be modified as follows: The first sentence shall list the City and CDOT as being indemnified. Page 75 of (RFB)

ARTICLE 20 PERSONAL & CIVIL RIGHTS OF CITY OF COMMERCE CITY GENERAL CONDITIONS, 20.1 COLORADO LABOR, This requirement is waived by the City of Commerce City.

Warranties: ARTICLE 8 WARRANTIES AND GUARANTEES OF ATTACHMENT D, CITY OF COMMERCE CITY GENERAL CONDITIONS, is hereby deleted in its entirety.

Section 9.13 - Vehicle Detection

Video detection systems shall consist of one video camera, isolation amplifier for video cabling, an automatic control unit (ACU) and a pointing device. The system shall detect vehicles on a roadway using only video images of vehicle traffic and shall be an FLIR/Traficon–Trafisense 2 System, Iteris – Vantage Next System, Miovision Detection System or other approved equal.

The system shall include software that detects vehicles in multiple lanes using only the video image. Detection zones shall be defined using only a video menu and a pointing device to place the zones on a video image.

Up to twenty four (24) detection zones per camera shall be available. The camera supplied shall be compatible with the video detection system and shall be mounted on the mast arm or other location as defined on the plans or as directed by the Construction Manager. The camera shall view approaching vehicles at a distance not to exceed 350 feet for reliable detection.

The camera shall be housed in an environmentally sealed enclosure and shall be equipped with a sun shield that prevents sunlight from directly entering the lens. The camera shall be less than 6 inches in diameter, less than 26 inches long and shall weigh less than 12 pounds when the camera and lens are mounted inside the enclosure.

The camera enclosure shall include all required environmental controls as defined by the camera manufacturer and may include a thermostatically controlled heater and/or fan to assure proper operation of the lens iris at both low and high temperatures, and prevent moisture condensation of the optical faceplate of the enclosure.

When a variable focal length lens with variable focus control is supplied as part of the camera, the lens shall be adjusted to suite the site geometry without opening up the camera housing.

When coaxial cable is used between the camera and the cabinet, coax cable shall be a 75 ohm, precision video cable with 20 gauge solid bare copper conductor (9.9 ohms/M), solid polyethylene insulating dielectric, 98" (min) tinned copper double-braided shield and black polyethylene outer covering. The signal attenuation shall not exceed 0.78 dB per 100 feet at 10MHz. Nominal outside diameter is 0.304 inches. This cable shall be suitable for installation in conduit or overhead appropriate span wire. BNC plug connectors shall be used at both the camera and cabinet ends. The coax cable, BNC connectors, and crimping tool shall be of an approved type by the supplier of the video detection system, and the manufacturer's instructions must be followed to insure proper connection.

Control and other cables required for installation, setup, and operation of the camera and/or video detection system are required, they shall be of the size and type required per manufacturer's specifications and the National Electric Codes. Control cables shall terminate within the controller cabinet.

The power cable shall be 16 AWG three conductor cable or as specified by the manufacturer. The cabling shall comply with local and National Electric Codes.

Hardware shall be included for remote programming and viewing of the video detection system through an Ethernet link and static I.P addressing, and shall provide for remote access, via a standard internet browser, to the communication board(s), detection board(s), zone configuration, and live streaming video. Remote access shall provide for setup and modification of configuration parameters, and retrieval of data and alarm logs.

The complete video detection system shall be warranted to be free of defects in material and workmanship for a period of not less than two years from the date of final acceptance and warranty initiation. During the warranty period, the Contractor shall be responsible for the repair or replacement, at no charge to the City, of any product of the video detection system which fails to operate properly with the exception of failures as a result of vandalism, accident, and/or act of God.

Video detection systems shall be paid for on a lump sum basis per intersection location and shall include all labor, equipment and materials including cables necessary to install a video detection system for the entire intersection, complete-in-place.

Section 9.18.01 - Controller

Each controller shall be 100% compatible with the City's existing computerized signal system, TACTICS Version 5.3.4.

A controller shall consist of a complete electrical mechanism to control the operation of traffic control signals, including the timing mechanism and all necessary auxiliary equipment. Controllers shall be Yunex/Siemens M60 TS2 Type 2 controllers. All equipment furnished shall be the manufacturers' latest, current production model, complete with all standard accessories, tested and delivered by domestic manufacture who is regularly engaged in the construction of such equipment.

Controllers shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

Section 9.12.02 - Ethernet Managed Switch

An Ethernet Managed Switch shall only be used where specified in the project plans or project specials, and may be considered by the Construction Manager on a per project basis. The Ethernet Managed Switch shall be Ruggedcom RS-900 G.

An Ethernet Managed Switch shall include the power supply, Cat5E/Cat6 Ethernet cable or serial cable as required to connect the Ethernet Managed Switch to the traffic signal controller, and duplex fiber patch cables for connecting the Ethernet Managed Switch to the fiber termination panel.

Unless otherwise specified, the Contractor shall be responsible for proper programming, setup, and testing of the Ethernet Managed Switch. At the City's discretion, the City may opt to have their Maintenance Contractor or other third party complete Ethernet Managed Switch, setup, and/or testing.

When the City's Maintenance Contractor or other third party is enlisted for programming, setup, and/or testing of the Ethernet Managed Switch, associated costs for the Maintenance Contractor or third party labor shall be the responsibility of the City.

Ethernet Managed Switches shall be measured by the units installed and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

Section 9.12.03 - Radio Interconnect

Where specified in the plans, radio communications shall be included on the project. The radio communication system shall be of the manufacturer and model number specified.

Programming software and manuals shall be supplied with the radio system and shall become the property of the City at the completion of the project.

The radio communication system shall include all ancillary materials required to make the wireless link operational, and to connect the radios to the equipment for which communications was intended, and shall include, but not limited to, the antenna, coax cable, surge suppression, power supply, serial cable, and/or Ethernet cable.

Unless otherwise specified, the Contractor shall be responsible for proper programming, setup, and testing of the radio communication system. At the City's discretion, the City may opt to have their Maintenance Contractor or other third party complete the radio communication system programming, setup, and/or testing. When the City's Maintenance Contractor or other third party is enlisted for programming, setup, and/or testing of the radio communication system, associated costs for the Maintenance Contractor or third party labor shall be the responsibility of the City.

Radios shall be measured by the paired units installed (Transmitter & Receiver) where both a transmitter and receiver are installed, individually where only a transmitter or receiver are installed, and shall include all labor, equipment, and materials necessary to install the item complete-in place.

**2021 COLORADO DEPARTMENT OF
TRANSPORTATION (CDOT) Standard
Specifications for Road and Bridge
Construction**

All changes to the 2021 CDOT Standard Specifications for Road and Bridge Construction, to include revisions, additions, deletions, terms and definitions, are contained in these Project Special Provisions. All bids and all construction shall be in accordance with these Specifications.

The following Project Special Provisions take precedence over Standard Specifications or Plans and supplement or amend the above referenced "Standard Specifications for Road and Bridge Construction".

**SECTION 101
DEFINITIONS AND TERMS**

Section 101 of the Standard Specifications is hereby revised for this project as follows:

All references to Resident Engineer shall mean the City Engineer.

All references to Engineer or Project Engineer shall mean the Project Manager.

All references to Region Transportation Director shall mean the City of Commerce City Director of Public Works.

All references to Department or CDOT shall mean the City of Commerce City Public Works Department.

All references to the City in these Project Special Provisions shall mean the City of Commerce City.

SECTION 102
BIDDING REQUIREMENTS AND CONDITIONS

Section 102 of the Standard Specifications is hereby revised for this project as follows:

Delete Subsection 102.01, Prequalification of Bidders

SECTION 105
CONTROL OF WORK

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Delete Subsections 105.22, Dispute Resolution, 105.23 Dispute Review Board, and 105.24 Claims for Unresolved Disputes.

SECTION 107
LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

Section 107 of the Standard Specifications is hereby revised for this project as follows:

107.02 **Permits, Licenses and Taxes.** Delete Subsection 107.02 and replace with the following:

The Contractor shall obtain all licenses and permits required to perform the Work. This refers to all permits required by the City as well as those required by County, State and Federal Agencies.

SECTION 630
CONSTRUCTION ZONE TRAFFIC CONTROL

Section 630 of the Standard Specifications is hereby revised for this project as follows:

630.10 **Transportation Management Plan.** Add the following to the first paragraph of Subsection 630.10:

This project shall be considered to be a non-significant project for the purposes of this section. Approval of the Method of Handling Traffic (MHT) by the City does not relieve the Contractor of traffic control responsibility and liability specifically assigned to him under this Contract.

A copy of the approved MHT shall be available at the Project site in order that City personnel may verify compliance with the specified traffic control requirements.

630.12 Temporary Masking Signs. Add the following to Subsection 630.12:

All existing traffic control devices including traffic signals, signs, and pavement markings that are compatible with the construction zone traffic control shall remain visible and fully operational. If these devices are incompatible with the temporary construction, they shall be covered, relocated or removed.

Whenever the Contractor removes, obliterates or covers in any way, any pavement markings including lane lines and crosswalks, he shall install temporary tab markers, at a minimum spacing of 200 feet or as needed prior to opening the road to traffic.

630.17 Method of Measurement. Delete Subsection 630.17 and replace with the following:

Signs, barricades, traffic channelizing devices, variable message signs, flashing beacons (portable), Mobile Pavement Marking Zone, Method of Handling Traffic, Traffic Control Supervisor, flagging and all other requirements of Section 630 are included in the pay item for Traffic Control Management unless they are identified in the Bid Schedule as separate pay items.

No payment will be made under Section 630 until the Method of Handling Traffic (MHT) has been submitted and approved.

Traffic Control Management, as determined by the Method of Handling Traffic (MHT), will be paid as follows: 50% of the Contract item amount upon first utilization, an additional 40% of the Contract item amount when 75% of the original Contract amount has been earned, and the final 10% when the Project has been Accepted, in accordance with Subsection 105.21, exclusive of any maintenance periods.

630.18 Basis of Payment. Add the following:

Pay Item	Pay Unit
Traffic Control Management	Day

AUTOMATED TRAFFIC SIGNAL PERFORMANCE MEASURES (ATSPM) SYSTEM

Contractor will perform services to implement the following traffic signal improvement components:

- Deploy Automated Traffic Signal Performance Measures (ATSPM) on arterial corridors throughout the City.

This project will include the procurement and implementation of an ATSPM system at twenty-three intersections.

General Project Requirements

The City is seeking a qualified Contractor to furnish, install, integrate and test all necessary software and hardware, and make operational an Automated Traffic Signal Performance Measure (ATSPM) system. The

Contractor shall be responsible for all items necessary to furnish, install, configure, implement, test and provide training and documentation on the proposed system as well as other requirements outlined in this RFB.

The City is seeking to procure a commercially available, off-the-shelf ATSPM systems at a total of twenty three (23) signalized intersections on the arterial corridors.

The proposed ATSPM system shall meet the system requirements as included in *Appendix I – Commerce City Automated Traffic Signal Performance Measure System Requirements*. Additional details regarding goals of the system, operations and operating environment can be found in the Concept of Operations as included in *Attachment H – Concept of Operations*.

The project locations are listed below.

INT.	
NO.	INTERSECTION
1	56th Avenue/Holly Street
2	56th Avenue/Monaco Street
3	Quebec Parkway/58th Avenue
4	Quebec Parkway/60th Avenue
5	Quebec Parkway/64th Avenue
6	Quebec Parkway/72nd Avenue
7	Highway 2 / 72nd Avenue
8	Highway 2/Quebec Parkway/Rosemary Street
9	Highway 2 / 88th Avenue
10	88th Avenue/Rosemary Street
11	Highway 2 / 96th Avenue
12	Highway 2 / 104th Avenue
13	Highway 2 / 112th Avenue
14	104th Avenue/Revere Drive
15	104th Avenue/Potomac Street
16	104th Avenue/King Soopers Drive
17	104th Avenue/Chambers Street
18	104th Avenue/Landmark Drive
19	104th Avenue/Reunion
20	Tower Road/104th Avenue
21	Tower Road/96th Avenue
22	Tower Road/88th Avenue
23	Tower Road/81st Avenue

The Contractor shall furnish, install, integrate, and test all necessary software and hardware, and make operational an ATSPM system comprised of a system capable of monitoring of traffic signals as outlined in the System Requirements found in *Attachment I - ATSPM System Requirements*. The Vendor shall be responsible for all items necessary to furnish, install, configure, implement, test, and provide training and documentation on the proposed system.

System Requirements

This RFB and the related attachments contain systems requirements for the proposed ASTPM system. The Proposer is required to respond to every requirement as included in *Attachment I – Systems Requirements for the ATSPM*. For each requirement, the Proposer shall indicate if it is currently “Met”, “Partially Met”, or “Not Met” by the proposed system. Provide a written description for each requirement that the system cannot meet or can partially meet for consideration during proposal evaluations.

The Contractor shall be fully responsible for the maintenance and care of all hardware, equipment, and software furnished by the Vendor until the time of final acceptance of the ATSPM system by the City of Commerce City.

Project Task One: Project Management: The Contractor shall designate a dedicated Project Manager that will be committed to this project through the duration of the contract. The Contractor Project Manager’s responsibilities shall include, but not limited to:

- Coordinate the work of this contract with other concurrent work as necessary.
- Maintain communication between key contract personnel and City’s Project Manager.
- Maintain an adequate staff of qualified support personnel to perform the work necessary to complete the project.
- Establish and maintain contract administration procedures, which may include supplemental agreements, time-extensions, subcontracts, and tracking and maintaining the budget.
- Inform the City’s Project Manager of any changes to the key personnel assigned to the project. The work shall be performed and directed by the key personnel identified in the proposal. Any changes in the designated key personnel or the proposed Project Manager in charge of the work, as indicated in the proposal, shall be subject to review and approval by the City. The proposed staff assigned to perform any task shall be qualified individuals with closely related experience in that field.
- Keep City’s Project Manager informed of all the pertinent decisions related to the project.

Project Schedule:

The Contractor Project Manager shall develop and maintain a project schedule for the duration of the project. Within one week after the notice to proceed (NTP), the Contractor shall submit a detailed schedule indicating all milestone dates and major deliverables. The City’s Project Manager will review and approve the Project Schedule for content and format. Upon approval of the Project Schedule, the Vendor shall update the Project Schedule at least on a monthly basis to reflect actual progress.

Progress Meetings:

The Contractor Project Manager shall arrange and attend regular progress meetings as needed either online or at the City’s designated facility to report the progress and provide data to the City’s Project Manager. The data shall generally include the following information:

- Detailed project schedule and critical path work from initial plans as work progresses.
- Progress against schedule for each identified work item.
- Forecast the completion dates from current progress.
- Rescheduled work in any area, which is out of the required sequence.
- Respond to any inquiry concerning the status of any work element in terms of schedule, staff, and cost.

Project Task Two: ATSPM System Detection Requirements and Setup

The Contractor shall review the existing detection configuration at the 23 ATSPM project intersections. Future detection upgrades will be implemented at selected intersections. Contractor is advised that major detection enhancements are planned under a future project funded through HSIP grant funds. It is not the City's intent to implement detection upgrades at all locations.

Project Task Three: Furnish ATSPM

The Contractor shall furnish the ATSPM software per the system requirements contained in Attachment I. This shall include any additional 3rd party software, operating system(s), application(s), and/or utilities necessary for the operation of the ATSPM system.

For any hardware supplied by the Contractor, the Contractor shall provide the City's Project Manager with hardware submittals for review and approval prior to delivery. It shall be the Contractor's responsibility to provide any ancillary equipment such as cables, mounting rails, etc. with the provided hardware.

Project Task Four: Installation, Integration, and Deployment

The Contractor shall install, configure, and integrate the ATSPM on the City's workstations and laptops as requested by City staff.

The Contractor shall install the system at the Public Works Department within the City's MSC Main Building. The City will provide the necessary communications network infrastructure to connect the servers to the City's existing transportation network. As needed, the System Contractor shall coordinate with the City's Project Manager and City's IT staff to integrate the main server onto the City's existing network.

Project Task Five: System Testing, Verification, and Acceptance

The Contractor shall develop Verification and Acceptance Test Procedures for the City's review and approval. The Vendor shall provide a proposed acceptance test procedure to the City's Project Manager for approval at least 30 days before the acceptance test is to begin. The City shall review the Contractor's initial Acceptance Test Procedure and provide review comments within 14 days. The Acceptance Test Procedures shall not be final until accepted by the City.

The Acceptance Test Procedures will serve as a guide to operationally test system hardware, software, and integration. The procedures must include a detailed description of the tests to be conducted and the purpose of each test. Each test should be mapped to at least one of the system requirements. At a minimum, the Acceptance Test Procedure shall define testing stages, methods, procedures, tools and data to verify that the system is working as designed under the planned and maximum conditions.

Final acceptance testing shall include tests for the ATSPM software, any additional software implemented, and communications between field traffic signal controllers and the ATSPM software. The test period for final acceptance will be a period of 30 days of error free operation. The City may choose to pause the testing period on days spent correcting minor errors. The City may choose to restart the 30-day acceptance test if errors are found to be significant.

Final acceptance tests will be conducted to:

- Verify requirements are satisfied;

- Verify user interface is implemented correctly;
- Verify error-free linkage of field controllers and the ATSPM server and software;
- Verify storage and throughput capacity requirements;
- Verify real time performance requirements are met;
- Verify security measures;
- Verify diagnostic and logging features;
- Verify ability to recover from errors, improper input and hardware failures; and
- Ensure hardware performs correctly.

All tests will be conducted by the System Contractor in the presence of the City's Project Manager. The Contractor shall document and record all test results. A variance report shall be prepared by the Contractor each time a test results in the ATSPM system not meeting a functional requirement. The Contractor shall document actions to be taken to correct the variance.

The City's Project Manager will provide final acceptance of the ATSPM system software, hardware, integration, and other services following the Vendor's completion of work in accordance with the contract and after successful completion of the 30-day acceptance test. The acceptance date will mark the beginning of the Vendor's warranty period.

Project Task Six: Training and Documentation

The Contractor shall provide one training sessions for up to three (3) City staff members. The first training session is anticipated to occur when the system is initially deployed, with the second session occurring 6-12 months later at the City's discretion. Training shall include all aspects of operating, maintaining, and administering the ATSPM. It shall include setting up user accounts, reporting, troubleshooting, among other aspects.

The Contractor shall submit a training plan to the City for review and approval 30 days prior to the start of training. The training materials shall include all reference materials, procedures, and manuals that will be used. The training plan shall include the method for delivering the training, any requirements for the City to provide (room space, access to equipment, etc.) and the detailed agenda with timing for the training.

The training shall be a combination of classroom instruction and hands-on interaction with the ATSPM system, if applicable. All training shall be conducted during the normal business hours of the City.

Project Task Seven: System Documentation

The Contractor shall provide a complete systems documentation package. The documentation package in general shall include any applicable drawings, schematics, software and hardware submittals, detailed functional and interface descriptions, user/operator manuals, software programming manuals and procedures and all other required documentation related to the completed ATSPM system. The documentation package shall address all hardware and software provided under this contract, and shall be subject to review and approval by the City Project Manager before final system acceptance.

The System Contractor shall submit all documentation for review and approval by City. Following approval, a minimum of two (2) copies of the documentation shall be provided to the City.

Project Task Eight: System License, and Support

Licenses

The Contractor shall provide all licenses required for the operations and maintenance of the system, including, but not limited to, third-party software applications, databases, network components, and servers (if applicable) for the unlimited use by the City. The terms and conditions of any software license will be incorporated into the final contract. Prior to finalizing the contract, the City reserves the right to negotiate terms of the software license.

The Contractor shall coordinate in advance of updating the software, including scheduling time for any updates that will cause the software to be inaccessible. If applicable, the Contractor shall repair/replace any inoperable hardware/equipment in a timely manner during the warranty period to minimize any disruptions to City operations.

Technical Support

The Contractor shall provide technical support to the City. Technical support includes, but is not limited to, the following:

- Troubleshooting of the system
- Routine questions
- Configuration questions or changes
- Customized reporting

The Contractor shall provide in the contract the support terms, including response times, communication methods, and hours of availability.

City Oversight

A designated individual will be responsible for management of the contract for the City ("Project Manager"). The City will provide reasonable assistance to Contractor in the scheduling of meetings, interpretation of policy and procedural requirements, research relating to internal documents, coordination with outside agencies and City staff, but the City's obligation will not limit Contractor's obligations to perform the Services. The City will rely on the personnel, experience, and expertise of Contractor to ensure all necessary components of the scope of work are completed.

Location			Existing Detection System	Detection Upgrade Description	Controller/Software Upgrade	Communication System Upgrade Description
1	56th Avenue	Holly Street	Loops	Provide/Install new video detection system(complete system).	Provide/Install new M60 Yunex Controller w/updated SEPAC software	Provide/Install (1) Ruggedcom RS900G Switch / Provide Install (2) Iteris Pegasus 5.8GHz Radios - Radio System connection at existing radio system 60th/Holly approximately 2,600 feet north. Install two Pegasus radios as this is a relay station.
2	56th Avenue	Monaco Street	Iteris Smart Cycle	None	Provide/Install new M60 Yunex Controller w/updated SEPAC software	Provide/Install (1) Ruggedcom RS900G Switch / Provide/Install Iteris (1) Pegasus 5.8 GHz Radio System -- Radio System connection at new radio system 56th/Holly approximately 2,600 feet west.
3	Quebec Parkway	58th Avenue	FLIR/Traficon	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Upgrade Software (SEPAC 3.58 Installed) <u>By City Staff</u>	None
4	Quebec Parkway	60th Avenue	FLIR/Traficon	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Upgrade Software (SEPAC 5.0.0 Installed)	None
5	Quebec Parkway	64th Avenue	FLIR/Traficon	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Upgrade Software (SEPAC 3.58 Installed) <u>By City Staff</u>	None
6	Quebec Parkway	72nd Avenue	FLIR/Traficon	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Provide/Install new M60 Yunex Controller w/updated SEPAC software	None
7	Highway 2	72nd Avenue	Loops	Provide/Install new video detection system(complete system).	Upgrade Software (SEPAC 3.58 Installed) <u>By City Staff</u>	Provide/Install (1) Ruggedcom RS900G Switch / Provide/Install (3) Iteris Pegasus 5.8GHz Radios -- Radio System connection at new radio system 72nd Ave/Quebec Prkwy approximately 3,500 feet east. Install two Pegasus radios at 72nd/Highway 2 as this is a relay station and one Pegasus radio at 72nd/Quebec.
8	Highway 2	Quebec Parkway/Rosemary Street	Wavetronix/Highway 2 approaches and Loops/Quebec-Rosemary approaches	For two approaches (Quebec & Rosemary) -Provide/Install new video detection system(complete system)	Upgrade Software (SEPAC 3.58 Installed) <u>By City Staff</u>	Provide/Install (1) Ruggedcom RS900G Switch.
9	Highway 2	88th Avenue	Wavetronix/Highway 2 approaches and Loops/88th approach	For one Approach - Provide/Install new video detection system(complete system).	Upgrade Software (SEPAC 3.58 Installed) <u>By City Staff</u>	Provide/Install (1) Ruggedcom RS900G Switch.
10	88th Avenue	Rosemary Street	FLIR/Traficon	None - signal system will be replaced under upcoming 88th Avenue Corridor Improvements	Upgrade Software (SEPAC 3.58 Installed) <u>By City Staff</u>	None
11	Highway 2	96th Avenue	Iteris Vantage Vector Hybrid System	None	None	None
12	Highway 2	104th Avenue	Wavetronix/Highway 2 approaches and Loops/104th approaches	Install Wavetronix Detection System for 2 approaches (EB/WB 104th). Sensor and processor provided by City. Provide and install cable from sensor to cabinet.	Upgrade Software (SEPAC 3.58 Installed) <u>By City Staff</u>	None
13	Highway 2	112th Avenue	FLIR/Traficon	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Upgrade Software (SEPAC 3.58 Installed) <u>By City Staff</u>	Provide/Install (1) Ruggedcom RS900G Switch / Provide/Install (2) Iteris Pegasus 5.8 GHz Radios -- Radio system connection at new radio system 104th/Highway 2 approximately 1.3 miles south. Install one Pegasus radio at 104th/Highway 2 and one Pegasus radio at 112th/Highway 2.
14	104th Avenue	Revere Drive	FLIR/Traficon	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Upgrade Software (SEPAC 5.2.0 Installed) <u>By City Staff</u>	None
15	104th Avenue	Potomac Street	FLIR/Traficon	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Provide/Install new M60 Yunex Controller w/updated SEPAC software	None
16	104th Avenue	King Soopers Drive	Iteris Vantage Edge	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Provide/Install new M60 Yunex Controller w/updated SEPAC software	None
17	104th Avenue	Chambers Street	Iteris Vantage Edge	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Upgrade Software (SEPAC 5.2.0 Installed) <u>By City Staff</u>	None
18	104th Avenue	Landmark Drive	Iteris Vantage Edge	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Upgrade Software (SEPAC 5.2.0 Installed) <u>By City Staff</u>	None
19	104th Avenue	Reunion Parkway	Iteris Vantage Edge	None - detection system will be replaced under upcoming FY25 HSIP funded improvements	Upgrade Software (SEPAC 5.2.0 Installed) <u>By City Staff</u>	None
20	Tower Road	104th Avenue	FLIR/Traficon	Provide/Install FLIR PIM Module for expansion to 64 output channels *	Upgrade Software (SEPAC 5.2.0 Installed) <u>By City Staff</u>	None
21	Tower Road	96th Avenue	FLIR/Traficon	Provide/Install FLIR PIM Module for expansion to 64 output channels *	Provide/Install new M60 Yunex Controller w/updated SEPAC software	None
22	Tower Road	88th Avenue	FLIR/Traficon	Provide/Install FLIR PIM Module for expansion to 64 output channels *	None (SEPAC 5.2.3 Installed)	None
23	Tower Road	83rd Avenue	FLIR Trafisense 2	None	Upgrade Software (SEPAC 5.2.0 Installed) <u>By City Staff</u>	None
24	Tower Road	81st Avenue	FLIR/Traficon	Provide/Install FLIR PIM Module for expansion to 64 output channels *	None (SEPAC 5.2.3 Installed)	None

*Upgrades allow expansion to 64 output channels

ATTACHMENT F: LOCATION SPECIFICS

Location		Detection Improvements	Controller Improvements	Communication System Improvements	ATSPM Improvements	
1	56th Avenue	Holly Street	Provide and Install new video detection system for all approaches	Provide and install new M60 Yunex Controller w/updated SEPAC software	Provide and install (1) Ruggedcom RS900G Switch. Provide and install (2) Iteris Pegasus 5.8GHz Radios -- Radio System connection at existing radio system 60th/Holly approximately 2,600 feet north. Install two Pegasus radios as this is a relay station.	Yes
2	56th Avenue	Monaco Street	None	Provide and install new M60 Yunex Controller w/updated SEPAC software	Provide and install (1) Ruggedcom RS900G Switch. Provide and install Iteris (1) Pegasus 5.8 GHz Radio System -- Radio System connection at new radio system 56th/Holly approximately 2,600 feet west.	Yes
3	Quebec Parkway	58th Avenue	None	None	None	Yes
4	Quebec Parkway	60th Avenue	None	None	None	Yes
5	Quebec Parkway	64th Avenue	None	None	None	Yes
6	Quebec Parkway	72nd Avenue	None	Provide and install new M60 Yunex Controller w/updated SEPAC software	None	Yes
7	Highway 2	72nd Avenue	Provide and install new video detection system for all approaches.	None	Provide and install (1) Ruggedcom RS900G Switch. Provide and install (3) Iteris Pegasus 5.8GHz Radios -- Radio System connection at new radio system 72nd Ave/Quebec Prkwy approximately 3,500 feet east. Install two Pegasus radios at 72nd/Highway 2 as this is a relay station and one Pegasus radio at 72nd/Quebec.	Yes
8	Highway 2	Quebec Parkway/Rosemary Street	Provide and install new video detection system for Quebec and Rosemary approaches	None	Provide and install (1) Ruggedcom RS900G Switch.	Yes
9	Highway 2	88th Avenue	Provide and install new video detection system for 88th Ave approach.	None	Provide and install (1) Ruggedcom RS900G Switch.	Yes
10	88th Avenue	Rosemary Street	None	None	None	Yes
11	Highway 2	96th Avenue	None	None	None	Yes
12	Highway 2	104th Avenue	Install Wavetronix Detection System for EB and WB 104th approaches. Sensor and processor provided by City. Provide and install cable from sensor to cabinet.	None	None	Yes
13	Highway 2	112th Avenue	None	None	Provide and install (1) Ruggedcom RS900G Switch. Provide and install (2) Iteris Pegasus 5.8 GHz Radios -- Radio system connection at new radio system 104th/Highway 2 approximately 1.3 miles south. Install one Pegasus radio at 104th/Highway 2 and one Pegasus radio at 112th/Highway 2.	Yes
14	104th Avenue	Revere Drive	None	None	None	Yes
15	104th Avenue	Potomac Street	None	Provide and install new M60 Yunex Controller w/updated SEPAC software	None	Yes
16	104th Avenue	King Soopers Drive	None	Provide and install new M60 Yunex Controller w/updated SEPAC software	None	Yes
17	104th Avenue	Chambers Street	None	None	None	Yes
18	104th Avenue	Landmark Drive	None	None	None	Yes
19	104th Avenue	Reunion Parkway	None	None	None	Yes
20	Tower Road	104th Avenue	Provide and install FLIR PIM Module for expansion to 64 output channels *	None	None	Yes
21	Tower Road	96th Avenue	Provide and install FLIR PIM Module for expansion to 64 output channels	Provide and install new M60 Yunex Controller w/updated SEPAC software	None	Yes
22	Tower Road	88th Avenue	Provide and install FLIR PIM Module for expansion to 64 output channels	None	None	Yes
23	Tower Road	81st Avenue	Provide and install FLIR PIM Module for expansion to 64 output channels	None	None	Yes

**AFFIRMATIVE ACTION REQUIREMENTS
EQUAL EMPLOYMENT OPPORTUNITY**

February 3, 2011

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**AFFIRMATIVE ACTION REQUIREMENTS
EQUAL EMPLOYMENT OPPORTUNITY**

A. AFFIRMATIVE ACTION REQUIREMENTS

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)

1. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area are as follows:

Goals and Timetable for Minority Utilization

Timetable - Until Further Notice			
Economic Area	Standard Metropolitan Statistical Area (SMSA)	Counties Involved	Goal
157 (Denver)	2080 Denver-Boulder	Adams, Arapahoe, Boulder, Denver, Douglas, Gilpin, Jefferson.....	13.8%
	2670 Fort Collins	Larimer.....	6.9%
	3060 Greeley	Weld.....	13.1%
	Non SMSA Counties	Cheyenne, Clear Creek, Elbert, Grand, Kit Carson, Logan, Morgan, Park, Phillips, Sedgwick, Summit, Washington & Yuma.....	12.8%
158 (Colo. Spgs. - Pueblo)	1720 Colorado Springs	El Paso, Teller.....	10.9%
	6560 Pueblo	Pueblo.....	27.5%
	Non SMSA Counties	Alamosa, Baca, Bent, Chaffee, Conejos, Costilla, Crowley, Custer, Fremont, Huerfano, Kiowa, Lake, Las Animas, Lincoln, Mineral, Otero, Prowers, Rio Grande, Saguache.....	19.0%
159 (Grand Junction)	Non SMSA	Archuleta, Delta, Dolores, Eagle, Garfield, Gunnison, Hinsdale, La Plata, Mesa, Moffat, Montezuma, Montrose, Ouray, Pitkin, Rio Blanco, Routt, San Juan, San Miguel	10.2%
156 (Cheyenne - Casper WY)	Non SMSA	Jackson County, Colorado.....	7.5%
GOALS AND TIMETABLES FOR FEMALE UTILIZATION			
Until Further Notice.....			6.9% -- Statewide

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These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Par 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
4. As used in this specification, and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the Invitation for Bids and on the plans. In cases where the work is in two or more counties covered by differing percentage goals, the highest percentage will govern.

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B. STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

1. As used in these Specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. "Minority" includes;
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractor toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any office of Federal Contract Compliance Programs Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

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5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following;
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its union have employment opportunities available, and maintain a record of the organization's responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source of community organization and of what action was taken with respect to each individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
 - d. Provide immediate written notification to the Director when the union with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
 - f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc., by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and by posting the Contractor's EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

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- g. Review, at least annually, the Contractor's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc. such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and Contractor's activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligation.

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8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goal and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form, however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

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C. SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES.

1. *General.*

- a. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required Contract. Provisions (Form FHWA 1273 or 1316, as appropriate) and these Special Provisions which are imposed pursuant to Section 140 of Title 23, U.S.C., as established by Section 22 of the Federal-Aid highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract provisions.
- b. The Contractor will work with the State highway agencies and the Federal Government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract.
- c. The Contractor and all his/her subcontractors holding subcontracts not including material suppliers, of \$10,000 or more, will comply with the following minimum specific requirement activities of equal employment opportunity: (The equal employment opportunity requirements of Executive Order 11246, as set forth in Volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway Program Manual, are applicable to material suppliers as well as contractors and subcontractors.) The Contractor will include these requirements in every subcontract of \$10,000 or more with such modification of language as is necessary to make them binding on the subcontractor.

2. *Equal Employment Opportunity Policy.* The Contractor will accept as his operating policy the following statement which is designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote the full realization of equal employment opportunity through a positive continuing program;

It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, or national origin. Such action shall include; employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training.

3. *Equal Employment Opportunity Officer.* The Contractor will designate and make known to the State highway agency contracting officers and equal employment opportunity officer (herein after referred to as the EEO Officer) who will have the responsibility for an must be capable of effectively administering and promoting an active contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

4. *Dissemination of Policy.*

- a. All members of the Contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Contractor's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum;

- (1) Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the Contractor's equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

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- (2) All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official, covering all major aspects of the Contractor's equal employment opportunity obligations within thirty days following their reporting for duty with the Contractor.
 - (3) All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate company official in the Contractor's procedures for locating and hiring minority group employees.
- b. In order to make the Contractor's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Contractor will take the following actions:
- (1) Notices and posters setting forth the Contractor's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
 - (2) The Contractor's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

5. *Recruitment.*

- a. When advertising for employees, the Contractor will include in all advertisements for employees the notation; "An Equal Opportunity Employer." All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.
- b. The Contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the Contractor will, through his EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the Contractor for employment consideration.

In the event the Contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the Contractor's compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the Contractor to do the same, such implementation violates Executive Order 11246, as amended.)

- c. The Contractor will encourage his present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.
6. *Personnel Actions.* Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, or national origin. The following procedures shall be followed;
- a. The Contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

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- b. The Contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
- c. The Contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the Contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
- d. The Contractor will promptly investigate all complaints of alleged discrimination made to the Contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the Contractor will inform every complainant of all of his avenues of appeal.

7. *Training and Promotion.*

- a. The Contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
- b. Consistent with the Contractor's work force requirements and as permissible under Federal and State regulations, the Contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.
- c. The Contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
- d. The Contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

8. *Unions.* If the Contractor relies in whole or in part upon unions as a source of employees, the Contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women with the unions, and to effect referrals by such unions of minority and female employees. Actions by the Contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

- a. The Contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
- b. The Contractor will use best efforts to incorporate an equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin.
- c. The Contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the Contractor, the Contractor shall so certify to the State highway department and shall set forth what efforts have been made to obtain such information.

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d. In the event the union is unable to provide the Contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the Contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex or national origin; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor has held that it shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the Contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such Contractor shall immediately notify the State highway agency.

9. *Subcontracting.*

- a. The Contractor will use his best efforts to solicit bids from and to utilize minority group subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of minority-owned construction firms from State highway agency personnel.
- b. The Contractor will use his best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.

10. *Records and Reports.*

- a. The Contractor will keep such records as are necessary to determine compliance with the Contractor's equal employment opportunity obligations. The records kept by the Contractor will be designed to indicate:
 - (1) The number of minority and nonminority group members and women employed in each work classification on the project.
 - (2) The Progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to contractors who rely in whole or in part on unions as a source of their work force).
 - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and
 - (4) The progress and efforts being made in securing the services of minority group subcontractors or subcontractors with meaningful minority and female representation among their employees.
- b. All such records must be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the State highway agency and the Federal Highway Administration.
- c. The Contractors will submit an annual report to the State highway agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR 1391.

Disadvantaged Business Enterprise (DBE) Contract Goal

Section 100 of the Standard Specifications is hereby revised for this project to add the following:

This is a federally-assisted construction project. As described in the CDOT DBE Standard Special Provision, the Bidder shall make good faith efforts to meet the following contract goal:

0 Percent DBE participation.

DISADVANTAGED BUSINESS ENTERPRISE (DBE)
REQUIREMENTS (LOCAL AGENCY)

October 1, 2019

DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS
(LOCAL AGENCY)

1. Overview

The Disadvantaged Business Enterprise (DBE) Program is a federally-mandated program that seeks to ensure non-discrimination in the award of U.S. Department of Transportation (DOT)-assisted contracts and to create a level playing field on which DBEs can compete fairly for DOT-assisted contracts. Local Public Agencies (LPAs) that receive federal funds, must comply with CDOT's DBE program. To such end, CDOT sets a contract goal for DBE participation for each DOT-assisted LPA Contract.

In order to be awarded the Contract, the bidder shall show that it has committed to DBE participation sufficient to meet the goal or has otherwise made good faith efforts to do so. CDOT will amend the goal prior to award if the lowest apparent bidder demonstrates that good faith efforts were made but sufficient commitments to meet the goal could not be obtained.

CDOT and the LPA will monitor the progress of the Contractor throughout the project to ensure that the Contractor's DBE commitments are being fulfilled. Modifications to the commitments must be approved by the CDOT Regional Civil Rights Office (RCRO). CDOT may withhold payment or seek other contractual remedies if the Contractor is not complying with the requirements of this special provision. Upon completion of the Contract, CDOT may require the LPA to reduce the final payment to the Contractor if the Contractor has failed to fulfill the commitments or made good faith efforts to meet the contract goal.

For general assistance regarding the DBE program and compliance, contact CDOT's Civil Rights and Business Resource Center (CRBRC) at (303)757-9234. For project specific issues, contact the LPA Engineer or RCRO.

All forms referenced herein can be found on the CDOT website in the forms library.

2. Contract Assurance

By submitting a proposal for this Contract, the bidder agrees to the following assurance and shall include it verbatim in all (including non-DBE) subcontracts:

The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to: (1) Withholding monthly progress payments; (2) Assessing sanctions; (3) Liquidated damages; and/or (4) Disqualifying the contractor from future bidding as non-responsible.

3. Definitions

Terms not defined herein shall have the meaning provided in the CDOT Standard Specifications for Road and Bridge Construction.

- A. *Commitment.* A commitment is a portion of the Contract, identified by dollar amount and work area, designated by the bidder or Contractor for participation by a particular DBE. Commitments are submitted to CDOT via Form 1414, Anticipated DBE Participation Plan, or via Form 1420, DBE Plan Modification Request. Once approved, commitments are enforceable obligations of the Contract.

- B. *Commercially Useful Function (CUF)*. Responsibility for the execution of the work and carrying out such responsibilities by actually performing, managing and supervising the work as further described in Section 8 below.
- C. *Contract Goal*. The percentage of the contract designated by CDOT for DBE participation. The contract goal for this contract is provided in the Project Special Provision Disadvantaged Business Enterprise Contract Goal.
- (1) The bidder/Contractor shall make good faith efforts to fulfill the contract goal with eligible DBE participation. For determining whether the contract goal was met prior to award, the contract goal shall be based upon the proposal amount excluding force account items. For determining whether the contract goal was met during and upon completion of the project, the contract goal shall be based upon the total earnings amount.
 - (2) If the lowest apparent bidder demonstrates that it was unable to meet the contract goal but made good faith efforts to do so, the contract goal will be amended and the revised contract goal will be provided on Form 1417, Approved DBE Participation Plan.
- D. *Disadvantaged Business Enterprise (DBE)*. A Colorado-certified Disadvantaged Business Enterprise listed on the Colorado Unified Certification Program (UCP) DBE Directory at www.coloradodbe.org.
- E. *DBE Program Manual*. The manual maintained by the CRBRC which details CDOT's policies and procedures for administering the DBE program. A copy of the DBE Program Manual is available on the CRBRC webpage.
- F. *Eligible Participation*. Work by a DBE that counts toward fulfillment of the contract goal as described in Section 4 below.
- G. *Good Faith Efforts*. All necessary and reasonable steps to achieve the contract goal which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if not fully successful. Good faith efforts are evaluated prior to award and throughout performance of the Contract. For guidance on good faith efforts, see 49 CFR Part 26, Appendix A.
- H. *Joint Check*. A check issued by the Contractor or one of its subcontractors to a DBE firm and a material supplier or other third party for materials or services to be incorporated into the work.
- I. *Reduction*. A reduction occurs when the Contractor reduces a commitment to a DBE. A reduction constitutes a partial termination.
- J. *Subcontractor*. An individual, firm, corporation or other legal entity to whom the Contractor sublets part of the Contract. For purposes of this special provision, the term subcontractor includes suppliers.
- K. *Substitution*. Substitution occurs when a Contractor seeks to find another DBE to perform work on the contract as a result of a reduction or termination.
- L. *Termination*. A termination occurs when a Contractor no longer intends to use a DBE for fulfillment of a commitment.
- M. *Total Earnings Amount*: Amount of the Contract earned by the Contractor, including approved changes and approved force account work performed, but not including any deductions for liquidated damages, price reduced material, work time violations, overweight loads or liens. The amount of the Contract earned does not include plan force account items (i.e. OJT, pavement incentives, etc).
- N. *Work Code*. A code to identify the work that a DBE is certified to perform. A work code includes a six digit North American Industry Classifications System code plus a descriptor. Work codes are listed on a firm's profile on the UCP DBE Directory. The Contractor may contact the CRBRC to receive guidance on

whether a work code covers the work to be performed.

4. Eligible Participation

The following rules will be used to determine whether work performed by a DBE qualifies as eligible participation on the Contract:

- A. *Work Must be Identified in Commitment.* The work performed by the DBE must be reasonably construed to be included in the work area and work code identified by the Contractor in the approved commitment.
- (1) If the Contractor intends to use a DBE for work that was not listed in the commitment, the Contractor shall submit Form 1420, DBE Participation Plan Modification for approval of the modification. Unapproved work will not count toward the contract goal.
 - (2) A DBE commitment cannot be modified to include work for which the DBE was not certified at the time of the approval of the original commitment.
- B. *DBE Must be Certified to Perform the Work.* The DBE must be certified to perform the work upon submission of the commitment and upon execution of the DBE's subcontract.
- (1) When a commitment has been made, but upon review of Form 205, Sublet Permit, CDOT determines that the DBE is no longer certified in the work code which covers the work to be performed, the Contractor may not use the DBE's participation toward the contract goal. The Contractor shall terminate the DBE commitment and seek substitute DBE participation in accordance with Section 9 below.
 - (2) A DBE's work will continue to count as eligible participation if the DBE was certified upon approval of Form 205, Sublet Permit and the certification status changes during the performance of the work.
 - (3) Suppliers must be certified upon execution of the purchase order.
- C. *DBE Performs the Work.* Eligible participation will only include work actually performed by the DBE with its own forces.
- (1) Work performed by the DBE includes the cost of supplies and materials obtained by the DBE for its work on the Contract, including any equipment leased by the DBE, provided that such supplies or equipment are not purchased or leased from the Contractor or a subcontractor that is subletting to the DBE.
 - (2) The term "work actually performed by the DBE with its own forces" includes work by temporary employees, provided such employees are under the control of the DBE.
 - (3) If CDOT or the LPA determines that a DBE has not performed a CUF on the project, no participation by such DBE shall count toward the contract goal.
- D. *DBE Subcontracts to Another Firm.* When a DBE subcontracts part of the work, the value of the subcontracted work may only be counted toward the goal if the subcontractor is a DBE. Performance by non-DBE subcontractors, including non-DBE trucking firms and owner-operators, shall be deducted from the DBE's participation.
- E. *DBE Received Payment for the Work.* Eligible participation only includes work for which the DBE has received payment, including the release of its retainage.

- F. *Special Calculations for Suppliers.* When a DBE supplies goods on a project, the DBE may be classified as a manufacturer, dealer or broker. The DBE's status as a manufacturer, dealer or broker is determined on a contract-by-contract basis and is based upon the actual work performed.
- (1) When a DBE is deemed to be acting as a manufacturer, one hundred percent of the commitment will count as eligible participation.
 - (2) When a DBE is deemed to be acting as a regular dealer (i.e. non-manufacturer supplier), only sixty percent of the commitment will count as eligible participation.
 - (3) When a DBE is deemed to be acting as a broker, only the reasonable brokerage fee will count as eligible participation.
- G. *Reasonable Fee for Contract-Specific Services.* Services shall count toward the contract goal only if they are specifically required for the performance of the Contract. Non-contract specific expenses may not be counted toward the contract goal. Fees for services must be reasonable. Services include but are not limited to professional services, public involvement, etc. In the case of temporary employment placement agencies, only the placement fee for an individual to be specifically and exclusively used for work on the contract shall count as eligible participation.
- H. *Pre-Approval for Joint Venture Participation.* When a DBE is a participant in a joint venture, the DBE must apply to CDOT to determine how much of the work performed by the joint venture will count toward the contract goal. The DBE shall complete Form 893, Information for Determining DBE Participation when a Joint Venture Includes a DBE. Form 893 shall be submitted to CDOT CRBRC no less than ten days before the submission of the Proposal or to the RCRO no less than ten days before submission of the Form 205 to ensure sufficient time for review.

5. Proposal Requirements

In order to be eligible for award, the following shall be submitted with the proposal to the LPA:

- A. *Form 1413, Bidders List.* The bidder shall list each subcontractor (including both DBE and non-DBE subcontractors) that submitted a quote for participation on the project. Failure to submit a signed Form 1413 will result in rejection of the proposal.
- B. *Form 1414, Anticipated DBE Participation Plan.* If the Contract Goal is greater than zero, the bidder shall submit Form 1414 to document anticipated DBE participation.
- (1) If the Bidder has not obtained any DBE commitments, it shall still submit Form 1414 documenting zero anticipated participation. If the Contract Goal is greater than zero, failure to submit a signed Form 1414 shall result in rejection of the proposal.
 - (2) The bidder shall list the DBE, work area(s), commitment amount and estimated eligible participation for each commitment. Once Form 1414 is submitted, a commitment may only be terminated or reduced in accordance with Section 9 below. The bidder is responsible for ensuring that commitments, and the estimated eligible participation resulting therefrom, have been properly calculated prior to submitting its proposal.
 - (3) If the bidder is a DBE, the bidder must include itself in Form 1414 and list the work area(s) and amount that it intends to self-perform and count as eligible participation on the contract.
 - (4) Commitments may be made to second tier or lower DBE subcontractors; however, the Contractor is ultimately responsible for the fulfillment of the commitment and shall sign the Form 1415, Commitment Confirmation.

6. Additional Forms Due Prior to Award.

If the contract goal is greater than zero, or if the bidder has voluntarily made commitments, the Bidder shall

submit the following forms to the LPA within five calendar days of selection as the lowest apparent bidder. These forms must be submitted to the CDOT CRBRC concurrent with the request for concurrence to award.

- A. *Form 1415, Commitment Confirmation.* A Form 1415, Commitment Confirmation shall be obtained from each DBE listed on Form 1414. The bidder shall complete Section 1 and the DBE shall complete Section 2 of Form 1415. Form 1415s shall be consistent with the commitments listed on Form 1414. The bidder shall not modify commitments listed on Form 1414 without good cause and approval from CDOT. The bidder shall contact CDOT if any issues arise which may require the bidder to alter or terminate a commitment.
- B. *Form 1416, Good Faith Effort Report.* If the total eligible participation listed on Form 1414 does not meet the contract goal, the lowest apparent bidder shall also submit Form 1416, Good Faith Effort Report and any supporting documentation that the bidder would like considered by CDOT as evidence of good faith efforts.

7. Commitment and Good Faith Effort Review

- A. *Commitment Review.* CDOT will evaluate the Form 1414 and each Form 1415 to ensure that the commitment is valid and has been properly calculated. CDOT may investigate or request additional information in order to confirm the accuracy of a commitment. If CDOT determines that the total estimated eligible participation of the commitments does not meet the contract goal, within two business days of notice from CDOT, the bidder shall submit Form 1416 to CDOT.
- B. *Good Faith Effort Review.* If the total eligible participation of Form 1414 and all supporting Form 1415s does not meet the contract goal, CDOT will review Form 1416 and all supporting documentation submitted by the bidder in order to determine whether the bidder has demonstrated good faith efforts to obtain DBE participation. CDOT will use 49 CFR Part 26, Appendix A as a guide for determining whether the bidder made good faith efforts to meet the contract goal. A bidder will be deemed to not have made good faith efforts if the bidder lists a DBE for a work area for which the DBE is not certified and the bidder cannot establish a reasonable basis for its determination. CDOT may consider and approve commitments made after submission of the bid if the Bidder demonstrates that (1) good faith efforts were made prior to submission of the bid and (2) there is a reasonable justification for not obtaining the commitments prior to submission of the bid.
- C. *Administrative Reconsideration.* If CDOT determines that the bidder did not demonstrate good faith efforts to meet the contract goal, it will provide the bidder and LPA with written notice of its determination. The bidder will be provided an opportunity to request administrative reconsideration of the decision. The process for reconsideration is set forth in the *Good Faith Effort Appeal Process*, which is an Appendix I to the DBE Program Manual. A copy of the *Good Faith Effort Appeal Process* will be included in the written notice from CDOT.
- D. *Form 1417, Approved DBE Participation Plan.* If CDOT determines that the bidder has met the contract goal or made good faith efforts to do so, CDOT will issue to the bidder, with a copy to the LPA, Form 1417, Approved DBE Participation Plan, documenting the approved commitments. If CDOT determines that the bidder did not meet the contract goal but made good faith efforts to do so, via the Form 1417 CDOT will amend the contract goal in accordance with the commitments that were obtained and attach an explanation of its determination.

8. Ongoing Oversight of DBE Participation

- A. *Consistency Review.* CDOT will review Form 205, Sublet Permit Application to determine whether the work being sublet is consistent with the DBE commitments. CDOT may withhold approval of the sublet or direct the LPA to stop performance of the work if the Contractor has reduced, terminated, or otherwise modified the type or amount of work to be performed by a DBE without seeking prior approval.
- B. *Form 1419, DBE Participation Report.* The Contractor shall submit Form 1419, DBE Participation Report to the LPA Engineer on a quarterly basis (January 15, April 15, July 15, and October 15) and upon completion of the Contract. The LPA may withhold progress payments if the quarterly Form 1419 is not received on time. The LPA will not provide final payment on the Contract until the final Form 1419 has been reviewed and approved by the CDOT RCRO.
- C. *Joint Checks.* All joint checks must be approved by the CDOT RCRO before they are used in payment to a DBE. Joint checks used in payments to DBEs will be monitored closely to ensure (1) the DBE is performing a CUF and (2) the joint checks are not being used in a discriminatory manner. The Contractor shall request approval for the use of a joint check in a written letter signed by the DBE and the Contractor, stating the reason for the joint checks and the approximate number of checks that will be needed.
- D. *Commercially Useful Function.* CDOT will monitor performance during the Contract to ensure each DBE is performing a CUF. If CDOT or the LPA determines that a DBE is not performing a CUF, no work performed by such DBE shall count as eligible participation. The DBE, Contractor, and any other involved third parties may also be subject to additional enforcement actions.
- (1) When determining whether a DBE is performing a CUF, CDOT and the LPA will consider the amount of work subcontracted, industry practices, the amount the firm is to be paid compared to the work performed and eligible participation claimed, and any other relevant factors.
 - (2) With respect to material and supplies used on the Contract, in order to perform a CUF the DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing the material, if applicable, and paying for the material itself.
 - (3) With respect to trucking, in order to perform a CUF, the DBE trucking firm must own and operate at least one fully licensed, insured and operational truck used on the Contract. Additionally, the DBE trucking firm must be responsible for the management and supervision of the entire trucking operation for which it is responsible on the Contract.
 - (4) A DBE does not perform a CUF when its role is limited to that of an extra participant in a transaction, contract or project through which funds are passed in order to obtain the appearance of DBE participation. CDOT will evaluate similar transactions involving non-DBEs in order to determine whether a DBE is an extra participant.
 - (5) If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work than would be expected on the basis of normal industry practice for the type of work involved, CDOT and the LPA will presume that the DBE is not performing a CUF. The DBE may present evidence to rebut this presumption.

9. DBE Participation Plan Modifications

- A. *Contractor must Use DBEs Listed in Approved Plan.* The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which it is listed unless the Contractor obtains the CDOT RCRO's written consent to terminate, reduce or modify the commitment. Unless CDOT grants such consent, the Contractor will not be entitled to payment for the work or materials. Failure to carry out the requirements of this section is a material breach of the Contract and may result in the termination of the Contract or other remedies established by CDOT or the LPA.
- B. *Form 1420, DBE Participation Plan Modification Request.* During the performance of the Contract, the Contractor shall use Form 1420, DBE Participation Plan Modification Request to communicate all requests for termination, reduction, substitution, and waivers to the CDOT RCRO. One Form 1420 may include multiple requests and must be submitted at the time of the occurrence or, if that is not possible, within a reasonable time of the occurrence requiring termination, reduction, substitution or waiver.
- C. *Commitment Terminations and Reductions.* No commitment shall be terminated or reduced without CDOT's approval. Terminations and reductions include, but are not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces, those of an affiliate, a non-DBE firm or with another DBE firm. In order to receive approval, the Contractor shall:
- (1) Have good cause for termination or reduction. Good cause may include:
 - (i) the DBE fails or refuses to execute a written contract;
 - (ii) the DBE fails or refuses to perform the work of its subcontract consistent with normal industry standards, provided that such failure is not the result of bad faith or discriminatory actions of the Contractor or one of its subcontractors;
 - (iii) the DBE fails to meet reasonable, nondiscriminatory bond requirements;
 - (iv) the DBE becomes bankrupt, insolvent, or exhibits credit unworthiness;
 - (v) the DBE is ineligible to work because of suspension or debarment proceedings or other state law;
 - (vi) the DBE is not a responsible contractor;
 - (vii) the DBE voluntarily withdraws from the project and provides written notice to CDOT,
 - (viii) the DBE is ineligible to receive DBE credit for the work required;
 - (ix) the DBE owner dies or becomes disabled and is unable to complete the work;
 - (x) the DBE ceases business operations or otherwise dissolves;
 - (xi) or other documented good cause that compels termination. Good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.
 - (2) Provide the DBE notice of the Contractor's intent to terminate or reduce the commitment and the reason for such termination or reduction, with a copy to the CDOT RCRO and LPA;
 - (3) In the notice of intent, provide the DBE at least five calendar days to respond to the notice and inform CDOT and the Contractor of the reasons, if any, why it objects to the proposed termination

or reduction and any reasons that it shall not be approved. The Contractor is not required to provide the five calendar days written notice in cases where the DBE in question has provided written notice that it is withdrawing from the subcontract or purchase order. The notice period may be reduced by the CDOT RCRO if required by public necessity.

- (4) Following the notice period, if the Contractor decides to proceed, submit Form 1420 requesting approval of the termination or reduction.
- (5) When a commitment is terminated or reduced (including when a DBE withdraws), make good faith efforts to find another DBE to substitute. These good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the contract as the participation that was terminated or reduced up to the contract goal.

D. *Contract Changes.* In the event of a contract change:

- (1) If the LPA eliminates or reduces work committed to a DBE, such change shall be considered good cause for termination or reduction in accordance with Section 9.B above. The Contractor shall follow the processes outlined in Section 9.B.
- (2) If the LPA issues a change which increases or adds new work items, the Contractor shall ensure that it has obtained sufficient DBE participation to meet the Contract Goal, or has made good faith efforts to do so.

E. *Process for Substitution or Increase in Participation to Meet the Contract Goal.* When the Contractor must obtain additional DBE participation to meet the Contract Goal, whether resulting from an approved termination or reduction or a change to the Contract, the Contractor shall:

- (1) Increase the participation of a DBE for any work items previously identified in an approved commitment without seeking CDOT approval; provided, however, that at its discretion, the CDOT RCRO may request a Form 1420 documenting such additional participation; or
- (2) If the Contractor needs to add new work to a commitment or obtain additional participation from a DBE that is not already participating on the contract pursuant to an approved commitment, submit a Form 1420 and Form 1415 to the RCRO requesting approval of the additional participation; or
- (3) If the Contractor determines that additional DBE participation cannot be obtained, submit a Form 1420 to the RCRO requesting waiver of the participation. The Contractor shall include its justification for not obtaining additional participation and, at its discretion, CDOT may require additional information regarding the efforts of the Contractor. If the Contractor has not obtained substitute participation, the RCRO may require the Contractor to submit evidence of good faith efforts to substitute. The contractor shall have seven days to submit such information. This period may be extended at the discretion of the RCRO.

10. Payment Reduction

The Contractor's retainage will not be released until the CDOT RCRO has determined whether the Contractor will be subject to a payment reduction. Payment reductions will be calculated as follows:

- A. *Failure to Fulfill Commitments.* If the Contractor terminated or reduced a commitment, the Contractor will be subject to a payment reduction for any termination or reduction which was not approved via a Form 1420.
- B. *Failure to Meet Contract Goal.* If the Contractor failed to meet the contract goal, the Contractor will be subject to a payment reduction for the portion of the contract goal that was not met and was not waived via an approved Form 1420.
- C. *Duplication.* The contractor will not be subject to duplicate reduction for the same offense.
- D. *Adjustments.* CDOT may adjust the payment reduction wherein the Contractor demonstrates that its failure to obtain DBE participation was due to circumstances outside of its control.

11. Other Enforcement

- A. *Investigations.* As it determines necessary, CDOT or the LPA may conduct reviews or investigations of participants. All participants, including, but not limited to, DBE firms and applicants for DBE certification, complainants, and contractors using DBE firms to meet contract goals, are required to cooperate fully and promptly with compliance reviews, certification reviews, investigations, and other requests for information.
- B. *Intimidation and retaliation.* Participants shall not intimidate, threaten, coerce, or discriminate against any individual or firm for the purpose of interfering with any right or privilege secured by the DBE program or because the individual or firm has made a complaint, testified, assisted, or participated in any manner in an investigation, proceeding, or hearing under the DBE program.
- C. *Consequences of Non-Compliance.* Failure to comply with subsections 11 A. or 11 B. shall be a ground for appropriate action against the party involved (e.g., with respect to recipients, a finding of noncompliance; with respect to DBE firms, denial of certification or removal of eligibility and/or suspension and debarment; with respect to a complainant or appellant, dismissal of the complaint or appeal; with respect to a contractor which uses DBE firms to meet goals, findings of non-responsibility for future contracts and/or suspension and debarment).
- D. *Fraud and Misrepresentation.* If CDOT or the LPA determines that a Contractor or subcontractor was a knowing and willing participant in any intended or actual subcontracting arrangement contrived to artificially inflate DBE participation or any other business arrangement determined by CDOT or the LPA to be unallowable, or if the Contractor engages in repeated violations, falsification or misrepresentation, CDOT may:
 - (1) refuse to count any fraudulent or misrepresented DBE participation;
 - (2) withhold progress payments to the Contractor commensurate with the violation;
 - (3) suspend or reduce the Contractor's prequalification status;
 - (4) refer the matter to the Office of Inspector General of the US Department of Transportation for investigation; or
 - (5) seek any other available contractual remedy.

REVISION OF SECTION
DISADVANTAGED BUSINESS
ENTERPRISE (DBE) REQUIREMENTS

NOTICE

This Standard Special Provision (SSP) revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*. These are the official instructions for its use on CDOT construction projects, and have been reviewed, approved, and issued by the Construction Engineering Services Branch. Use as written without change. Do not use modified versions of this SSP on CDOT construction projects. Do not use this special provision on CDOT projects in a manner other than specified in the instructions without approval by CDOT's Standards and Specifications Unit. The instructions for use appear below.

Other agencies using the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision appropriately and at their own risk.

Revise **The DISADVANTAGED BUSINESS ENTERPRISE (DBE) REQUIREMENTS, 7 (b) Work Included in Commitment and/or Verified via form 205 or form 1425**, as shown:

(b) *Work Included in Commitment and/or Verified via Form 205 or Form 1425*. The work performed and/or supplies garnered by the DBE must be reasonably construed by CDOT to be included in the work area and work code identified by the Contractor in an approved commitment and verified via Form 205 or Form 1425. The work identified on a Form 1425 shall not count against the Contractor's thirty percent as required under CDOT Standard Special Provisions for Road and Bridge Construction subsection 108.01.

If the Contractor intends to use a DBE for work that was not listed in the original commitment, the Contractor shall submit a request for modification. Unapproved work will not count toward the contract goal. A DBE commitment cannot be modified to include work for which the DBE was not certified at the time of the approval of the original commitment unless such work is in addition to the original commitment.

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding (29 CFR 5.5)

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics,

including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records (29 CFR 5.5)

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or

subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees (29 CFR 5.5)

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State

Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor

set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility (29 CFR 5.5)

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1 of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section. 29 CFR 5.5.

* \$27 as of January 23, 2019 (See 84 FR 213-01, 218) as may be adjusted annually by the Department of Labor; pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990).

3. Withholding for unpaid wages and liquidated damages.

The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section. 29 CFR 5.5.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section. 29 CFR 5.5.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or

equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance

with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.326.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders

or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.326.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant

who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is

submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(b) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(c) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier

subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.
2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS
ROAD CONTRACTS** (23 CFR 633, Subpart B, Appendix B)

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

FEDERAL-AID HIGHWAY CONSTRUCTION CONTRACTORS ANNUAL EEO REPORT

1. MARK APPROPRIATE BLOCK <input type="checkbox"/> Contractor <input type="checkbox"/> Subcontractor	2. COMPANY NAME, CITY, STATE: _____	3. PROJECT NUMBER: _____	4. DOLLAR AMOUNT OF CONTRACT: _____	5. PROJECT LOCATION: (County and State) _____
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This collection of information is required by law and regulation 23 U.S.C. 140a and 23 CFR Part 230. The OMB control number for this collection is 2125-0019 expiring in August, 2019.

6. WORKFORCE ON FEDERAL-AID AND CONSTRUCTION SITE(S) DURING LAST FULL PAY PERIOD ENDING IN JULY 20__ (INSERT YEAR)

JOB CATEGORIES	TABLE A																TABLE B					
	TOTAL EMPLOYED		TOTAL RACIAL/ ETHNIC MINORITY		BLACK or AFRICAN AMERICAN		HISPANIC OR LATINO		AMERICAN INDIAN OR ALASKA NATIVE		ASIAN		NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER		TWO OR MORE RACES		WHITE		APPRENTICES		ON THE JOB TRAINEES	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
OFFICIALS	0	0	0	0																		
SUPERVISORS	0	0	0	0																		
FOREMEN/WOMEN	0	0	0	0																		
CLERICAL	0	0	0	0																		
EQUIPMENT OPERATORS	0	0	0	0																		
MECHANICS	0	0	0	0																		
TRUCK DRIVERS	0	0	0	0																		
IRONWORKERS	0	0	0	0																		
CARPENTERS	0	0	0	0																		
CEMENT MASONS	0	0	0	0																		
ELECTRICIANS	0	0	0	0																		
PIPEFITTER/PLUMBERS	0	0	0	0																		
PAINTERS	0	0	0	0																		
LABORERS-SEMI SKILLED	0	0	0	0																		
LABORERS-UNSKILLED	0	0	0	0																		
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE C (Table B data by racial status)

APPRENTICES	0	0	0	0																		
OJT TRAINEES	0	0	0	0																		

8. PREPARED BY: (Signature and Title of Contractors Representative) _____	9. DATE _____	10. REVIEWED BY: <i>(Signature and Title of State Highway Official)</i> _____	11. DATE _____
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ON THE JOB TRAINING CONTRACT GOAL

The Department has determined that On the Job Training shall be provided to trainees with the goal of developing full journey workers in the types of trade or classification involved. The contract goal for On the Job Trainees working in an approved training plan in this Contract has been established as follows:

Minimum number of total On the Job Training required 0 hours

August 28, 2018

ON THE JOB TRAINING LOCAL AGENCY PROJECTS NOT USING LCPtracker FOR REPORTING

NOTICE

This is a standard special provision that revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*. It has gone through a formal review and approval process and has been issued by CDOT's Project Development Branch with formal instructions regarding its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by the Standards and Specifications Unit of the Project Development Branch. The instructions for use on CDOT construction projects appear below.

Other agencies that use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

1
ON THE JOB TRAINING
LOCAL AGENCY PROJECTS NOT
USING LCPTracker FOR REPORTING

This training special provision is an implementation of 23 U.S.C. 140 (a). The Contractor shall meet the requirements of the FHWA 1273 for all apprentices and trainees.

As part of the Contractor's Equal Employment Opportunity Affirmative Action Program, training shall be provided on projects as follows:

1. The Contractor shall provide on the job training aimed at developing full journey workers in the skilled craft identified in the approved training plan. The Contractor shall provide at a minimum, required training hours listed in the Project Special Provisions for each project.
2. The primary objective of this specification is to train and upgrade women and minority candidates to full journey worker status. The Contractor shall make every reasonable effort to enroll and train minority and women workers. This training commitment shall not be used to discriminate against any applicant for training whether or not the applicant is a woman or minority.
3. The Contractor may employ temporary workers from CDOT supportive services providers to meet OJT requirements. Information pertaining to supportive services providers may be obtained by calling the CDOT OJT Coordinator at the number shown on the link <http://www.coloradodot.info/business/equal-opportunity/training.html>
4. An employee shall not be employed or utilized as a trainee in a skilled craft in which the employee has achieved journey status.
5. The minimum length and type of training for each skilled craft shall be as established in the training program selected by the Contractor and approved by the Department and the Colorado Division of the Federal Highway Administration (FHWA), or the U. S Department of Labor (DOL), Office of Apprenticeship or recognized state apprenticeship agency. To obtain assistance or program approval contact:

CDOT Center for Equal Opportunity
4201 East Arkansas Avenue
Denver, CO 80222
co@dot.state.co.us
1-800-925-3427
6. The Contractor shall pay the training program wage rates and the correct fringe benefits to each approved trainee employed on the project and enrolled in an approved program. The minimum trainee wage shall be no less than the wage for the Guardrail Laborer classification as indicated in the wage decision for the project.
7. The CDOT Regional Civil Rights Manager must approve all proposed apprentices and trainees for the participation to be counted toward the project goal and reimbursement. Approval must occur before training begins. Approval for the apprentice or trainee to begin work on a CDOT project will be based on:
 - A. Evidence of the registration of the trainee or apprentice into the approved training program.
 - B. The completed Form 838 for each trainee or apprentice as submitted to the Engineer.
8. Before training begins, the Contractor shall provide each trainee with a copy of the approved training program, pay scale, pension and retirement benefits, health and disability benefits, promotional opportunities, and company policies and complaint procedures.
9. Before training begins, the Contractor shall submit a copy of the approved training program and CDOT Form 1337 to the Engineer. Progress payments may be withheld until this is submitted and approved and may be withheld if the approved program is not followed.

**ON THE JOB TRAINING
LOCAL AGENCY PROJECTS NOT
USING LCPTracker FOR REPORTING**

10. On a monthly basis, the Contractor shall provide to the Engineer a completed On the Job Training Progress Report (Form 832) for each approved trainee or apprentice on the project. The Form 832 will be reviewed and approved by the Engineer before reimbursement will be made. The Contractor will be reimbursed for no more than the OJT Force Account budget. At the discretion of the Engineer and if funds are available, the Engineer may increase the force account budget and the number of reimbursable training hours through a Change Order. The request to increase the force account must be approved by the Engineer prior to the training.
11. Upon completion of training, transfer to another project, termination of the trainee or notification of final acceptance of the project, the Contractor shall submit to the Engineer a "final" completed Form 832 for each approved apprentice or trainee.
12. All forms are available from the CDOT Center for Equal Opportunity, through the CDOT Regional Civil Rights Manager, or on CDOT's website at <http://www.coloradodot.info/business/bidding/Bidding%20Forms/Bid%20Winner%20Forms>
13. Forms 838 and 832 shall be completed in full by the Contractor. Reimbursement for training is based on the number of hours of on the job training documented on the Form 832 and approved by the Engineer. The Contractor shall explain discrepancies between the hours documented on Form 832 and the corresponding certified payrolls.
14. The OJT goal (# of training hours required) for the project will be included in the Project Special Provisions and will be determined by the Regional Civil Rights Manager after considering:
 - A. Availability of minorities, women, and disadvantaged for training;
 - B. The potential for effective training;
 - C. Duration of the Contract;
 - D. Dollar value of the Contract;
 - E. Total normal work force that the average bidder could be expected to use;
 - F. Geographic location;
 - G. Type of work; and
 - H. The need for additional journey workers in the area
 - I. The general guidelines for minimum total training hours are as follows:

Contract dollar value	Minimum total training hours to be provided on the project
Up to 1 million	0
>1 - 2 million	320
>2 - 4 million	640
>4 - 6 million	1280
>6 - 8 million	1600
>8 - 12 million	1920
>12 - 16 million	2240
>16 - 20 million	2560
For each increment of \$5 million, over \$20 million	1280

ON THE JOB TRAINING
LOCAL AGENCY PROJECTS NOT
USING LCPtracker FOR REPORTING

15. The number of training hours for the trainees to be employed on the project shall be as shown in the Contract. The trainees or apprentices employed under the Contract shall be registered with the Department using Form 838, and must be approved by the Regional Civil Rights Manager before training begins for the participation to be counted toward the OJT project goal. The goal will be met by an approved trainee or apprentice working on that project; or, if a Contractor's apprentice is enrolled in a DOL approved apprenticeship program and registered with CDOT using Form 838 and working for the Contractor on a non-CDOT project. The hours worked on the non-CDOT project may be counted toward the project goal with approved documentation on Form 832. Training hours will be counted toward one project goal.
16. Subcontractor trainees who are enrolled in an approved Program may be used by the Contractor to satisfy the requirements of this specification.
17. The Contractor will be reimbursed \$2.00 per hour worked for each apprentice or trainee working on a CDOT project and whose participation toward the OJT project goal has been approved.
18. The Contractor shall have fulfilled its responsibilities under this specification if the CDOT Regional Civil Rights Manager has determined that it has provided acceptable number of training hours.
19. Failure to provide the required training will result in the following disincentives: A sum representing the number of training hours specified in the Contract, minus the number of training hours worked as certified on Form 832, multiplied by the journey worker hourly wages plus fringe benefits [(A hours – B hours worked) x (C dollar per hour + D fringe benefits)] = Disincentives Assessed. Wage rate will be determined by averaging the wages for the crafts listed on Form 1337. The Engineer will provide the Contractor with a written notice at Final Acceptance of the project informing the Contractor of the noncompliance with this specification which will include a calculation of the disincentives to be assessed.

REVISION OF SECTION 106
BUY AMERICA REQUIREMENTS

NOTICE

This Standard Special Provision (SSP) revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*. These are the official instructions for its use on CDOT construction projects, and have been reviewed, approved, and issued by the Construction Engineering Services Branch. Use as written without change. Do not use modified versions of this SSP on CDOT construction projects. Do not use this special provision on CDOT projects in a manner other than specified in the instructions without approval by CDOT's Standards and Specifications Unit. The instructions for use appear below.

Other agencies using the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision appropriately and at their own risk.

Section 106 of the Standard Specifications as follows:

106.11 Buy America Requirements, delete and replace 106.11(a) with the following:

- (a) *Steel and Iron*. All manufacturing processes, including the application of a coating, for all steel and iron products permanently incorporated in the work shall have occurred in the United States of America. All manufacturing processes include the processes that change the raw ore or scrap metal into a finished steel or iron product. This requirement will not prevent a minimal use of foreign steel or iron, provided the total cost, including delivery to the project, of all such steel and iron products does not exceed one-tenth of one percent of the total contract cost or \$2,500, whichever is greater. When there is foreign steel or iron permanently incorporated into the project, the Contractor shall provide documentation of the project delivered cost of that foreign steel or iron.

The Contractor shall maintain on file Buy America certifications that every process from either the original smelting or melting operation, including the application of a coating, performed on steel or iron products either has or has not been carried out in the United States of America. These Buy America certifications apply to every steel and iron product that requires pre-inspection, pretesting, certified test results, or a certificate of compliance. Shipping invoices, bar lists, and mill test reports shall accompany the Buy America certifications. The Contractor shall obtain a Buy America certification from each supplier, distributor, fabricator, and manufacturer that has handled each steel or iron product. These Buy America certifications shall create a chain of custody trail for every supplier, distributor, fabricator, and manufacturer that handled the steel or iron product and shall include certified mill test reports with heat numbers from either the original smelting or melting operation. Upon request, the Contractor shall allow the State, FHWA, and their representatives access to the Buy America certifications including supporting documentation. When the Contractor does not provide the Buy America certifications at the Engineer's request, the Engineer will reject the steel or iron product.

Before the permanent incorporation into the project and before payment for steel or iron products, the Contractor shall provide an assurance document. The assurance document shall certify in writing that the steel or iron products comply with Buy America requirements; the Buy America certifications and supporting documentation are on file; and when requested, the Contractor has submitted the required documentation to CDOT. The Contractor shall maintain an assurance

**REVISION OF SECTION 106
BUY AMERICA REQUIREMENTS**

document that summarizes the date and quantity of all steel and iron material delivered to the project. This assurance document shall include the pay item, quantity of material delivered to the project, mill test reports with heat numbers, and the quantity of material installed by the monthly progress payment cutoff date. The assurance document shall reconcile the pay item quantities and certified mill test reports, for the material delivered to the project to the Buy America certifications and supporting documentation. The assurance documentation shall include the cost of all foreign steel or iron delivered and permanently incorporated into the project. The Contractor shall also submit a summary for each month that no steel or iron products are incorporated into or delivered to the project. The Contractor shall submit the assurance documentation to the Engineer by the monthly progress payment cutoff date. The assurance documentation does not relieve the Contractor of providing the necessary Buy America certifications and supporting documentation for steel or iron products.

October 1, 2021

REVISION OF SECTION 109
PROMPT PAYMENT
(LOCAL AGENCY)

NOTICE

This is a standard special provision that revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*. It has gone through a formal review and approval process and has been issued by CDOT's Project Development Branch with formal instructions for its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by CDOT's Standards and Specifications Unit. The instructions for use on CDOT construction projects appear below.

Other agencies which use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

Section 109 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 109.06(e) and replace with the following:

(e) *Prompt Payment*. The Contractor shall pay subcontractors and suppliers for all work which has been satisfactorily completed within seven calendar days after receiving payment for that work from the Local Public Agency (LPA). For the purpose of this section only, work shall be considered satisfactorily complete when the LPA has made payment for the work. The Contractor shall include in all subcontracts a provision that this requirement for prompt payment to subcontractors and suppliers must be included in all subcontracts at every tier. The Contractor shall ensure that all subcontractors and suppliers at every tier are promptly paid. If the Contractor or its subcontractors fail to comply with this provision, the Engineer will not authorize further progress payment for work performed directly by the Contractor or the noncompliant subcontractor until the required payments have been made. The Engineer will continue to authorize progress payments for work performed by compliant subcontractors.

Delete subsection 109.06(f)5 and replace with the following:

5. In determining whether satisfactory completion has been achieved, the Contractor may require the subcontractor to provide documentation such as certifications and releases, showing that all laborers,

REVISION OF SECTION 109
PROMPT PAYMENT
(LOCAL AGENCY)

lower-tiered subcontractors, suppliers of material and equipment, and others involved in the subcontractor's work have been paid in full. The Contractor may also require any documentation from the subcontractor that is required by the subcontract or by the Contract between the Contractor and the LPA or by law such as affidavits of wages paid, material acceptance certifications and releases from applicable governmental agencies to the extent that they relate to the subcontractor's work.

Delete subsection 109.06(f)8 and replace with the following:

8. If additional quantities of a particular item of work are required at a later date after final measurement has been made, the Contractor shall perform this work in accordance with Contract requirements and at unit bid prices.

For this subsection only, satisfactory completion of all work described on CDOT Form No. 205 is when all tasks called for in the subcontract as amended by changes directed by the Engineer have been accomplished and documented as required by the LPA.

The requirements stated above do not apply to retainage withheld by the LPA from monies earned by the Contractor. The LPA will continue to process the release of that retainage based upon the completion date of the project as defined in the Commencement and Completion of Work special provision.

Delete subsection 109.06(f)9 and replace with the following:

9. If during the prosecution of the project a portion of the work is partially accepted in accordance with subsection 105.21(a), the Contractor shall release all subcontractors' retainage on the portion of the partially accepted work performed by subcontractors. Prior to the LPA releasing the Contractor's retainage on work that has been partially accepted in accordance with subsection 105.21(a), the Contractor shall submit to the Engineer a certified statement for each subcontractor that has participated in the partially accepted work. The statement shall certify that the subcontractor has been paid in full for its portion of the partially accepted work including release of the subcontractor's retainage. The statement shall include the signature of a legally responsible official for the Contractor, and the signature of a legally responsible official for the subcontractor.

Delete subsection 109.06(g) and replace with the following:

- (g) *Good Cause Exception.* If the Contractor has "good cause" to delay or withhold a subcontractor's progress payment, the Contractor shall notify the LPA and the subcontractor in writing within seven calendar days after receiving payment from the LPA. The notification shall specify the amount being withheld and provide adequate justification for withholding the payment. The notice shall also clearly state what conditions the subcontractor must meet to receive payment. "Good cause" shall include but not be limited to the failure of the subcontractor to make timely submission of required paperwork.

Delete subsection 109.06(h) and replace with the following:

- (h) *Monthly Reporting.* On a monthly basis, the Contractor shall submit the Form 1418, Monthly Payment Report, to the Engineer along with the project schedule updates, in accordance with subsections 108.03(g). Failure to submit a complete and accurate Form 1418 shall be grounds for CDOT to withhold subsequent payments or retainage from the Contractor.

ATTACHMENT H

Concept of Operations

City of Commerce City
Automated Traffic Signal Performance Measures (ATSPM)
MARCH 2023



1 Scope

1.1 Document Purpose and Scope

As part of the DRCOG Regional Transportation Operations and Technology Set-Aside, the City of Commerce City was selected to receive a grant to deploy an Automated Traffic Signal Performance Measures (ATSPM) system.

The City of Commerce City will improve its traffic signal system by applying advanced technologies to better manage vehicular, bicycle and pedestrian movements, with a goal of improving travel time reliability and safety as well as reducing fuel consumption and emissions. An ATSPM system provides the tools (data, performance measures, reports) that will enable the City to make informed decisions on operational strategies for the traffic signals. The ATSPM is expected to be a commercially-available off-the-shelf system.

The scope of this document covers the implementation of ATSPM within the City. This document describes and provides a rationale for the expected operations of the proposed performance monitoring systems.

1.2 Project Purpose and Scope

This project will deploy an ATSPM system to improve monitoring and management capabilities. The ATSPM system will be configured at 23 intersections and will provide the tools to monitor, manage, and report on the operations of the traffic signal system.

The existing traffic signal system utilizes Yunex M60 controllers with SEPAC software. The City runs a central traffic signal control system utilizing Yunex TACTICS.

The project limits are shown in Figure 1 and Table 1 .

Table 1 : Project Intersections

INT. NO.	INTERSECTION
1	56th Avenue/Holly Street
2	56th Avenue/Monaco Street
3	Quebec Parkway/58th Avenue
4	Quebec Parkway/60th Avenue
5	Quebec Parkway/64th Avenue
6	Quebec Parkway/72nd Avenue
7	Highway 2 / 72nd Avenue
8	Highway 2/Quebec Parkway/Rosemary Street
9	Highway 2 / 88th Avenue
10	88th Avenue/Rosemary Street
11	Highway 2 / 96th Avenue
12	Highway 2 / 104th Avenue
13	Highway 2 / 112th Avenue
14	104th Avenue/Revere Drive
15	104th Avenue/Potomac Street
16	104th Avenue/King Soopers Drive
17	104th Avenue/Chambers Street
18	104th Avenue/Landmark Drive
19	104th Avenue/Reunion
20	Tower Road/104th Avenue
21	Tower Road/96th Avenue
22	Tower Road/88th Avenue
23	Tower Road/81st Avenue

1.3 Procurement

The ATSPM system will be commercially- available off-the-shelf and. System compatibility with the City’s existing controllers is needed to integrate the system.

The detection requirements for optimal performance of the ATSPM system are indicated in this ConOps and identify the detection requirements for the specific performance measures that the City needs. Most intersections in Commerce City have advanced detection for the major street (phases 2 and 6) but some major street approaches may not have stop bar detection.

2 Referenced Documents

The following documents have been used in preparation of this Concept of Operations and stakeholder discussions.

- “System Engineering Guidebook for ITS”, California Department of Transportation, Division of Research & Innovation, Version 3 .

- “Model Systems Engineering Documents for Adaptive Signal Control Technology (ASCT) Systems”, U .S . Department of Transportation, Federal Highway Administration, August 2012, FHWA-HOP-11-027
- “Systems Engineering for Intelligent Transportation Systems, An Introduction for Transportation Professionals”, U .S . Department of Transportation, Federal Highway Administration, January 2007
- “Adaptive Traffic Control Systems: Domestic and Foreign State of Practice”, National Cooperative Research Program (NCHRP) Synthesis 403, Transportation Research Board, 2010.
- “Performance-Based Management of Traffic Signals – Phase 1 Report”, National Cooperative Highway Research Program (NCHRP) Project 03-122, Transportation Research Board, 2017.
- “Performance Measures for Traffic Signal Systems, An Outcome-Oriented Approach”, C . Day, D . Bullock, H . Li, S . Remias, A . Hainen, R . Freije, A . Stevens, J . Sturdevant, T . Brennan, 2014.
- “Integrating Traffic Signal Performance Measures into Agency Business Processes”, C . Day, D . Bullock, H . Li, S . Lavrenz, W . Smith, J . Sturdevant, 2015 .

3 User-Oriented Operational Description

3.1 Existing Situation

3.1.1 Network Characteristics

The project intersections/corridors are geographically spread out across the City with traffic characteristics varying depending on the corridor and context.

3.1.2 Traffic Characteristics

The traffic characteristics of the corridors in the city that are proposed for the ATSPM system implementation are summarized below:

56th Avenue – This Principal Arterial connects from US 85 to Pena Boulevard. The section of 56th Avenue between Quebec Street and US 85 is Commerce City jurisdiction. This portion of 56th Avenue consists of a 4-lane roadway section.

Highway 2 – This Principal arterial is the only local connection in practical terms between the Historic City and Northern Range. Between Quebec Street and 96th Street (more than two miles), it only has one intersection – at 88th Avenue. Highway 2 is currently constructed as a 4-lane roadway section from 64th Avenue to 112th Avenue.

104th Avenue – This Principal Arterial consists of a 4-lane roadway section between US 85 and E-470 and is a signature street in Commerce City. Since 104th Avenue has westward continuity through Thornton and Westminster, it will be widened to six lanes at build out.

Tower Road – This Principal Arterial is currently the only north-south arterial roadway serving the eastern part of Commerce City. It is highly congested, particularly during the morning and evening peak hours. Since the Tower corridor is one of the few north-south arterials, it will carry a high volume of traffic and will need to be widened to six through lanes at build out.

3.2 Limitations of the Existing System

The following statements summarize the limitations of the existing system that prevent it from satisfactorily accommodating and monitoring the traffic situations describe above.

- The existing system lacks the ability to continuously provide traffic signal operations data. For smaller agencies, it is difficult to continuously measure signal timing efficiency and react to signal timing deficiencies without the benefit of updated operational data.
- Signal device malfunctions persist for extended durations because the system is unable to automatically detect and report on them, contributing to degraded traffic flow and reliability.
- Excessive manual maintenance activities required with respect to the current resource-constrained staffing environment (i.e. no support for automating various maintenance tasks).

3.3 Improvements to the Existing System

This section describes in broad terms the improvements that will be incorporated to address the limitations described above. The main improvements are as follows:

- Create reports that inform how the signals and signal system are operating in real time and historically.
- Keep signal timing current rather than letting its efficiency deteriorate between periodic signal re-timing efforts.
- Recognize the existence of differing traffic conditions in various parts of the network and react in each section appropriately.

3.4 Vision, Goals, and Objectives of Proposed System

The vision of the ATSPM system is to provide a cost-effective performance measurement system that ensures people can arrive at their destination safely and travel efficiently and reliably regardless of mode choice.

The goals of the ATSPM system are to:

- Provide safe operations—incorporate proactive operations and maintenance practices to reduce traffic congestion that results from poor and outdated signal timing.
- Enable efficient and cost-effective maintenance— identify equipment failures more quickly and provide staff with the information to maintain signals in an excellent operating state.
- Improve operations—actively monitor the signalized intersection performance so problems can be addressed before they become complaints.

To support this vision and goals, the following User Objectives are identified:

- Continuously monitor the operational effectiveness and reliability of traffic signal coordination plans.
- Continuously monitor the maintenance condition of detection devices.
- Systematically identify traffic pattern shifts.
- Assess signal phasing and splits for throughput optimization and travel delay reduction.
- Verify complaints and troubleshoot operational issues.

- Increase safety of intersection operation.
- Focus maintenance resources.

3.5 Operational Objectives

The corridor operational objectives help the City determine traffic signal operational strategies (i.e. how to operate and manage the traffic signals). The operational objectives depend on a number of factors including, but not limited to, the location, context, and time of day.

The ATSPM system will be used to measure and track how the traffic signals operate in relation to the objectives. The operational objectives of the signal system are:

- Equitably serve green times at major intersections
- Minimize phase failures
- Minimize queuing, especially queuing in left turn lanes and queuing related to special events (soccer tournaments) and/or traffic generators (commercial, medical)
- Minimize transit delay
- Provide smooth flow on the mainline
- Balance progression direction
- Adjust to fluctuations due to spillover from incidents on regional facilities
- Minimize bicycle delay
- Minimize pedestrian delay
- Minimize high and low priority preemption impacts

3.6 Strategies to Be Applied by the System

The monitoring strategies that will be employed to achieve the operational objectives are:

- Assist City Staff in providing a green band along a coordinated route to maximize the throughput during periods of high demand and provide a green band along a coordinated route to smooth the flow of traffic in one or both directions.
- Assist City Staff in distributing phase times in a way that equitably shares the green time between various movements and minimizes the risk of phase failures (phase terminates with a residual queue).
- Assist City Staff in managing queues so that they do not exceed the available storage capacity and are located so they do not affect the capacity of other movements.
- Assist City Staff in managing the distribution of green times for vehicles and pedestrians in an equitable manner.
- Collect and store high-resolution data, including detector inputs and phase state changes, from the traffic signal controller.
- Create reports that describe and summarize the real time and historical operation of signal system

It is understood that some of these strategies may conflict with one another, and the selection will best optimize the operation.

4 User-Oriented Operational Description

This section describes the operational needs of the users that should be satisfied by the ATSPM system. Each of these statements describes an operational need that the system operators have. Each of these

needs will be satisfied by compliance with one or more system requirements. In the list of system requirements, each requirement is linked to one or more of these needs statements.

4.1 Automated Traffic Signal Performance Measures

[NOP-101] The system needs to report when a phase is not long enough to serve the demand on a consistent basis (i.e., phase failure).

[NOP-102] The system needs to report when a phase gaps out, maxes out or is forced off.

[NOP-103] The system needs to report where there are high delays on specific approaches.

[NOP-104] The system needs to report how efficient the progression is along a corridor.

[NOP-105] The system needs to report how emergency preemption impacts the nearby traffic signals.

[NOP-106] The system needs to report how railroad preemption impacts the nearby traffic signals.

[NOP-107] The system needs to report when large queues form or how long they are at specific locations.

[NOP-108] The system needs to report when each coordinated timing plan was active

[NOP-109] The system needs to report when and how often a traffic signal is in transition.

[NOP-110] The system needs to report the length of each phase and cycle.

[NOP-111] The system needs to report when the pedestrian push buttons are activated and if the passive pedestrian detection was requested.

[NOP-112] The system needs to report when communications to the traffic signals fail.

[NOP-113] The system needs to report when detectors fail.

[NOP-114] The system needs to report when an intersection goes into Flash mode.

[NOP-115] The system needs to report when the travel time is outside of the norm.

[NOP-116] The system needs to report where, when and for how long TSP is activated.

[NPL-101] The system needs to collect, report, and track vehicle volume data.

[NPL-102] The system needs to collect, report, and track bicycle volume data.

[NPL-103] The system needs to collect, report, and track vehicle travel time data.

[NPL-104] The system needs to collect, report, and track vehicle delay data.

[NRD-101] The system needs to retrieve data from the local controllers (not external “black box”) and create the performance measure reports.

[NRD-102] The system needs to provide reports that are customizable by timeframe and data interval.

[NRD-103] The system needs to produce both automated reports and reports based on a specific query

[NRD-104] The system needs to provide near real-time logs (within 15 minutes)

[NRD-105] The system needs to produce reports that are high level summaries for decision makers and detailed for use in operations and troubleshooting.

[NRD-106] The system needs to store the logs, alarms, and reports for a set amount of time where they are easily accessible (details to follow).

[NRD-107] The system needs to produce performance measures based on the Purdue Data Set and show them graphically. Typical performance measures, grouped by category, are shown in Table 3.

[NRD-108] The system needs a dashboard that is configurable for each user and each of the performance measures he/she wishes to see.

[NRD-109] The system needs to send alerts based on user defined triggers (using high-resolution data).

[NRD-110] The system needs to produce reports that compare current operations to past performance at same intersection.

[NAR-101] The system needs to be accessible from the City network and remotely via VPN.

[NAR-102] The system needs to fully function between network security devices (i.e., fire walls).

[NAR-103] The system needs to send alerts based on triggers via email or texts.

[NAR-104] The system needs to collect data and produce reports on any City signal connected to the system.

[NAR-105] The system needs to allow multiple users to access the system at the same time.

[NAR-106] The system needs to provide ad-hoc reports and query results within a reasonable delay of no more than 5 seconds from the time the request is made.

[NMT-101] The user needs vendor support for training. The user needs user manuals for system set-up, configuration, operations and maintenance.

[NMT-102] The user needs on-call support for maintenance and troubleshooting issues.

[NMT-103] The user needs to be notified of software revisions when they become available.

[NOT-101] The system needs to be compatible with Yunex M60 controllers operating SEPAC firmware.

[*NOT-102*] The system needs to be compatible and operate in parallel with the selected central signal system.

[*NOT-103*] If the system fails, the existing central traffic signal systems and local controllers shall not be negatively impacted.

5 Automated Traffic Signal Performance Measurement System Overview

This section describes the ATSPM system to be deployed. Elements include the system's main features and capabilities, the scope of its coverage, and other systems with which it will be interfaced.

5.1 System Features and Capabilities

The core function of the ATSPM system is the production of performance measures that provide useful and actionable insights into how the traffic signal network is performing. This section describes the internal system components required to obtain this data.

The four key components are:

- Intersection components, which collect the intersection event data
- Communication, wired or wireless infrastructure used to send event data to a management center
- Data architecture, hardware and software components used to aggregate and organize data such that it can be ready to be analyzed
- Applications, performance measurement and visualization software used to make sense of the structured data

5.1.1 Intersection Equipment

At the intersection level, the key ATSPM system function is the collection of state-change event data occurring in the intersection.

Data Logger

In order to collect state-change data of the signal controller, a data collection device at the intersection is necessary. Modern controllers, such as the City's Yunex M60 with SEPAC firmware capable of collecting high-resolution data, provide such a data logging capability. A firmware upgrade may be required to legacy equipment to enable the ATSPM-specific data logging capabilities.

Detection

Performance measures that incorporate vehicle data require a detection system that can sense the presence of vehicles within defined detection zones. The detection of transit vehicles, bicycles, and pedestrians may also be a capability of this detection system or may be part of a separate system.

The City currently utilizes a mix of video, radar and in-pavement inductive loops for detection. Emergency vehicle and railroad preemption systems are also sources of vehicle detection that are provided to the controller.

Detection Zones

Depending on the extent of detection for an intersection, certain signal performance measures may be attainable. In general, the more detection zones that are captured and the more capable the detection technology, the more performance measures that can be attained.

Lane-by-lane detection is generally preferable in order to calculate performance metrics at a higher level of detail, but it is not strictly required.

The three typical detection types are:

- Stop bar detection
- Advance detection
- Counts

Table 3 presents the key required/desired performance measures to be produced by the ATSPM system and indicates the minimum detection necessary to attain the given measure— stop bar (SB), advance (A), and/or counts (C) . The count detector may be configured in advance or at the stop bar, wherever there is free flow traffic.

CATEGORY	PERFORMANCE MEASURE	REQUIRED	DESIRED	MIN. DETECTION NEEDED
Intersection Performance	Split Monitor	●		<i>Not needed</i>
	Purdue Phase Termination	●		<i>Not needed</i>
	Purdue Split Failure	●		SB
	Detector Health		●	SB+A
	Approach Delay		●	SB+A+C [external syst.]*
	Queue Length		●	SB+A+C [external syst.]*
	Coordination Mode Status		●	<i>Not needed</i>
Corridor Performance	Speed		●	A [external syst.]*
	Arrivals on Green (Purdue Coordination Diagram)	●		A
	Arrivals on Red	●		A
	Travel Time		●	[external syst.]*

Multimodal	Pedestrian delay	●		Ped Push Button
	Bicycle delay		●	Bicycle
Preemption	Number of Preemptions	●		EVP Detector
	Length of Preemptions		●	EVP Detector
Planning	Vehicle Approach Volume	●		C
	Vehicle Turn Movement Counts		●	C
	Bicycle Volume		●	C
	Passive Pedestrian Actuators		●	[external syst.]*

Table 3: Key ATSPM System Performance Measures and Required Detection

5.1.2 Communications

Communications infrastructure and devices are used to transfer logged controller data from the intersection to a centralized location for processing and analysis.

5.1.3 Data Architecture

The processing, analyzing, and storing of traffic control system data obtained from the field is accomplished with centrally-located computer hardware and software components. Various physical architecture options are available to support these functions including servers housed at the traffic management center (on-premise) running database software or integrated cloud-based solutions that manage all aspects of the system.

The typical functions include:

- Data processing—normalizing and formatting data to be used for generating performance measures
- Data schemas—using database management systems to produce a data schema that organizes and stores data such that it is accessible, scalable, and useful to the users

5.1.4 Applications

The final step of the ATSPM system is in which the user accesses processed performance measures data through reports and visual displays. Software linked to or packaged with the central management system may provide such tools.

Commercial solutions are available today that provide standalone packages or web-based services to produce performance measures. Controller and detection system manufacturers as well as ATSPM- specific software companies all provide such ATSPM application solutions.

6 ATSPM Operational Environment

The ATSPM system will be operated and monitored primarily from the City's TMC and from the workstations at the desks of transportation and support staff. Licenses/seats for up to 3 concurrent users shall be available.

City Transportation staff will also access the system remotely from portable devices. The ATSPM system will provide remote access and interface options for touch-based portable devices.

The City will continue to use TACTICS for its central traffic control system.

Any required on-premises server equipment will be housed at the City Public Works Department, located at 8602 Rosemary, Commerce City, CO or such similar City facility, to be determined by IT. In the case of a cloud-hosted solution, equipment will be hosted remotely by a third party.

The City has standardized on Yunex M60 controllers with SEPAC firmware, which are capable of collecting high-resolution data. This controller and firmware standard will be used for the ATSPM system.

The City communication system is an IP-based communications network using fiber or wireless radio.

The City employs a mix of video detection and inductive loop detection. Where additional detection (whether stop bar and/or advance) is needed for ATSPM and/or ASCT, the City will install additional detection equipment.

7 ATSPM Support Environment

This section describes the support environment for the ATSPM system. Key elements include identifying institutions and stakeholders, facilities, system architecture constraints, equipment, computing hardware and software, personnel, and other support needs.

7.1 Stakeholders

Stakeholders of the ATSPM system include the City staff and Signal Maintenance Contractor Staff. The City will be the owner of the ATSPM system to be deployed and will be responsible for the operations, management and maintenance. DRCOG is the funding agency and program manager of this initiative and is responsible for overall program oversight to ensure project delivery and success.

7.2 Facilities

The City Signal Operations staff are located at 8602 Rosemary, where all servers and networking equipment is located. TMC accesses these systems via direct fiber and wireless communications links.

The TMC is a secured facility that is currently managed by Engineering and IT staff. Depending on the architecture for the selected solution, the ATSPM system may be housed alongside and supported by the existing equipment or, in the case of a cloud solution, be hosted remotely as part of a fully-managed cloud solution .

7.3 Systems Architecture Constraints

The City’s IT department, in conjunction with the City’s transportation group, will provide support and system management to ensure that the ATSPM server or cloud platform is integrated into the City’s existing communications network. Communications with signal controllers and other field devices will be provided using the existing Ethernet network and communications infrastructure.

7.4 Equipment

The City has all required equipment and resources to support the existing traffic signal system.

Any additional equipment, software, or detection required to support the ATSPM system will be determined by the system vendor, subject to approval by the City. The vendor will be responsible for identifying and providing any hardware needed to support the ATSPM system, including servers and data storage.

Other existing equipment in the City’s TMC that may be used to support the ATSPM system will be maintained and repaired by the City’s IT staff. City staff will also be responsible for software maintenance for standard software packages (e.g., computer operating systems, business applications).

7.5 Personnel

The ATSPM system will be operated by existing Signal Operations staff that currently operate the central signal system. There is one traffic signal operations engineer and technicians from the City’s maintenance contractor. One full time engineer/ project manager will be assigned for the duration of the project to coordinate internal resources and ensure the ATSPM system is deployed successfully.

The City may also hire a consulting traffic engineer to assist the City Traffic Engineer with implementation. Training of Signal Operations staff will be required to be provided by the system vendor during and after the installation of the ATSPM system.

Key roles and responsibilities for the implementation and operation of the ATSPM system are identified in Table 4.

Table 4: Key ATSPM System Operational Roles and Responsibilities

ROLES	RESPONSIBILITIES
City Signal Techs/City Traffic Engineer	Maintain controllers as needed
City Traffic Engineer City Signal Techs	Operate and maintain ATSPM system Review data and reports Perform timing adjustments
City IT	Ongoing systems and network support

ATTACHMENT I

Systems Requirements

City of Commerce City

Automated Traffic Signal Performance Measures (ATSPM)

MARCH 2023



INT. NO.	INTERSECTION
1	56th Avenue/Holly Street
2	56th Avenue/Monaco Street
3	Quebec Parkway/58th Avenue
4	Quebec Parkway/60th Avenue
5	Quebec Parkway/64th Avenue
6	Quebec Parkway/72nd Avenue
7	Highway 2 / 72nd Avenue
8	Highway 2/Quebec Parkway/Rosemary Street
9	Highway 2 / 88th Avenue
10	88th Avenue/Rosemary Street
11	Highway 2 / 96th Avenue
12	Highway 2 / 104th Avenue
13	Highway 2 / 112th Avenue
14	104th Avenue/Revere Drive
15	104th Avenue/Potomac Street
16	104th Avenue/King Soopers Drive
17	104th Avenue/Chambers Street
18	104th Avenue/Landmark Drive
19	104th Avenue/Reunion
20	Tower Road/104th Avenue
21	Tower Road/96th Avenue
22	Tower Road/88th Avenue
23	Tower Road/81st Avenue

Table 1 : Project Intersections

2 Requirements

The ATSPM requirements are divided into categories and subcategories as defined below. The requirements are listed as required or desired and reflect the needs and objectives determined by City stakeholders.

- Signal Performance Measures: Requirements for the signal performance measures (SPM) to be provided by the ATSPM system
 1. General SPM Requirements
 2. Reports Requirements
 3. Alerts/Alarms Requirements
 4. Mapping Requirements
- System Support and Management: Requirements involving basic data exchange and architecture of the ATSPM system
 5. General Access Requirements
 6. General Data Requirements
 7. Security Requirements

To provide traceability, each requirement includes a reference to associated user needs and key performance measures. The full list of user needs and key performance measures are included below.

Table 2 identifies the user need categories and abbreviations. A complete list of user needs and reference numbers is included below.

Table 2. User Need Categories and Abbreviations

Category	Abbreviation	Description
Operations	NOP	User needs related to the operations of the traffic signal
Planning	NPL	User needs related to collecting and tracking data and trends
Reporting and Documenting	NRD	User needs related to the performance measures reports
Network and Access	NAR	User needs related to the system network and access
Maintenance	NMT	User needs related to system maintenance and support
Other	NOT	User needs not included in the other categories

[NOP-101] The system needs to report when a phase is not long enough to serve the demand on a consistent basis (i.e., phase failure).

[NOP-102] The system needs to report when a phase gaps out, maxes out or is forced off.

[NOP-103] The system needs to report where there are high delays on specific approaches.

[NOP-104] The system needs to report how efficient the progression is along a corridor.

[NOP-105] The system needs to report how emergency preemption impacts the nearby traffic signals.

[NOP-106] The system needs to report how railroad preemption impacts the nearby traffic signals.

[NOP-107] The system needs to report when large queues form or how long they are at specific locations.

[NOP-108] The system needs to report when each coordinated timing plan was active

[NOP-109] The system needs to report when and how often a traffic signal is in transition.

[NOP-110] The system needs to report the length of each phase and cycle.

[NOP-111] The system needs to report when the pedestrian push buttons are activated and if the passive pedestrian detection was requested.

[NOP-112] The system needs to report when communications to the traffic signals fail.

[NOP-113] The system needs to report when detectors fail

[NOP-114] The system needs to report when an intersection goes into Flash mode.

[NOP-115] The system needs to report when the travel time is outside of the norm.

[NOP-116] The system needs to report where, when and for how long TSP is activated.

[NPL-101] The system needs to collect, report, and track vehicle volume data.

[NPL-102] The system needs to collect, report, and track bicycle volume data.

[NPL-103] The system needs to collect, report, and track vehicle travel time data.

[NPL-104] The system needs to collect, report, and track vehicle delay data.

[NRD-101] The system needs to retrieve data from the local controllers (not external “black box”) and create the performance measure reports.

[NRD-102] The system needs to provide reports that are customizable by timeframe and data interval.

[NRD-103] The system needs to produce both automated reports and reports based on a specific query.

[NRD-104] The system needs to provide near real-time logs (within 15 minutes)

[NRD-105] The system needs to produce reports that are high level summaries for decision makers and detailed for use in operations and troubleshooting.

[NRD-106] The system needs to store the logs, alarms, and reports for a set amount of time where they are easily accessible (details to follow).

[NRD-107] The system needs to produce performance measures based on the Purdue Data Set and show them graphically. Typical performance measures, grouped by category, are shown in Error! Reference source not found..

[NRD-108] The system needs a dashboard that is configurable for each user and each of the performance measures he/she wishes to see.

[NRD-109] The system needs to send alerts based on user defined triggers (using high-resolution data)

[NRD-110] The system needs to produce reports that compare current operations to past performance at same intersection.

[NAR-101] The system needs to be accessible from the City network and remotely via VPN.

[NAR-102] The system needs to fully function between network security devices (i.e., fire walls).

[NAR-103] The system needs to send alerts based on triggers via email or texts.

[NAR-104] The system needs to collect data and produce reports on any City signal connected to the system.

[NAR-105] The system needs to allow multiple users to access the system at the same time.

[NAR-106] The system needs to provide ad-hoc reports and query results within a reasonable delay of no more than 5 seconds from the time the request is made.

[NMT-101] The user needs vendor support for training

[NMT-102] The user needs user manuals for system set-up, configuration, operations and maintenance.

[NMT-103] The user needs on-call support for maintenance and troubleshooting issues

[NMT-104] The user needs to be notified of software revisions when they become available

[NOT-101] The system needs to be compatible with ATC controllers procured by City

[NOT-102] The system needs to be compatible with selected adaptive signal system

[NOT-103] The system needs to be compatible and operate in parallel with the selected central signal system.

[NOT-104] If the system fails, the existing central traffic signal systems and local controllers shall not be negatively impacted.

Table 3 identifies the key ATSPM system performance measures and whether they are required or desired.

Table 3. Key ATSPM System Performance Measures

Category	Performance Measure	Required	Desired
Intersection Performance	Split Monitor	x	
	Purdue Phase Termination	x	
	Purdue Split Failure	x	
	Detector Health		X
	Approach Delay	x	
	Queue Length		X

Category	Performance Measure	Required	Desired
	Coordination Mode Status		X
Corridor Performance	Speed		X
	Arrivals on Green (Purdue Coordination Diagram)	x	
	Arrivals on Red	x	
	Travel Time		X
Multimodal	Pedestrian delay	x	
Preemption	Number of Preemptions	x	
	Length of Preemptions		X
Planning	Vehicle Approach Volume	x	
	Vehicle Turn Movement Counts		X
	Bicycle Volume		X
	Passive Pedestrian Actuations		X

3 Verification Methods

A Verification Plan will be developed by the Contractor and submitted to City Project Manager for review and approval. The Verification Plan will describe the method/activity of verifying that the system(s) provided satisfy all the requirements set out in this requirements document. The requirements can be verified by a variety of methods, including:

- Demonstration – without external test equipment
- Test – requiring external test equipment
- Analysis – indirectly through logical conclusion or mathematical analysis
- Inspection – visual comparison.

ATTACHMENT J

Automated Traffic Signal Performance Measures (ATSPM) Scope of Work

MARCH 2023



Automated Traffic Signal Performance Measures (ATSPM) Scope of Work

For each requirement specified in Attachment I – Systems Requirements, the Contractor has indicated that the proposed ATSPM system will result in a “Met” response.

The Contractor shall be fully responsible for the maintenance and care of all hardware, equipment, and software furnished by the Vendor until the time of final acceptance of the ATSPM system by the City of Commerce City.

Project Task One:

Project Management: The Contractor shall designate a dedicated Project Manager that will be committed to this project through the duration of the contract. The Contractor Project Manager’s responsibilities shall include, but not be limited to:

- Coordinate the work of this contract with other concurrent work as necessary.
- Maintain communication between key contract personnel and City’s Project Manager.
- Maintain an adequate staff of qualified support personnel to perform the work necessary to complete the project.
- Establish and maintain contract administration procedures, which may include supplemental agreements, time-extensions, subcontracts, and tracking and maintaining the budget.
- Inform the City’s Project Manager of any changes to the key personnel assigned to the project. The work shall be performed and directed by the key personnel identified in the proposal. Any changes in the designated key personnel or the proposed Project Manager in charge of the work, as indicated in the proposal, shall be subject to review and approval by the City. The proposed staff assigned to perform any task shall be qualified individuals with closely related experience in that field.
- Keep City’s Project Manager informed of all the pertinent decisions related to the project.

Project Schedule: The Contractor Project Manager shall develop and maintain a project schedule for the duration of the project. Within one week after the notice to proceed (NTP), the Contractor shall submit a detailed schedule indicating all milestone dates and major deliverables. The City’s Project Manager will review and approve the Project Schedule for content and format. Upon approval of the Project Schedule, the Vendor shall update the Project Schedule at least on a monthly basis to reflect actual progress.

Progress Meetings: The Contractor Project Manager shall arrange and attend regular progress meetings as needed either online or at the City’s designated facility to report the progress and provide data to the City’s Project Manager. The data shall generally include the following information:

- Detailed project schedule and critical path work from initial plans as work progresses.
- Progress against schedule for each identified work item.
- Forecast the completion dates from current progress.
- Rescheduled work in any area, which is out of the required sequence.
- Respond to any inquiry concerning the status of any work element in terms of schedule, staff, and cost.

Project Task Two:

ATSPM System Detection Requirements and Setup: The Contractor shall review the existing detection configuration at the 23 ATSPM project intersections.

Project Task Three:

Furnish ATSPM: The Contractor shall furnish the ATSPM software per the system requirements contained in Attachment I. This shall include any additional 3rd party software, operating system(s), application(s), and/or utilities necessary for the operation of the ATSPM system. For any hardware supplied by the Contractor, the Contractor shall provide the City's Project Manager with hardware submittals for review and approval prior to delivery. It shall be the Contractor's responsibility to provide any ancillary equipment such as cables, mounting rails, etc. with the provided hardware.

Project Task Four:

Installation, Integration, and Deployment: The Contractor shall install, configure, and integrate the ATSPM software on the City's workstations and laptops as requested by City staff. The Contractor shall install the system at the Public Works Department within the City's MSC Main Building. The City will provide the necessary communications network infrastructure to connect the servers to the City's existing transportation network. As needed, the System Contractor shall coordinate with the City's Project Manager and City's IT staff to integrate the main server onto the City's existing network.

Project Task Five:

System Testing, Verification, and Acceptance: The Contractor shall develop Verification and Acceptance Test Procedures for the City's review and approval. The Contractor shall provide a proposed acceptance test procedure to the City's Project Manager for approval at least 30 days before the acceptance test is to begin. The City shall review the Contractor's initial Acceptance Test Procedure and provide review comments within 14 days.

The Acceptance Test Procedures shall not be final until accepted by the City. The Acceptance Test Procedures will serve as a guide to operationally test system hardware, software, and integration. The procedures must include a detailed description of the tests to be conducted and the purpose of each test. Each test should be mapped to at least one of the system requirements. At a minimum, the Acceptance Test Procedure shall define testing stages, methods, procedures, tools and data to verify that the system is working as designed under the planned and maximum conditions.

Final acceptance testing shall include tests for the ATSPM software, any additional software implemented, and communications between field traffic signal controllers and the ATSPM software. The test period for final acceptance will be a period of 30 days of error free operation. The City may choose to pause the testing period on days spent correcting minor errors. The City may choose to restart the 30-day acceptance test if errors are found to be significant.

Final acceptance tests will be conducted to:

- Verify requirements are satisfied;

- Verify user interface is implemented correctly;
- Verify error-free linkage of field controllers and the ATSPM server and software;
- Verify storage and throughput capacity requirements;
- Verify real time performance requirements are met;
- Verify security measures;
- Verify diagnostic and logging features;
- Verify ability to recover from errors, improper input and hardware failures; and
- Ensure hardware performs correctly.

All tests will be conducted by the Contractor in the presence of the City's Project Manager. The Contractor shall document and record all test results. A variance report shall be prepared by the Contractor each time a test results in the ATSPM system not meeting a functional requirement. The Contractor shall document actions to be taken to correct the variance.

The City's Project Manager will provide final acceptance of the ATSPM system software, hardware, integration, and other services following the Contractor's completion of work in accordance with the contract and after successful completion of the 30-day acceptance test. The acceptance date will mark the beginning of the Vendor's warranty period.

Project Task Six:

Training and Documentation: The Contractor shall provide two training sessions for up to three (3) City staff members. The first training session is anticipated to occur when the system is initially deployed, with the second session occurring 6-12 months later, at the City's discretion. Training shall include all aspects of operating, maintaining, and administering the ATSPM. It shall include setting up user accounts, reporting, troubleshooting, among other aspects.

The Contractor shall submit a training plan to the City for review and approval 30 days prior to the start of training. The training materials shall include all reference materials, procedures, and manuals that will be used. The training plan shall include the method for delivering the training, any requirements for the City to provide (room space, access to equipment, etc.) and the detailed agenda with timing for the training. The training shall be a combination of classroom instruction and hands-on interaction with the ATSPM system, if applicable. All training shall be conducted during the normal business hours of the City.

Project Task Seven:

System Documentation: The Contractor shall provide a complete systems documentation package. The documentation package in general shall include any applicable drawings, schematics, software and hardware submittals, detailed functional and interface descriptions, user/operator manuals, software programming manuals and procedures and all other required documentation related to the completed ATSPM system. The documentation package shall address all hardware and software provided under this contract, and shall be subject to review and approval by the City Project Manager before final system acceptance.

The System Contractor shall submit all documentation for review and approval by City. Following approval, two (2) copies of the documentation shall be provided to the City.

Project Task Eight:

System License, and Support

Licenses: The Contractor shall provide all licenses required for the operations and maintenance of the system, including, but not limited to, third-party software applications, databases, network components, and servers (if applicable) for the unlimited use by the City.

The Contractor shall coordinate in advance of updating the software, including scheduling time for any updates that will cause the software to be inaccessible. If applicable, the Contractor shall repair/replace any inoperable hardware/equipment in a timely manner during the warranty period to minimize any disruptions to City operations.

Technical Support: The Contractor shall provide technical support to the City. Technical support includes, but is not limited to, the following:

- Troubleshooting of the system
- Routine questions
- Configuration questions or changes
- Customized reporting

In the ATSPM system submittal, the Contractor shall provide written confirmation of the support terms, including response times, communication methods, and hours of availability.

City Oversight: A designated individual will be responsible for management of the contract for the City ("Project Manager"). The City will provide reasonable assistance to Contractor in the scheduling of meetings, interpretation of policy and procedural requirements, research relating to internal documents, coordination with outside agencies and City staff, but the City's obligation will not limit Contractor's obligations to perform the Services. The City will rely on the personnel, experience, and expertise of Contractor to ensure all necessary components of the scope of work are completed.



**Addendum No. 1
To Request for Bids dated December 13, 2022
City of Commerce City, Colorado
Department of Public Works**

**Project: Commerce City Automated Traffic Signal Performance
Measure (ATSPM) Improvements
Project No.: 2022-22-PW**

DATE: January 20, 2023

TO: All Prospective Bidders or Respondents

The following responses are made a part of the above-referenced solicitation:

ANSWERS TO QUESTIONS RECEIVED:

(Question 1) What is included under the Furnish, install, and configure ATSPM System, line item?

(Answer 1) This item includes: furnish, install, integrate, and test all necessary software and hardware, and make operational an ATSPM system comprised of a system capable of monitoring of traffic signals as outlined in the System Requirements found in Attachment I - ATSPM System Requirements. The contractor shall be responsible for all items necessary to furnish, install, configure, implement, test, and provide training and documentation on the proposed system. This will include the project tasks indicated on pages 92-96. The bid item is paid per each intersection as designated in the project scope.

(Question 2) Is the bid item Install Wavetronix Detection System for the eastbound and westbound 104th Ave approaches and that the sensor and processor will be provide by the City, only for 104th Ave & Hwy 2?

(Answer 2) The Wavetronix sensors (2) and Click 650 Cabinet Interface Device (1) will be provided by the City. This bid item is only for the EB and WB approaches of the 104th Avenue/Highway 2 intersection.

(Question 3) Would you accept GRIDSMART on this project?

(Answer 3) The specification indicates the accepted systems along with “or approved equal.” Other systems will considered for approval if they are able to provide the detection capabilities needed for the proposed ATSPM system.

(Question 4) I do have another a question, I want to clarify that no work will be done at the intersection of Hwy2 & 96th Ave, is that correct?

(Answer 4) At 96th/Highway 2, the only project work will be implementation of the ATSPM system for

this intersection. The controller, communication and detection systems have all been updated and no changes are planned.

(Question 5) What about Tower Rd & 83rd Ave, it is on the spreadsheet as a Software Upgrade, but it's not on the list in the RFB.

(Answer 5) 83rd/Tower was not included for ATSPM because it was not constructed when this project started 3 years ago. Thus, no ATSPM for this intersection under the original scope of this project.

(Question 6) Also, another question, since work will be performed on Hwy 2 will CDOT specs be followed regarding traffic control?

(Answer 6) No, Highway 2 is a City of Commerce City roadway. CDOT does not maintain jurisdiction over Highway 2.

(Question 7) Is advanced detection needed with the four video detection locations? If so, on how many approaches?

(Answer 7) Each approach that receives a new detection system will need to include advanced detection zones. For example, at 88th/Highway 2, the project will install a new detection system to serve the eastbound approach. Advance detection zones should be configured to serve this eastbound approach.)

(Question 8) Is the ATSPM training required to be in person or is remote okay?

(Answer 8) Remote will be acceptable.

(Question 9) Is there communication available from all intersections to the cloud?

(Answer 9) All intersections communicate back to City Traffic Operations Center (TOC) office. It is anticipated that access to the Cloud will be through an opened Port at the TOC.)

(Question 10) At the intersections where you are requesting detection equipment and installation of the equipment, are you needing advanced radar detection as well as video stop-bar detection?

(Answer 10) The project calls for video based detection. Radar based detection is not specified in this project. The video based detection should include the implementation of advanced detection zones to the extent possible with the video detection system.

(Question 11) At the intersections where you are requesting detection equipment and installation of the equipment, are you going to implement "Red Protect"?

(Answer 11) This project is not implementing new 'Red Protect' capability.

(Question 12) For the SPM software, our offering is cloud based but we need a small piece of software

on a server in your network, do you have a server for that or do we need to supply a server?

(Answer 12) City staff previously provided an open port at our Traffic Operations Center for controller data to be transmitted to the cloud from the TOC server.

(Question 13) On the SPM software requirements, If we have another software offering to meet the “desired” features, would you like us to include it as an option or should we just stick to the SPM software?

(Answer 13) – The focus is on meeting the required system requirements. If any requirements are not met, the vendor will need to provide a projected date when the system will be modified to include the requirement that is not met.

(Question 14) When do you see the project starting?

(Answer 14) A Notice To Proceed will be issued shortly after Contract Award. The specified start date will take equipment/material delivery lead times into consideration.)

(Question 15) Will the data be stored in a server or in a cloud-based storage?

(Answer 15) The system shall be Cloud based.

(Question 16) Do you already have data storage being utilized?

(Answer 16) We previously provided an open port at our Traffic Operations Center for controller data to be transmitted to the cloud.

(Question 17) Do you have a preference of an open source or a vendor ATSPM?

(Answer 17) The system must comply with the specified Systems Requirements.

(Question 18) On the page I’ve attached from the Concept of Operations calls out that the “selected solution provider will provide a 10-year maintenance contract that includes system updates, upgrades and support services.”

(Answer 18) The 10 year maintenance contract language in the ConOps is not applicable to this project. The bid includes the Annual ATSPM System License and Support (Years 1-5). The requirements of this item are contained in Attachment F Project Task Eight.

(Question 19) How will this maintenance be paid for?

(Answer 19) The 10 year maintenance contract language in the ConOps is not applicable to this project.

(Question 20) What is considered maintenance in this instance?

(Answer 20) The 10-year maintenance contract language in the ConOps is not applicable to this project.

(Question 21) Will we only be maintaining what we've installed for this project?

(Answer 21) The bid item for Annual ATSPM System License and Support (Years 1-5) will apply to the project intersections that receive an ATSPM system.

(Question 22) Is this maintenance included in line item 2 – Annual ATSPM System License, and Support (Years 1-5)?

(Answer 22) The requirements of this bid item are described in Attachment F Project Task Eight.

(Question 23) On your requirements... You mention the Purdue Diagrams... We do our own version of these charts that serve the same purpose but aren't exactly the UDOT/Purdue Diagrams.

(Answer 23) A version of the charts that provides equivalent information for the traffic engineer's utilization is acceptable.

(Question 23) Within the next year we should have approach delay and queue length if they are using vectors. If they do not have vectors, we will not be able to support approach delay and queue length. Those are both desired though and not required.

(Answer 23) This project will be dependent on the required performance measures being provided in the ATSPM system. Products that do not contain the desired performance measures will be acceptable on this project.

(Question 23) Speed and Travel time (desired) will be available if you have the ClearGuide Arterial module. This has an added cost and isn't a required feature,

(Answer 23) This project will be dependent on the required performance measures being provided in the ATSPM system. Products that do not contain the desired performance measures will be acceptable on this project.

END OF ADDENDUM NUMBER 1



**Addendum No. 2
To Request for Bids dated December 13, 2022
City of Commerce City, Colorado
Department of Public Works**

**Project: Commerce City Automated Traffic Signal Performance
Measure (ATSPM) Improvements
Project No.: 2022-22-PW**

DATE: January 25, 2023

TO: All Prospective Bidders or Respondents

The following are hereby made a part of Attachment G - Required CDOT-FHWA Forms and Documents in the above referenced solicitation:

- 1) CDOT Standard Special Provision - Minimum Wages, Colorado, U.S. Dept. of Labor General Decision Number CO20230006 Highway Construction (This is a standard special provision that revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*):

**U.S. DEPT. OF LABOR DAVIS BACON MINIMUM WAGES COLORADO
HIGHWAY CONSTRUCTION GENERAL DECISION NUMBER – CO20230006**

General Decision No. CO20230006 applies to the following counties: Adams, Arapahoe, Broomfield, Clear Creek, Elbert, Gilpin, Jefferson, and Park counties.

- 2) CDOT Standard Special Provision - Certified Payroll Requirements For Construction Contracts (This is a standard special provision that revises or modifies CDOT's *Standard Specifications for Road and Bridge Construction*.)

All applicable contractors subject to Davis-Bacon and Related Acts (DBRA) requirements shall submit all payrolls weekly (at least every seven days), related to Form FHWA 1273, *Required Contract Provisions for Federal-Aid Construction Contracts*, and the Colorado Senate Bill 19-196. The Contractor, all subcontractors, and applicable suppliers required to submit certified payrolls shall follow all DBRA requirements, including sections 5.5, 3.5, and 3.6 of the 29 CFR. Contractors shall upload a completed Contractor Fringe Benefit Statement (CFBS) into LCPTracker at least once per project, utilizing the following web link:

<https://prod-cdn.lcptracker.net/login/login>

The CFBS shall include benefit details for employees who perform work on the project. The CFBS shall provide an overview of the bona fide benefits provided by the employer. If a contractor's fringe benefits change during the project's life, a revised CFBS shall be submitted to reflect the changes accurately. Note other deductions by type and amount. Attach required supporting documentation in the LCPtracker system. Contractors, subcontractors, and applicable suppliers shall establish and utilize a process that allows all employees to verify the number of hours and classifications submitted to pay wages and benefits.

The Contractor, subcontractors, and applicable suppliers shall submit payrolls directly into LCPtracker for approval by the Contractor. The prime approver for the Contractor shall approve or reject payrolls within seven days after submission into LCPtracker.

END OF ADDENDUM NUMBER 2

CITY OF COMMERCE CITY GENERAL CONDITIONS

ARTICLE 1 DEFINITIONS, ABBREVIATIONS & REFERENCES

1.1. Definitions.

Whenever used in the Contract Documents, the following terms shall have the following meanings, applicable to both the singular and plural, in addition to words otherwise defined in the Contract Documents:

- 1.1.1. **Addenda:** Written changes to the Bidding Documents issued before the opening of Bids that clarify, correct, or change the Contract or change the date set for the Opening of Bids.
- 1.1.2. **Bonds:** Bid Bonds, Performance Bonds, and Payment Bonds, any warranty bond, or other instruments of security furnished by the Contractor and its Surety according to the Contract.
- 1.1.3. **Change Order:** A written modification of the Contract, issued after award to the Contractor, authorizing an addition, deletion, or revision in the Work within the general scope of the Contract or authorizing an adjustment in the Contract Price or Contract Time mutually agreed upon between the City and the Contractor.
- 1.1.4. **City or Owner:** The City of Commerce City, Colorado. Any reference to the approval, decision, or discretion of the City, whether express or implied, is a reference to the approval, decision, or discretion of the City Manager, or to his or her designee unless otherwise stated or required by law.
- 1.1.5. **Completion Date:** The date the Contract specifies the Work is to be completed.
- 1.1.6. **Construction Schedule:** The schedule of Work approved by the City in accordance with the Contract Documents.
- 1.1.7. **Contract:** The construction contract for the completion of the Work consisting of the Construction Contract Agreement and all other Contract Documents.
- 1.1.8. **Contract Documents:** All the documents expressly incorporated into the Contract by and including the Construction Contract Agreement, including without limitation all Addenda, Bid Forms, Change Orders, Plans/Drawings, General Conditions, Request for Bids (including all attachments), insurance certificates, Notice of Intent to Award, Notice of Final Acceptance, Notice to Proceed, Notice of Substantial Completion, any Performance Bonds, any Payment Bonds, Special Conditions, accepted Shop Drawings, and Specifications.
- 1.1.9. **Contract Price:** The total monies payable to the Contractor under the terms and conditions of the Contract.
- 1.1.10. **Contract Time:** The number of days provided in the Contract for the completion of the Project from the date of the Notice to Proceed through and including the date of Final Acceptance. The Contract Documents may require completion on or before a certain specified date.

- 1.1.11. **Contractor:** The person or entity identified in the Construction Contract Agreement contracting with the City to perform the Work required by the Contract.
- 1.1.12. **Drawings or Plans:** The part of the Contract prepared or approved by the Project Manager showing the characteristics and scope of the Work to be performed.
- 1.1.13. **Date of Contract:** The execution date in the Agreement for a Construction Contract unless otherwise specified.
- 1.1.14. **Day or day:** A calendar day of twenty-four hours each from midnight to midnight, unless otherwise specified.
- 1.1.15. **Field Order:** A written order issued by the Project Manager to the Contractor during construction that directs the Contractor to commence a change in the Work before complete agreement on or execution of a Change Order.
- 1.1.16. **Final Acceptance:** The City's final acceptance of the Work completed according to the Contract requirements with all parts of the Work in good condition and in working order, including completion of all punch list items, cleanup work, and delivery of all required guarantees, warranties, licenses, releases, and other deliverables.
- 1.1.17. **Final Payment:** The final and complete payment to the Contractor in accordance with the Contract Documents.
- 1.1.18. **Inspector:** The City's authorized representative assigned to make detailed inspection of the Work performed by the Contractor.
- 1.1.19. **Notice of Final Acceptance:** The written notice of the date, as certified by the City, of Final Acceptance.
- 1.1.20. **Notice to Proceed:** The written notice by the City to the Contractor authorizing the Contractor to proceed with the Work.
- 1.1.21. **Notice of Substantial Completion:** The written notice of the date, as certified by the City, of Substantial Completion.
- 1.1.22. **Parties:** The City and the Contractor.
- 1.1.23. **Project:** The total construction of which the Work to be provided under the Contract Documents may be the whole or a part as indicated elsewhere in the Contract Documents and may include construction by other contractors.
- 1.1.24. **Project Manager:** The City's designated, authorized representative assigned to the Project with day-to-day responsibility for managing the Contract.
- 1.1.25. **Reasonably Predictable Weather Days:** Estimated Weather Day(s) where critical path activities cannot be performed in any month, within contract weather or temperature limitations, or due to weather related soil conditions.
- 1.1.26. **Shop Drawings:** All drawings, diagrams, illustrations, brochures, schedules, and other data prepared by the Contractor, any Subcontractor, manufacturer, Supplier or distributor that illustrate how specific portions of the Work will be fabricated or installed.

- 1.1.27. **Special Conditions:** Additions to the General Conditions containing instructions and conditions peculiar to an individual Project.
- 1.1.28. **Specifications:** A part of the Contract Documents consisting of written technical description of materials, equipment, construction systems, standards, and workmanship.
- 1.1.29. **Subcontractor:** Any person or entity having a subcontract with the Contractor (or any Subcontractor, of any tier, whether or not authorized by the Contractor) to furnish and perform work at the Work site, including the provision of labor, materials, equipment, supplies, tools, services, or any combination of these. This definition shall not limit the Contractor's obligations, or alter any Subcontractor's rights, under any law or contract.
- 1.1.30. **Substantial Completion:** The date on which the Work has progressed to the point that the City can beneficially occupy or utilize the Work for the purpose for which it is intended, and the Work complies with all applicable codes and regulations, including, if required, issuance of a certificate of occupancy, or certificate of suitability for use from the appropriate governmental agencies, as determined by the City in its sole discretion.
- 1.1.31. **Superintendent:** The Contractor's authorized representative assigned to the Project with day-to-day responsibility for managing the Project.
- 1.1.32. **Supplier:** Any person or organization who supplies materials, supplies, tools, equipment, or other items for the Work, including those fabricated to a special design, but who does not perform labor at the site. This definition shall not limit the Contractor's obligations, or alter any Supplier's rights, under any law or contract.
- 1.1.33. **Surety:** Any entity that is bound with and for the Contractor for the performance of the Work and/or the payment for any labor and material through the performance bond and/or the payment bond.
- 1.1.34. **Unit Price:** An amount stated in the Bid as a price per unit of measurement for materials or services as described in the Contract. Unit Prices are intended to cover all items of work to be done and materials to be furnished to fully complete the Work in accordance with the Contract Documents (including without limitation the cost of appurtenant items of work, labor, materials, fees, bond costs, supplies, utilities, royalties, tools, forms and equipment, and all other costs (including without limitation sales and use tax, insurance, licenses, permits, profit, and other overhead) not listed separately, not shown on the Plans and Specifications, or not specified but necessary to complete the Work in accordance with the Contract Documents).
- 1.1.1. **Weather Day:** Any day on which Work is scheduled in the Construction Schedule but cannot be performed within contract weather or temperature limitations or due to weather related soil conditions, and where work on critical activities cannot be performed for more than fifty percent (50%) of the work day, including any day immediately following a Weather Day on which subsequent day Work was scheduled in the Construction Schedule but cannot be performed on scheduled critical path activities due to weather related site or soil conditions for more than fifty percent (50%) of the day (drying days).
- 1.1.2. **Work:** The construction and services required by the Contract Documents, whether completed or partially completed, including all other labor, materials, equipment, supplies, management, administration, supervision, manufactured components, and

services provided or to be provided by the Contractor to fulfill the Contractor's obligations under the Contract. The Work may be the whole or a part of the Project.

1.2. Words of Importance.

When the Contract Documents use the phrases or words "as directed," "as required," "approved," "acceptable," "satisfactory," or other phrases or words of like meaning without further indication, the intended direction, requirement, approval, or satisfaction shall be that of the Project Manager.

1.3. References.

Words describing materials or Work having a well-known technical or trade meaning in an industry, unless otherwise specifically defined, shall be construed in according to well-known meanings as recognized by engineers, architects, and the trades. All references to standard specifications, methods of testing materials, codes, practices, and requirements refer to the edition of each in effect on the date of the Request for Bids unless a specific edition or revision is referenced.

1.4. Computation of Time.

Any period of time referred to in the Contract Documents will be computed to exclude the first and include the last day of the period. If the last day of the period falls on a Saturday, Sunday, or legal holiday for the City, such day will be omitted from the computation.

1.5. Abbreviations.

When the following abbreviations appear in the documents, they are defined as follows:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ACOE or COE	U.S. Army Corps of Engineers
AGC	Associated General Contractors of America, Inc.
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
APHA	American Public Health Association
APWA	American Public Works Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWSC	American Welding Society Code
AWWA	American Water Works Association
CDOT	Colorado Department of Transportation
CPM	Critical Path Method
DHS	U.S. Department of Homeland Security
EPA	U.S. Environmental Protection Agency
GESC	Grading, Erosion and Sediment Control
IEEE	Institute of Electrical and Electronic Engineers

MUTCD	Manual on Uniform Traffic Control Devices
NBS	National Bureau of Standards
NCPI	National Clay Pipe Institute
NEC	National Electric Code
NEMA	National Electrical Manufacturer's Association
OSHA	Occupational Safety & Health Administration
RCRA	Resource Conservation and Recovery Act
SAME	Society of American Military Engineers
SACWSD	South Adams County Water & Sanitation District
SAVE	Systematic Alien Verification or Entitlement program
WW-P	Federal Specifications Prefix

ARTICLE 2 PRELIMINARY MATTERS

2.1. Notice to Proceed.

The City will give the Contractor written Notice to Proceed with the Work after execution of the Contract by the City. The Contractor shall begin the Work by the date stated in the Notice to Proceed and diligently pursue the Work regularly and without interruption (unless otherwise directed in writing by the Project Manager) with the force necessary to complete the Work and achieve Final Acceptance within the Contract Time. If any milestones are described in the Contract Documents or the approved Construction Schedule, the Work described by each milestone shall be accomplished on or before that milestone in accordance with the Contract Documents.

2.2. Construction Schedule.

- 2.2.1. Within the time specified in the Request for Bids, the Contractor shall submit to the City a proposed Construction Schedule using Primavera, MS Project or other comparable Critical Path Method (CPM) scheduling software.
- 2.2.2. The Construction Schedule must include all Work activities to be performed under the Contract including any work to be performed by Subcontractors and must account for all Reasonably Predictable Weather Days. All activities should be logically tied with a critical path clearly identified. The schedule must have sufficient detail to adequately plan and manage the Work. Contractual and key milestones are to be identified.
- 2.2.3. The Construction Schedule must include a brief narrative including:
 - a) A Critical Path description;
 - b) Identification of non-work days such as weekends or holidays;
 - c) A table showing calculated Reasonably Predictable Weather Days (including drying days for each month); and
 - d) List of assumptions used while developing the Construction Schedule.
- 2.2.4. It will be presumed that the Contractor, at the time of bidding, took into account the number of days which might be unavailable for Work as a result of Reasonably Predictable Weather Days during the Contract Time.
- 2.2.5. The Contractor shall calculate Reasonably Predictable Weather Days by using the last ten (10) years of historical weather data from the nearest NOAA weather data collection station, or other approved weather station, to compute the average number

of Weather Days for each month of the Construction Schedule.

- 2.2.6. On a monthly basis with each pay application and as requested by the Project Manager, the Contractor shall update the Construction Schedule and provide a summary report of progress on the various parts of the Work, including the status, rate of progress, estimated completion date, and cause of delay, if any. This report shall not constitute a request or approval for any change in the Contract Time.
- 2.2.7. Work shall normally not be done on Saturdays, Sundays, City observed holidays, or outside of the daytime working hours (7:00 a.m. to 5:00 p.m.), except for such work as may be necessary for proper care, maintenance, and protection of Work already done, or in cases when the Work would be endangered or when hazard to life or property would result.
- 2.2.8. If the Contractor believes it may be necessary to work on Saturdays, Sundays, holidays, or at night, the Contractor shall make prior arrangements with the Project Manager and receive written approval at least twenty-four (24) hours before such work period so that proper inspection and engineering services can be provided. Such approval may be revoked by the Project Manager if the Contractor fails to maintain adequate equipment and lighting at night for the proper prosecution, control and inspection of the Work. If Work is done outside of approved working hours, and the Project Manager has not assigned Inspectors to the Work, the Work performed during those periods of time may be declared defective solely on the grounds that it was not properly inspected.

2.3. Pre-Construction Meeting.

Before Work is commenced and materials are ordered, the Contractor shall meet and consult with the Project Manager relative to the materials, equipment, schedule, site, and other arrangements for the commencement of the Work.

2.4. Contractor's Understanding of Work.

The Contractor agrees that, by careful examination, it is satisfied as to the nature and location of the Work, the conformation of the ground, the character, quality, and quantity of the materials to be encountered, the character of equipment and facilities needed before beginning and for the Work, the general and local conditions, and all other matters, which can in any way affect the Work under the Contract. No oral agreement with any officer, agent, or employee of the City either before or after the execution of the Contract shall affect or change any of the terms or obligations contained in the Contract.

2.5. Contractor's Representation.

The Contractor represents and warrants that it has the knowledge, ability, experience, and expertise to perform the Work competently in accordance with the Contract Documents. The Contractor represents and warrants the capacity of the Contractor's construction plant, personnel, and its ability to complete the Work by the Completion Date.

2.6. Other Work.

The City reserves the right to award other contracts in connection with the Project or other activities. The Contractor must be prepared to accept the presence, on or adjacent to the construction site, of work forces of other contractors, subcontractors, tenants, government

agencies and municipal, public service or utility systems. The Contractor shall cooperate with and afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall coordinate its Work with theirs. If it becomes impossible to proceed with the Work in a manner that permits all activities to progress at a reasonable pace, the Project Manager will select the course of action that appears to best serve the City.

2.7. Notices.

Except for routine communications, written notices required under this Contract and all other correspondence between the Parties will be deemed received when hand-delivered or three (3) days after being sent by certified mail, return receipt requested (unless the Parties consent to electronic delivery). The address in the Bid will be the Contractor's address for the delivery of notices, unless modified by the Contractor by written notice at least three (3) business days prior to the change. Notices to the City shall be delivered to the Project Manager except as provided in the Contract Documents.

2.8. Contractor's Signs.

No signs with Contractor's name, logo, telephone number, address or, (etc.), shall be placed on any pole, road, structure or other surface, unless approved in writing, and in advance of such placement, by the City.

2.9. Publicity and Advertising.

2.9.1. Neither the Contractor nor its Subcontractors or Suppliers shall include any reference to the Contract or to Work performed hereunder in any advertising or public relations materials without first obtaining the written approval of the Project Manager. All information shall be factual, and shall in no way imply that the City endorses the Contractor or its services or product.

2.9.2. The City shall have the right to photograph, videotape, film or in any other manner record the progress of the Work at any time and to use such materials for any purpose.

ARTICLE 3 DRAWINGS AND SPECIFICATIONS

3.1. Intent of Drawings and Specifications.

3.1.1. In the Drawings and Specifications, the City intends that the Contractor furnish all superintendence, labor, materials, tools, equipment, supplies, machinery and transportation necessary for the proper execution of the Work unless specifically noted otherwise. The Contractor shall do all the Work shown on the Drawings and described in the Specifications and all incidental Work reasonably necessary to complete the Project in a substantial and acceptable manner, and to complete fully the Work, ready for use, by the City. The Contractor shall complete all Work according to the Specifications and Drawings.

3.1.2. The Contract Documents are intended to be complementary, and Work called for on any Drawing and not mentioned in the Specifications, or Work described in the Specifications and not shown on any Drawing, is included under the Contract as if set forth in both the Specifications and Drawings.

3.1.3. Material and workmanship specified by the number, symbol, or title of a referenced

standard shall comply with the latest edition or revision thereof and any amendments or supplements thereto in effect on the date the bid is received except where a particular issue or edition of a publication is indicated. In case of a conflict between the Drawings, Specifications and the referenced standard, the more stringent shall govern, as determined by the Project Manager.

- 3.1.4. If labor, materials or equipment, although not described by the Drawings or Specifications, is required to successfully complete the Work and can reasonably be inferred by competent contractors by virtue of common knowledge or customary practice in the construction industry from the Contract Documents as being necessary to produce the intended result, the Contractor shall perform that work or provide the materials or equipment as if they were specified.
- 3.1.5. Contractor shall carefully study the Contract Documents and, if Contractor identifies any discrepancies found between the Drawings and Specifications and site conditions and any adjacent work on which the Work is dependent and any errors or omissions in the Drawings or Specifications, shall promptly notify the Project Manager of such discrepancies, errors, or omissions in writing, and any necessary changes shall be accomplished by issuance of an appropriate Change Order or Field Order. Any Work done by the Contractor after discovery of such discrepancies, errors or omissions prior to the issuance of a Change Order or Field Order is done at the Contractor's risk. In all cases, the Project Manager shall decide the intent of the Drawings and Specifications.
- 3.1.6. If the Contractor or any of its Subcontractors or Suppliers, knows or reasonably should know by virtue of common knowledge or customary practice in the construction industry that any of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, or rules or regulations, in any respect, the Contractor shall promptly notify the Project Manager in writing, and any necessary changes shall be accomplished by issuance of an appropriate Change Order or Field Order. The Contractor shall assume full responsibility for, and shall bear all costs attributable to work performed by the Contractor or any Subcontractor prior to the issuance of a Change Order or Field Order when any of them know or reasonably should know that it is contrary to such laws, statutes, ordinances, building codes, rules or regulations.
- 3.1.7. The Contractor, before commencing work, shall verify all governing dimensions, and shall examine, to the extent reasonable, all adjoining work on which its Work is in any way dependent. No disclaimer of responsibility for defective or non-conforming adjoining work will be considered unless written notice of the same has been filed by the Contractor and agreed to in writing by the Project Manager before the Contractor begins any part of the affected Work.
- 3.1.8. The Contractor shall perform no portion of the Work at any time without Contract Documents or, where required, approved Drawings, Specifications, instructions, Shop Drawings, product data, or samples for such portion of the Work.

3.2. Copies of Drawings and Specifications Furnished.

The Project Manager will furnish to the Contractor copies of Drawings and Specifications of the Work at reproduction costs (including labor) or electronic copies of Drawings and Specifications in electronic form at no charge.

3.3. Utilities.

- 3.3.1. Delays relating to relocation of utilities should be anticipated for Work on or involving City rights-of-way.
- 3.3.2. It is the Contractor's responsibility to verify all locations of existing structures and utilities shown on the Drawings and to ascertain whether any other structures and utilities exist. The Drawings show available information on the location of existing underground, surface and overhead structures and utilities. However, the City does not guarantee the results of the investigations are accurate or complete.

3.4. Requests for Clarifications and Information.

- 3.4.1. The Contractor shall submit any requests for information or clarification of Drawings and Specifications to the Project Manager or to the person who has been designated by the Project Manager to receive such requests. When the City responds to such requests for information or clarification, it will issue a response which can consist of a written explanation with or without drawings or other information in the City's sole discretion. Such requests and responses to such requests shall neither authorize nor constitute changes in the Contract Time or Contract Price. If the Contractor believes that the response to any request for information or clarification requires a change in Contract Time or Contract Price, it shall submit a Contractor Change Request in accordance with the Contract Documents.
- 3.4.2. The Contractor shall review and attempt to answer requests for information or clarification from its Subcontractors and Suppliers. Such requests shall be encompassed within the Contractor's request for information or clarification by the Contractor to the Project Manager if the Contractor is unable to answer such requests.

3.5. Dimensions.

Figured dimensions shall govern over scaled dimensions.

3.6. Shop Drawings.

- 3.6.1. The Contractor shall provide Shop Drawings, settings, schedules, and such other Drawings as may be necessary for the prosecution of the Work in the shop and in the field as required by the Drawings, Specifications or Project Manager's instructions.
- 3.6.2. The Contractor shall submit for approval three (3) reproducible copies of all Shop Drawings and descriptive data as applicable showing all features not fully detailed on the Specifications but essential for a completely coordinated installation. An additional copy shall be provided for each railroad company affected by the Work. The Contractor will correct errors in Shop Drawings as directed by the City.
- 3.6.3. The City's approval of Shop Drawings indicates only that the type and kind of equipment and general method of construction or detailing are satisfactory and in general compliance with the Contract Documents and design concept of the Project. The Contractor has the responsibility for incorporating into the Work satisfactory materials and equipment meeting the requirements of the Contract Documents, the proper dimensions, and the detailing of connections.
- 3.6.4. The Contractor may not construe such approval as a complete check and approval

does not indicate the waiver of any Contract requirement. Changes in the Work are authorized only by separate written Change Order.

3.7. Record Documents.

- 3.7.1. The Contractor shall keep one complete set of all Drawings and Specifications at the work site and available to the City and its representatives at all times.
- 3.7.2. The Contractor shall keep one record copy of all Amendments, Change Orders, Drawings, Field Orders, Shop Drawings and Specifications in good order.
- 3.7.3. The Contractor shall record any changes made during construction and any discrepancies between the Contract Documents and Work actually performed on the record copies (however minor or seemingly insignificant). The Contractor shall make a set of "Record Drawings" by marking this set of prints with all changes from the original Drawings as bid, including all Change Orders, alignment changes, depth changes of underground pipes and utilities, utility locations, and all other items that are not the same as originally drawn. The Contractor shall keep the Record Drawings up to date as the Project progresses. The Project Manager may require, as a condition of the approval of any progress payment, periodic inspection of the Record Drawings. The Contractor will deliver the Record Drawings to the Project Manager upon completion of the Project before Final Payment.
- 3.7.4. All Contract Documents are the property of the City and shall not be used by the Contractor for any purpose other than the Work to be performed under the Contract. At Final Acceptance, all Shop Drawings and Record Drawings, including all material in electronic format shall become the property of the City. The Contractor will be permitted to maintain a copy of the Drawings, Specifications and Shop Drawings as necessary to maintain a Contract record file.
- 3.7.5. The Contractor shall prepare and keep current a schedule of submittals that shall note all required submittals, submittal dates, required approval dates, and all required delivery dates.

3.8. Site Inspection & Differing Site Conditions.

- 3.8.1. Drawings and specifications defining the Work were prepared on the basis of interpretation by design professionals of information derived from investigations of the Work site. Such information and data are subject to sampling errors, and the interpretation of the information and data depends to a degree on the judgment of the design professional. Information about the degree of difficulty of the Work to be done cannot totally be derived from either the Drawings or Specifications or from the Project Manager. The Contractor shall not be entitled to an adjustment to the Contract Time or Contract Price for any condition that was or would have been evident at the time of a pre-bid site inspection. By executing the Contract, the Contractor represents that it has visited the site if and to the extent it believed necessary, familiarized itself with the location and conditions under which the Work is to be performed, and correlated its observations with the requirements of the Contract Documents.
- 3.8.2. The Contractor shall promptly, before such conditions are further disturbed, notify the Project Manager in writing of:

e) Subsurface or latent physical conditions at the Work site differing materially from

those indicated in the Contract; or

f) Unknown physical conditions at the Work site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

3.8.3. Upon receipt of written notification from the Contractor of alleged differing site conditions, the City shall promptly investigate the conditions. If the City finds that the conditions materially differ and could not have been discovered, or reasonably inferred, from the Contract Documents or a thorough inspection of the Work site by the Contractor, and such conditions cause an increase or decrease in the Contractor's cost of or the time required for performance of any related part of the Work under the Contract, an adjustment to the Contract Time or Contract Price, or both, may be made through a Change Order.

3.8.4. If the Contractor has not fully complied with the notice and submittal requirements of this section or any part of the General Conditions pertaining to Change Orders, with particular attention to not disturbing the site prior to allowing the City to investigate the conditions, the Contractor shall be deemed to have waived its right to assert a claim for differing site conditions.

3.8.5. No claim will be allowed under this section if Final Payment has been made.

3.9. Geotechnical and Other Design Professional Reports, Investigations & Tests.

3.9.1. The Contractor acknowledges that certain soils reports, borings, and other geotechnical data, more particularly described or referenced in the Specifications of the Contract, have been made available for inspection and review. The borings were made for the use of the City in the design of the Project and are not intended to be interpreted for use in temporary construction facilities designed by the Contractor.

3.9.2. The City in no way warrants the accuracy or reliability of said borings and other geotechnical data or of the data, information or interpretations contained in said soils reports, and is not responsible for any deduction, interpretation, or conclusion drawn therefrom by the Contractor. Said soil reports may contain interpretations by design professionals of borings and geotechnical data obtained at the Work site. Such borings and geotechnical data are subject to sampling errors, and any interpretations or conclusions based on such borings and data depend to a degree on the judgment of the design professionals.

3.9.3. The Contractor agrees that it will make no claims against the City if, in performing the Work, it finds that the actual conditions encountered do not conform to those indicated by said soil reports, borings and other geotechnical data, or those reasonably inferred therefrom or reasonably discoverable by a thorough inspection of the site by the Contractor.

ARTICLE 4 RIGHT-OF-WAY & ACCESS

4.1. Acquisition of Right-of-Way.

4.1.1. Before issuance of Notice to Proceed, the City shall obtain all land and right-of-way necessary for carrying out and completion of the Work to be performed pursuant to the Contract, unless otherwise mutually agreed.

4.1.2. The City shall provide to the Contractor information that delineates and describes the lands owned and rights-of-way acquired, when necessary. The Contractor shall confine its operations within the areas designated by the Project Manager.

4.2. Access to Right-of-Way.

4.2.1. The City will make best efforts to provide right of access to all places necessary for the performance of the Work in a timely manner. The City will not be liable to Contractor for any delay in providing access for reasons outside the City's control.

4.2.2. Nothing contained in the Contract shall give the Contractor exclusive occupancy of the area provided by the City. The City, other contractors of the City and utility companies may enter upon or occupy portions of the land furnished by the City for any purpose, but without unreasonably interfering with the completion of the Project. Joint occupancy or use of the territory shall not be the basis of any claim for delay or damages.

4.3. State Highway Right-of-Way.

If any part of the Project requires Work within the right-of-way of a roadway under the jurisdiction of the Colorado Department of Transportation (CDOT) the Contractor shall obtain the necessary permits from CDOT to perform such Work. The Contractor shall conform to all the requirements and restrictions indicated on the permit. The Contractor shall restore the area to its original condition, including reseeding if necessary, at the completion of the Project. The Contractor's equipment shall not be stored on any traveled highway.

ARTICLE 5 CONTRACTOR'S GENERAL RESPONSIBILITIES

5.1. Contractor Performance.

5.1.1. The Contractor will perform the Work or cause the Work to be performed in a manner that is in compliance with the requirements of the Contract Documents. The Contractor shall perform the Work exactly as specified by the Contract Documents.

5.1.2. Unless otherwise provided in the Contract Documents, for the Unit Prices, the Contractor shall provide and pay for all labor, materials, equipment, tools, supplies, construction equipment and machinery, water, heat, electricity, energy, utilities, transportation, any temporary construction easements not provided by the City, apparatus, permits, superintendence, maintenance, dismantling, removal, and other facilities and services, necessary for the proper execution and completion of the Work, whether temporary or permanent, and whether or not incorporated or to be incorporated into the Work.

5.1.3. The Contractor shall supervise and direct the Work using the Contractor's best efforts, skill and attention.

5.1.4. The Contractor shall also supervise, direct and be responsible for all work performed by its Subcontractors, their agents and employees and other persons performing any of the Work under a contract with the Contractor, Subcontractors of any tier, or Suppliers of any tier.

5.1.5. The Contractor shall be solely responsible for all construction means, methods, safety, techniques, sequences and procedures unless otherwise specified in the Contract

Documents.

- 5.1.6. When the work includes adjusting valve boxes, meter pits, manholes, pavement markings and/or striping, etc., the Contractor shall complete this work within ten (10) days of placing the final lift of asphalt.

5.2. Contractor's Superintendent.

- 5.2.1. The Contractor shall designate a Superintendent to be its representative and have immediate charge of the Project. The Superintendent or his or her representative shall have the Contractor's authority to act in its absence. The same person shall continue in the capacity of Superintendent until the Work has been completed unless the City requests that the Superintendent be replaced or the Superintendent ceases to be employed by the Contractor or becomes sick or disabled.
- 5.2.2. All directions and notice given to the Superintendent or his or her representative shall be considered given to the Contractor.
- 5.2.3. The Contractor shall keep the Project Manager informed, at all times, of the progress of the work and schedule of construction. The Superintendent or his or her representative shall have a radio, cell phone, or pager to be available to the Project Manager or any inspector as needed. The Project Manager may suspend operations at the Work site if the City cannot communicate with the Superintendent.
- 5.2.4. Any person employed on the Project who fails, refuses, or neglects to obey the Superintendent or his or her representative shall, upon the order of the Project Manager, be at once removed from the Project and not again employed on any part of the Project.

5.3. Subcontractors.

- 5.3.1. The Contractor may use the services of specialty Subcontractors on those parts of the Work which, under normal contracting practices, are performed by specialty Subcontractors.
- 5.3.2. The Contractor shall not sublet or subcontract any portion of the Work to be done under the Contract to any Subcontractor or Supplier not identified in the Bid until approval of such action has been obtained from the City. The City may disapprove of a Subcontractor for any reason deemed appropriate by the Project Manager, including without limitation:
 - a) Default on a contract within the last five (5) years;
 - b) Default on a contract that required that a surety complete the contract under payment or performance bonds issued by the surety;
 - c) Debarment within the last five (5) years by a public entity or any organization that has formal debarment proceedings;
 - d) Significant or repeated violations of Federal Safety Regulations (OSHA);
 - e) Failure to have the specific qualifications listed in the Contract Documents for the work that the Subcontractor will perform;
 - f) Failure to have the required City or Colorado licenses to perform the work

described in the subcontract;

- g) Failure to pay workers the proper wage and benefits or to pay suppliers or subcontractors with reasonable promptness within the last five (5) years;
- h) Conviction, plea of nolo contendere, entry into a formal agreement admitting guilt or entry of a plea of guilty or otherwise admitting culpability to criminal offenses of bribery, kickbacks, collusive bidding, bid-rigging, anti-trust, fraud, undue influence, theft, racketeering, extortion or any offense of a similar nature in connection with Subcontractor's business, on the part of Subcontractor's principal owners, officers, or employees, within the last five (5) years;
- i) Failure to pay taxes or fees to the City;
- j) Evidence that the Subcontractor was selected by the Contractor through the process of bid shopping, dishonesty or buyout.

Rejection or acceptance of any Subcontractor shall not create in that Subcontractor a right to any subcontract or the right to perform any portion of the Work, nor shall acceptance or rejection relieve the Contractor its responsibilities for the work of any Subcontractor.

- 5.3.3. The Contractor is fully responsible to the City for the acts and omissions of its Subcontractors, and of persons either directly or indirectly employed by them.
- 5.3.4. The action or omission of any Subcontractor in violation of this Contract or any subcontract will not relieve the Contractor from any obligation under this Contract or at law.
- 5.3.5. Nothing contained in the Contract or any exercise of rights under this Contract creates any contractual relationship or privity of contract tween any Subcontractor and the City.
- 5.3.6. The Contractor shall put appropriate provisions (including the indemnity and insurance provisions) in all Subcontracts relative to the Work to bind Subcontractors to the terms of the Contract insofar as applicable to the work of Subcontractors (even if not specifically required here), and to give the Contractor the same power to terminate any Subcontractor that the City may exercise over the Contractor.
- 5.3.7. The Contractor shall specifically stipulate in all Subcontractor or Supplier contracts and purchase order forms for all materials and systems that the guarantee period begins with the date of Substantial Completion. The Contractor shall, during the course of the Work, specifically instruct Subcontractors and Suppliers that all written guarantees, that are due to be submitted to the City, shall indicate the initiation of the guarantee period as being the date of Substantial Completion.
- 5.3.8. The Contractor shall make available to each proposed Subcontractor, before the execution of the subcontract, complete and accurate copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Subcontractors.

5.4. Workforce.

- 5.4.1. The Contractor shall assign an adequate number of qualified, competent workers to each task to complete the Work on schedule and in accordance with the Contract Documents.
- 5.4.2. If the City believes that the Work is not proceeding satisfactorily or may not be satisfactorily completed by the Completion Date, the Project Manager may, by letter to the Contractor, require the Contractor to submit a corrective action plan identifying steps to be taken, at no additional cost to the City, to raise the rate of progress to an acceptable level.
- 5.4.3. Competent personnel with experience and skills adequate for the assigned tasks are an absolute necessity for job safety and for the performance of quality work. The Contractor and any Subcontractor shall employ only foremen and workers skilled in the Work requiring special qualifications. The Contractor shall reassign or remove from the Project all personnel who are requested to be reassigned or removed by the Project Manager or who are incompetent, uncooperative, refuse to comply with safety requirements, or are otherwise unfit to perform the assigned task. No increase in Contract Time or Contract Price is authorized as a result of the City's exercise of this section.

5.5. Work Performed Under Adverse Weather Conditions.

- 5.5.1. Adverse weather conditions are those that can, depending on the Work to be performed, cause defective Work. High or low temperatures, excessive moisture, or unusual drying conditions are examples.
- 5.5.2. Construction methods and practices that have been or may be developed for Work performed under such circumstances may only be used after the Project Manager has approved the concept of such method or practice.
- 5.5.3. If the Contractor does attempt Work during periods of adverse weather conditions without the Project Manager's approval, that Work shall be at the Contractor's sole risk.

5.6. Materials and Equipment Furnished by the Contractor.

- 5.6.1. Unless otherwise provided for in the Specifications, all workmanship, equipment, materials, and articles incorporated in the Project are to be new, suitable for the purpose used, of good quality, free from faults and defects and in conformance with the Contract Documents.
- 5.6.2. The Contractor further warrants that it has full title to all parts, materials, components, equipment, and other items conveyed to the City under the terms of the Contract, that its transfer of such title to the City is rightful and that all such parts, materials, components, equipment, and other items shall be transferred free and clear from all security interests, liens, claims, or encumbrances whatsoever. Materials, supplies, and equipment to be incorporated into the Project shall not be purchased by the Contractor or any Subcontractor subject to chattel mortgage or under a conditional sales contract or other agreement by which an interest is retained by the seller. The Contractor agrees to warrant and defend such title against all persons claiming the whole or any part thereof, at no cost to the City.

- 5.6.3. The Contractor shall furnish the City, for the Project Manager's approval, the name of the manufacturer of machinery and other equipment for materials the Contractor contemplates incorporating in the Project. The Contractor shall also furnish information on capacities, efficiencies, sizes, etc., and other information as may be required by the Project Manager. All items shall be labeled to indicate the Contract and Project name, Contractor, source of supply, and manufacturer and shall be submitted in sufficient time to permit proper consideration by the Project Manager without impacting the Construction Schedule.
- 5.6.4. The Contractor shall have available for use when needed all necessary construction machinery and equipment. Such machinery and equipment shall comply with all applicable federal, state and local safety requirements and be in good working condition, adequate for the task, and in the numbers needed to maintain a rate of progress sufficient to complete the Work within the Contract Time and milestones. Whenever an operation is undertaken which must be accomplished without any slowdown or stoppage, or to avoid an inferior product, the Contractor shall provide standby equipment capability so that an equipment breakdown does not disrupt that activity.
- 5.6.5. The Contractor shall give the Project Manager three (3) copies of all shop manuals, operating manuals, parts lists, classifications, catalog cuts, specifications, warranties and guarantees for all equipment and machinery installed.
- 5.6.6. Consideration of a product as an "equal" by the Project Manager may require that the manufacturer of such product furnish guarantees that extend beyond the usual product warranty time. The refusal of a manufacturer to provide such guarantees is sufficient reason for rejecting the product.
- 5.6.7. The Contractor shall not incorporate any materials into the Project or cover any part of the Work until it has been inspected and approved according to the Contract Documents. Machinery, equipment, materials, and articles installed or used without the Project Manager's approval are at the risk of subsequent rejection.
- 5.7. Substitution of Materials & Equipment.**
- 5.7.1. After the award of the Contract, the Contractor may ask for substitution of specified material or equipment with equal or equivalent items only under the following circumstances: (i) The Contractor provides evidence to the Project Manager that, in the Project Manager's sole opinion, establishes that an item of specified material is not available; (ii) the Contractor provides evidence to the Project Manager that, in the Project Manager's sole opinion, establishes that the specified item will have an unreasonable delivery time due to no fault of the Contractor; or (iii) acceptance of such substitution would result in a significant saving to the City without materially impairing the quality or performance of the Work. If any of these circumstances exist, the Contractor shall request approval for a substitution at least thirty (30) days before the material or equipment must be ordered.
- 5.7.2. All requests for substitutions shall be made in writing as part of a submittal. The request shall describe all features of the requested substitution including any tie-in with other elements of the Work, including utilities and controls along with the size and capacity of substitute materials or equipment. The request must be submitted on a form provided by or otherwise acceptable to the Project Manager, and shall list all

differences from the product described in the Specifications, include the price of the specified item and the requested substitution, and describe any advantages or disadvantages of the proposed substitution. The Contractor shall be responsible for any effect upon related Work in the Project of any substitution and shall pay any additional cost resulting from or relating to any substitution.

- 5.7.3. If the "equal or equivalent" material or equipment costs less than that specified, the Contractor shall so state in its request for substitution and, if the City accepts the proposed substitution, it may issue a Change Order to reduce the Contract Price by the amount of the direct cost savings without markup to the Contractor.
- 5.7.4. If the equal or equivalent material or equipment is accepted for unavailability or unreasonable delivery time due to no fault of the Contractor, the City may, if appropriate, issue a Change Order to increase the Contract Price by the resulting actual, direct cost increase, if any, to the Contractor, without markup.

5.8. Defective Work and Materials.

- 5.8.1. Material and workmanship not conforming to the requirements of the Contract are deemed defective. The Contractor shall bear all costs of investigating and correcting such defective Work and materials, which includes design efforts necessary to correct such Work.
- 5.8.2. Whether or not the Work is defective will be determined by comparing it to the Contract Drawings, Specifications, accepted Shop Drawings and manufacturer's literature and further measuring it against the standard of quality implied by the Contractor's warranty. Also, should the appearance and performance of any element of the Work fail to conform to standards of the trade for such Work, that Work may be declared defective.
- 5.8.3. Defects discovered by any inspection process or testing, or otherwise made apparent during the Work, shall be repaired, removed, or replaced by the Contractor, at no cost to the City, as identified. The City shall have the right to charge the Contractor for its costs of re-inspecting the Work after the defective Work is corrected and any costs of verifying or determining the existence of latent defects.
- 5.8.4. If the Contractor fails to replace rejected materials or Work within ten (10) days after receipt of written notice, the City may replace or correct them and charge the cost to the Contractor and may terminate the right of the Contractor to proceed.
- 5.8.5. Failure to detect previously installed defective materials or workmanship shall not impair the City's right to receive a completed Work, which is free of defects and meets all of the requirements of the Contract Documents. Nothing in this section shall limit the City's right to seek recovery for latent defects that are not observable until after any warranty or guaranty periods have run.

5.9. Cutting and Patching.

- 5.9.1. The Contractor shall be responsible for all cutting, fitting, or patching that may be required to complete the Work, to make its several parts fit together properly or to tie the Work into other work that is shown in the Contract Documents.
- 5.9.2. The Contractor shall organize and plan the Work to reduce to a minimum the need for

cutting or otherwise modifying or removing load-bearing structural elements to accommodate the installation of other elements of the Work. If two or more contractors are doing work in the same place, the Contractor shall be responsible for the coordination effort needed to avoid or to reduce the amount of cutting, modifying or removing of structural elements to accomplish such work. However, if modification or removal of structural elements is required because the Work could not be organized and planned to avoid that need, the Contractor shall inform the Project Manager of the need so that the consequences of such modification or removal of structural elements can be assessed. No structural element shall be cut, drilled, bored or otherwise modified unless cutting, drilling, boring or other modification is indicated in the Contract Documents.

- 5.9.3. If the Contractor needs to modify a structural element from its original design, the Contractor must submit to the Project Manager a request to make the modification. The request must provide complete details including all necessary calculations performed by a professional engineer licensed in the State of Colorado to show that the structural elements can still function as originally designed. The request must be accepted by the Project Manager before any modification is made.
- 5.9.4. The Contractor shall be responsible for all repair, replacement, and patching that is necessary to restore the Work, other property, or work of others damaged by the Contractor.

5.10. **Samples and Testing.**

- 5.10.1. All materials and equipment used in the Project will be subject to sampling and testing by an independent testing company acceptable to the City according to generally accepted standards and as required in the Contract Documents. In the absence of direct references, the sampling and testing of materials will be done according to current specifications of the ASTM or the AWWA.
- 5.10.2. The Contractor shall furnish all samples without charge. The Contractor will cooperate with the Project Manager in collecting, handling, storing, and forwarding required samples including the furnishing of manpower and equipment when necessary.
- 5.10.3. The Contractor will pay the cost of the initial test except when the Contract states otherwise. The Contractor will pay the costs for repeated tests due to failure of the initial test. The costs of any testing and retesting may be deducted from any payment due to the Contractor under the Contract.
- 5.10.4. The Contractor will provide the Project Manager at least twenty-four (24) hours prior notice for any inspection involving testing or sampling.
- 5.10.5. The Contractor shall be responsible for testing of concrete and soils and, unless otherwise specified, the Contractor shall perform testing of all other materials and equipment. The Contractor shall provide the Project Manager with satisfactory proof of compliance with the requirements of the Contract Documents of any materials or equipment tested. Satisfactory proof of compliance shall be submitted in one or more of the following ways:
 - a) Manufacturer's Certificate of Compliance. For standard labeled stock products of standard manufacture that have a record of satisfactory performance in similar work over a period of not less than two (2) years, the Project Manager may accept

a notarized statement from the manufacturer certifying that the product conforms to the applicable specifications.

- b) Mill Certificates. For materials where such practice is the usual standard, the Project Manager may accept the manufacturer's certified mill and laboratory certificate.
- c) Testing Laboratory Certificates. The Project Manager may accept a certificate from an independent commercial testing laboratory satisfactory certifying that the product has been tested within a period acceptable to the Project Manager and that it conforms to the requirements of the Plans and Specifications.
- d) Report of Actual Laboratory Test. The Project Manager may require that Contractor make actual tests of any product and submit a report of the specified test. Such test shall be made by a commercial testing laboratory satisfactory to the Project Manager at the Contractor's sole expense.

5.11. **Substituted Performance.**

- 5.11.1. If the Contractor's failure of exact performance does not appear to the City to be deliberate or willful and if the City concludes that less than exact performance in some minor part of the Work will not result in a decrease in quality in the entire Work, the City may, at its sole option, accept substituted performance.
- 5.11.2. Should the City accept substituted performance, the cost of the Work shall be reduced by the sum of money that the City determines to be a reasonable consideration for less than exact performance and the City may, at its discretion, require separate warranties for any substituted performance.

5.12. **Project Signs.**

- 5.12.1. One or more project signs may be posted at each Work site. The City will prepare any signs at its expense. When the City notifies the Contractor that the signs are ready, the Contractor shall deliver the signs to the Work site and install them in locations designated by the Project Manager. As the Work progresses, the Project Manager may direct the Contractor to relocate the signs. The Project Manager will direct the Contractor as to final removal of the signs, either upon completion of the Work or at such other time as the Project Manager may determine.
- 5.12.2. All costs of transporting, installing, relocating and removing such signs shall be borne by the Contractor. The Contractor shall pay the costs of repairing any damage to the signs which occurs after the Contractor takes possession of the signs.

5.13. **Surveys.**

- 5.13.1. The City shall develop and arrange for all engineering surveys necessary, in the City's judgment, to establish reference points for the construction of the Work. The Contractor assumes full responsibility for construction according to the established lines and grades. If the Contractor proceeds with the Work without having lines and grades set, the Contractor will not be relieved of strict compliance with the Contract Documents.
- 5.13.2. The Contractor shall carefully protect all monuments and property markers from disturbance or damage. The Contractor, at its expense, will replace any monuments or benchmarks destroyed by the Contractor using a professional land surveyor licensed in the State of Colorado.

- 5.13.3. Unless otherwise stated in the Specifications or the Special Conditions, the City will provide all reference points shown on the Contract Drawings by coordinates and/or elevation. The Contractor must accurately transfer the survey control information to the points of application to ensure that all elements of the Work are correctly located.
- 5.13.4. Requests by the Contractor to relocate survey reference points must be made ninety-six (96) hours prior to the time when the point will be disturbed in order to permit the City to accomplish such surveys on normal working days.
- 5.13.5. Any Work that the Contractor begins before confirming the reference points provided may be rejected.
- 5.13.6. Should the original reference points that the City provided be obliterated or dislodged by operations that the Contractor controls, the City will replace them and charge the Contractor for the resurvey. The cost of these resurveys will be determined by multiplying the hourly equivalent of the salaries and fringe benefits paid to the survey personnel actually involved in the resurvey by the hours expended in doing that resurvey, plus material and equipment costs.

5.14. Lines and Grades.

- 5.14.1. The Contractor shall survey and stake and shall be responsible for laying out the work.
- 5.14.2. The Contractor shall preserve all stakes, bench marks, and any other survey points and shall pay for the replacement, in accordance with state law, of any stakes, benchmarks, or other survey points destroyed by the Contractor or any Subcontractor.

5.15. Value Engineering.

Value engineering includes changes in materials or methods used that will reduce the amount of the Contract and will preserve the integrity of the Work without reducing quantities completed. Proposed changes in materials or methods used must be approved by the Project Manager and any agency having jurisdiction over the affected work before such work is attempted. The Contractor shall be paid fifty percent (50%) of all identifiable cost savings resulting from said value engineering approved and accepted. A Change Order must be issued to effect such a value engineering task.

5.16. Patents and Copyrights.

- 5.16.1. The Contractor's bid price shall be considered to include a sufficient sum to cover all fees, royalties and claims for any material, artist rights, process, patent rights, machine, appliance, copyright, trademark, or any arrangement that may be used upon or in any manner connected with or appurtenant to the Work.
- 5.16.2. The Contractor shall provide a suitable legal agreement giving the Contractor the right to use any design, device, material, or process covered by letters patent or copyright, in the construction of the Project when the use has not been specified or required by the Drawings and Specifications. The Contractor shall file a copy of this agreement with the City, if requested. The Contractor and the Surety shall indemnify, defend and save harmless the City from all claims for infringements on patented design, devices, material, process or any trademark or copyright during the prosecution or after the completion of the Project.

- 5.16.3. If any design, device, material, process or product of a particular manufacturer covered by letters patent or copyright is specified for use by the Drawings and Specifications, the City is responsible for any claims for infringement by reason of the use of such design, device, material, process or product of a particular manufacturer; but the Contractor shall pay any royalties or license fees required.

5.17. Utilities.

- 5.17.1. The Contractor shall support, and protect from injury, until completion of the Work any existing power lines, telephone lines, water mains, gas mains, sewers, cables, conduits, ditches, curbs, walks, pavements, driveways, and other structures in the vicinity of the Work that are not authorized to be removed.
- 5.17.2. The Contractor shall schedule and coordinate all Work with any utilities. The Contractor shall cooperate with utility owners (including electrical, gas, communication, water, sewer and railroad) to mitigate damage (including relocation or removal) whenever the Contractor's work affects their utilities. The Contractor shall seek to expedite the progress of such work and minimize duplication of work and disruption of services.
- 5.17.3. The Contractor shall conduct its operations in such a manner as to minimize the inconvenience to the public due to disconnected utilities. The Contractor shall not disconnect any utility without prior approval of the affected utility and the Project Manager. Such utility shall then not be disconnected before 9:00 A.M. and service shall be restored by 4:00 P.M. of the same day. If the Contractor's operations require or cause utility service to be disconnected beyond the time limits stated above, the Contractor shall make arrangements suitable to the Project Manager to provide temporary utility service. Such temporary service shall be at Contractor's expense.
- 5.17.4. The City will not be responsible or liable for any delay or other impact to the Work caused by the acts or omissions of any utility or related agency.

5.18. Coordination with SACWSD.

The Contractor shall always coordinate its Work with SACWSD. If it becomes necessary to close portions of any water or sewer system due to construction operations, the Contractor will provide at least twenty-four (24) hours prior notice to SACWSD. SACWSD shall have authority to dictate requirements of the closure. It is the Contractor's responsibility to ensure continuity of the utilities.

5.19. Notification of Affected Utility & Property Owners.

- 5.19.1. The Contractor shall not excavate without first notifying all owners, operators, or association of owners and operators having underground facilities in the area of such excavation. Notice may be given in person, by telephone or in writing. Notice to an association is notice to each member of the association.
- 5.19.2. The Contractor shall contact the Utility Notification Center of Colorado at least forty-eight (48) hours before the start of any excavating.
- 5.19.3. The Contractor shall give such notice of the commencement, extent, and duration of the excavation work at least forty-eight (48) hours before beginning Work affecting the area.

- 5.19.4. If the Project affects fences, landscaping, mailboxes, driveways or other improvements, the Contractor shall notify the affected property owners or occupants IN WRITING at least forty-eight (48) hours before beginning Work. The Contractor shall cooperate with the owners or occupants to reduce inconvenience where reasonably possible.

5.20. Compliance with Laws; Licenses and Permits.

- 5.20.1. The Contractor shall perform all obligations under the Contract in strict compliance with all applicable federal, state, and municipal laws, rules, statues, charter provisions, ordinances, and regulations.
- 5.20.2. The Contractor and its employees, agents and Subcontractors, while performing the Work or while on City property for any reason during the Term, shall adhere to the City's policies applicable to City employees regarding drugs, alcohol and workplace violence.
- 5.20.3. The Contractor will obtain, at its cost, all licenses and permits required to do the Work by City, county, state, federal, or other applicable law or regulation. A Subcontractor shall also have the proper permits applicable to the Work to be performed by the Subcontractor.

5.21. Protection of Persons.

- 5.21.1. The Contractor is responsible for the health and safety of all persons on or at the Work site and shall take all necessary and reasonable precautions and actions to protect all such persons from injury, death, or loss.
- 5.21.2. The Contractor and any Subcontractor shall not require any laborer, mechanic or other person employed in performance of the Work to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous to health or safety. The Contractor and all Subcontractors shall comply with all applicable safety rules and regulations adopted by the United States Department of Labor Occupational Safety and Health Administration (OSHA), the Industrial Commission of the State of Colorado or the City of Commerce City, whichever is most restrictive. The City assumes no duty to ensure that the Contractor follows the safety regulations issued by OSHA or the State of Colorado.
- 5.21.3. The Contractor shall provide all necessary protective devices and safety precautions. Such devices and precautions may include but are not limited to: posting of danger signs warning against hazards such as, but not limited to, hoists, well holes, elevator hatchways, scaffolding, openings, stairways, trip and fall hazards and falling materials; placement of warning flares; equipment back-up alarms; installation of barricades; promulgation and application of safety regulations and employment of safety personnel and guards. Signs will not be considered to be an adequate substitute for physical protective barriers. The costs of all protective devices and the planning and implementing of safety precautions are considered to be included in the Unit Prices, even if not specified.
- 5.21.4. If, in the opinion of the Project Manager, the Contractor has not supplied necessary and adequate barricades, warnings, or other safety devices, then the City may order additional devices and deduct the cost from the Contractor's payment. By taking such action, the City assumes no liability for the adequacy of such barricades, warnings or other safety devices.

- 5.21.5. For operations involving trenching, excavation or any other underground construction, the Contractor's attention is specially directed to and its work shall conform to the Construction Safety and Health Regulations, Part P Subparagraph 1926.6013-6016 by OSHA, latest revision.
- 5.21.6. The Contractor and all Subcontractors shall always, whether or not so specifically directed by the Project Manager, take necessary precautions to ensure the protection of the public. The Contractor shall furnish, erect, and maintain at its own expense all necessary precautions for the protection of the Work and safety of the public through and around its construction operations.
- 5.21.7. The Contractor shall make the provisions of this section a condition of each contract with any Subcontractor.

5.22. Protection of Property.

- 5.22.1. The Contractor shall continuously take all reasonable precautions to protect from damage, injury or loss, all or any part of the Work and all or any part of materials or equipment to be incorporated in the Work, whether in storage on or off the Work site, under the care, custody, control of the Contractor or any Subcontractor or Supplier. The Contractor shall repair or replace at its expense any such damage, injury or loss, except such as may be directly due to error in the Contract or caused by agents or employees of the City.
- 5.22.2. The Contractor shall provide and maintain at its expense all passageways, barricades, guard fences, lights, and other protection facilities required by public authority or local conditions.
- 5.22.3. The Contractor is responsible for protection of all public and private property on and adjacent to any site of the Work. The Contractor shall use every precaution necessary to prevent damage to curbs, sidewalks, driveways, trees, shrubs, sod, mailboxes, fences, and other private and public improvements. The Contractor shall protect carefully from disturbance or damage all land monuments and property markers until an authorized agent has witnessed or otherwise referenced their locations, and shall not remove them until directed.

5.23. Protection of Historical Sites.

When the Contractor's operations encounter remains of prehistoric peoples, dwelling sites or artifacts of historical or archeological significance, the Contractor shall temporarily discontinue such operations and immediately advise the Project Manager. The Project Manager will contact archeological authorities to determine the disposition of the items in question. When directed, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and remove them for delivery to the custody of the proper authorities. Such excavation is considered, and paid for, as extra Work.

5.24. Responsibility to Repair.

- 5.24.1. When any direct or indirect damage or injury is done to any public or private property or utility by or on account of any act, omission, neglect or misconduct in the execution of the Work, the Contractor shall restore the damaged property at its own expense to a condition equal to or better than that existing before such damage or injury.

- 5.24.2. If any existing property is damaged in the Work as a result of Contractor's non-performance, the Contractor shall immediately notify the property owner. The Contractor shall not attempt to make repairs unless authorized in writing by the property owner or directed by the Project Manager. Written authorization from the owner to make repairs must be so worded as to save the City harmless from any responsibility whatsoever relative to the sufficiency of the repairs. The Contractor shall give the Project Manager a copy of the written authorization to make repairs.
- 5.24.3. The Contractor shall replace any materials and equipment lost, stolen, damaged or otherwise rendered useless during the performance of Work on the Project.
- 5.24.4. At the Contractor's cost, the City may undertake any such repair or replacement required by this section when the Contractor fails to do so within a reasonable time. The City may deduct any such cost from any payment due the Contract or may recover such costs from the Contractor or the Surety..

5.25. Hazardous & Explosive Materials & Substances.

- 5.25.1. If the Contractor encounters or discovers any hazardous materials or substances during its performance of the Work, it shall immediately take reasonable precautions concerning such hazardous material or substances and notify the Project Manager verbally and in writing of the existence of such materials or substances immediately upon discovery.
- 5.25.2. The Contractor shall exercise the utmost care and caution if the storage or use of hazardous materials or substances or explosives are required for the performance of the Work. Activities related to the purchase, storage, handling, use, removal, treatment, or disposal of such hazardous materials or substances or explosives shall at all times be the sole responsibility of the Contractor and shall be supervised and carried out by personnel properly qualified to perform such activities. However, under no circumstances shall activities requiring the purchase, storage, handling, use, removal, treatment or disposal of hazardous materials or substances or explosives be initiated without first notifying the Project Manager in writing of the proposed activity and receiving the Project Manager's written approval of such activity. The use, handling and storage of explosives will not be allowed on site unless they are required or explicitly permitted by the Specifications

5.26. Cleaning Up and Restoration.

- 5.26.1. The Contractor shall clean up and lawfully dispose of all refuse or scrap materials so the site presents a neat, orderly, and workmanlike appearance at all times. The Contractor shall follow all direction from the Project Manager as to the appearance of the site at all times.
- 5.26.2. The Contractor shall remove all mud or other materials tracked or otherwise deposited on any roadway daily or as directed by the Project Manager.
- 5.26.3. Upon completion of the Work, and before Final Inspection, the Contractor shall remove from the construction site and any occupied adjoining property all plants, buildings, refuse, unused materials, forming lumber, sanitary facilities, and any other materials and equipment that belong to the Contractor or any Subcontractors. The Contractor shall clean and replace any broken or scratched windows, clean and repair all surfaces, and clean and adjust all units of equipment that are part of the Work. Final

Payment will not be made until all cleanup is done to the Project Manager's satisfaction.

- 5.26.4. At the Contractor's cost, the City may clean up and restore the construction site satisfactorily when the Contractor fails to do so within two (2) days of the Project Manager's direction. The City may deduct any such cost from any payment due the Contract or may recover such costs from the Contractor or the Surety.

5.27. Pest & Vector Control.

The Contractor will be responsible for pest control and vector control at the Work site until Substantial Completion. All pest and vector control activities shall be conducted in compliance with applicable laws, including ordinances, statutes and regulations governing the handling, storage and application of pesticides or other hazardous materials and substances.

5.28. Traffic Control.

- 5.28.1. The Contractor shall arrange Work to disrupt traffic as little as possible. All traffic Control Devices used shall conform to the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD). Except as otherwise permitted, two way traffic shall be maintained at all times in public roadways.

- 5.28.2. At least seven (7) days before starting any Work in City right-of-way, the Contractor shall submit a detailed traffic control plan for review from the Public Works Department, with a copy to the Police Department. The approval shall establish the requirements for closures related to the number of lanes and time of day lanes or streets may be closed in accordance with the MUTCD and other applicable criteria or regulations. The Traffic Control Plan (TC Plan) shall include the name of the Contractor, the name and phone number of the person responsible for the traffic control, the date for beginning and ending construction activity and hours of operation expected. The TC Plan should show the widths of streets involved, traffic lanes, the size and location of the Work area with distances from the curb, distance to the nearest intersection, detours, parking areas, access to private property, and the type and location of traffic control devices. No changes to the TC Plan shall be permitted without prior approval by the Public Works Director.

- 5.28.3. The Contractor, at its cost, shall furnish and maintain all necessary signs, barricades, lights, and flaggers necessary to control traffic and provide for safety of the public, all in compliance with the MUTCD with subsequent revisions and additions, and to the satisfaction of the Public Works Director. No construction signs shall be placed on sidewalks unless construction is actually taking place on the sidewalk. During evening hours and when not in use, all signs shall be turned away from traffic and moved at least eight (8) feet away from the edge of the nearest traveled way.

- 5.28.4. Whenever a police officer is necessary for traffic control, the Contractor shall hire and pay a uniformed off-duty police officer with authority in the City to direct traffic. The police department will determine the rate of pay for the officers.

- 5.28.5. The Contractor shall make its Traffic Control plans in concurrence with any Traffic Control requirements that may be specifically stated in the Special Conditions.

- 5.28.6. The City may impose a price reduction charge for any recurrence of an incident under

the TC Plan, after notification by the Project Manager, according to the following schedule. The price reduction charge will not be considered a penalty, but will be a price reduction for failure to perform traffic control in compliance with the Contract. For purposes of this section, an “incident” is any violation of the TC Plan lasting up to thirty (30) minutes; each successive or cumulative 30-minute period in violation of the TC Plan will be deemed a separate incident, as determined by the Project Manager.

Incident	Price Reduction Charge
First	None – Notice from Project Manager
Second	\$150.00
Third	\$300.00
Fourth	\$600.00
Subsequent	\$1,200.00

5.29. Sanitary Regulations.

- 5.29.1. The Contractor is responsible for providing proper health and sanitation facilities for its employees, in compliance with any rules and regulations of the Colorado Department of Public Health and Environment or any other agencies having jurisdiction.
- 5.29.2. The Contractor shall always provide an abundant supply of safe drinking water for its employees and shall give orders against the drinking of any water known to be unsafe in the vicinity of the Project.
- 5.29.3. At convenient places, the Contractor shall provide fly-proof outside toilets which are to be maintained in a sanitary condition. Toilets shall not be permitted in any reservoir area and shall not be permitted where they may pollute a water supply.
- 5.29.4. The Contractor shall provide and empty daily a thirty (30) gallon or larger trash can near each toilet.

5.30. Pollution Control.

- 5.30.1. The Contractor shall comply with all applicable Federal and State laws, orders, and regulations concerning the control, prevention, and abatement of water pollution and air pollution in all operations pertaining to the Contract whether on right-of-way provided by the City or elsewhere.
- 5.30.2. The Contractor shall use construction methods that prevent release, entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes including, but not restricted to refuse, garbage, cement, concrete, sewage effluent, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution. Non-regulated solid wastes shall be disposed of by methods approved under applicable laws and regulations, including, the Resource Conservation and Recovery Act (RCRA), Subtitle D, as administered by Colorado and local Health Departments and the EPA.
- 5.30.3. Contaminated and hazardous materials are regulated by RCRA, Subtitles C and D. The Contractor shall notify the Colorado Department of Public Health and Environment, local health departments, and local fire departments if suspect materials are encountered.

- 5.30.4. The Contractor shall utilize methods and devices that are reasonably available to control, prevent, and otherwise minimize atmospheric emissions or discharges of air contaminants including dust in its construction activities and operation of equipment.
- 5.30.5. The Contractor shall not emit dust into the atmosphere during any operations, including but not limited to: grading; excavating; manufacturing, handling or storing of aggregates; trenching; or cement or pozzolans. The Contractor shall use the necessary methods and equipment to collect, deposit, and prevent dust from its operations from damaging crops, orchards, fields or dwellings or causing a nuisance to persons. The Contractor is liable for any damage resulting from dust.
- 5.30.6. The Contractor may not operate equipment and vehicles with excessive emission of exhaust gases due to improper mechanical adjustments, or other inefficient operating conditions, until repairs or adjustments are made.
- 5.30.7. Burning trash, rubbish, trees, brush or other combustible construction materials is not permitted unless the Contractor has obtained a valid burning permit issued by the Tri-County District Health Department or successor agency. Any such burning shall be conducted in accordance with permit requirements.
- 5.30.8. De-watering for structure foundations or earthwork operations adjacent to or encroaching on lakes, streams or watercourses shall be done in a manner which prevents muddy water and eroded materials from entering the lakes, streams or watercourses, by construction of intercepting ditches, bypass channels, barriers, settling ponds or by other approved means. Excavated materials may not be deposited or stored in or alongside lakes or watercourses where they can be washed away by high water or storm runoff.
- 5.30.9. The Contractor will not allow wastewater from aggregate processing, concrete batching or other construction operations to enter lakes, streams, watercourses or other surface waters without turbidity control methods such as settling ponds, gravel-filter entrapment dikes, approved flocculation processes that are not harmful to fish, recirculation systems for washing of aggregates or other approved methods. Any wastewaters discharged into surface waters shall conform to applicable discharge standards of any agency having jurisdiction over the discharge, including the Colorado Department of Public Health and Environment and any federal agency.

5.31. Staging and Storage.

- 5.31.1. With the Project Manager's approval, the Contractor may obtain sites of his/her choosing for equipment storage and/or materials stockpiling. The Contractor shall not occupy storage sites without prior written approval by the Project Manager. A list of such sites showing the proposed truck route for ingress and egress for each site shall be submitted to the Project Manager for approval at least five (5) days prior to intended use.
- 5.31.2. For all sites approved and used, Contractor shall be responsible for the following:
 - a) Obtaining prior written permission of the owner. A copy of this permission shall be provided to the City;
 - b) Keeping stockpiles and equipment confined within the approved area and in accordance with applicable erosion control requirements;

- c) Providing security for materials and equipment at the site;
- d) Providing for public safety at the site;
- e) Keeping access roads clean and in good condition and in accordance to the City's Erosion Control requirements; and
- f) At Contractor's sole cost expense, restoring the site to its original or better condition at the completion of the Work.

5.32. Salvage.

Items removed by Contractor shall become the property of Contractor unless other disposition or repositioning is required by the Contract Documents or needed for the Work. The Contractor may reuse such items elsewhere or on other contracts, sell such items with proceeds of said sale becoming the property of Contractor or otherwise dispose of such items from the site. Items removed by the Contractor that do not have any salvage value are to be disposed of by Contractor at an approved dump at the Contractor's expense.

ARTICLE 6 CITY'S GENERAL RESPONSIBILITIES

6.1. City Performance.

- 6.1.1. The City will furnish the data, perform acts, and make payments as required by the Contract Documents.
- 6.1.2. The City shall not supervise, direct, or have authority or control over, nor be responsible for, the Contractor's means, methods, techniques, sequences, or procedures of construction or safety precautions, or any failure of the Contractor to comply with any laws or regulations applicable to the Work. The City will not be responsible for the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.
- 6.1.3. The City's promise to pay for the Work that the Contractor promises to perform is limited by the City's Charter and its ordinances. A payment obligation of the City under this Contract, whether direct or contingent, shall extend only to funds appropriated by the City Council for the purpose of the Contract, encumbered for the purpose of the Contract and paid into the City or otherwise lawfully made available by the City. Unless authorized by law, (i) the City does not by this Contract irrevocably pledge present cash reserves for payments in future fiscal years, and (ii) this Contract is not intended to create a multiple-fiscal year direct or indirect debt or financial obligation of the City. Other limitations are found in the law that the Contractor is presumed to know. Three such limitations on payment are listed below:
 - a) Under no circumstances will the City be liable for any extra Work that has not been authorized by a properly executed Change Order or Field Order.
 - b) No Change Order, Field Order, or other form of directive to the Contractor shall be issued, and no such order or directive shall be binding if issued, if: (i) it would directly cause the aggregate amount payable under the Contract to exceed the amount appropriated or otherwise lawfully made available for the Contract, or (ii) it would require the Contractor to perform additional compensable work which would cause the aggregate amount payable to exceed such appropriated or provided amount.
 - c) It shall be the Contractor's responsibility to verify that the amounts already

appropriated or otherwise made available for the Contract are sufficient to cover the entire costs of the Work. Any work undertaken or performed in excess of the amount appropriated or otherwise made available is undertaken or performed in violation of the terms of the Contract, without the proper authorization, and at the Contractor's own risk.

- 6.1.4. Any limitations on the sources of funding for payments made under the Contract are stated in the Contract Documents.

6.2. Project Manager.

- 6.2.1. The Project Manager is designated by the City to exercise all authority on its behalf under the Contract and to see that the Project is completed according to the Contract Documents. The Project Manager may be changed by written notice to the Contractor.
- 6.2.2. The Project Manager may assume exclusive control of the performance of the Contractor in the case of non-performance or if there is an imminent threat to life or safety of persons or property.
- 6.2.3. The Project Manager will furnish all explanations, directions, stakes or markers, and inspections necessary to carry out and complete the Project. No inspection, explanation or direction by the Project Manager shall be deemed authority for Contractor to deviate from the requirement that the Work be performed in accord with the Contract Documents.

6.3. Right to Bar Persons from the Work and Site.

The City reserves the right to bar any person, including employees of the Contractor and Subcontractors, from the Work site by order of the Project Manager. This shall not be treated as a request for the employee's termination but a request that the employee not be assigned to work on the City Work site. No increase in contract time or price is authorized as a result of the City's exercise of this section.

6.4. Access to Work.

- 6.4.1. The City, its representatives, and participating federal or state agencies and other public authorities having jurisdiction established by law shall have access to the Project and Work site at any time for any purposes, including without limitation inspection, sampling, and testing. The Contractor shall provide proper facilities for access to the Project.
- 6.4.2. Access means wherever and whenever the Work is in manufacture, preparation or progress and includes access to payrolls, records of personnel not protected from disclosure by law, invoices of materials, terms and conditions of sale of materials and equipment to be incorporated in the Project, files, records, books, correspondence, instructions, Drawings, receipts, subcontracts, purchase orders, vouchers, memoranda and any other relevant data and records relating to the Contract.
- 6.4.3. The City may, at reasonable times, inspect the part of the plant, place of business or worksite of the Contractor or Subcontractor at any tier that is pertinent to the performance of the Contract.

6.5. Inspection.

- 6.5.1. The City shall appoint Inspectors to inspect the Project. Inspection may extend to all or any part of the Work. Inspectors are not authorized to alter any Contract Documents or to delay the fulfillment of the Contract by failure to inspect materials and Work with reasonable promptness. Inspectors are not authorized to act as foreman for the Contractor.
- 6.5.2. Inspectors may perform any tests and observe the Work to determine whether or not designs, materials used, manufacturing, and construction processes and methods applied, and equipment installed satisfy the requirements of the Contract Documents and the Contractor's warranties and guarantees.
- 6.5.3. Inspectors assigned to the Work by the City are authorized to reject any Work, any materials, or any component of the Work and to suspend any Work that is not being done as required or specified in the Contract Documents. Such rejection or suspension will be confirmed by the Project Manager in writing to the Contractor
- 6.5.4. The Contractor shall give the Project Manager due and timely notice of readiness when the Project is to be inspected, tested, or approved by someone other than the Inspector. The Contractor shall give the Project Manager required certificates of inspection, testing, or approval. Inspection, tests, or approvals by the Project Manager or others do not relieve the Contractor from its obligations to perform the Work according to the requirements of the Contract.
- 6.5.5. If the Project Manager considers it necessary or advisable that previously completed or covered Work be inspected or tested, the Contractor shall uncover, expose or otherwise make the Work available to the Project Manager at the Contractor's expense for inspection and testing. The Contractor shall furnish all tools, labor, material, and equipment necessary to make the Work available. If the Project Manager finds the Work defective, the Contractor shall pay for the cost of satisfactory reconstruction and making the Work available. However, if the Work is not found defective, the Contractor will be allowed an increase in the Contract Price and/or an extension of the Contract Time for costs and time directly attributable to making the Work available and for reconstruction unless covered by the Contractor before any required inspection hold point.
- 6.5.6. If the Contractor's operations require inspecting, testing or surveying to be done outside normal working hours (7 a.m. to 5 p.m.) or on weekends or City holidays, the cost of such overtime shall be at the Contractor's expense. The fee charged shall not exceed fifty dollars (\$50) and shall be charged "portal to portal" from the Inspector's workplace.
- 6.5.7. Inspections shall not be construed to relieve the Contractor of quality control responsibilities or full compliance with the Contract Documents.

ARTICLE 7 SUSPENSION OF WORK

7.1. General.

- 7.1.1. The City may suspend all or any part of the Work by written order signed by the Project Manager, without invalidating the Contract, for such period or periods as it may deem necessary due to:
 - a) Any reason for the convenience of the City, with or without cause, including but not limited to the availability of funding for the Project;
 - b) An order from a state or federal court or administrative agency; or
 - c) The Contractor's failure to perform any provision of the Contract Documents.
- 7.1.2. Upon receipt from the Project Manager of an order to suspend the Work, the Contractor shall, within three (3) days, submit a suspension plan to the Project Manager for acceptance. The plan shall describe how the Contractor will store all materials in a manner so that the materials will not become an obstruction or become damaged in any way, what cost effective methods it will employ to prevent damage to or deterioration of the Work and otherwise protect the Work, how suitable drainage will be provided, what temporary structures will be necessary, and how the Contractor will prepare for resuming the Work for the least possible remobilization cost. After the plan is accepted, the Contractor shall implement it in accordance with instructions received from the Project Manager.
- 7.1.3. Under no circumstance shall a suspension absolve the Contractor or the Contractor's sureties of the duties and responsibilities guaranteed under the Bonds.
- 7.1.4. The Contractor shall again proceed with the Work when it is ordered to do so in writing by the Project Manager.
- 7.1.5. Upon the resumption of the Work for all suspensions not involving the Contractor's failure to perform in accord with the Contract Documents, adjustment of Contract Time, if appropriate, will be made in accordance with these General Conditions. Adjustment of the Contract Price, if any, will be within the City's sole discretion and shall not in any event, exceed the cost of the extra work resulting from such suspension. Such cost, if any, shall be determined in accordance with these General Conditions.

7.2. Suspension of Work for the City's Convenience.

- 7.2.1. Upon decision to suspend the Work or any part of the Work for the City's convenience, the order of suspension will extend the Contract Time for the number of days of such suspension if all Work is suspended. If the suspension applies to only a part of the Work, a time extension will not be authorized until the partial suspension has run and its effect on the entire Contract can be evaluated. In all cases of suspension for the City's convenience, the costs to the Contractor will be determined in accordance with these General Conditions.
- 7.2.2. Upon order of such suspension, the Contractor shall immediately begin to perform in a manner designed to minimize the costs of protecting the Work and maintaining it in a condition which will permit its resumption for the least possible remobilization cost.

7.3. Suspension of Work Due to Order of City, State, or Federal Court or Agency.

The order of suspension will identify the court or agency order which caused the suspension and will extend the Contract by the amount of time specified by the court or agency order. If the order causes suspension for an indefinite period of time and as a

result a time extension cannot be established, the order of suspension will also be for an indefinite period of time. If the order is issued because of acts or omissions of the Contractor, the Contractor shall not be entitled to a time extension or payment for any additional costs it incurs.

7.4. Suspension of Work Resulting from Contractor's Failure to Perform.

If a suspension order results from the Contractor's failure to satisfactorily perform any of the provisions of the Contract, including but not limited to faulty workmanship, safety concerns, improper or inadequate manpower, equipment, supplies or supervision, or failure to perform the Work in a timely manner, the order will identify the reason, or reasons, for the order. In this circumstance, no time extension will be authorized for the Contractor and any costs to the Contractor resulting from such suspension order will not be reimbursed by the City. A suspension order issued under these circumstances will remain in effect until the Contractor has removed or corrected the grounds for the suspension, if applicable, or the order requiring such suspension expires by its terms

ARTICLE 8 WARRANTIES AND GUARANTEES

8.1. The Contractor and its Surety are jointly responsible for maintenance and satisfactory operation of all Work performed under the Contract for a period of one (1) year following the later of Notice of Substantial Completion or until warranty work is fully satisfied. Neither the Contractor nor Surety is liable for any failure resulting from the City's neglect or improper operation of facilities or the act of a third party for whom the Contractor is not responsible.

8.2. The Contractor and its Surety are responsible for the prompt and satisfactory repair or replacement of any Work, materials or equipment which is found defective during this period (including design costs), provided any failure results directly or indirectly from faulty workmanship or negligence by the Contractor or any Subcontractor or from faulty manufacturing or from faulty erection or improper handling of materials or equipment furnished or installed by the Contractor or any Subcontractor. The Contractor and its Surety shall promptly replace any materials and re-perform any portion of the Work found to be defective within this period in accordance with the Contract and without expense to the City.

8.3. Nothing in this section shall limit the City's right to seek recovery for latent defects that are not observable until after the warranty or guarantee periods have run.

8.4. All Subcontractors', manufacturers', and Suppliers' warranties and guarantees, express or implied, for any part of the Work and any materials used in the Work shall be obtained and enforced by the Contractor for the benefit of the City whether or not these warranties and guarantees have been assigned or otherwise transferred to the City. The Contractor shall assign or transfer such warranties and guarantees (including those of any longer term) to the City if the City requests the Contractor to do so, but such transfer shall not affect the Contractor's obligation to enforce such warranties and guarantees.

8.5. Performance During Warranty Period.

8.5.1. The Project Manager will notify the Contractor of defective Work that is found to be defective and fails to satisfy the warranties and guarantees described in this article, or elsewhere in the Contract Documents, and the Contractor shall, within ten (10) days or such longer time as may be requested and set forth in the notice, commence the

repair, replacement, or correction of the defective Work. If the Contractor fails to complete such Work within a reasonable period, the City may make the repairs or replacements at the expense of the Contractor. If the City determines that immediate action to make repairs, replacements or other corrections is necessary because of emergency conditions or to prevent further loss or damage, the City may proceed without notice to the Contractor, but at the expense of the Contractor.

- 8.5.2. If the Contractor does not proceed with the correction of such defective Work within the time fixed by written notice from the Project Manager, or if an emergency condition exists, the City may remove and store any defective materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of the removal and storage within ten (10) days thereafter, the City may, upon ten (10) additional days' written notice, sell the stored Work at auction.
- 8.5.3. If the proceeds of sale do not cover all costs that the City has incurred and which the Contractor should have borne, the difference shall be charged to the Contractor and the Contractor and its surety shall be liable for and pay such difference to the City.
- 8.5.4. If the Contractor does not agree that the Work is defective or the defective Work is its responsibility and if no emergency condition exists, the Contractor may request review, in writing, of the Project Manager's decision in accordance with these General Conditions. If such review is not requested within ten (10) days of the notification of defective Work, the Contractor shall have waived the right to contest its responsibility for the correction of the defective Work. Under emergency conditions, the Contractor shall immediately correct the alleged defective Work, and the question of responsibility for the expense shall be determined by the Project Manager, subject to the right of the Contractor to seek review within ten (10) days of the City's notice allocating responsibility for the expense.
- 8.5.5. Should the City claim by written communication sent or mailed before the warranty or guarantee period expires that certain defective Work exists and that it requires repair or replacement, the warranty and guarantee period shall be automatically extended for as long as the defective Work exists.

ARTICLE 9 CHANGES

9.1. General.

- 9.1.1. The Contractor shall perform the Work, as changed by any Change Order, as if originally specified. All changes shall be accomplished by either a written Change Order or a written Field Order issued in accordance with these General Conditions. If a Field Order is used, a Change Order will be executed when the terms of the change are agreed upon.
- 9.1.2. Changes to the Contract Price and Contract Time are authorized only by Change Orders.
- 9.1.3. Any plan of action, method of work, or construction procedure suggested orally or in writing to the Contractor by any City employee, agent or representative, which is not set out in Change Orders or Field Orders issued in accordance with the Contract Documents, if adopted or followed by the Contractor in whole or in part, shall be performed at the Contractor's sole risk and responsibility.
- 9.1.4. The Contractor may not treat any order, statement or conduct of the Project Manager as a change under this article nor become entitled to an equitable adjustment in the

Contract Price or Contract Time except as provided in this article.

9.1.5. Claims for changes in the Contract Price or Contract Time of Performance will not be considered after the Final Payment has been made.

9.1.6. Change Orders involving an increase in the Contract Price must be authorized as follows:

- a) Up to \$5,000 – Division Manager or above (or other as delegated by Division Manager)
- b) Up to \$50,000.00 – Department Director or above (or other as delegated by Department Manager)
- c) Up to \$250,000.00 – City Manager
- d) Over \$250,000.00 – City Council

9.2. City Change Request.

9.2.1. The City may, without notification to any Surety, require the Contractor to perform additive or deductive changes to the Work within the general scope of the Project without invalidating the Contract or any Bond.

9.2.2. When the City desires to initiate a change, the Project Manager will issue a change request informing the Contractor of the proposed change in the Work, and requesting the Contractor's detailed price proposal for such change. The Contractor, at no expense to the City and within the time period specified in the Change Request, shall provide the Project Manager with a complete and itemized proposal for the change in the Work, which shall include the estimated increase or decrease in the Contract Price or Contract Time. Such increase or decrease shall be based on the criteria and methods described in these General Conditions. The Contractor shall be responsible for any delays in the Work and any additional costs to the City caused by the Contractor's failure to submit a complete price proposal within the time provided. The Contractor shall participate with the City in prompt joint analysis and negotiations to finalize a Change Order. The issuance of a Change Request by the City is not a prerequisite to the issuance of a Field Order.

9.3. Field Orders.

9.3.1. The Project Manager may make changes in the details of the Project at any time, by issuing a Field Order. Upon receipt of a Field Order, the Contractor shall promptly sign the Field Order and return it to the Project Manager, and shall promptly proceed with performing the change in the Work.

9.3.2. A Field Order may be used when:

- e) The City determines that the Contractor must proceed immediately to perform a change in the Work in order to avoid an adverse impact on the schedule or other work, or to avoid or correct a situation where the health or safety of persons may be affected, and sufficient time is not available to negotiate a Change Order; or
- f) The City and Contractor have not completed their negotiation and reached agreement on all of the terms of a Change Order, but the City requires the Contractor to proceed without such agreement.

9.3.3. If the Contractor believes that such Field Order entitles it to a change in Contract Price or Contract Time, or both, the Contractor shall give the Project Manager written notice within five (5) days after the receipt of the Field Order. Within twenty (20) days after receiving the Field Order, the Contractor shall provide the Project Manager with a complete and itemized proposal that includes the estimated increase or decrease in the Contract Price or Contract Time, or both, attributable to the changes based on the criteria and methods described in these General Conditions. The Contractor shall be responsible for delays to the Work and any additional costs incurred by the City caused by its failure to submit complete pricing information within the time provided above.

9.3.4. Time and Materials.

- a) If the maximum cost of the change in the Work to be performed under a Field Order has not been agreed upon and reduced to writing in the actual Field Order, or if such change is not fully described under a Unit Price set forth in the Contract Documents or the Field Order, the Contractor shall proceed with such Work on a time and materials basis.
- b) Whenever Work is performed on a time and materials basis, the Contractor shall fully document all costs associated with such Work. Beginning with the first day such Work is performed and on a daily basis thereafter, the Contractor shall submit to the Project Manager a daily itemization of all such costs in such form as the Project Manager may require.
- c) The final Contract adjustment for Field Order changes in the Work performed on a time and materials basis shall be calculated in accordance with these General Conditions.

9.3.5. When the City and the Contractor reach agreement on an adjustment to the Contract Price or Contract Time, or both as appropriate, such agreement shall be promptly executed as a Change Order. If the City requires Contractor to perform additional compensable work under a Field Order prior to executing a Change Order, the Contractor shall submit its costs to perform the work as periodically completed in its monthly application for payment, and City shall reimburse such costs, subject to retainage and any applicable withholding. In no instance shall the City be required to periodically reimburse Contractor for such additional compensable work prior to Contractor submitting to City an estimate of the cost of the additional compensable work to be performed.

9.4. **Contractor Change Requests.**

9.4.1. If the Contractor: (i) receives any instructions, interpretations or directives which it believes are at variance with the Contract Documents or would require the Contractor to accelerate or decelerate the Work; or (ii) identifies what it believes are errors or omissions of any kind, including design errors or omissions, in the Drawings or Specifications; or (iii) encounters a differing site condition; or (iv) is delayed in performing the Work; or (v) becomes aware of any other matter or circumstance that the Contractor believes might require a change in the Contract Documents, Contract Time, or Contract Price, the Contractor shall give the Project Manager prompt written notice of such matter and request a Change Order in a document identified as a "Contractor Change Request."

9.4.2. Following submission of a Contractor Change Request, the Contractor shall diligently continue performance of the Contract to the maximum extent possible.

9.4.3. All Contractor Change Requests shall be dated, numbered sequentially, and shall describe the action or event that the Contractor believes may require the issuance of a Change Order. The Contractor shall also provide a description of possible Contractor actions or solutions to minimize the cost of the Contractor Change Request and, when possible, provide an estimate of the adjustment in the Contract Time and Contract Price which the Contractor believes is appropriate.

9.4.4. Time Requirements.

- a) With respect to orders, instructions, directives, interpretations, determinations, or the discovery of any errors or omissions in the Contract Documents, a Contractor Change Request shall be submitted before the Contractor acts on them, but in no event more than five (5) days after they have been, or reasonably should have been, received or discovered.
- b) With respect to any differing site conditions, a Contractor Change Request shall be submitted before the conditions are disturbed, but in no event more than five (5) days after the conditions are first discovered or reasonably should have first been discovered.
- c) With respect to delays, as set out in these General Conditions, a Contractor Change Request shall be submitted as soon as the Contractor becomes aware, or reasonably should have become aware, of the delay, but in no event more than five (5) days therefrom.
- d) With respect to any other matter or circumstance that the Contractor believes would require a change, a Contractor Change Request shall be submitted as soon as the Contractor reasonably has knowledge of the matter or circumstance, but in no event more than five (5) days after the Contractor becomes aware, or reasonably should have become aware, of such circumstance or matter.

9.4.5. Submittal Requirements and Waiver of Claims.

- a) If the Contractor does not submit a Contractor Change Request within the time required by these General Conditions, any action by the Contractor related to such order, direction, instruction, interpretation, determination, design error or omission, or other matter, including delays or differing site conditions, will not be considered by the City as a change to the Work and the Contractor waives any claim for an adjustment on the Contract Price or the Contract Time.
- b) The Contractor shall, within ten (10) days after submitting a Contractor Change Request, provide the Project Manager with a complete and itemized proposal that sets out as specifically as practicable the requested adjustments to Contract Price, Contract Time, or other Contract provisions, and contains the other information described in these General Conditions.
- c) The proposal shall also contain a detailed explanation, citing all applicable provisions in the Contract Documents that support the Contractor Change Request. If the Contractor does not submit its itemized proposal for a Change Order within the time described above or within such extension that the Project Manager, in his or her discretion may have granted in writing, the Contractor waives any claim for an adjustment in the Contract Price or Contract Time arising out of the act or event giving rise to or necessitating a Contractor Change Request.
- d) The Contractor shall furnish, upon request, all additional information and data that the Project Manager determines is needed to assist the City in evaluating and

resolving the Contractor Change Request through negotiation. The Contractor shall give the City access to its books, correspondence, records, electronic data bases and files, and other materials relating to the work described in the Contractor Change Request, shall require its Subcontractors and Suppliers to provide the City with such access, and shall make its personnel and that of its Subcontractors and Suppliers available to discuss and answer cost, schedule, and other questions related to such request. Clear and legible copies of all necessary supporting records shall be provided to the City at no cost. Failure to submit requested information may be a basis for denial of the request.

9.4.6. Specific Provisions for Delay-Based Contractor Change Requests.

If the Contractor Change Request is based in whole or in part on a delay of any kind or nature, the complete itemized proposal shall include the following information in addition to all other required information:

- a) The date, nature, and circumstances of each event regarded as a cause of the delay;
- b) The names of all individuals acting on behalf of the City who are known or believed by the Contractor to have direct knowledge of the delay;
- c) If the Contractor claims acceleration costs of scheduled performance or delivery, the basis upon which acceleration arose;
- d) The identification of any documents and the substance of any oral communications known to the Contractor which substantiate, refute, or concern such delay;
- e) A Critical Path Method (CPM) schedule corrected to reflect actual performance, showing delay impacts as separate tasks and Contractor's mitigation of such impacts; and
- f) The specific elements of Contract performance for which the Contractor may seek an equitable adjustment, including:
 - 1) Identification of each Contract or schedule line item that has been or may be affected by such delay;
 - 2) To the extent practicable, identification of the delay and disruption in the manner and sequence of performance, and the effect on continued performance, that have been or may be caused by such delay;
 - 3) Identification of labor, materials, or both, or other cost items including overhead and Subcontractor costs, that have been or may be added, deleted, or wasted by such delay;
 - 4) A statement that the Contractor is maintaining records by some generally accepted accounting procedure that allows the separately identifiable direct costs due to the delay, and those not incurred as a result of the delay, to be readily identified and segregated; and
 - 5) Estimates of the necessary adjustments to Contract Price, Contract Time and any other Contract provisions affected by the delay.

9.4.7. Determination by Project Manager.

- a) The Project Manager shall respond in writing to any timely Contractor Change Request within ten (10) days of receipt of the complete and itemized proposal in support of the request. Failure of the Project Manager to respond within such time period shall be deemed a denial of the Contractor Change Request unless the

Project Manager notifies the Contractor that additional time is necessary to review the Contractor Change Request.

- b) If a Contractor Change Request is denied by the Project Manager, in whole or in part, any claim for an increase in the Contract Price or Contract Time arising out of the act or event described in the Contractor Change Request is waived unless the Contractor timely submits a protest or dispute in accordance with these General Conditions.

ARTICLE 10 ADJUSTMENT TO CONTRACT PRICE

10.1. Contract Price Adjustments.

All adjustments to the Contract Price shall be determined by using one or more of the following methods in descending order:

- 10.1.1. Unit Prices (as stated in the Contract Documents or subsequently agreed upon) multiplied by final verified quantities of work performed and subject to the requirements of paragraph 10.7 below;
- 10.1.2. A negotiated lump sum. If requested by the City, the Contractor shall promptly provide itemized and sufficient substantiating data, including calculations, measurements, cost records, production rates, equipment types and capacity, labor costs by craft and other information that the City may reasonably require the Contractor to produce in order to permit the City to evaluate any lump sum Contractor Change Request. In pricing such proposals, the Contractor shall include estimates of the type of costs described in this article
- 10.1.3. Costs as determined in a manner previously agreed upon by the Parties, which include markups that do not exceed those described in this article.
- 10.1.4. Time and Material costs as determined in the manner described in this article. These amounts may be reduced where necessary to take into account the cost of base Work, Work included in approved Change Orders, Work described in other Field Orders, idle time for workers and/or equipment when Work could have been performed in other locations or when the number of workers or amount of equipment provided exceeded the number or amount required to perform the Work, unsatisfactory Work, or Work that may be or was performed concurrently with the changed Work and which cannot be easily segregated from the changed Work.

10.2. Calculation of the Contract Adjustment.

In no event shall the charge or credit to the City associated with any change exceed the sum of the following:

- 10.2.1. Direct Labor. The actual net, direct increase or decrease in the cost of the Contractor's labor. Such cost shall include only the cost associated with the workers who actually perform the changed Work. The cost of supervision, management and field or office overhead shall not be included or calculated as a direct labor cost. For shop work, the direct labor cost shall include only those workers who work directly on the item being manufactured or the actual operators of the equipment being used to handle the items being manufactured.
- 10.2.2. Labor Burden. Contractor's actual costs for worker's compensation and liability insurance, payroll taxes, social security and employees' fringe benefits (including employer paid health insurance) imposed on the basis of payrolls, and any other benefits provided to employees (including under any applicable collective bargaining

agreement). This burden must reflect the variability of some burdens, i.e., social security. The burden shall be itemized and include all small tools and miscellaneous supplies. The total labor burden for such small tools shall not exceed two percent (2%) of the Direct Labor cost.

10.2.3. Direct Material, Supplies, Installed Equipment. The actual net, direct cost of materials, supplies and equipment incorporated into or consumed by the Work. If actual costs are not available, this cost shall be the lowest commercially available price including all discounts, rebates, shipping and restocking charges, and applicable taxes. Such cost shall be based on buying the material, supplies and equipment in the largest practical quantity to receive quantity discounts.

10.2.4. Equipment Costs. Without markup or operator, the lesser of (i) the actual net cost to the Contractor of owned or rented equipment, other than small tools; or (ii) the rental rate for such equipment as determined by using the following method(s):

- a) Equipment rental rates listed in the appropriate rental rate book currently in use by CDOT. If an item of equipment does not appear in the rental rate book currently in use by CDOT, the rental rates published by the Associated Equipment Dealers may be used as a basis for negotiating a rental rate for a particular piece of equipment. The Contractor shall provide all information necessary to determine the appropriate rental rate at the time the equipment is brought on the job. This shall include, but not be limited to, type, description, make, year, model, series, serial number, fuel type, transmission, wheel combination, GVW, capacity and equipment owner.
- b) Rental equipment costs shall be determined using actual invoiced rates, less all discounts for basic equipment rental.
- c) Mobilization/demobilization costs will be paid if the equipment is mobilized for Work described in a Change Order and is not otherwise to be mobilized or demobilized for the Work at the time. If the equipment is also used on Base Contract Work, no mobilization or demobilization cost will be paid. Mobilization/demobilization costs will be based on using the least expensive means to mobilize or demobilize. Equipment shall be obtained from the nearest available source. When the least expensive methods are used, the costs shown in the actual invoice will be the basis for pricing.

10.2.5. Mark Up For Overhead And Profit.

The Contractor or Subcontractor of any tier who actually performs the Work shall be entitled to a reasonable markup of no more than ten percent (10%) on the actual costs for Direct Labor, Labor Burden, Direct Material, Supplies, Installed Equipment, and Equipment Costs, as described in this article. Bonds and insurance are compensated at direct cost without markup

10.2.6. Bonds, Insurance, Permits And Taxes.

The actual increases or decreases in the cost of premiums for bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.

10.3. **Totals as Equitable Adjustment.**

The Contractor agrees that the total of the above items constitute an equitable adjustment for any and all costs or damages resulting from a change.

10.4. **No Equitable Adjustment for Obstruction by Contractor.**

No equitable adjustment shall be made as a result of costs resulting from any act, hindrance, obstacle, obstruction, interference, or omission of the Contractor, its Subcontractors, Suppliers, or Surety, or any other entity or individual acting on behalf of the Contractor, or any Subcontractor, Supplier, or Surety.

10.5. Calculation of Certain Equitable Adjustments.

10.5.1. In case of delay in completion of the entire Contract due to drawings, designs or specifications that are defective and for which the City is responsible, the equitable adjustment for delays or costs incurred prior to notification to the City of such defect shall only include the extra cost and time reasonably incurred by the Contractor in attempting to comply with the defective drawings, designs or specifications before the Contractor identified, or reasonably should have identified, such defect.

10.5.2. An equitable adjustment shall not include increased costs for delay resulting from the Contractor's failure to continue performance during determination of any Contractor Change Request or claim.

10.6. Price Reductions for Defective Cost or Pricing Data.

If it is later determined that pricing adjustments to the Contract were not correct due to incomplete or inaccurate pricing data by the Contractor or any Subcontractor or Supplier or that lower prices were reasonably available, the price shall be reduced accordingly and the Contract Price modified by an appropriate Change Order.

10.7. Variations in Estimated Quantities.

10.7.1. Where the quantity of a Unit Price pay item in the Contract is an estimated quantity and where the actual quantity of such pay item varies more than 25% below the estimated quantity stated in the Contract, the Contractor shall make an equitable adjustment in the Contract Price, upon demand of the City. The Contract Price adjustment will be based upon any decrease in costs due solely to the variation below 75% of the estimated quantity.

10.7.2. Where the quantity of a Unit Price pay item in the Contract is an estimated quantity and the actual quantity of such pay item is more than 25% above the estimated quantity in the Contract, the City may elect to terminate the Contract for convenience or issue a Change Order to adjust the Contract Price. The Contract Price adjustment will be based upon any increase in costs due solely to the variation above 125% of the estimated quantity.

10.7.3. If the quantity variation is such as to cause an increase in the time necessary for completing the Work, the Contractor may request, in writing, an extension of time in accordance with these General Conditions.

10.8. Disposition of Excess or Obsolete Property.

When the cost of materials, supplies, equipment or other personal property made obsolete or excess as a result of a delay is included in the equitable adjustment, the Project Manager shall have the right to prescribe the manner of disposition of such property.

ARTICLE 11 CONTRACT TIME

11.1. General.

Work shall be fully completed in a satisfactory and acceptable manner by the Completion Date as modified by Change Orders providing for additional time due to excusable delays.

11.2. Delays.

11.2.1. Delay claims fall into three categories: **non-excusable**; **excusable/non-compensable**; and **excusable/compensable**. Any payment for compensable delays or the granting of time extensions for excusable delays requires a properly executed Change Order. The Contractor agrees that time extensions shall constitute full compensation for, and the Contract shall make no claim for monetary damages relating to, any non-excusable delay or any excusable/non-compensable delay.

11.2.2. **Non-excusable delay** is caused by factors within the Contractor's reasonable control or by the Contractor's fault. No additional time or additional compensation is allowed for non-excusable delays. Typical non-excusable delays, without limitation, include:

- a) Late submittal of Shop Drawings;
- b) Late procurement of materials or equipment;
- c) Insufficient personnel;
- d) Unqualified personnel;
- e) Inadequate coordination of Subcontractors or other contractors;
- f) Subcontractor delays;
- g) Late response to City, Project Manager, or Inspector inquiries;
- h) Failure to comply with the requirements of the Contract Documents;
- i) Construction not conforming to contract requirements making repeated re-working necessary;
- j) Delays resulting from the Contractor's failure to take reasonable actions to mitigate or prevent further delays relating to any excusable delay;
- k) Failure to continue performance during the determination of any Contractor Change Request or claim; and
- l) Weather Days exceeding the Reasonably Predictable Weather Days identified on the approved Construction Schedule, unless approved as unusually severe weather days.

11.2.3. **Excusable/Non-compensable delay** is caused by factors beyond the Contractor's reasonable control, but is not the result of the City's actions or omissions. An excusable/non-compensable delay entitles the Contractor to an extension of time but no additional compensation for the cost of the delay. Typical excusable/non-compensable delays, without limitation, include strikes, lockouts, natural fires not caused by Contractor's acts or omissions, unusual delay in transportation, unavoidable casualties, legal or administrative proceedings affecting the Work or the Project, and other causes beyond the Contractor's control.

11.2.4. **Excusable/Compensable delay** is caused by the City's failure to meet an obligation within its control stated or implied in the Contract, but shall not include any action, omission, or exercise of any right under the Contract. If the Project Manager considers a delay as compensable, the City will grant a time extension or reimburse the Contractor for the increased total cost of performance caused by the delay, or both, as

appropriate. Typical excusable/compensable delays, without limitation, include:

- a) Late approval of Shop Drawings and samples;
- b) Delays in answers to field inquiries made by the Contractor;
- c) Interference with the Contractor during construction;
- d) City-caused schedule changes;
- e) Design changes; or
- f) Interference by another contractor's or the City's forces.

11.2.5. **Time Adjustments for Weather Delays.** The Project Manager, in his or her discretion, may deem weather-related delays as excusable/non-compensable if the net number of Weather Days in any month exceeds the number of Reasonably Predictable Weather Days for that month shown on the approved Construction Schedule. The Contractor must submit a weather time impact analysis supporting any request for time extensions due to unusually severe weather.

11.3. Failure to Complete Work on Time – Liquidated Damages.

11.3.1. The City may permit the Contractor to proceed if the Contractor fails to advance the Work sufficiently to obtain a Notice of Substantial Completion on or before the Completion Date, as modified by Change Orders providing for additional time due to excusable delays. In such case, the Contractor will pay the sum of liquidated damages stipulated in the Special Conditions for each day that the Work remains uncompleted. This sum shall not be a penalty but is liquidated damages.

11.3.2. The Parties agree that time is of the essence in the performance of this Contract and that actual damages for delay are incapable of calculation. The Parties agree that, under all of the circumstances, the daily basis and the amount set forth as liquidated damages is reasonable and equitable. The City expends additional personnel effort in administrating the Contract or portions of it that are not completed on time, and such efforts and the costs thereof are impossible to accurately compute. In addition, some, if not all, citizens of Commerce City incur personal inconvenience and lose confidence in their government as a result of public projects or parts of them not being completed on time, and the impact and damages, certainly serious in monetary as well as other terms, are impossible to measure.

11.3.3. Permitting the Contractor to continue and finish the Work, or any part of it, after the Completion Date shall not operate as a waiver on the part of the City of liquidated damages or any of its rights under the Contract.

11.3.4. The City may deduct any liquidated damages or any portion thereof due under this article from Final Payment and may sue for and recover such damages from the Contractor and the Surety.

11.3.5. Liquidated damages in the amounts stipulated do not include any sums of money to reimburse the City for extra costs which the City may become obligated to pay on other contracts which were delayed or extended because of the Contractor's failure to complete the Work within the Contract Time. The City reserves all of its rights to actual damages from the Contractor for injury or loss suffered by the City from actions or omissions of the Contractor, including but not limited to any other breach or default of the Contract, outside of the scope of this section.

ARTICLE 12 PAYMENTS TO CONTRACTOR AND COMPLETION

12.1. General.

Unless expressly provided otherwise, the Unit Prices shown in the Bid include the cost of all labor, materials, supplies, equipment, tools, forms, services, utilities, royalties, fees, taxes, profit, overhead, and any other thing or expense, whether temporary or permanent, necessary to complete the Project in accordance with the Contract Documents. Items not shown on the Contract Documents that are necessary to construct the Project will be considered a part of the Project whether specified or not and no separate payment will be made for these items.

12.2. Determination of Amounts and Quantities.

- 12.2.1. The Project Manager or his or her designee shall verify determinations of amounts and quantities of Work performed.
- 12.2.2. The method of measurement of pay items subject to Unit Prices will be as specified in the Special Conditions.

12.3. Monthly Estimates & Progress Payments.

- 12.3.1. The Contractor shall submit signed applications for progress payments on a monthly basis based on partial estimates for all Work completed to date. Applications shall be submitted no later than ten (10) days after the end of the month for Work subject to the application. Applications shall be submitted in a format reflecting the line items for which payment is requested according to the Unit Price Form in the Bid and any applicable Change Order, shall be dated as of the actual date of submittal (or revised submittal, as applicable), and shall reflect the Work completed and the date to which Work has been completed. The Contractor will provide support documentation for all applications, as requested.
- 12.3.2. The signature on each application is a representation by the Contractor to the City that the Work has progressed to the point indicated, that the Work covered by the application is in accordance with the Contract Documents, that the money received as a result of the application will be used to discharge the Contractor's obligations under the Contract, and that the Contractor is entitled to payment in the amount requested.
- 12.3.3. By submitting an application for payment, the Contractor warrants that: (i) the title to the Work covered by the estimate of Work completed will pass to the City by incorporation into the completed Work; (ii) the Work covered by previous estimates of Work completed is free and clear of liens, claims, security interests or encumbrances, except for any interest created by retainage; and (iii) no Work covered by the estimate of Work completed is subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or any other person or entity.
- 12.3.4. The Contractor shall not include in its application for payment any billing for defective Work or for work performed by Subcontractors or Suppliers if it does not intend to pay the Subcontractors or Suppliers for such work.
- 12.3.5. Applications may include the value of acceptable materials required in the construction which have been delivered on the site of the Work or to adjacent railway siding and for

which acceptable provisions have been made for preservation and storage, providing the Contractor submits with its monthly estimate paid invoices in duplicate for the material for which payment is being requested. Material paid for by the City becomes the property of the City and, in the event of the default on the part of the Contractor, the City may use or cause to be used such materials in construction of the Work provided for in the Contract.

- 12.3.6. The authorized City representative(s) must approve the applications and estimates before progress payments will be made. The City will make payments within thirty (30) days after that the receipt of a monthly estimate in proper form containing all required and requested information. Progress payments are payments on accounts and shall not be construed as acceptance by the City or any part of the Work.
- 12.3.7. All progress payments, except for the Final Payment, shall be subject to correction on subsequent applications after the discovery of any error. Approval of an application for payment of Work completed or actual payment by the City shall not foreclose the right of the City to examine the books and records of the Contractor to determine the correctness and accuracy of any item.
- 12.3.8. The Contractor shall make partial payments of the amount due and payable to each of its Subcontractors and Suppliers in the same manner as the City is required to pay the Contractor under this article. This provision shall not create any privity of contract between the City and any Subcontractor or Supplier, or make any Subcontractor or Supplier a third-party beneficiary of this Contract.

12.4. Retainage & Withheld Amounts.

- 12.4.1. The City will retain **five percent (5%)** of the total amount earned, including Change Orders, as indicated in each approved application until Final Payment. Securities are not acceptable to the City in lieu of retainage.
- 12.4.2. If the City finds that satisfactory progress is being made in all phases of the Contract, it may, upon written request by the Contractor, authorize payment from the withheld percentage. Before such payment is made, the City shall determine that satisfactory and substantial reasons exist for the payment and shall require written approval from any Surety furnishing the Payment Bond or Performance Bond.
- 12.4.3. The City may withhold, in addition to retained percentages from Contractor payments, such an amount or amounts from any progress payment or Final Payment as may be necessary to cover:
 - a) Claims for labor or materials furnished the Contractor or any Subcontractor or reasonable evidence indicating probable filing of such claims;
 - b) Failure of the Contractor to make proper payment to Subcontractors or Suppliers;
 - c) A reasonable doubt that the Contract can be completed for the balance then unpaid;
 - d) Evidence of damage to another contractor, utility, or private property;
 - e) Uncorrected defective Work or guarantees that have not been met;
 - f) Failure of the Contractor to submit cost breakdowns, schedules, reports and other information required under the Contract;

- g) Persistent failure to carry out the Work according to the Contract;
- h) Reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- i) Any tax delinquency, unpaid fee, or other unpaid financial obligation of the Contractor owed to the City;
- j) Any request that the City pay additional compensation to another contractor as a result of delays in the performance of that contractor's work caused by the Contractor's acts or omissions; and
- k) Any other amounts that the City is authorized to withhold under the Contract Documents.

If the reason for withholding is removed, the City will make payment of the withheld sums with the next regular progress payment unless another basis for withholding exists

- 12.4.4. Execution of the Contract by the Contractor shall constitute a waiver by the Contractor to claim any right of payment of interest upon any funds retained or withheld by the City pursuant to these General Conditions or C.R.S. § 38-26-107.

12.5. Substantial Completion.

- 12.5.1. When the Contractor considers the entire work ready for its intended use, the Contractor shall notify the Project Manager in writing that the entire Work is substantially complete, except for minor items specifically listed by Contractor as incomplete (the Contractor's punch list), and request that the Project Manager issue a Notice of Substantial Completion.

- 12.5.2. Within seven (7) days after the receipt of such notice, the Contractor, Project Manager and any other appropriate City representatives shall inspect the Work to determine the status of completion and the Contractor's punch list.

- a) If the Project Manager does not consider the Work substantially complete, the inspection will cease and the Project Manager will notify the Contractor in writing giving the reasons for denial of the Notice of Substantial Completion and the Contractor will proceed with the Work. All costs associated with such premature inspection, including any compensation for additional design services and the City's additional costs, shall be deducted from any payment due to the Contractor.
- b) If the Project Manager considers the Work substantially complete, the Project Manager will prepare and deliver to the contractor a Notice of Substantial Completion. The Project Manager shall attach to the notice a punch list of items to be completed or corrected before Final Acceptance. Failure to include any items on the punch list shall not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

12.6. Right of Early Occupancy or Use.

- 12.6.1. The City shall have the right to take early beneficial possession of and to use any completed or partially completed portions of the Work, even if Substantial Completion of the Work has not occurred and even if the Work has not been finally accepted. Such beneficial possession and early occupancy shall not constitute Substantial Completion of such portions of the Work nor affect the City's right to assess liquidated damages.

- 12.6.2. If the City elects to take possession of and to use any completed or partially completed portions of the Work prior to Substantial Completion, an inspection shall be made by the Contractor and the Project Manager. Based upon such inspection, the Project Manager will attempt to list all incomplete Work items observed, and shall provide the Contractor with such list. However, the absence of an item from the list shall not relieve the Contractor of responsibility to perform all of the Work. Any and all areas so occupied will be subject to a final inspection prior to Final Acceptance.
- 12.6.3. At the time of such inspection, the Parties shall also negotiate the responsibilities of the City and the Contractor for security, maintenance, heat, utilities, property insurance premiums, and damage to the Work. These negotiations are subject to the final approval of the City.
- 12.6.4. If the Contractor believes there will be an additional cost or delay associated with completion of the Work while the City occupies the Work in whole or in part under this section, the Contractor shall advise the Project Manager by Contractor Change Request of all such costs at or before the time of such inspection. If the Contractor fails or refuses to furnish such cost information, or fails or refuses to comply with the Contractor Change Request procedure, the Contractor shall be deemed to have waived any and all rights to assert any claim for such additional cost or delay.
- 12.6.5. If the City's need to occupy the Work prior to such time as the Work is complete is caused by the Contractor's failure to complete the Work within the stipulated Period of Performance, the Contractor shall bear any and all additional costs associated with completing the Work.

12.7. Final Acceptance.

- 12.7.1. When the Work specified in the Contract (including all punch list items) is completed and the final cleanup has been performed, the Contractor shall notify the Project Manager that all Work under the Contract has been completed and the Project Manager shall, within seven (7) days after such notice, make the final inspection.
- 12.7.2. If the Project Manager finds that the Project has been completed according to the Contract requirements and that all parts of the Work are in good condition and in working order, the City, upon the recommendation of the Project Manager, shall issue a Notice of Final Acceptance. Any Notice of Final Acceptance issued orally or without proper City authorization is void.
- 12.7.3. If the Project Manager finds that the Project has not been completed according to the Contract requirements and that not all parts of the Work are in good condition and in working order, the Project Manager shall compile a punch list of corrective or replacement Work to be completed by the Contractor and Contract obligations yet to be satisfied that the Contractor shall complete or fulfill to the Project Manager's satisfaction, at the Contractor's expense, as a condition precedent to the issuance of a Notice of Final Acceptance.

12.8. Final Settlement & Final Payment.

- 12.8.1. After Final Acceptance, the Project Manager, Contractor, or other person designated by the City, as appropriate, will prepare a final estimate of the total value of all Work performed under the Contract. This will include all extra Work properly authorized and performed. All prior estimates and payments shall be subject to correction in the final

estimate and payment. In the absence of error or fraud, all estimates, when approved by the City, shall be conclusive evidence of the Work performed and materials furnished.

- 12.8.2. The City shall not authorize final payment until all items on the punch list have been completed, a Notice of Final Acceptance is issued, and the Notice of Final Settlement has been published. If the Work is substantially completed, but Final Acceptance is prevented by the unavailability of materials, or other causes beyond the control of the Contractor, and if consistent with any applicable bond ordinance, the City, in its sole discretion, may release to the Contractor all amounts due except for a retainage of two (2) times the cost of completing the unfinished Work as estimated by the City.
- 12.8.3. Before the City will advertise final settlement, the Contractor shall demonstrate to the operating personnel of the City the proper operation and maintenance of all equipment and systems, and deliver to the Project Manager:
 - a) All guarantees and warranties;
 - b) Bound sets of required operations and maintenance manuals and instructions as required by the Contract Documents;
 - c) Record Documents as required by the Contract Documents;
 - d) Satisfactory evidence that all payroll, material bills, taxes, and other indebtedness connected with the Work have been paid or otherwise satisfied;
 - e) A complete and final, unconditional waiver or release of any and all lien and claim rights from each Subcontractor, materialman, Supplier, manufacturer, and dealer for all labor, equipment and material used or furnished by each on the Work;
 - f) Consent of the Surety to final payment;
 - g) All submittals required by the Contract Documents; and
 - h) Any other documents required to be furnished by the Contract Documents
- 12.8.4. The Work shall be advertised (Notice of Contractor's Settlement) in accordance with C.R.S. § 38-26-107. This statute governs the maintenance and enforcement of claims for payment against the Project by Subcontractors, Suppliers and certain others. Final payment and settlement shall be made only after the Contractor has completed the foregoing requirements, and the City is satisfied that no claims by Subcontractors or Suppliers have been filed or remain pending.
- 12.8.5. If any unpaid claim for labor, materials, rental machinery, tools, supplies, or equipment is filed prior to the date set for final settlement, the City shall withhold from payments to the Contractor sufficient funds to ensure the payment of such claim, until the same shall have been paid or withdrawn. Such payment or withdrawal shall be evidenced by filing with the Project Manager an unconditional receipt in full or an order for withdrawal signed by the claimant or its duly authorized agent or assignee. The City will withhold from payment any funds it may be required by law to withhold or that it may in the determination of the City be entitled to withhold, and final payment will not be made until, in the sole determination of the City, all conditions of the Contract and of law have been met.
- 12.8.6. If there are outstanding claims against the Contractor or its Subcontractors or for any other reason the Contractor is not able to fulfill one or more of the requirements of this section, the City may, at its sole discretion, waive the requirement, provided the Surety

agrees to the City making final settlement without in any way lessening or modifying the Surety's liability under such Bonds.

- 12.8.7. If any overpayment was made by the City at any time, the Contractor shall immediately return all overpaid amounts.
- 12.8.8. At the time of settlement, there shall be deducted from the final estimate (i) all previous payments made to the Contractor under the Contract, (ii) all amounts chargeable to the Contractor, (iii) all liquidated damages due the City; (iv) all unpaid taxes due and payable the City; and (v) all damages and all other costs, expenses and charges properly chargeable to the Contractor under the terms of the Contract.
- 12.8.9. Subject to delays allowed by Colorado law and these General Conditions, the City shall make Final Payment after Final Acceptance, including the release of all retainage and withheld amounts, except as authorized by the Contract Documents. Final Payment shall constitute complete payment for all Work, labor, materials, equipment, and miscellaneous items in the Project.
- 12.8.10. At the time of delivery to the Contractor of the final payment, the Contractor shall execute and give to the City a final receipt for the same.
- 12.8.11. The acceptance of final payment shall constitute a waiver of all Claims by the Contractor except those previously made in accordance with these General Conditions which have been separately identified by the Contractor as unsettled in the final payment application, and which the City agrees in writing may be set over for resolution after final payment.
- 12.8.12. All provisions of these Contract Documents, including without limitation those establishing obligations and procedures, shall remain in full force and effect notwithstanding the making or acceptance of final payment.

ARTICLE 13 DISPUTES & MEDIATION

13.1. If the Contractor considers any ruling or decision of the Project Manager to be unfair, the Contractor shall immediately ask for a written instruction or decision but shall perform the Work in conformance with the Project Manager's ruling. If the Contractor considers such instructions or decision unsatisfactory, the Contractor shall file a written claim or protest with the Project Manager.

13.2. Notice of Intent to Claim.

The Contractor shall submit a Notice of Intent to Claim for any claim, dispute, or protest ("Claim") of any decision or event arising out of or related to this Contract (other than those for which a specific procedure is set forth elsewhere in these General Conditions) in writing within ten (10) days of the later of the Contractor's receipt of the Project Manager's written instruction or decision (if applicable), deemed denial, or any other event giving rise to the claim, dispute, or other matter and shall include the basis for the Claim. The Notice of Intent to Claim shall be clearly titled as such, dated as of the actual date of submission, and numbered sequentially, and shall contain at a minimum:

- a) Project title and number;
- b) Date of the event giving rise to the claim, dispute, or protest;

- c) A description of the Claim and the events giving rise to the Claim, including any original request and the Project Manager's decision or denial; and
- d) The reasons why the Contractor believes additional compensation or time is due or charges were wrongly assessed;
- e) An accounting or estimate of all additional costs associated with the Claim;
- f) The Contractor's plan for mitigating costs or delays associated with the Claim.

13.3. Claim.

Within twenty (20) days after submitting the Notice of Intent to Claim, the Contractor shall submit to the Project Manager a complete and itemized Claim that includes any claimed increase in Contract Time or Contract Price, or both. The Contractor may request an extension of time to submit the Claim, which extension may be granted by the Project Manager, provided that good cause is shown. The Claim must be described in sufficient detail to allow the City to evaluate the basis of and costs associated with the Claim.

- 13.3.1. A Claim for an increase in Contract Price shall be submitted based on actual costs whenever possible, rather than an estimate or opinion, shall be supported by invoices, time cards, and other business records commonly accepted in the industry, and shall comply with the requirements of these General Conditions concerning changes to the Contract Price.
- 13.3.2. Any Claim for changes to the Contract Time shall include the information required by these General Conditions concerning changes to the Contract Time. The Claim shall be accompanied by copies of all Contract provisions or other documents supporting the Claim and a summary of the legal and factual theories supporting the Claim. A Claim for time extension must be accompanied by a revised Construction Schedule reflecting the effects of the delay on the completion of critical activities and showing actions that the Contractor has taken or proposes to take to minimize the effects of the delay.
- 13.3.3. The Claim shall also identify any measures the City can take to minimize the Claim.
- 13.3.4. The Contractor shall submit with its Claim a notarized certificate, executed under penalties of perjury, that:
 - a) The Claim is made in good faith;
 - b) All supporting data are accurate and complete to the best of the Contractor's knowledge and belief;
 - c) The amount requested accurately reflects that Contract adjustment for which the Contractor believes the City is liable; and
 - d) The prices stated for material and equipment are the lowest reasonably available to the Contractor and include all available discounts.
- 13.3.5. If the Contractor is an individual, the certification shall be executed by that individual; if the Contractor is not an individual, the certification shall be executed by an officer or general partner of the Contractor or other person having written authority to sign the Claim.

13.4. Additional Information.

The Contractor shall furnish, upon request, all additional information and data that the City

determines is needed to aid in resolving the Claim through negotiation or is required to complete an evaluation of the Claim. The Contractor shall give the City access to its books, correspondence, records, electronic files and data bases, and any other materials relating to the Claim, shall require its Subcontractors and Suppliers to provide the City with such access, and shall make its Personnel and that of its Subcontractors and Suppliers available to discuss and answer cost, schedule and other questions relating to the Claim. Clear copies of all necessary supporting records shall be provided to the City at no cost. Failure to submit requested information may be a basis for denial of the Claim.

13.5. Decision.

- 13.5.1. The City shall investigate, review, and evaluate the Claim and make a determination in writing within sixty (60) days of receipt of a completed and fully documented claim, unless special circumstances exist or the Claim is unusually complex, in which case the Contractor will be notified of any longer review period. If no determination is made within sixty (60) days, or by the end of any announced extended period of time, the claim is automatically denied.
- 13.5.2. The Contractor shall proceed diligently with performance of the Contract, pending final resolution of any Claim made under this article. Failure to proceed with the Work shall be grounds for suspension or termination of the Contract.
- 13.5.3. If the Contractor agrees with any determination or resolution by the City, such determination or resolution shall be processed as a Change Order

13.6. Waiver.

- 13.6.1. Failure to strictly meet any of the requirements of this article in a timely and complete manner shall constitute a waiver by the Contractor of any and all right to adjustments of Contract Time or Contract Price, either by administrative review or by any other action at law or equity.
- 13.6.2. Strict compliance with all provisions of this article shall be a condition precedent to the Contractor's ability to file any lawsuit in law or equity, or recover any damages, in connection any Claim.

13.7. Mediation.

- 13.7.1. If the Contractor disagrees with the City's determination of the Claim, the Parties shall first submit the dispute to non-binding mediation before seeking any remedy in any other forum. The mediator shall be a trained mediator having experience related to municipal construction projects. The Parties shall jointly select the mediator from a list of mediators proposed by the Parties. If the Parties are unable to agree on a mediator, the Parties shall submit three mediator names each and the mediator shall be selected by random drawing at which the Project Manager and the Contractor are present. No discussions or statements of the mediator may be admitted as evidence in any subsequent litigation, nor may the mediator be called to testify in any litigation. The cost of the mediator shall be shared equally by the Parties.
- 13.7.2. Mediation in accordance with this section shall be a condition precedent to filing any lawsuit relating to any Claim.

13.8. If any dispute, mediation, or litigation arises out of this Contract, the Contractor shall

continue the Work in accordance with the terms and conditions of the Contract Documents during the time such dispute, mediation, or litigation is pending except as expressly provided in the Contract Documents.

ARTICLE 14 BONDS

14.1. The Contractor shall, within the time specified in the Request for Bids, and before the commencement of any Work, provide the City with a separate:

14.1.1. Performance bond in an amount equal to 100% of the amount of the Contract Price as a guarantee of the Contractor's faithful performance and completion of all undertakings, covenants, terms, conditions, warranties, and agreements of the Contract; and

14.1.2. Payment bond in an amount equal to 100% of the amount of the Contract Price, which bond shall conform to the requirements of C.R.S. § 38-26-101, *et seq.*, as amended, as a guarantee of the Contractor's prompt payment to all persons supplying labor and materials in the prosecution of the Work provided by the Contract.

The Contractor shall use the Bond forms included with the Request for Bids. Other forms may be used if approved by the City Attorney before the submission of the bid.

14.2. The Contractor bears the expense of all Bonds.

14.3. The Contractor shall secure an increase in the bonds in an amount equal to the cost of any additional work authorized pursuant to a duly executed Change Order or Contract amendment that increases the Contract Price by ten percent (10%) or more, unless waived in writing by the Project Manager.

14.4. The Contractor and a Surety shall execute the Bonds. The Surety shall be corporate bonding company acceptable to the City, licensed to transact such business in the State of Colorado, and listed in the U.S. Department of the Treasury Circular 570 in effect on the date of the Request for Bids. Evidence of authority of an attorney-in-fact acting for the Surety shall be provided in the form of a certificate as to its power of attorney and to the effect that it is not terminated and remains in full force and effect on the rate of the Bonds.

14.5. If at any time a Surety on any Bond becomes irresponsible, is disqualified from doing business in the State of Colorado, or becomes insolvent or otherwise impaired, the Contractor shall furnish Bond(s) from an alternate Surety acceptable to the City.

14.6. The Bonds shall remain in effect until Final Acceptance.

ARTICLE 15 INSURANCE

15.1. **General Requirements.**

15.1.1. **Insurance Requirement.** The Contractor, at its own cost, shall procure and maintain, and shall cause each Subcontractor to procure and maintain, policies containing the minimum insurance coverage listed in this article for the duration of the Work. Such coverage shall be procured and maintained with forms and insurers acceptable to the City. All coverage shall be continuously maintained from the date of commencement of Work. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage.

- 15.1.2. **No Modification of Liability.** The Contractor shall not be relieved of any liability, claims, demands or other obligations assumed pursuant to the Contract Documents by reason of its failure to procure or maintain insurance, or by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types. The insurance requirements contained in the Contract shall not limit or redefine the obligations of the Contractor as provided elsewhere in the Contract. The limits of any insurance required by this Agreement will not limit Contractor's liability.
- 15.1.3. **Evidence of Coverage.** Before commencing Work, the Contractor will provide certificates of insurance policies and all necessary endorsements evidencing insurance coverage required by the Contract Documents and identifying the Project. The City will not be obligated under the Contract until Contractor provides acceptable such certificates of insurance and endorsements. If the Term extends beyond the period of coverage for any required insurance, the Contractor will, at least ten (10) days before the expiration of any such insurance coverage, provide the City with new certificates of insurance and endorsements evidencing either new or continuing coverage.
- 15.1.4. **Breach.** Failure on the part of the Contractor to procure or maintain policies providing the required coverage, conditions, and minimum limits shall constitute a material breach of contract upon which the City at its discretion may procure or renew any such policy or any extended connection therewith, and all monies so paid by the City shall be repaid by Contractor to the City upon demand, or the City may offset the cost of the premiums against any monies due to Contractor from the City.

15.2. Required Policies.

- 15.2.1. **Commercial General Liability Insurance.** Comprehensive general liability insurance insuring against any liability for personal injury, bodily injury or death arising out of the performance of the Work with at least One Million Dollars (\$1,000,000) each occurrence and Two Million Dollars (\$2,000,000) general aggregate, including the following coverages: broad form property damage; operations premises liability; personal and advertising injury liability, independent contractors coverage, contractual liability, completed operations/products liability; coverage for construction, means, and methods; and explosion, collapse, and underground liability (if the Work requires blasting, explosive conditions, collapse hazards or underground operations, this coverage shall contain no exclusion relative to property in the care, custody, or control of the insured).
- 15.2.2. **Products and Completed Operations Insurance.** Products and completed operations insurance insuring against any liability for bodily injury or property damage caused by the completed Work, with a combined single limit of at least One Million Dollars (\$1,000,000) and Two Million Dollars (\$2,000,000) general aggregate.
- 15.2.3. **Builder's Risk.** A builder's risk or installation floater policy, at the City's discretion, in an amount equal to the value of the Project where the possibility exists of losses or damage to the Project. The Special Conditions of the Contract Documents will state if and when Builder's Risk is required.
- 15.2.4. **Comprehensive Automobile Liability Insurance.** Comprehensive automobile liability insurance insuring against any liability for personal injury, bodily injury or death arising out of the use of motor vehicles and covering operations on or off the site of all motor vehicles controlled by Contractor that are used in connection with performance of the

Work, whether the motor vehicles are owned, non-owned, hired, leased, or borrowed, with a combined single limit of at least Two Million Dollars (\$2,000,000) each accident and personal injury protection per Colorado law.

- 15.2.5. **Other Insurance.** Workers' compensation insurance (unless Contractor provides a completed Declaration of Independent Contractor Status Form) and other insurance required by applicable law.

15.3. **Terms of Insurance.**

- 15.3.1. **Additional Insured.** Except for the workers' compensation policy, all required insurance policies shall name the City and any additional person or entity identified by the City as an additional insured and will provide that the City or other additional insured, although named as an additional insured, will nevertheless be entitled to recovery under said policies for any loss occasioned to the City or its officers, employees or agents or other additional insured by reason of the negligence of Contractor or its officers, employees, agents, subcontractors or business invitees. The insurance policies will be for the mutual and joint benefit and protection of the Contractor and the City and other additional insured, if any. Such policies will be written as primary policies not contributing to and not in excess of coverages the City or other additional insured may carry.
- 15.3.2. **Qualification; Deductible.** Insurance required by this Section will be with companies qualified to do business in the State of Colorado and having an AM Best Rating of not less than B+ and/or VII. Insurance may provide for deductible amounts as the Contractor deems reasonable for the Services, but in no event greater than Twenty Thousand Dollars (\$20,000.00) (unless waived by the City), and the Contractor will be responsible for the payment of any such deductible.
- 15.3.3. **Cancellation.** The policies shall not be cancelled, terminated or materially changed until at least 30 days prior written notice has been given to the City.
- 15.3.4. **Coverage Type.** Contractor will identify whether the type of coverage is "occurrence" or "claims made." If the type of coverage is "claims made," which at renewal Contractor changes to "occurrence," the Contractor will carry a twelve (12) month tail. The Contractor will not do or permit to be done anything that will invalidate the policies.
- 15.3.5. **No "Pollution Exclusion."** The required insurance will cover any and all damages, claims or suits arising out of the actual, alleged or threatened discharge, dispersal, seepage, migration, release or escape of pollutants, and will not exclude from coverage any liability or expense arising out of or related to any form of pollution, whether intentional or otherwise. If the Contractor is unable to procure a policy of insurance in compliance with these provisions, the Contractor will secure and maintain either a rider or a separate policy insuring against liability for pollution related damages, claims or suits, as described in subsection ii(a), with at least Two Million Dollars (\$2,000,000) each occurrence, subject to approval by the City.

ARTICLE 16 INDEMNIFICATION

- 16.1. The Contractor shall indemnify, save harmless, and defend the City, its officers and employees, from and in all suits, actions or claims of any character brought because of: any injuries or damage received or sustained by any person, persons or property because of operations for the City under the Contract; the Contractor's failure to comply with the provisions of the Contract; the Contractor's neglect of materials while constructing the Work; because of any act or omission, neglect or misconduct of the Contractor; because of any claims or amounts recovered from any infringements of patent, trademark, or copyright, unless the design, device, materials or process involved are specifically required by Contract; from any claims or amount arising or recovered under the "Workers' Compensation Act," by reason of the Contractor's failure to comply with the act; pollution or environmental liability; or any failure of the Contractor to comply with any other law, ordinance, order or decree. Nothing in this article requires the Contractor to defend, indemnify, or hold harmless the City from the City's own negligence.
- 16.2. The Contractor will include this article in all Subcontracts.
- 16.3. The City may retain so much of the money due the Contractor under the Contract as the City considers necessary to offset any damages for which Contractor may be liable under this paragraph. If no money is due, the Contractor's Surety may be held until such suits, actions, claims for injuries or damages have been settled. Money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that it and the City are adequately protected by public liability and property damage insurance.
- 16.4. The Contractor will pay the City all expenses incurred to enforce this article. If the insurer of the Contractor fails to provide or pay for the defense of the City of Commerce City, its officers and employees, as additional insured, the Contractor agrees to pay for the cost of that defense.
- 16.5. This article will survive Final Acceptance and the termination of this Contract.

ARTICLE 17 CONTRACT TERMINATION

17.1. Termination for Cause.

- 17.1.1. The City may terminate the Contract for cause due to the actions or inactions of the Contractor. Cause includes, without limitation:
- a) If the Work to be performed under the Contract is assigned by the Contractor without written permission of the City;
 - b) If the Contractor shall file a voluntary petition in bankruptcy;
 - c) If a general assignment of the Contractor's assets is to be made for the benefit of its creditors;
 - d) If a receiver is appointed for the Contractor or any of its property;
 - e) If the Contractor has materially breached any of the conditions, provisions or covenants of the Contract;
 - f) If, at any time, the performance of the Work under the Contract is being unnecessarily delayed or if the Contractor is willfully or deliberately violating any of the conditions, provisions, or covenants of the Contract Documents, or if the Contractor is executing the same in bad faith or otherwise not in accordance with

terms of the Contract;

- g) If the Work or any part of the Work is not fully completed within the time or times named for its completion or within the time to which such completion date or dates have been extended;
- h) If the Contractor abandons the Work;
- i) If the Contractor fails to maintain the required Bonds, licenses, permits, or insurance;
- j) If the Contractor or any of its officers or employees are convicted, plead nolo contendere, enter into a formal agreement in which they admit guilt, enter a plea of guilty, or otherwise admit culpability to criminal offenses of bribery, kickbacks, collusive bidding, bid-rigging, antitrust, fraud, undue influence, theft, racketeering, extortion or any offense of a similar nature, in connection with Contractor's business; or
- k) If other just cause exists.

17.1.2. The City will send written notice to the Contractor and the Surety of the City's intent to terminate for cause and will give the Contractor and Surety ten (10) days from the date the notice was sent to cure the default or provide to the City in writing, a detailed plan of how it will remove the causes for termination, except that, if the Completion Date is less than ten (10) days away, the notice may specify less than ten (10) days. If the Contractor or Surety does not submit such plan within the time established, or if, in the judgment of the City, such plan will not ensure the satisfactory performance of the Work, the City may declare the Contract terminated on the effective date specified in the notice or any other date thereafter.

17.1.3. In the event of termination for cause, the City shall notify the Contractor to discontinue all Work under the Contract and the Contractor shall immediately respect such notice, stop all Work and cease to have any right to possession of the Work site.

17.1.4. In addition, the Contractor shall forfeit its Contract as of the specified effective date of termination.

17.1.5. Upon such termination for cause, the City may take possession of all materials, equipment, tools, and plant as may be on the site of the Work or necessary for completion of the Work and take over the Work and prosecute the same to completion, by Contract or otherwise, for the account and at the expense of the Contractor.

17.1.6. The Contractor and the Surety shall be liable to the City for any and all costs and expenses in excess of the Contract Price or prices sustained by the City by reason of such prosecution and completion, which costs shall include all administrative costs.

17.2. Termination for Convenience.

17.2.1. The performance of Work under the Contract in whole or in part may be terminated without cause by the City whenever the City, in its sole discretion, shall determine that such termination is in the best interest and convenience of the City or whenever the City is prohibited from completing the Work for any reason. Such termination shall be effected by giving not less than three (3) days' written notice to the Contractor specifying the extent to which performance of the Work is terminated and the date upon which such termination becomes effective.

17.2.2. Upon receipt of such notice of termination, the Contractor shall:

- a) Stop work as specified in the notice;

- b) Terminate all orders and subcontracts except as necessary to complete Work which is not terminated;
 - c) If directed in writing by the City to do so, assign all right, title, and interest in subcontracts and materials in progress, in which case the City will have the right, in its discretion, to settle or pay any or all Claims arising out of the termination of such subcontracts;
 - d) Settle outstanding liabilities and claims with the approval of the City;
 - e) Complete performance of such part of the Work not terminated; and
 - f) Take such other actions as may be necessary, or as may be directed by the City, for the protection and preservation of the property related to the Contract.
- 17.2.3. Except as provided herein, any inventory paid for by the City but remaining upon the termination of the Contract may, with written approval of the City, be sold or acquired by the Contractor under the conditions prescribed by and at prices approved by the City.
- 17.2.4. Upon receipt of notice of such termination, the Contractor shall submit to the Project Manager a request for final payment, in a form and with certification prescribed by the City. Such request shall be submitted promptly but in no event later than sixty (60) days from the effective date of termination, unless extended in writing by the Project Manager, upon the written request of the Contractor within such sixty (60) day period.
- 17.2.5. The final payment to the Contractor after a termination for convenience shall be calculated as follows:
- a) From the Contract Price, subtract the following:
 - 1) The total amount paid to the Contractor to date;
 - 2) The value of the Work completed since the last approved pay application;
 - 3) The total amount of retainage withheld by the City to date;
 - 4) The agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired or sold by the Contractor or sold pursuant to these General Conditions and not otherwise recovered by or credited to the City;
 - 5) The total of all claims the City may have against the Contractor; and
 - 6) Any outstanding claims pursuant to C.R.S. § 38-26-107, as amended or superseded.
 - b) Multiply the number resulting by 0.05. The number resulting is the full and complete compensation for anticipated profits
 - c) Add the following to the total resulting from the prior step:
 - 1) Any actual costs incurred by the Contractor for restocking charges;
 - 2) The agreed upon price of protecting the Work in the manner, if any, directed by the City;
 - 3) The amount of retainage withheld by the City to date; and
 - 4) The value of the Work completed since the last approved pay application.
- 17.3. The sum calculated under this article, when paid to the Contractor, shall constitute full and final settlement of the Contract Price.

- 17.4. The City may, from time to time, under such terms and conditions as the City may prescribe, authorize partial payments and payments against costs incurred by the Contractor for the terminated portion of the Contract, if it is estimated that the total of such payments will not exceed the amount to which the Contractor will be entitled. If the total of such payments is in excess of the amount to which the Contractor is entitled, the excess shall be payable by the Contractor to the City upon demand, together with interest computed pursuant to statute, for the period from the date the excess payment is received by the Contractor to the date the excess is repaid to the City.
- 17.5. The settlement for the Work performed shall not relieve the Contractor or its surety from responsibility for defective Work and/or materials on the completed portion of the Work nor for labor and materials or any other items as guaranteed by the Bonds.
- 17.6. The City shall be given full access to all books, correspondence, records, electronic files and data bases, and other materials of the Contractor relating to the Contract in order to determine the amounts to be paid on account of the termination of the Contract under this article. The Contractor shall furnish clear copies of any such materials as requested by the City.
- 17.7. If the Parties fail to agree in whole or in part on the amount or amounts to be paid to the Contractor in connection with the termination of work pursuant to this article, the Contractor may submit a claim as provided in these General Conditions, except that, if the Contractor has failed to submit its request for payment within the time provided above and has failed to request an extension of such time, it shall have no such right.

ARTICLE 18 AUDIT

18.1. Records and Reports.

18.1.1. The Contractor shall keep and maintain and shall cause its Subcontractors, Suppliers and outside consultants to keep and maintain books, records, accounts and other documents ("records") that are sufficient to accurately and completely reflect all costs incurred pursuant to the Contract that may be the basis of a Contractor Change Request or a claim by the Contractor. Such records may include the bid estimate, receipts, memoranda, vouchers, and accounts of every kind and nature pertaining to the performance of the Work including but not limited to job cost ledgers, invoices from and payments to Subcontractors, Suppliers and materialmen, and records of home and field office overhead, as well as complete summaries and reports setting forth all reimbursable man hours expended and payroll records.

18.1.2. All such records shall be maintained a period of three (3) years from the date of Final Payment under the Contract in which the Work is completed. All Subcontractors shall keep and preserve such records accounts for a period of three (3) years from the date of Final Payment under the subcontract.

18.2. **Access.** The Contractor shall permit the City and the its auditors to have access to such records and any information or areas as provided in these General Conditions for the purpose of making such financial audits, or verifications as the City deems necessary or appropriate concerning the Contractor's performance under the Contract. Access will be provided at the Contractor's regular place of business in Colorado at reasonable times and upon reasonable notice.

ARTICLE 19 SALES AND USE TAX

Unless specifically exempt, all equipment used and all materials provided or consumed in or for construction and services performed within the City are taxable, including construction and services performed on behalf of an exempt institution or governmental, religious, charitable, private or any other type of owner, including the City.

- 19.1. **Contractor Responsible for Tax.** The Contractor is subject to the tax on all purchases, fabrication, manufacture or other production of tangible personal property used, stored or consumed on such construction and services, including parking lots, roads, bridges, highways, building construction and remodeling of both public and private facilities.
- 19.2. **Specific Industry Standard.** The Specific Industry Standard for Construction and Contractors (Regulation 20-S.I.15) can be provided upon request by contacting the City's Finance Department, Sales Tax Division, at 303-289-3628, and is available on the City's website at <http://www.c3gov.com/DocumentView.aspx?DID=115>.
- 19.3. **Equipment.** Prior to or on the date the Contractor locates equipment within the City to fulfill this Work, the Contractor shall file a declaration describing each anticipated piece of equipment the purchase price of which was two thousand five hundred dollars (\$2,500) or greater, stating the dates on which the Contractor anticipates the equipment to be located within and removed from the boundaries of the City and stating the actual or anticipated purchase price of each such anticipated piece of equipment along with any other information deemed necessary by the City. When such declared equipment is located within the City for a period of thirty (30) days or less, the Contractor may include sales and use tax calculated on one-twelfth (1/12) of the purchase price of such equipment in the contract amount, in compliance with Section 20-5-T of the Commerce City Sales & Use Tax Code. If the Contractor fails to declare the equipment to the City prior to or on the date the Contractor locates the equipment within the City, none of the sales and use tax due on the equipment shall be allowed as a contract expense.

ARTICLE 20 PERSONNEL & CIVIL RIGHTS

- 20.1. **Colorado Labor (C.R.S. § 8-17-101).** At least eighty percent (80%) of each type or class of labor employed by the Contractor and any Subcontractors to perform the Work shall be persons who, at time of employment, are residents of the State of Colorado, without discrimination as to race, color, creed, gender or sex, age, religion, national origin, veteran's status or religion, except when minimum age is a bona fide occupational qualification. The Project Manager, if requested in writing by the Contractor and approved by the Project Manager in writing, may waive this requirement.
- 20.2. **Anti-Discrimination.** While engaged in the performance of the Work, Contractor shall maintain employment practices consistent with the Colorado Antidiscrimination Act, C.R.S. § 24-34-301 through § 24-34-804, as amended.
- 20.3. **Civil Rights.**

In compliance with the Civil Rights Act of 1964, coupled with the Colorado Governor's Executive Order dated July 6, 1972, Contractor, for itself and its assignees and successors in interest, agree as follows:

- 20.3.1. When applicable, the Contractor shall comply with the Regulations of the Department of Transportation relative to nondiscrimination in Federally assisted programs of the

Department of Transportation (Title 49, Code of Federal Regulations, Part 21, hereinafter referred to as the "Regulations"), which are herein incorporated by reference and made a part of this Contract. Contractor shall not participate either directly or indirectly in discrimination prohibited by Section 21.5 of the Regulations including employment practices when the Contract covers a program set forth in Appendix "C" of the Regulations.

- 20.3.2. The Contractor, with regard to the Work performed by it after award and prior to completion of the Work, shall not discriminate on the grounds of race, creed, color, gender or sex, age, religion, veteran status, national origin or ancestry in the selection and retention of Subcontractors, including procurements of materials and leases of equipment.
- 20.3.3. In all solicitations either by competitive bidding or negotiation made by Contractor for work to be performed under a subcontract, including procurements of materials or equipment, each potential Subcontractor or Supplier shall be notified by Contractor of Contractor's obligations under this Contract and the regulations related to nondiscrimination on the grounds of race, creed, color, gender or sex, age, religion, veteran status, national origin or ancestry.
- 20.3.4. The Contractor shall take all affirmative actions necessary and appropriate to implement, not only the letter but also the spirit, of the policy of equality of opportunity as enunciated in the Constitution and the laws of the State of Colorado and as construed by the courts to prevent discrimination because of race, creed, color, gender or sex, age, religion, handicap, veterans status, national origin or ancestry.
- 20.3.5. The Contractor shall include the provisions of these subsections 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, orders or instructions issued pursuant thereto. The Contractor shall take such action with respect to any subcontract or procurement as the City may direct as a means of enforcing such provisions; provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or supplier as a result of such direction, the Contractor may request the City to enter into such litigation to protect the interest(s) of the City.

20.4. **Americans with Disabilities Act.**

The City makes every attempt to comply with the Americans with Disabilities Act and requires all contractors to be aware of this law and to report immediately to the Project Manager any requests or complaints based upon the Americans with Disabilities Act. This requirement applies to persons or groups who have identified themselves as disabled, or as someone with whom they associate as disabled, and who require a special accommodation.

20.5. **Illegal Aliens & Public Contracts (C.R.S. § 8-17.5-38).**

- 20.5.1. **Certification.** The Contractor certifies that, as of the Effective Date, it does not knowingly employ or contract with an illegal alien who will perform work under this Contract and that the Contractor will participate in the E-verify Program or Department Program as defined in C.R.S. § 8-17.5-37 in order to confirm the eligibility of all employees who are newly hired to perform work under this Contract.

- 20.5.2. **Pre-Employment Screening.** The Contractor is prohibited from using either the E-

verify Program or Department Program procedures to undertake pre-employment screening of job applicants while this Contract is being performed.

20.5.3. **Contractor Obligations.** The Contractor will not knowingly employ or contract with an illegal alien to perform work under this Contract or contract with a Subcontractor that fails to certify to the Contractor that the Subcontractor will not knowingly employ or contract with an illegal alien to perform work under this Contract. If the Contractor obtains actual knowledge that a Subcontractor performing work under this Contract knowingly employs or contracts with an illegal alien, the Contractor will:

- a) Notify the Subcontractor and the City within three (3) days that the Contractor has actual knowledge that the subcontractor is employing or contracting with an illegal alien; and
- b) Terminate the subcontract with the Subcontractor if within three (3) days of receiving the notice required pursuant to this subparagraph d the Subcontractor does not stop employing or contracting with the illegal alien; provided, however, that the Contractor will not terminate the contract with the Subcontractor if during such three (3) days the Subcontractor provides information to establish that the Subcontractor has not knowingly employed or contracted with an illegal alien.

20.5.4. **Compliance with Investigation.** The Contractor will comply with any reasonable request by the Colorado Department of Labor and Employment made in the course of an investigation undertaken pursuant to Article 17.5 of Title 8, C.R.S.

20.5.5. **Violation.** If the Contractor violates this Section, the City may terminate this Contract for breach of contract and the Contractor will be liable for actual and consequential damages to the City.

20.6. **Verification of Lawful Presence (C.R.S. § 24-76.5-103).**

20.6.1. If the Contractor is a natural person, including a sole proprietor with or without employees (i.e., not a corporation, limited liability company, partnership or similar entity), and is 18 years of age or older, the Contractor must: (a) complete an affidavit containing the information required by C.R.S. § 24-76.5-103(4)(b); and (b) attach a photocopy of the front and back of a valid form of identification as required by C.R.S. § 24-76.5-103(4)(a).

20.6.2. If the Contractor executes the affidavit stating that he/she is an alien lawfully present in the United States, the City will verify his/her lawful presence through the federal systematic alien verification or entitlement program, known as the "SAVE Program," operated by the U.S. Department of Homeland Security ("DHS") or a successor program designated by DHS. If the City determines through the verification process that the Contractor is an alien not lawfully present in the United States, the City will terminate this Agreement without further obligation to Contractor.

ARTICLE 21 MISCELLANEOUS

21.1 **Federal Aid Provisions.** When the United States of America, acting through any of its duly constituted departments or agencies, provides funds to pay for any portion of the costs of Work performed under the Contract, the provisions of the Constitution, Laws of the United States and the rules and regulations promulgated by the department or agency thereof, pertaining to the utilization of such funds, shall be incorporated by reference as a part of the terms and conditions of the Contract and shall be observed by the Contractor.

When the United States of America is involved as a result of providing funds to support the Work of the Contract, it may assign observers or inspectors as it deems necessary to ensure that purposes for which the funds were provided are achieved. However, such activity by the United States does not make it a party to the Contract and shall not interfere with the rights of either the City or the Contractor.

- 21.2 **Duties & Remedies.** The duties and obligations imposed by, and rights and remedies available under, the Contract Documents shall be in addition to, and shall not be in any way construed to be a limitation of, any duties, obligations, rights, and remedies imposed by or available by law or contract.
- 21.3 **Survival.** All representations, warranties, and guarantees made in the Contract Documents shall survive Final Payment, Final Acceptance, and termination of the Contract for any reason.
- 21.4 **Government Immunity.** The City is relying on, and does not waive or intend to waive by any provision of this Contract, the monetary limitations or any other rights, immunities, and protections provided by the Colorado Governmental Immunity Act, §24-10-37, *et seq.*, 10 C.R.S., as from time to time amended, or otherwise available to City, its officers, or its employees.
- 21.5 **Colorado Open Records Act.** The City is a public entity subject to the Colorado Open Records Act, C.R.S. § 24-72-201, *et seq.*, and all Contract Documents and any documents or reports produced pursuant to this Contract, may be subject to public disclosure.
- 21.6 **Construction.** The provisions of the Contract shall be construed as to the ordinary meaning of the words used so as to fairly accomplish the purposes and intentions of all Parties, and not for or against any party based upon any attributes to such party of the source of the language in question. No term of this Agreement will be construed or resolved in favor of or against the City or Contractor on the basis of which party drafted the uncertain or ambiguous language. Where appropriate, the singular includes the plural and neutral words and words of any gender will include the neutral and other gender. All headings, captions and titles are for convenience and reference only and of no meaning in the interpretation or effect of the Contract.
- 21.7 **No Implied Representations.** No representations, agreements, covenant, warranties, or certifications, express or implied, exist as between the Parties, except as specifically set forth in the Contract.
- 21.8 **Financial Obligations of City.** All financial obligations of the City under the Contract are contingent upon appropriation, budgeting, and availability of specific funds to discharge such obligations. Nothing in the Contract shall be deemed a pledge of the City's credit, or a payment guarantee by the City to the Contractor.
- 21.9 **Assignment/Transference.** The Contractor may not assign or transfer any interest in the Contract, including any money due or to become due, without the express prior written consent of the City.
- 21.10 **Amendments.** The Parties shall only amend the Contract in writing with the proper official signatures and, if required elsewhere in this Contract, on the proper forms.
- 21.11 **Waiver.** The waiver of any breach of a term, provision or requirement of this Contract, including the failure to insist on strict compliance or to enforce any right or remedy, shall

not be construed or deemed as a waiver of: any subsequent breach of such term, provision or requirement or of any other term, provision or requirement; any right to insist on strict compliance with any term, provision or requirement; or any right to enforce any right or remedy with respect to that breach or any other prior, contemporaneous, or subsequent breach.

- 21.12 **No Third-Party Beneficiaries.** The enforcement of the terms and conditions of the Contract and all rights of action relating to such enforcement shall be strictly reserved to the Parties. The Parties expressly intend that any person other than the City and the Contractor shall be deemed to be only an incidental beneficiary under this Agreement.
- 21.13 **Independent Contractor – No Partnership or Agency.** Notwithstanding any language in the Contract Documents or any representation or warranty to the contrary, the relationship between the Contractor and the City shall be as independent contractors, and neither the City nor the Contractor shall be deemed or constitute an employee, servant, agent, partner or joint venturer of the other. The Contractor is obligated to pay federal and state income tax on any money earned pursuant to this Contract, and neither the Contractor nor its employees, agents, or representatives are entitled to workers' compensation benefits unemployment compensation benefits, sick and annual leave benefits, medical insurance, life insurance, or pension or retirement benefits from the City.
- 21.14 **Governing Law; Jurisdiction; Venue.** The Contract is governed and to be construed according to the laws of the State of Colorado without regard to its conflicts of laws provisions. For all claims arising out of or related to this Contract, the Contractor consents to the jurisdiction of and exclusive venue in the state courts in the County of Adams, State of Colorado. Contractor waives any exception to jurisdiction because of residence, including any right of removal based on diversity of citizenship.
- 21.15 **Attorney's Fees & Costs.** The prevailing party in any litigation to resolve a dispute between the Parties arising from this Contract will be entitled to recover court costs and reasonable attorney fees from the non-prevailing party.
- 21.16 **Binding Contract.** The Contract is binding upon the Parties and their respective heirs, executors, administrators, successors, and assigns.

9.00 TRAFFIC SIGNALS

- 9.01 GENERAL
 - 9.01.01 SCOPE AND INTENT
 - 9.01.02 CONSTRUCTION MANAGER
 - 9.01.03 TRAFFIC CONTROL AND STREET CLOSURE
 - 9.01.04 PROTECTION OF PROPERTY
 - 9.01.05 CLEANUP AND BARRICADING
 - 9.01.06 INTERSECTION POWER
 - 9.01.07 FIELD LOCATION
 - 9.01.08 INTERSECTION PHASING
 - 9.01.09 LICENSE AND PERMITS
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- 9.02 REGULATIONS AND CODE

- 9.03 EQUIPMENT LIST AND DRAWINGS

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- 9.05 EXCAVATION AND BACKFILL

- 9.06 REMOVING, REPLACING, AND RESETTING IMPROVEMENTS

- 9.07 FOUNDATIONS

- 9.08 CONDUIT

- 9.09 PULL BOX

- 9.10 CABINET BASES

- 9.11 CONDUCTOR AND CABLE

- 9.12 INTERCONNECT
 - 9.12.01 HARDWARE/COPPER INTERCONNECT
 - 9.12.02 FIBER INTERCONNECT
 - 9.12.03 RADIO INTERCONNECT

- 9.13 VEHICLE DETECTION
 - 9.13.01 GENERAL
 - 9.13.02 VIDEO DETECTION
 - 9.13.03 INDUCTANCE DETECTION
 - 9.13.04 INDUCTANCE DETECTOR

- 9.13.05 OTHER DETECTION
- 9.14 PEDESTRIAN PUSH BUTTONS
- 9.15 EMERGENCY VEHICLE DETECTION
- 9.16 BONDING AND GROUNDING
- 9.17 FIELD TESTING
 - 9.17.01 SIGNAL
 - 9.17.02 FIBER
- 9.18 CONTROLLER AND CABINET
 - 9.18.01 CONTROLLER AND CABINET INTRODUCTION
 - 9.18.02 CABINET DESIGN AND CONSTRUCTION
 - 9.18.03 TESTING AND WARRANTY
- 9.19 ON-STREET MASTER CONTROLLER
- 9.20 TRAFFIC SIGNAL HEADS
- 9.21 TRAFFIC SIGNAL POLES, MAST ARMS AND LUMINAIRE DAVITS
- 9.22 SPAN WIRE POLE
- 9.23 PEDESTAL POLE
- 9.24 PEDESTRIAN PUSH BUTTON POLE
- 9.25 ILLUMINATED STREET NAME SIGNS
 - 9.25.01 FLOURESCENT
 - 9.25.02 LED/OTHER
- 9.26 BLANK OUT REGULATORY/WARNING SIGNS
- 9.27 SCHOOL FLASHING BEACON ASSEMBLY
- 9.28 WARNING OR REGULATORY SIGN FLASHING BEACON ASSEMBLY
- 9.29 SOLAR POWER SYSTEM
- 9.30 UNINTERRUPTABLE POWER SUPPLY (UPS)
 - 9.30.01 GENERAL
 - 9.30.02 CABINET
 - 9.30.03 OPERATIONAL SPECIFICATIONS

- 9.31 CLOSED-CIRCUIT TELEVISION (CCTV)
 - 9.31.01 CCTV CAMERA
 - 9.31.02 ENCODER/DECODER

- 9.32 MISCELLANEOUS HARDWARE

- 9.33 MAINTENANCE AND EMERGENCY REPAIR DURING CONSTRUCTION

- 9.34 MOBILIZATION

9.00 TRAFFIC SIGNALS

9.01 GENERAL

9.01.01 SCOPE AND INTENT

The work specified in this section describes the installation of necessary material and equipment to complete traffic signals and/or other electrical systems as specified on the Plans, in the Contract Documents, or herein.

9.01.02 CONSTRUCTION MANAGER

The Construction Manager shall be the Traffic Engineer, or his designated representative, and shall be the responsible person overseeing all work on the City's behalf.

9.01.03 TRAFFIC CONTROL AND STREET CLOSURE

The Contractor will be required to maintain access to all properties throughout the period of construction for this project. The Contractor shall be required to erect, maintain, and remove all barricades, traffic control signs and devices necessary for any street closure including detour signs. Any signs not in use shall be turned away from traffic or removed from the job site. All traffic control devices shall be in good condition. Signs shall be clean, retro reflective, and free of scratches and graffiti.

Any street closure must be pre-approved by the Construction Manager. A Road Closure Packet is required to be completed and submitted a minimum of one week prior to any road closure. All such barricades and traffic control signs and devices shall be in accordance with the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways" including the "Colorado Supplement". Traffic control plans shall be submitted to the Construction Manager for review no later than forty-eight (48) hours in advance of any work.

9.01.04 PROTECTION OF PROPERTY

The Contractor shall assume full responsibility and expense for the protection of all public and private property, structures, water mains, sewers, utilities, etc., both above and below ground, at or near the site or sites of the work being performed under the Contract, or which are in any

manner affected by the prosecution of the work or the transportation of personnel and materials in connection therewith.

The Contractor shall give notice of not less than forty-eight (48) hours to the Department of the City having charge of any property or utilities served by the City and to other owner or owners of public or private property or utilities when they will be affected by the work to be performed under the Contract; and shall make all necessary arrangements with such departments, owner or owners for the removal, replacement, or protection of such property or utilities.

9.01.05 CLEANUP AND BARRICADING

The Contractor shall be responsible for insuring that all work sites are properly cleaned and barricaded prior to the completion of the day's activities.

9.01.06 INTERSECTION POWER

The Contractor shall notify the Construction Manager a minimum of three (3) weeks prior to the signal turn-on so that orders may be issued for power connection to the intersection on the specified turn-on date. The Contractor shall coordinate with the appropriate power company (Xcel Energy, United Power, etc.) to ensure timely connection of power feed.

9.01.07 FIELD LOCATION

All loops, poles, control cabinets, pull boxes, pole foundations and permanent pavement marking material shall be field located by the Construction Manager.

9.01.08 INTERSECTION PHASING

Intersection phasing shall be as defined based on the direction of the coordinated vehicular movements. When intersection phasing defined in the plans and/or project specials conflicts with that defined here within, the Construction Manager shall make final determination as to the intersection phasing.

Coordinated Phases North/South	
Controller Phase	Vehicular Movement
1	Southbound Left Turn
2	Northbound
3	Westbound Left Turn
4	Eastbound
5	Northbound Left Turn
6	Southbound
7	Eastbound Left Turn
8	Westbound
Coordinated Phases East/West	
1	Westbound Left Turn
2	Eastbound
3	Northbound Left Turn
4	Southbound
5	Eastbound Left Turn
6	Westbound
7	Southbound Left Turn
8	Northbound

9.01.09 LICENSE AND PERMITS

The Contractor shall obtain any and all permits as necessary from the City Building Department, the City Public Works Department, and other agencies as required.

9.01.10 UTILITIES

All utility locations and elevations will require field verification in cooperation with the affected companies and public agencies. The Contractor shall be responsible for locating all underground utilities, valve boxes, manholes, etc., and insuring that they are properly protected and adjusted as called for in the plans and/or project specials. When utility adjustments are required, but have not been called for in the plans and/or project specials, the Contractor shall notify the Construction Manager immediately.

9.01.11 GUARANTEE

There shall be a one (1) year guarantee on all work performed by the Contractor. Said one (1) year period shall commence from the date of Final Acceptance.

Materials shall be warranted for a minimum of one (1) year, except as otherwise noted. The Contractor shall supply the Construction Manager with all manufacturers' warranties covering material and parts.

At Final Acceptance, normal operation and maintenance shall become the responsibility of the City.

9.01.12 WORK HOURS

The Contractor shall work only on week days between the hours of 8:00 AM and 5:00 PM. The Contractor, upon approval of the traffic control plan by the Construction Manager, will be allowed lane closures in the public roadway weekdays only from the hours of 9:00 AM to 3:30 PM, unless alternate hours are approved. The Contractor must receive written approval from the Construction Manager for lane closures at any other time; and also, to work weekends or holidays.

9.02 REGULATIONS AND CODE

All materials and workmanship shall conform to the standards of the latest edition of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, and these Standards and Specifications. If conflicts arise between the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, these Standards and Specifications, and the contract documents, the contract documents shall take precedence. In addition to requirements of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, these Standards and Specifications, and the contract documents, all material and work shall conform to the requirements of the National Electrical Line Construction of the Public Utilities Commission, the Standards of the American Society for Testing and Materials (ASTM), the American Standards Association (ASA), and any local ordinance which may apply.

Wherever reference is made in these Standards and Specifications to the code, rules, or the Standards mentioned above, the reference shall be construed to mean the code, rule, or standard that is in effect at the date of bidding.

9.03 EQUIPMENT LIST AND DRAWINGS

After contract award, prior to installation, and/or at the Construction Manager's request, the Contractor shall submit shop drawings and

specifications for equipment and materials the Contractor proposes to furnish. The shop drawings and specifications shall be complete as to name of manufacturer, size, and catalog number of unit, and shall be supplemented by such other data as may be required. The Construction Manager's approval shall be required prior to installation.

Inspection or sampling of any materials, other than those materials already approved by the Construction Manager, must be made by the Construction Manager prior to installation. If the Contractor proposes a substitution of material called for in the plans, project specials, as specifically defined in these specifications, or as shown in approved submittals and shop drawings, the Contractor shall provide additional information to prove the substitution item is of equal or superior quality. Any material and/or equipment installed by the Contractor that is not in conformance with these specifications shall be removed or changed at the Contractor's expense.

9.04 AS-BUILTS

The Contractor shall submit "as-built drawings" showing in detail all construction changes, including, but not limited to wiring, cable, and location and depth of conduit. As-Builts shall be submitted at the end of the project and shall be required prior to final acceptance by the City.

9.05 EXCAVATION AND BACKFILL

Excavations for the installation of conduit, foundations, and other appurtenances shall be performed in such a manner as to cause the least possible damage to the streets, sidewalks and other improvements. The trenches shall not be excavated wider than necessary for the proper installation of conduit, foundations, and other appurtenances. Excavating shall not be performed until immediately before installation of conduit, foundations, and other appurtenances. The material from the excavation shall be placed in a position where the least interference with the surface drainage will occur and without obstruction to vehicular or pedestrian traffic. Refer to Chapter 8, "Stormwater Quality Control Criteria", Section 8.04, "Temporary Controls and Installation and Maintenance Procedures" of these these Standards and Specifications. All excavations shall be done in conformance with OSHA regulations. Excavated material shall be removed at the completion of the project or as directed by the Construction Manager.

Excavations, after backfilling, shall be kept well filled and maintained in a smooth and well-drained condition until permanent repairs are made.

Chapter 7, "Permits, Licenses, and Construction Inspection", Section 7.02.2, "Construction Requirements" of these Standards and Specifications shall govern all backfilling requirements.

All conduit bores shall comply with Chapter 7, "Permits, Licenses, and Construction Inspection", Section 7.03, "Related Construction and Specifications" of these Standards and Specifications.

At the end of each day's work and any other time construction operations are suspended, all construction equipment and other obstructions shall be removed from that portion of the roadway open for use by public traffic.

Excavations in streets or highways shall be performed in such a manner that, at a minimum, one (1) lane of traffic in each direction shall be open to public traffic during the approved work hours.

When excavations remain open overnight as approved by the Construction Manager, they shall be properly marked to warn motorists and/or pedestrians. The excavation shall be properly barricaded for vehicles and/or pedestrians. If the excavated area is required to be open to traffic, it shall be properly covered by a steel plate.

All excavated areas outside of pavement sections shall be restored to a condition better than what existed prior to the excavation. Areas shall be seeded with native seed mix or re-sodded as appropriate.

9.06

REMOVING, REPLACING, AND RESETTING IMPROVEMENTS

The Contractor shall replace or reconstruct sidewalks, curbs, gutters, rigid or flexible pavement, and any other improvements removed during construction with material meeting the requirements of Chapter 7, "Permits, Licenses, and Construction Inspection", of these Standards and Specifications, or as otherwise directed by the Construction Manager.

Whenever a part of a square or slab of existing concrete is broken, damaged, or potholed by the Contractor during construction, the entire square or slab shall be removed and the concrete reconstructed, at no cost to the City. Refer to Chapter 7, "Permits, Licenses, and Construction Inspection", Section 7.02.2.E, "Concrete Pavement Patching" of these Standards and Specifications.

Concrete and asphalt removal shall be cut full depth, or to a depth approved by the Construction Manager. Cuts shall be neat and true with no shatter outside the removal area. When, in the course of concrete removal, damage occurs to a square or slab of existing concrete outside

of the removal area, the square or slab shall be considered damaged with the entire square or slab requiring replacement.

Removal items shall consist of the items specifically identified on the plans, or in writing by the Construction Manager. It shall be the Contractor's responsibility to assure that the Contractor has a full and complete understanding of included items prior to bidding.

Removal of poles and controllers shall include foundation removal to the depth indicated by the Construction Manager. Otherwise, removal shall consist of complete elimination of the specified items. Any conduit runs associated with the foundation shall be extended or abandoned as called for on the plans.

All traffic signal equipment which is removed shall remain the property of the City unless otherwise specified in the plans or by the Construction Manager. City property shall be removed from the work site and returned by the Contractor to the City at 8602 Rosemary Street, Commerce City Colorado 80022, or other designated location.

Reset pay items shall consist of the items specifically identified in the plans, or in writing by the Construction Manager. It shall be the Contractor's responsibility to assure that the Contractor has a full and complete understanding of included items prior to bidding.

Reset items are to be initially removed, then adjusted or modified as directed by the Construction Manager, and finally reinstalled to full operational capability. Modifications and adjustments shall be detailed on the plans or stated in writing by the Construction Manager.

9.07 FOUNDATIONS

All concrete foundations shall be of a class as defined by the most recent revision of the Colorado Department of Transportation latest edition of Standard Specifications for Road and Bridge Construction or as otherwise directed by the Construction Manager.

The bottom of foundations shall rest on properly compacted ground. Cast-in-place foundations shall be poured monolithically. The exposed portions shall be formed to present a neat appearance.

Pre-cast pole footings, if used, shall be used only for roadway lighting and pedestal poles. They shall be installed in drilled holes, with compacted sand, clay, or sandy clay backfill material.

Forms shall be true to line and grade. Tops of foundations, except as noted on plans, shall be finished to curb or sidewalk grade, or as ordered by the Construction Manager. Forms shall be rigid and securely braced in place, and inspected prior to the pouring of concrete. Conduit ends and anchor bolts shall be placed in proper position and to template until the concrete sets.

Anchor bolts shall conform to the manufacturer's specifications and each individual bolt shall have a minimum of two (2) flat washers, one (1) lock washer, and two (2) nuts. Shims or other similar devices will not be allowed for plumbing or raking. When indicated on the plans as a future signal location, foundation bolts shall be protected with the placement of bracing per Detail 900-03 of these Standards and Specifications.

Both forms and ground, which will be in contact with the concrete, shall be thoroughly moistened before placing concrete. Forms shall not be removed until the concrete has thoroughly set.

Reinforcing steel shall be installed in foundations as specified in the construction plans or these Standards and Specifications.

Ground rods shall be provided as indicated in the standard details.

9.08 CONDUIT

All cables and conductors not shown on the plans as aerial cable shall be installed in conduit unless installed in poles, pedestals, or master arms. All metal conduits referred to in the specifications and shown on the plans shall be the rigid pipe type of ductile steel that is adequately galvanized. All PVC conduits shall be Schedule 80 or heavier. For new conduit installations, PVC or Schedule 80 polypipe shall be understood unless otherwise defined.

The conduit schedule shall be as defined in Detail 900-10 of these Standards and Specifications, unless otherwise specified in the traffic signal plans.

The Contractor, at his sole expense, may use larger conduit than specified if desired. Where larger conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings will be permitted underground.

The ends of all metal conduit, existing or new, shall be well reamed to remove burrs and rough edges. Field cuts of existing or new conduit shall be made square and true, and the ends shall butt together for the full

circumference thereof. Slip joints or running threads will not be permitted for coupling metal conduit. When a standard coupling cannot be used, an approved threaded union coupling shall be used. All couplings shall be screwed up tight until the ends of the metal conduits are brought together.

Where a "stubout" is called for on the plans, a sweeping ell shall be installed in the direction indicated and properly capped using materials manufactured for that purpose. Duct tape, duct seal, and/or other temporary capping materials shall not be permitted. The locations of ends of all conduits in structures or terminating at curbs shall be marked by a "Y" at least three (3) inches high cut into the face of curb, gutter or wall directly above the conduit.

Conduit bends, except factory bends, shall have a radius of not less than six (6) times the inside diameter of the conduit. Where factory bends are not used, conduit shall be bent without crimping or flattening, using the longest radius practicable. Conduit bends feeding pull boxes and foundations shall have an eighteen (18) inch radius as shown on the standard details.

Conduit shall be laid at a depth of not less than thirty (30) inches below the finished roadway grade and twenty-four (24) inches below the finished grade in all other areas.

Conduit under railroad tracks shall be at the minimum depth below the bottom of tie required by the particular railroad company.

Conduit shall always enter a pedestal base, pull box, pole foundation, cabinet foundation, or any other type structure from the direction of the run only. Conduit connections at junctions shall be tightly secured.

Conduit terminating in a standard or pedestal shall extend approximately two (2) inches vertically above foundations.

All conduit runs that exceed ten (10) feet in length shall have a continuous one-eighth (1/8) inch diameter nylon line pulled into the conduit along with the specified electrical cables. The line shall be firmly secured at each end of the conduit run with three (3) feet of slack. The purpose of this line is to be able to pull future electrical cable through the existing conduit runs. Mule tape shall be installed in place of the nylon line when specified in the plans and/or project specials.

A 14 AWG locate wire shall be installed for the complete length of all new conduit runs installed as part of the project. No less than three (3) feet of slack shall remain in each pull box in which the conduit terminates. Where joint trenching is used, only one locate wire need be installed for each joint

trench. Splicing of locate wire through interconnect conduit shall be required in each pull box, controller cabinet to controller cabinet. Splicing of the locate wire within conduits shall not be permitted.

Existing underground conduit to be incorporated into a new system shall be cleaned with a mandrel and blown out with compressed air.

New conduit runs shown on the plans are for bidding purposes only and may be changed at the direction of the Construction Manager.

Any spare or unused conduits shall be capped using materials manufactured for that purpose. Duct tape, duct seal, and/or other temporary capping materials shall not be permitted.

Polypipe to PVC coupling shall be completed with the use of "E-Loc" couplings or approved equal.

When a cabinet is defined as a master cabinet, a two (2) inch PVC conduit shall be installed from the controller cabinet to the designated telephone company demarcation point.

A two (2) inch PVC conduit shall be installed to all signal poles for the exclusive use of the local utility company providing electrical power for luminaires. The conduit may be laid in trenches cut for signal wire conduit and shall run from the controller cabinet home run pull box to signal poles through associated signal pole pull boxes.

When inductance loops and/or micro loops are required, a two (2) inch PVC conduit shall be installed from the nearest signal pole pull box to a water valve pull box located within the roadway. The two (2) inch conduit shall be routed through and terminated within a pull box located adjacent to both the roadway and the associated inductance loop(s). The conduit may be laid in trenches cut for signal wire conduit.

When conduit is referenced in the project plans or project specials as interconnect conduit, where interconnect conduit runs exceed ten (10) feet in length, and when called for in the project plans or project specials, detectable MaxCell 3x3 innerduct, or approved equal, shall be installed. No less than three (3) feet of slack shall remain in each pull box.

When innerduct is installed, cable runs exterior to the innerduct shall not be permitted. Locate wire and mule tape shall be incorporated in the innerduct. Locate wire shall be spliced in each pull box, controller cabinet to controller cabinet. When conduit houses a single MaxCell 3x3 innerduct, or approved equal, a single mule tape shall be installed

externally to the innerduct and shall serve as a pull line for additional innerduct as required.

Where all innerduct cells are in use and additional cable is required, an additional MaxCell 3x3 innerduct, or approved equal, shall be required. When conduit is inadequately sized for additional innerduct, the Construction Manager shall be notified and shall provide direction.

Mule tape and/or innerduct shall be installed per manufacturer's specifications.

Innerduct shall be measured and paid for by the linear foot of innerduct installed and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

Conduit shall be measured and paid for by the linear foot of conduit installed from center of pull box to center of pull box, center of pull box to center of pole, or center of pull box to center of cabinet and shall include all labor, equipment, and materials necessary to install the item complete-in-place. Allowances shall be made in the linear foot calculation for conduit sweeps and elbows.

9.09

PULL BOX

Pull boxes shall be installed at all locations as shown on the plans and at such additional points as ordered by the Construction Manager.

With the exception of water valves, pull boxes shall be of pre-cast polymer concrete type. The pull box schedule shall be as defined in Detail 900-07 of these Standards and Specifications unless otherwise specified in the traffic signal plans.

Communication Vaults should be installed at all existing and planned traffic signals, and may be considered for use at splice points as to provide adequate space for splice enclosures without minimization of fiber interconnect cable slack.

The maximum spacing for Communication Vaults shall be 500' unless otherwise approved by the Construction Manager.

Pull boxes shall be installed so that the covers are level with curb or sidewalk grade or level with the surrounding ground when no grade is established. The bottoms of all pull boxes shall be set on twelve (12) inches of crushed rock.

Pull box lids shall be imprinted with markings. Painted markings shall not be permitted.

When a new conduit run enters an existing pull box, the Contractor shall temporarily remove the pull box, or tunnel under the side at no less than eighteen inches (18") below the pull box bottom, and enter from the direction of the run. No new conduit will be allowed to enter a new or existing pull box in any other manner than that shown on the standard details.

When pull box usage is for "Communication Vault", a flat format Carsonite, or approved equal, utility marker, with decal, shall be installed in conjunction with the pull box.

Utility Marker

The utility marker shall adhere to the following specifications:

- a. Measure 66" x 3.75".
- b. Be orange in color.
- c. Be constructed of fiberglass reinforced composite material.

Utility Marker Decal

The utility marker decal shall be installed at the top of the utility marker, and shall adhere to the following specifications:

- a. Measure 2.5" x 14".
- b. Lettering shall be black on orange.
- c. UNCC dig notification number shall be defined for as contact phone number.
- d. City of Commerce City shall be defined as owner.
- e. Wording shall be as shown in Detail 900-07 of these Standards and Specifications, or as otherwise approved by the Construction Manager.

Pull boxes shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.10 CABINET BASES

Controller cabinet bases shall be fiberglass type, sized to match with the controller cabinet, and set with approximately 50% of height extending below grade and 50% extending above grade.

Controller cabinet bases shall be set on a twelve (12) inch deep bed of crushed rock. The interior of the base shall be filled to grade level with crushed rock.

Conduits within the controller cabinet base shall extend a minimum of 6" above the crushed rock. Conduits shall be installed in such fashion as to prevent undo bend stress on cables being fed into the cabinet through these conduits.

Ground rods shall be provided as indicated in the standard details.

9.11 CONDUCTOR AND CABLE

Wiring shall conform to appropriate articles of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, and/or the National Electrical Code, as applicable. Wiring within cabinets, junction boxes, etc., shall be neatly arranged. Signal conductors shall be No.14 AWG stranded, conforming to IMSA Spec 20-1-1984.

Power feed cable shall be THHN/THWN copper, installed in conduit, and be sized for the electrical load served. The power feed cable shall have a minimum size of #8 and be sized such that the overall voltage drop, between the local utility company demarcation point and controller cabinet, does not exceed 5%. The Contractor shall install power feed cable from the local utility company power demarcation point to the controller cabinet thru an URD Mold connector located in the controller cabinet home run pull box. URD Mold connectors shall be installed in the home run pull box and shall be used to extend electrical service from the local utility company power demarcation point to the controller cabinet and to street lights on signal poles.

Whenever a raceway is not UL approved, direct burial type insulation shall be required on all associated wiring.

Power cable between the controller cabinet home run pull box and the street lights pole bases shall be type 12-2 UF. Daisy chaining of power cable thru the pole bases using SLK connectors shall be permitted. With the exception of the URD Mold connector in the controller cabinet home run pull box, power cable splices within pull boxes shall not be permitted.

Power cable from the end of each street light davit to the base of the signal pole shall be type 12-2 UF with ground. All street light feeds shall be independently fused at the base of each pole.

All signal cables shall be labeled with colored electrical tape based on the table below.

Direction	Tape Color
Northbound Thru	Red
Northbound Left Turn	Red + White
Northbound Pedestrian	Red + Yellow
Southbound Thru	Green
Southbound Left Turn	Green + White
Southbound Pedestrian	Green + Yellow
Eastbound Thru	Orange
Eastbound Left Turn	Orange + White
Eastbound Pedestrian	Orange + Yellow
Westbound Thru	Blue
Westbound Left Turn	Blue + White
Westbound Pedestrian	Blue + Yellow

Signal circuit wiring shall be accomplished in the following manner:

A separate 21 conductor cable shall be installed between the cabinet and each signal pole. Cables shall be continuous with no splices. Conductor usage has been defined in the table below. All unused conductors shall become spare conductors and shall be coiled and taped back to minimize the chance for a short.

21 Conductor Color to Phase Assignment	
Main Street	
Color	Phase
Solid Green	Green
Solid Orange	Yellow
Solid Red	Red
Solid Blue	Left Turn Green
Solid Black	Left Turn Yellow
Red with White Trace	Left Turn Red
Blue with White Trace	Walk
Black with Red Trace	Don't Walk
Side Street	
Green with Black Trace	Green
Orange with Black Trace	Yellow
Red with Black Trace	Red
Blue with Black Trace	Left Turn Green
Black with White Trace	Left Turn Yellow
Red with Green Trace	Left Turn Red
Blue with Red Trace	Walk

Orange with Green Trace	Don't Walk
Right Turn	
Green with White Trace	Right Turn Green
Orange with Red Trace	Right Turn Yellow
AC Return	
Solid White	AC Return
White with Black Trace	AC Return
White with Red Trace	AC Return

Each signal head shall have its own signal cable to the base of the pole that it is mounted on. Cables shall be continuous with no splices. Conductor usage has been defined in the table below. All unused conductors shall become spare conductors and shall be coiled and taped back to minimize the chance for a short.

Conductor Color	7 Conductor (5 Section Head)	5 Conductor (3 Section Head)	5 Conductor (Pedestrian Head)
Red	Red Ball	Red Ball or Red Arrow	Don't Walk
Orange	Yellow Ball	Yellow Ball or Yellow Arrow	Spare
Green	Green Ball	Green Ball or Green Arrow	Walk
Blue	Green Arrow	Not Available	Not Available
Black	Yellow Arrow	Spare	Spare
White	AC Return	AC Return	AC Return
White/Black	AC Return - LT	Not Available	Not Available

Outboard signal heads shall use "7 Conductor" cable to accommodate for present or future left turns.

When a cabinet is defined as a master cabinet, phone cable shall be installed in conduit from the controller cabinet to the designated telephone company demarcation point. Phone cable shall be #REA-PE54 or equivalent for telephone service. The cable shall be continuous with no splices and run from the telephone service point to the controller cabinet. Adequate cable length shall remain on both cable ends to permit for proper termination.

Pedestrian push button wire shall be shielded single or multiple twisted pairs in polyethylene jacketed cable. Conductors shall be No. 18 AWG stranded copper, minimum. A stranded tinned copper drain wire shall be provided.

Pedestrian push button common wire shall not be connected to the signal neutral circuit.

Inductance detector loop lead-in cable shall be shielded single or multiple twisted pairs in polyethylene jacketed cable. Conductors shall be No. 18 AWG stranded copper, minimum. A stranded tinned copper drain wire shall be provided.

Emergency vehicle detection wiring shall be of the type as specified by equipment manufacturer.

Splicing any conductor, cable or wiring, except loop detector wiring and power cable as defined in these specifications, shall not be permitted in conduit or in pull boxes. All signal conductor splices shall be in the signal pole near the hand hole above grade. Signal load splices shall utilize copper crimp sleeves that compress from four directions as manufactured by Buchanan Company, or approved equal. The crimped sleeve shall then be protected within a flexible rubber insulating cover as manufactured by Ideal Wrap Company, or approved equal. Detector loop lead-in splices in pull boxes below grade shall be fully waterproofed using a DBY-6 splice kit as manufactured by 3M, or approved equal. A minimum of 12-inches of slack shall be left at each splice.

Powdered soapstone, talc, or other approved lubricant shall be used in placing conductors in conduit.

A small permanent tag with the direction and phase printed on it shall be securely attached near the end of each conductor in the controller cabinet. An example is "Ø1-NBLT" where Ø1 is the phase number.

Cabling shall be paid for on a lump sum basis and shall include all labor, equipment and materials necessary to install the item complete-in-place.

9.12 INTERCONNECT

9.12.01 HARDWIRE/COPPER INTERCONNECT

Hardwire/Copper interconnect is not approved for use.

9.12.02 FIBER INTERCONNECT

GENERAL FIBER SPECIFICATIONS

Fiber optic cable shall be Corning Altos, or approved equal. Unless otherwise specified in the project plans or special provisions, the following fiber schedule shall apply:

Usage Description	Fiber Count	Manufacturer	Model	Part Number
Major Backbone	96	Corning	Altos	096EU4-T4101D20
Minor Backbone	24	Corning	Altos	024EU4-T4101D20
Cabinet Lateral	12	Corning	Altos	012EU4-T4101D20

50' of fiber interconnect cable slack shall be installed in each Communications Vault and pull box through which the fiber interconnect cable travels. Where Communication Vaults and/or pull boxes are inadequately sized for required slack, and/or where Communication Vaults and/or pull boxes are occupied such that additional slack will not fit, the Construction Manager shall be notified and shall provide direction.

50' of fiber interconnect cable slack shall be installed in each cabinet in which the fiber interconnect cable enters. Where cabinet space is limited, fiber interconnect slack may be stored in the Communication Vault.

Fiber optic cable shall comply with industry standards such as Telcordia Technologies GR-20 (formerly Bellcore), Electronic Industries Association (EIA), Telecommunications Industry Association (TIA), International Telecommunications Union (ITU), International Electrotechnical Commission (IEC), and American Society for Testing and Materials (ASTM).

Fiber optic cable shall meet all requirements stated in this specification. The cable shall be an accepted product of the United States Department of Agriculture Rural Electrification Administration (REA) as meeting requirements of 7CFR1755.900.

All fiber cable shall be of Single Mode, Non-Armored, All-Dielectric, Single Jacketed, Loose Tube Dry Block Construction for outside plant installation.

When fiber cable installation includes cable transition into a building, and where the termination point is greater than 50' from the building's fiber cable entry point, fiber cable shall be converted to the appropriate cable type for the structure; plenum or riser rated. Conversion shall be made via a fiber splice panel to minimize losses.

The cable shall be new, unused, and of current design and manufacture.

All fibers in the cable must be usable fibers and meet these specifications.

All optical fibers shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical and environmental requirements of this specification.

Each optical fiber shall consist of a germania-doped silica core surrounded by a concentric glass cladding. The fiber shall be a matched clad design.

The fiber shall be coated with a dual layer acrylate protective coating. The protective coating shall be in physical contact with the cladding surface.

FIBER SPECIFICATION PARAMETERS

Color Code

The individual colors for fibers and buffer tube cable cores shall comply with EIA/TIA-598.

Central Strength Member

The central strength member functions as an anti-buckling element, and shall be a glass/epoxy composite dielectric rod. A polyethylene overcoat may be applied to the central member to provide the proper spacing between buffer tubes during stranding.

Cable Buffer Tubes

Optical fibers are enclosed within buffer tubes that have a diameter several times larger than the diameter of the fibers. The optical fibers are loose within the buffer tubes allowing the fibers to move freely. The loose buffer tubes should have a 2.5 mm diameter, with a nominal wall thickness of 0.4 mm.

Buffer tubes shall be of a dual-layer construction with the inner layer made of polycarbonate and the outer layer made of polyester.

Each buffer tube shall contain 12 fibers.

Filler rods may be included in the cable core to lend symmetry to the cable cross-section where needed.

The buffer tubes (and filler rods, if necessary) shall be stranded in a reverse oscillation lay (ROL) technique around the central strength member to allow for easy mid-span access. The core of buffer tubes shall be wrapped with two counter helically applied threads to bind together the cable core.

Binders shall be applied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage.

Tensile strength shall be provided by high tensile strength aramid yarns, fiberglass yarns, or both.

Water blocking of the core outside, and around the buffer tubes, shall be accomplished via dry block elements. In addition, water-blocking inside the buffer tubes shall be accomplished via dry block elements.

In buffer tubes containing multiple fibers, the colors or numbers shall be stable during temperature cycling and not subject to fading or smearing onto each other. Colors shall not cause fibers to stick together.

For ease of jacket removal, one clearly identifiable polyester ripcord shall be provided directly under the cable sheath.

Cable Outer Jacket Characteristics

All-Dielectric cables shall be sheathed with minimum or heavy density polyethylene. The minimal nominal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members and water block flooding compound. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The cable sheath shall be free of holes, splits, and blisters.

Cable Outer Jacket Markings

For standard outer jackets, printed characters shall be indent printed with white characters for black jackets, and black characters for non-black jackets.

The characters shall be of proper height and space to produce good legibility. Character height of 2 mm should facilitate adequate readability. An occasional illegible marking is permitted if there is a legible marking on either side.

The cable shall be sequentially marked at two feet intervals. The length intervals shall not be reset to zero on any length of the cable. The actual length of the cable shall be within -0/+1% of the length markings.

Each length of the cable shall be marked with manufacturer's name, manufacturer's part number, month and year cable was manufactured (MM-YY), telephone symbol (indicating fiber is of communications grade), fiber counts, and fiber type (SM, MM, SM/MM).

Cable Packaging

The manufacturer shall supply the product using their standard reel sizes, methods, apparatus, and reel wood lagging.

Reels are assumed to be in good working condition, firm, and able to support the product through shipping and final installation. Reels shall be clean, dry, and free of excessive dirt. All reels shall be checked for high nails, stave fit, and proper stenciling.

Each wood reel shall be permanently marked with the manufacturer's name, "OPTICAL CABLE", an arrow with the words "CABLE END" to indicate the position of the outer cable end, an arrow with the words "ROLL THIS WAY" to indicate direction reel should be rolled to prevent loosening, and reel number.

Outer layers of the reel shall be covered with a protective wrap to limit the solar heating of the cable.

Each end of the cable shall have end seals, either end caps or KELLEMS pulling grips, in order to prevent moisture ingress into the cable during shipping, storage, or installation.

The top end of the cable shall be securely fastened to the inside of the reel flange to prevent the cable from becoming loose in transit or during handling. The bottom end, "test tail", shall be approximately three meters in length and easily accessible. The end shall be protected within a cable slot and be securely fastened to the outside of the reel flange with wire ties or walkout straps.

Each cable shall have certified test data securely fastened to the reel in a waterproof wrapping. The certified test data shall include the following information:

- Cable Number
- Date
- Customer Name
- Ordered Length
- Customer Order Number
- Ship Length
- Customer Cable Code
- Customer Reel Number
- Customer Attenuation Specifications
- Number of Fibers
- Cable Construction
- Fiber Transmission Data
- Bandwidth Data (Multimode Fiber Only)
- Authorized Signature

Each cable shall have a reel tag securely fastened to the reel in a waterproof wrapping. The reel tag (Cut Length Data Sheet) shall include the following information:

- Cable Number
- Date
- Customer Name
- Ordered Length
- Customer Order Number
- Ship Length
- Customer Cable Code
- Customer Reel Number
- Customer Attenuation Specifications
- Number of Fibers
- Beginning and Ending Sequential Length Markings
- Gross Weight
- Net Weight
- Inspected By Signature

Single Mode Fiber Specifications

The dispersion un-shifted Single Mode fiber utilized in the cable specified herein shall conform to the following specifications:

- Typical Core Diameter: 8.3 micrometer;

- Cladding Diameter: 125.0 ± 1.0 micrometer;
- Core-to-Cladding Offset: ≤ 0.6 micrometer;
- Cladding Non-Circularity: ≤ 1.0 %, defined as $[(\text{minimum Cladding diameter} / \text{maximum Cladding diameter})] \times 100$
- Coating diameter: 245 ± 10 micrometer;
- Colored Fiber Diameter: nominal 250 micrometer;
- Attenuation Uniformity: No point discontinuity > 0.10 dB at either 1310 nm or 1550 nm;
- Attenuation at the Water Peak: The attenuation at 1383 ± 3 nm shall not exceed 2.1 dB/km;
- Cutoff Wavelength: The cabled fiber cutoff wavelength shall be < 1260 nm;
- Mode-field Diameter (Petermann II): 9.30 ± 0.50 nm at 1310 nm;
- Mode-field Diameter (Petermann II): 10.50 ± 1.00 micrometer at 1550 nm;
- Zero Dispersion Wavelength (ZDW): $1301.5 \text{ nm} \leq 1321.5$ nm;
- Zero Dispersion Slope (ZDS): $ZDS \leq 0.092 \text{ ps} / (\text{km} \times \text{nm}^2)$;
- Fiber Polarization Mode Dispersion (PMD): $0.5 \text{ ps} / \sqrt{\text{km}}$;
- Fiber Curl: ≥ 4.0 m radius of curvature;
- Maximum Tensile Loads: Short-Term 2700 N (600 lbs);
- Maximum Tensile Loads: Long-Term 890 N (200 lbs);
- Shipping, Storage, and Operating Temperature Range of the Cable: -40 Degrees C to +70 Degrees C.

Quality Assurance Provisions

All optical fibers shall be proof tested by the fiber manufacturer at a minimum load of 100 ksi.

All optical fibers shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel.

FIBER SPLICING AND TERMINATIONS

Optical Splices and Optical Splice Closures

Splices are not allowed without the authorization of the Construction Manager. If splices are authorized or specified on the plans, each such splice shall occur in a pull box of adequate size to house the splice closure and fiber optic cable slack without exceeding the fiber cable minimum bend radius. All splices shall be enclosed in a water proof splice closure.

Following successful splicing, said splice enclosure and fiber optic cable slack shall be placed inside the pull box.

When fiber splicing is specified in the plans, splicing diagrams shall be provided by the Construction Manager. Splicing diagrams shall define fiber cables to be spliced in part or whole and shall provide buffer tube designation, fiber designation, and routing information of each fiber to be spliced.

The Contractor shall accomplish the fiber splicing work using industry standard splicing tools and hardware.

Splice closures shall be used for splicing lateral fiber optic cable runs to the fiber optic backbone at pull box locations that are identified in the plans. All closures shall include a 1-inch future port kit. The size of the splice closure shall be governed by the number of cables and splices required at each location.

Buffer Tube Fan-out

Fiber fan-outs shall be completed as defined in the plans and/or special provisions. Only those buffer tubes defined shall be fanned out. When additional buffer tubes are present, but are not to be fanned out, a termination panel shall be required. Buffer tubes which have not been fanned out shall be loosely coiled and secured within a termination panel.

Fiber fan-outs shall only be completed within a building or NEMA 4 rated cabinet and shall be of the count and type as defined in the plans and/or special provisions.

Industry standard fan-out kit tools and tool kit consumables shall be used.

During installation, and at no time, shall the fiber fan-out, in part or whole, be reduced to a length shorter than 36 inches. Fiber fan-outs shorter than 36 inches shall be replaced by the Contractor. Fees associated with replacement of fiber fan-outs which were installed by the Contractor, but which do not meet specifications, including terminations and testing, shall be borne by the Contractor and shall not be chargeable to the City.

Terminations

Only those fibers defined shall be terminated.

Connectors shall be “ST” type unless otherwise specified. The connectors shall have a ceramic ferrule with nickel-plated nut and body. The connectors shall be compatible with a physical contact (PC) finish.

All connectors shall be polished to a PC finish such that the return loss per mated pair of connectors is less than -25 dB.

The return loss when the connector is mated with a previously installed connector shall be less than -18 dB.

The connector’s insertion loss shall not be greater than 0.20 dB (typical). The connector’s loss shall not vary more than 0.20 dB after 1000 repeated matings. Tensile strength shall withstand an axial load of 20 lbs with less than 0.20 dB change.

Index matching fluids or gels shall not be used. The connectors shall be compatible with the optical fiber surrounding jacket and shall be installed on one end of the optical fiber in accordance with the manufacturer’s recommended materials, equipment, and practices. The connectors shall be suitable for the intended environment and shall meet, or exceed, the following environmental conditions.

- Operating Temperature: -40 degrees C to +80 degrees C
- Storage Temperature: -40 degrees C to +85 degrees C

The connector loss shall not vary more than 0.20 dB over the operating temperature range.

Connectors shall be protected by a suitably installed waterproof protective cap.

Termination Panel

When a termination panel is specified in the plans for installation in a traffic cabinet, the termination panel shall be a wall mount type suitable for fastening to the cabinet rails. The termination panel shall be sized to accommodate all fibers of the fiber cable(s) entering the termination panel.

When a termination panel is specified in the plans for installation in a building, the termination panel shall be a wall mount type or rack mount type as defined in the plans. The termination panel shall be sized to accommodate all fibers of the fiber cable(s) entering the termination panel.

“ST” type bulkheads shall be used unless otherwise specified.

“Blank” plates, of the same manufacturer as the termination panel, shall be used to cover blanked areas where bulkhead plates would normally be installed, but which are not required.

UNIT OF MEASUREMENT

Fiber interconnect shall be measured by the linear feet installed and shall include all labor, equipment, and materials necessary to install the item end-to-end complete-in-place.

FIBER COMMUNICATIONS EQUIPMENT

Ethernet Managed Switch

An Ethernet Managed Switch shall only be used where specified in the project plans or project specials, and may be considered by the Construction Manager on a per project basis. When specified in the project plans and project specials, the Ethernet Managed Switch shall be of the manufacturer and model number specified.

An Ethernet Managed Switch shall include the power supply, Cat5E/Cat6 Ethernet cable or serial cable as required to connect the Ethernet Managed Switch to the traffic signal controller, and duplex fiber patch cables for connecting the Ethernet Managed Switch to the fiber termination panel.

Unless otherwise specified, the Contractor shall be responsible for proper programming, setup, and testing of the Ethernet Managed Switch. At the City’s discretion, the City may opt to have their Maintenance Contractor or other third party complete Ethernet Managed Switch, setup, and/or testing. When the City’s Maintenance Contractor or other third party is enlisted for programming, setup, and/or testing of the Ethernet Managed Switch, associated costs for the Maintenance Contractor or third party labor shall be the responsibility of the City.

Ethernet Managed Switches shall be measured by the units installed and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

Fiber Optic Transceivers

Fiber Optic Transceivers shall only be used where specified in the project plans or project specials, and may be considered by the Construction

Manager on a per project basis. When specified in the project plans and project specials, Fiber Optic Transceivers shall be of the manufacturer and model number specified.

Field located Fiber Optic Transceivers shall be shelf mount type, shall include the power supplies, cables as required to connect the Fiber Optic Transceivers to the field equipment, and fiber patch cables for connecting the Fiber Optic Transceivers to the fiber termination panels.

Traffic Operations Center (TOC) located Fiber Optic Transceivers shall be rack mount type, shall include cables as required to connect the Fiber Optic Transceivers to the TOC equipment, and fiber patch cables for connecting the Fiber Optic Transceivers to the fiber termination panels. Fiber card racks shall only be required if specified in the project plans and/or project specials. If a fiber card rack is required, the fiber card rack shall be 19" rack mountable and shall include a power supply capable of powering the card rack with a full compliment of Fiber Optic Transceivers.

Unless otherwise specified, the Contractor shall be responsible for proper programming, setup, and testing of the Fiber Optic Transceivers. At the City's discretion, the City may opt to have their Maintenance Contractor or other third party complete Fiber Optic Transceivers programming, setup, and/or testing. When the City's Maintenance Contractor or other third party is enlisted for programming, setup, and/or testing of the Fiber Optic Transceivers, associated costs for the Maintenance Contractor or third party labor shall be the responsibility of the City.

Fiber optic transceivers shall be measured by the units installed and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.12.03 RADIO INTERCONNECT

Where specified in the plans, radio communications shall be included on the project. The radio communication system shall be of the manufacturer and model number specified.

Programming software and manuals shall be supplied with the radio system and shall become the property of the City at the completion of the project.

The radio communication system shall include all ancillary materials required to make the wireless link operational, and to connect the radios to the equipment for which communications was intended, and shall include,

but not limited to, the antenna, coax cable, surge suppression, power supply, serial cable, and/or Ethernet cable.

Unless otherwise specified, the Contractor shall be responsible for proper programming, setup, and testing of the radio communication system. At the City's discretion, the City may opt to have their Maintenance Contractor or other third party complete the radio communication system programming, setup, and/or testing. When the City's Maintenance Contractor or other third party is enlisted for programming, setup, and/or testing of the radio communication system, associated costs for the Maintenance Contractor or third party labor shall be the responsibility of the City.

Radios shall be measured by the paired units installed (Transmitter & Receiver) where both a transmitter and receiver are installed, individually where only a transmitter or receiver are installed, and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.13 VEHICLE DETECTION

9.13.01 GENERAL

Unless otherwise noted, all traffic signal vehicle detection systems shall be accomplished through a video detection system.

9.13.02 VIDEO DETECTION

Video detection systems shall consist of one video camera, isolation amplifier for video cabling, an automatic control unit (ACU) and a pointing device. The system shall detect vehicles on a roadway using only video images of vehicle traffic and shall be an Econolite, Traficon, Iteris, or approved equal.

The system shall include software that detects vehicles in multiple lanes using only the video image. Detection zones shall be defined using only a video menu and a pointing device to place the zones on a video image. Up to twenty four (24) detection zones per camera shall be available.

The camera supplied shall be compatible with the video detection system and shall be mounted on the luminaire davit when luminaire davit is present, mast arm when luminaire davit is not present, or other location as defined on the plans or as directed by the Construction Manager. The

camera shall view approaching vehicles at a distance not to exceed 350 feet for reliable detection.

The camera shall be housed in an environmentally sealed enclosure and shall be equipped with a sun shield that prevents sunlight from directly entering the lens. The camera shall be less than 6 inches in diameter, less than 26 inches long and shall weigh less than 12 pounds when the camera and lens are mounted inside the enclosure.

The camera enclosure shall include all required environmental controls as defined by the camera manufacturer and may include a thermostatically controlled heater and/or fan to assure proper operation of the lens iris at both low and high temperatures, and prevent moisture condensation of the optical faceplate of the enclosure.

When a variable focal length lens with variable focus control is supplied as part of the camera, the lens shall be adjusted to suite the site geometry without opening up the camera housing.

When coaxial cable is used between the camera and the cabinet, coax cable shall be a 75 ohm, precision video cable with 20 gauge solid bare copper conductor (9.9 ohms/M), solid polyethylene insulating dielectric, 98" (min) tinned copper double-braided shield and black polyethylene outer covering. The signal attenuation shall not exceed 0.78 dB per 100 feet at 10MHz. Nominal outside diameter is 0.304 inches. This cable shall be suitable for installation in conduit or overhead appropriate span wire. BNC plug connectors shall be used at both the camera and cabinet ends. The coax cable, BNC connectors, and crimping tool shall be of an approved type by the supplier of the video detection system, and the manufacturer's instructions must be followed to insure proper connection.

Control and other cables required for installation, setup, and operation of the camera and/or video detection system are required, they shall be of the size and type required per manufacturer's specifications and the National Electric Codes. Control cables shall terminate within the controller cabinet.

The power cable shall be 16 AWG three conductor cable. The cabling shall comply with local and National Electric Codes.

When specified in the project plans or project specials, hardware shall be included for remote programming and viewing of the video detection system through an Ethernet link and static I.P addressing, and shall provide for remote access, via a standard internet browser, to the communication board(s), detection board(s), zone configuration, and live

streaming video. Remote access shall provide for setup and modification of configuration parameters, and retrieval of data and alarm logs.

The complete video detection system shall be warranted to be free of defects in material and workmanship for a period of not less than two years from the date of final acceptance and warranty initiation. During the warranty period, the Contractor shall be responsible for the repair or replacement, at no charge to the City, of any product of the video detection system which fails to operate properly with the exception of failures as a result of vandalism, accident, and/or act of God.

Video detection systems shall be paid for on a lump sum basis and shall include all labor, equipment and materials necessary to install a video detection system for the entire intersection, complete-in-place.

9.13.03 INDUCTANCE DETECTION

When specified in the plans, detector loops shall be installed in accordance with these specifications and the construction plans.

Each individual detector loop is to be spliced to a lead-in cable within a pull box as specified on the plans, and each loop shall consist of one continuous wire, without splicing, to this point. Any required series or parallel connections are to be completed in the pull box.

All detector loops shall have a tag attached to the leading clockwise lead of the loop. This tag shall be marked to indicate the relative location of the loop. This marking shall correspond directly to the phase designations in the Plans.

Detector loop roadway cuts, when required, shall be 3/8-inch in width and of sufficient depth to provide a minimum of 1-inch of sealant above the wire.

Detector loop roadway cuts where required shall be sealed to the surface level of the original roadway with "Gold Label Flex," "3-M Brand model Black 5000", "Bondo No. E-709", or approved equal. ("Bondo No. P-606" is not approved). This sealer is to be used whether or not the roadway is to be overlaid.

Detector loop installations larger than 6-foot x 6-foot shall be of a quadrapole (2-4-2) design, according to the Plans. Duct type loop wire, IMSA 51-5-1984, shall be used for all loops.

Where the detector loop lead enters or resides in a pull box or conduit, the two associated loop lead wires shall be twisted together in a clockwise direction with a twist rate of 10-12 twists per foot.

At a minimum, three (3) feet of twisted loop lead shall be left in the pull box where splicing is to occur.

Detector loops shall be paid for on a unit price basis including loop wire, saw cutting, and sealant for a complete installation to the splice point pull box.

9.13.04 INDUCTANCE DETECTOR

This specification defines the minimum design, operational, and performance requirements for a multiple channel, digital, self tuning inductive detector. Inductive detectors shall be card rack mounted, plug in type, and shall operate from an external 12-24 VDC power supply.

Inductance detectors shall be capable of operating within a TS1 or TS2-Type 1 cabinet.

Inductive detectors shall include a power indicator.

Inductive detectors shall have built-in protection against lightning induced and other transients.

Inductive detectors shall have all user programmed settings and vehicle detector gathered data stored in non-volatile memory.

Each inductive detector shall include two or four complete detector channels.

Each channel of the sensor unit shall automatically self tune to any loop and lead-in inductance from 20 to 2500 microhenries within 10 seconds after application or interruption of supply voltage. Units shall also track changes in loop/lead-in electrical characteristics, as might reasonably be expected to occur in undamaged loops properly installed in sound pavement, without producing false indications or changes in sensitivity.

Each channel shall have both detect and fault indicators.

All vehicle detection parameters shall be programmable separately for each channel. This includes the sensitivity, background adapt rate, recovery method, wash delay time, and wash adapt time.

Each channel at minimum shall be capable of a minimum of eight (8) pulse mode sensitivity levels, seven (7) presence mode sensitivity levels, off mode, and four (4) frequency settings.

Inductance detectors shall be hot-swappable.

Inductance detectors shall operate in temperatures between -29 degrees Fahrenheit and +165 degrees Fahrenheit with a humidity level of 0% to 95% (non-condensing).

When data storage capability is required per project plans and/or special provisions, inductance vehicle detectors shall meet these specifications, and all stored data shall be recoverable via built in RS232/RS485 communication ports.

Inductance vehicle detectors shall be measured by the units installed and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.13.05 OTHER DETECTION

Other type of vehicle detection shall only be used where specified in the plans and specifications, and may be considered by the Construction Manager on a per project basis. When specified in the project plans and/or specifications, other types of vehicle detection shall be of the manufacturer and model number specified.

9.14 PEDESTRIAN PUSH BUTTONS

Pedestrian push button assemblies shall be Pelco model SE-2005-08 (ADA pedestrian push button), or approved equal. The button housing shall be black in color. A separate decal sign, MUTCD Reference # R10-3b (non-count down pedestrian signal) or MUTCD Reference # R10-3e (count down pedestrian signal), or approved equal shall be installed with each pedestrian push button.

Push button locators shall only be used where specified in the plans and project specials, and may be considered by the Construction Manager on a per project basis. When push button locators are requested, this function shall be integrated as part of the pedestrian push button, the pedestrian push button shall be of the manufacturer and model number specified, and shall conform to the MUTCD.

Audible pedestrian indications shall only be used where specified in the plans and project specials, and may be considered by the Construction Manager on a per project basis. When audible pedestrian indications are requested, they may be of the manufacturer and model number specified, and shall conform to the MUTCD.

Pedestrian push buttons shall be paid for on a unit price basis and shall include all labor, equipment and materials necessary to install the item complete-in-place. Pedestrian push buttons shall be paid for under the "Pedestrian Push Button" pay item.

When an audible pedestrian indication is requested and where this function is integrated within the pedestrian push button, the audible pedestrian indication costs shall be included in, as part of, the unit price of the pedestrian push button. Where the audible pedestrian indication function is not integrated within the pedestrian push button, audible pedestrian indications shall be paid for on a unit price basis and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.15 EMERGENCY VEHICLE DETECTION

Global Traffic Technologies (GTT) Opticom phase selectors and detectors shall be of the most current model, or as specified herein. Opticom Detectors shall be installed as specified in the plans and may include model numbers 711, 721, and/or 722. Opticom Phase Selectors may include model numbers 752 or 754 as specified in the plans.

Opticom phase selectors and detectors shall be paid for on a unit price basis based on quantities and model numbers and shall include all labor, equipment and materials necessary to install the item complete-in-place.

9.16 BONDING AND GROUNDING

Metallic cable sheaths, conduit, metal poles and pedestals shall be effectively grounded. Bonding and grounding jumpers shall be copper wire or copper strap of the same cross-sectional area, No. 8 AWG for all systems. Loop lead-in cable for loop detectors is to be grounded in controller cabinet only. The other end of the sheath is to be taped and left ungrounded.

Bonding of standards shall be by means of a bonding strap attached to a brass bolt or a 3/16 inch or larger brass or bronze bolt installed in the lower portion of the shaft.

The controller cabinet and each individual pole and/or pedestal shall be attached to its own separate ground electrode via #6 solid bare copper wire. The ground electrodes may be placed in the foundation of the item to be grounded or may be placed in an adjacent pull box located no more than 6-feet away from said foundation. Ground electrodes shall be a one piece copper weld rod of 5/8-inch diameter, 8-feet in length.

Grounding shall be incidental to the pay item for which it is associated.

Electrical service shall be installed as per NEC or as amended by the City. The grounding and bonding of services shall be completed in accordance with Article #250.

Electrical service shall be paid for on a unit price basis and shall include all labor, equipment and materials necessary to install the electrical service, complete-in-place.

9.17 FIELD TESTING

9.17.01 SIGNAL

Prior to completion of the work, the Contractor shall cause the following tests to be made on all traffic signals in the presence of the Construction Manager:

- Each circuit shall be tested for continuity.
- Each circuit shall be tested for grounds.

A functional test shall be made in which it is demonstrated that each and every part of the system functions as specified or intended herein. The functional test for the traffic signal installation shall consist of not less than fourteen (14) days of continuous, satisfactory operation following a three to five day mandatory flashing period, or other flash period as directed by the Construction Manager.

Testing for signals shall be incidental to the pay item for which signal testing is required.

9.17.02 FIBER

GUIDELINES

When fiber optic cable is installed, the fiber optic cable test shall consist of the testing for single mode fiber optic cable as installed. The testing procedures involve an Optical Power Meter Test and/or OTDR test.

The guidelines for fiber optic cable testing include:

Test jumpers and patch cords must be of the same fiber core size and connector type as the cable system:

- a. Single Mode fiber 8.3/125 μ m

The light source and OTDR must operate with the range of 1310 ± 10 nm or 1550 ± 20 nm for single mode testing in accordance with ANSI/EIA/TIA-526-7.

The power meter and the light source must be set to the same wavelength during testing.

The power meter must be calibrated and traceable to the National Institute of Standards and Technology (NIST).

All system connectors, adapters and jumpers must be cleaned as per manufacturer's instructions before measurements are taken.

Fiber optic cable testing shall be paid for on a lump sum basis and shall include all labor, equipment, and materials necessary to complete end-to-end, bidirectional testing of all fiber installed as part of the project, complete-in-place.

MATERIALS

The following fiber optic test equipment is required to perform fiber optic cable tests:

- An OTDR;
- A test reel, of at least 900 feet;
- A light source at the appropriate wavelength;
- Optical Power Measurement Equipment;
- Test Jumpers as specified

Single Mode Fiber Test Jumpers

- a. CPR Test Jumper-1 and Test Jumper-2 shall be 1-5 meters long with connectors compatible with the light source and power meter and have the same fiber construction as the link segment being tested.

FIBER TESTING WITH OTDR

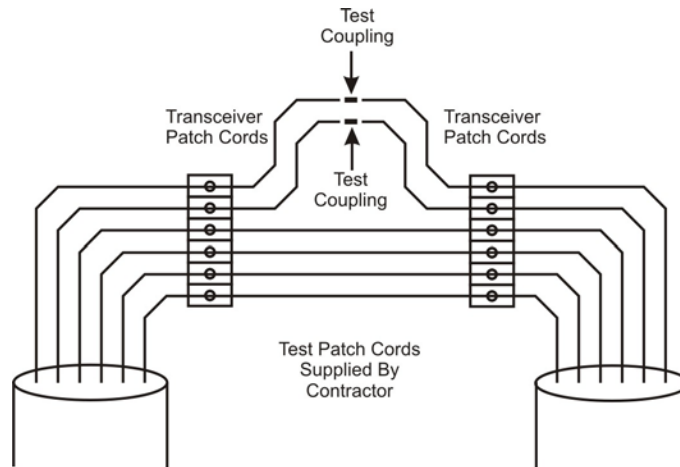
The Contractor shall perform an OTDR test of all fibers in all tubes on the reel, prior to installation of the fiber. The test results shall be supplied to the Construction Manager prior to installation of the cable.

If the fiber is specified as "Install Only", the Contractor shall test the fiber on the reel and provide the test results to the Construction Manager prior to accepting the cable. After installation, if there are unused portions of cable remaining on the reel, the Construction Manager may request the Contractor or other qualified technician to perform a reel test. The Contractor shall provide the Construction Manager the test results prior to delivering the cable to the Construction Manager. Any cable damaged while in the Contractor's possession shall be replaced at the Contractor's expense.

All fiber testing shall be performed on all fibers in the completed end-to-end system. Testing shall consist of a bi-directional end-to-end OTDR trace performed per TIA/EIA-455-61. The system margin loss measurements shall be provided at 1310 nm and 1550 nm for single mode fibers.

Segmented end-to-end testing shall not be less than 1 kilometer (1 mile). Patches for testing shall not exceed five (5).

If the plans require installation of a fiber optic patch panel, the Contractor shall supply patch cords to patch all terminated fibers through the panel for all fiber testing. If patch cords are specified in the plans for final equipment installation, these patch cords shall be connected using a test coupling for the end-to-end test.



OTDR readings will be used to ensure proper installation and to troubleshoot faults. OTDR signature traces will be used for documentation and maintenance. For fibers that are identified in the plans to be left unterminated, an OTDR shall be used to test end-to-end attenuation.

Loss numbers for the installed link shall be calculated by taking the sum of the bi-directional measurements and dividing that sum by two.

The Contractor shall use an OTDR that is capable of storing traces electronically and shall save each final trace.

To ensure the traces identify the end points of the fiber under test and the fiber designation, the Contractor shall use a test reel, if required, to eliminate the “dead zone” at the start of the trace so that the start of the fiber under test can be identified on the trace. Indicate the length of the test reel for all test results.

If the fiber designation is not indicated on the trace itself, the Contractor shall provide a cross-reference table between the stored trace file name and the fiber designation.

In compliance with EIA/TIA-455-61 “Measurement of Fiber or Cable Attenuation Using an OTDR” the Contractor shall record the following information during the test procedure:

- Names of personnel conducting the test.
- Type of test equipment used (manufacturer, model, serial number, calibration date).
- Date test is being performed.
- Optical source wavelength and spectral width.
- Fiber identification.

- Start and end point locations.
- Launch conditions.
- Method of calculation for the attenuation or attenuation coefficient.
- Acceptable link attenuation.

FIBER TESTING WITH OPTICAL POWER METER

When specifically requested in the project plans or project specials, the Contractor shall conduct an Optical Power Meter Test for each fiber installed.

Single mode segments shall be tested in one direction at both the 1310 nm and 1550 nm wavelengths.

In compliance with TIA/EIA-526-7 "Measurement of Optical Power Loss of Installed Single Mode Fiber Cable Plant," the following information shall be recorded during the test procedure:

- Names of personnel conducting the test.
- Type of test equipment used (manufacturer, model, serial number, calibration date).
- Date test is being performed.
- Optical source wavelength, spectral width, and for multimode, the coupled power ratio (CPR).
- Fiber identification.
- Start and end point locations.
- Test direction.
- Reference power measurement (when not using a power meter with a Relative Power Measurement Mode).
- Measured attenuation of the link segment.
- Acceptable link attenuation.

The minor attenuation differences due to test direction are on par with the accuracy and repeatability of the test method. Lateral segments within a building are limited to 90 meters. Therefore, attenuation differences caused by wavelength are insignificant, and as a result, single wavelength testing is sufficient.

ACCEPTABLE ATTENUATION VALUES

Acceptable attenuation values shall be calculated for each fiber tested. These values represent the maximum acceptable test values.

A connection is defined as the joint made by mating two fibers terminated with re-mateable connectors (e.g. ST, SC, LC).

The general attenuation equation for any single mode link segment is as follows:

- Acceptable Link Attenuation = Cable Attenuation + Connection Attenuation + Splice Attenuation
- 8.3 nm single mode attenuation coefficients:
 - a. Cable Attenuation = Cable Length (km) x (3.40 dB/km@1310 nm or 0.25 dB/km@1550 nm)
 - b. Connection Attenuation (ST or SC connectors) = (# of Connections x 0.39 dB). No more than 0.75 dB per connector.
 - c. Splice Attenuation (Mechanical or Fusion) = Splices x 0.20 dB

TEST ACCEPTANCE

The Contractor, solely at the Contractor's cost, shall remake any fusion splices that have test results exceeding acceptable attenuation values.

The Contractor, solely at the Contractor's cost, shall retest any fiber links that have been re-spliced.

The Contractor, solely at the Contractor's cost, shall bring any link not meeting the requirements of this specification into compliance.

SUBMITTALS

The Contractor shall submit test result documentation in electronic format.

After each reel test, the Contractor shall submit one electronic copy of the OTDR trace for every fiber on the reel. Appropriate software, to allow reading of the traces, shall be supplied to the Construction Manager at no cost to the City.

After installation, the Contractor shall submit one electronic copy of the OTDR trace for every spliced fiber. Appropriate software, to allow reading of the traces, shall be supplied to the Construction Manager at no cost to the City.

The Contractor shall submit one electronic copy of all Optical Power Meter Test results for every spliced fiber. Appropriate software, to allow reading of the results, shall be supplied to the Construction Manager at no cost to the City.

9.18 CONTROLLER AND CABINET

9.18.01 CONTROLLER AND CABINET INTRODUCTION

Each controller and cabinet shall be 100% compatible with the City's existing computerized signal system.

This specification sets forth the minimum requirements for a TS2 Type 1 traffic control modular cabinet assembly. The cabinet assembly shall meet, as a minimum, all applicable sections of the NEMA Standard Publication No. TS2-2003 v. 2.06. Where differences occur, this specification shall govern.

Unless otherwise called for in the plans or project specials, all controller cabinets shall be TS2 Type 1 "P" cabinets and shall meet or exceed Siemens EL712 cabinet specifications except for use at two phase pedestrian crossings and/or fire signals. Pedestrian crossing and fire signal controller cabinets shall be TS2 Type 1 "G" cabinets and shall meet or exceed Siemens EL760 cabinet specifications.

A controller shall consist of a complete electrical mechanism to control the operation of traffic control signals, including the timing mechanism and all necessary auxiliary equipment. Controllers shall be Siemens EPAC3108M52 TS2 Type 2 controllers. All equipment furnished shall be the manufacturers' latest, current production model, complete with all standard accessories, tested and delivered by domestic manufacture who is regularly engaged in the construction of such equipment. Each cabinet shall be furnished with full eight phase capability (loop amps, load switch, etc.) regardless of specific intersection design with the exception of mid-block and fire signals.

All electrical conduits running to the control cabinet shall enter from the bottom only, except as noted on the plans. No holes shall be drilled in any part of the cabinet other than the bottom, unless otherwise called for on the plans.

All controller cabinets and control equipment shall be factory wired, ready for operation. Contractor shall test cabinet and controller in his shop prior to installation. Field work will be limited to placing cabinets and equipment

and the connecting of field wiring to field terminal strips. All cabinet wiring shall be neat and firm.

Controller cabinets shall be furnished with all mounting hardware.

Power protection devices shall include the main AC+ power circuit breaker, radio interference suppressors, and lightning and surge protectors. These devices shall be in addition to any protective devices furnished with the controller and auxiliary equipment housed within the cabinet and shall be provided on the load side of the circuit breakers. All devices shall be mounted to the interior wall or the cabinet in the approved manner.

All controller cabinets shall be equipped for and wired for two Opticom card rack mounted Global Traffic Technologies (GTT) Model 752 phase selectors. The phase selector cards, field wiring, and detectors shall not be supplied, unless called for in the plans or project specials.

The controller cabinet shall be paid for on a lump sum basis and shall include all labor, equipment and materials necessary to install the item complete-in-place, including all cabinet accessories internal to the cabinet.

Where cabinets are designated as "Install Only" items, the Contractor shall be responsible for picking up the cabinet from the City of Commerce City Public Works location at 8602 Rosemary Street, or other designated location, bench-testing the cabinet, delivering the cabinet to the jobsite, and prepping and installing the cabinet per the plans and specifications.

Controllers and cabinets shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.18.02 CABINET DESIGN AND CONSTRUCTION

This specification sets forth requirements for a TS2, type 1 traffic control cabinet assembly. All applicable sections of the NEMA standard publication, TS2, shall also be incorporated by reference.

The cabinet shall be constructed of minimum, .125 inch thick, natural aluminum. When specified in the plans, the cabinet shall be powder coat painted Federal Green. The cabinet shall be of clean cut design and appearance having no sharp edges, corners or protrusions. All welds shall accomplish in a workman like manner, and shall be smooth, neatly formed and free of cracks, blowholes or other irregularities. The cabinet top shall slope downward toward the rear of the cabinet to prevent rain

accumulation. The main door of the cabinet shall occupy essentially the entire front and shall provide easy access to the interior. The door shall be fitted with a closed cell, neoprene gasket which shall fit tightly against a lip surrounding the door opening, such that entrance of moisture or dirt is prevented. The upper lip shall include a channel to prevent rain from entering the cabinet interior. The door shall be fitted with a strong, tumbler style lock, a three point latching mechanism and shall include a minimum 3/4" diameter handle, which shall include a hasp to allow the use of a padlock if desired. The door shall be hinged on its right side by means of a piano style hinge fabricated of non-corroding material. The main door shall be fitted with an automatically operating mechanism, capable of holding the door open at approximately 90, 125 and 150 degrees under windy conditions.

The roof of the cabinet shall incorporate an exhaust plenum and vent screen. The vent screen area shall face down to preclude entry of moisture.

The cabinet shall contain a ball bearing type, ventilating fan, having a minimum capacity of 100 CFM, controlled by a thermostat and shall include suitable dust filters for the capacity of the ventilating system. The thermostat shall be adjustable between 80 and 150 degrees Fahrenheit. The filters shall be of the dry type and easily replaced. Filters shall be located behind vent louvers located in the lower portion of the main door and shall be held securely in place.

The cabinet shall be equipped with a fluorescent light fixture located on the inside top of the cabinet, near the front edge. The fluorescent fixture shall accommodate a standard, FT15T12 lamp. The lamp shall be controlled by a door activated switch located near the top of the main cabinet door.

In addition to the main door of the controller cabinet, there shall be an auxiliary door provided in the main door with a lock and standardized police key. This auxiliary door shall incorporate a gasket seal in similar fashion to the main door. The panel behind the auxiliary police door shall contain two (2) switches to accomplish the following functions:

- (1) Change from normal operation to flashing, and vice versa.
- (2) Interrupt power to the signal heads.

Each cabinet shall include a terminal facility, which shall incorporate four major sub sections:

- Detector and communication interface terminal panel located on the cabinet left wall.
- Main terminal panel located on the cabinet rear wall.
- Power distribution panel located on the cabinet right wall.
- The detector terminal panel shall be fabricated of 0.125 inch aluminum and shall incorporate sufficient terminals for the connection of all incoming loop feeder cables, all pedestrian pushbutton wiring and all preemption detector field cables. All field connections shall terminate on pressure style terminal blocks rated at not less than 30 amps per circuit. A ground buss to facilitate the connection of feeder cable shield wires shall be provided adjacent to the field terminal strips. All detector connection wiring shall be terminated on this panel. A pressure style terminal block shall be included which shall serve as a termination point for all serial communication cables used to connect to the various components of the traffic controller system. There shall also be pressure style terminal block which shall serve as a termination and distribution point for all outputs from the cabinet power supply required to be connected to the detector racks. All terminals shall be permanently identified as to their circuit reference. All terminal blocks shall be "dead front" type.

All wiring between the detector loop terminal blocks and the detector rack assembly shall be color coded, twisted pairs. The detector loop terminal points associated with each detector rack shall be arranged in a single vertical row of 32 terminals on the detector panel. If multiple detector racks are required, then multiple, vertical rows of terminals shall be provided. The twisted pair connections to the detector racks shall terminate in a 37 pin "D" connector having a positive latch to ensure a reliable connection to the detector rack.

All internal cabinet serial data shall be carried on cables specifically designed for use with RS485 circuits, and all pairs shall be twisted and color coded. Cables shall be of sufficient length to allow rearrangement of the various components within the cabinet, but shall be coiled neatly to present a workman like appearance.

The main terminal facility panel which shall be located on the rear wall of the cabinet shall include wired socket positions for a flasher, load switches, flash transfer relays, controller I/O terminals and buss interface units (BIU's). It shall be fabricated of .125 brushed aluminum. Each

socket or terminal point shall be silk screened with its circuit reference identification.

The main terminal facility panel shall include pressure type terminal blocks, located horizontally along the lower edge for the connection of all field signal wiring. Immediately above the field hookup terminal blocks, a second series of terminal blocks shall provide a simple method of flash programming which shall involve only the use of simple hand tools. All connections between the field hook up terminal blocks and the flash program blocks shall be color coded, and the wiring diagram shall include clear instructions to facilitate the programming of flashing operation. Flash programming shall not involve any changes of the field signal wiring. All terminal blocks shall be clearly and permanently identified as to their function and circuit reference.

Terminal facility panels shall be available in four configurations, as prescribed by NEMA specification TS2, and described below. Configuration 4 shall be used for all City NEMA "P" cabinets. Configuration 1 shall be used for all City NEMA "G" cabinets.

- Configuration 1: 4 Load switch positions; 2 Flash transfer relay positions; 2 BIU positions; 1 Flasher position.
- Configuration 2: 8 Load switch positions; 4 Flash transfer relay positions; 2 BIU positions; 1 Flasher position.
- Configuration 3: 12 Load switch positions; 6 Flash transfer relay positions; 2 BIU positions; 1 Flasher position.
- Configuration 4: 16 Load switch positions; 8 Flash transfer relay positions; 2 BIU positions; 1 Flasher position.

A bracket or shelf extending at least half the length of the load switch or flasher shall support all load switch and flasher positions. All BIU positions shall be provided with rack style mounting with card edge guides for both the upper and lower edges of the BIU. Each BIU rack position shall have its address pins pre-wired to define the proper operation for each position, and to allow interchange of BIU's without the need for additional programming.

Each flash transfer relay position shall include an RC network, wired in parallel with the coil connection pins.

An expandable, braided, nylon mesh jacket to provide abrasion protection and to ensure a neat appearance of the assembly shall protect all cables within the cabinet assembly, except the serial data cables. All cables shall be securely fastened in place to provide strain relief.

All main terminal facility panels shall include connection cables to a Type 16 Malfunction Management Unit (MMU), as defined by NEMA specification TS2.

A power distribution panel shall be located on the right wall of the cabinet. The assembly shall contain provisions for the connection of the incoming AC service, a main cabinet circuit breaker, a radio interference line filter, lightning arrestor and a mercury buss relay to control the AC power to the signal heads. The lightning arrestor shall be EDCO model ACP-340. The mercury buss relay shall be of the normally open type, and shall have an RC network wired in parallel with its coil circuit. A neutral buss bar having a minimum of 13 positions shall be provided for easy connection of all signal neutral wiring.

The cabinet shall contain an internal test panel which shall contain a switch labeled "Stop Time – Run – Normal", to facilitate troubleshooting of the controller equipment. In the "Stop Time" position, all timing functions of the controller shall be suspended. The "Run" position shall allow the controller timing to operate without regard for the condition of any other devices within the cabinet. In the "Normal" position, the controller timing functions shall operate normally so long as all other equipment or switches are operating normally. Operation of flash switches or the detection of a fault by the MMU shall immediately apply a stop time input to the controller.

The test panel shall also contain a duplex convenience outlet, separately fused at 15 Amps, and wired directly to the AC input to the cabinet, such that power will be supplied to the outlet even with the main cabinet circuit breaker in its off position.

The cabinet shall include a cabinet power supply meeting the requirements of NEMA specification TS2. The power supply shall be completely enclosed in a brushed aluminum housing and shall be shelf mounted. It shall provide the following voltage and current outputs:

- +12 VDC +/- 1 VDC, 2.0 A
- +24 VDC +/- 1 VDC, 2.0 A
- 12 VAC, 0.25 A

Outputs shall be fused with slow blow fuses of the ratings indicated. AC power input shall be protected against over current with a 2 Amp slow blow fuse.

LED indicators on the front panel shall denote the presence of 12 VAC, 24 VDC and 12 VDC and the 60 Hz reference signal Test points for logic common and +24 VDC shall also be provided on the front panel.

The cabinet shall include a rack or racks for vehicle detector amplifiers.

9.18.03 TESTING AND WARRANTY

Testing

Each controller and cabinet assembly shall be tested as a complete entity under signal load for a minimum of 48 hours.

Each assembly shall be delivered with a signed document detailing the cabinet final tests performed.

The cabinet shall be assembled and tested by the controller manufacturer or authorized local distributor to ensure proper component integration and operation.

Warranty

The controller and Malfunction Management Unit shall be warranted by the manufacturer against mechanical and electrical defects for a minimum period of 2 years from date of shipment. The manufacturer's warranty shall be supplied in writing with each cabinet and controller. Second party extended warranties are not acceptable.

The cabinet assembly and all other components shall be warranted for a period of one year from date of shipment.

Any defects shall be corrected by the manufacturer or supplier at no cost to the owner.

9.19 ON-STREET MASTER CONTROLLER

A Siemens EPAC-380-M52 On-Street Master Controller shall be provided when called for in the plans and specifications and whenever a cabinet is designated as a master cabinet.

A telemetry interface harness and interface panel shall be supplied with each On-Street Master Controller for enabling of communications between the On-Street Master Controller with all associated local controllers.

The On-Street Master Controller shall include all required telemetry modules for communications to associated local controllers.

An external 56K Hayes-compatible dial-up modem, RJ11 phone jack, and modem cable shall be included and installed in the master cabinet when called for in the plans and specifications and whenever a cabinet is designated as a master cabinet.

The on-street master controller shall be paid for on a unit basis and shall include all labor, equipment and materials necessary to install the item complete-in-place, including all cabinet accessories internal to the cabinet.

9.20 TRAFFIC SIGNAL HEADS

All vehicular traffic signal heads shall be 100% polycarbonate, colored black, with black, detachable, tunnel visors. 12" Signal sections shall be used. Standard signal heads shall be Eagle Signal Corporation, McCain, or approved equal.

All pedestrian signal heads shall be single section, black, symbolized messages, and clam shell mounting. Standard pedestrian signal heads shall be as manufactured by Indicator Controls Corporation, or approved equal.

LED indications shall be furnished for all indications, with the exception of one side-of-pole red indication for each through movement approach, and unless defined otherwise in the plans, shall include red ball, yellow ball, green ball, arrow indications, and countdown pedestrian hand and walk-man indications. Pedestrian indications shall be of the "filled" type. Outlined hand and walk-man indications shall not be permitted.

Traffic LED indications shall meet the requirements of the latest version of the ITE Standards. Verification of LED adherence to ITE standards shall be through a 3rd party "Nationally Recognized Testing Laboratory (NRTL)" to demonstrate compliance to Section 6.3 (Production Tests & Inspections) of the latest ITE VTCSH Full Ball specification dated June 27th 2005 (for LED ball modules), and ITE VTCSH Arrow specifications dated July 1st 2007 (for LED arrow modules), and ITE PTCSI Pedestrian specification dated March 19th 2004 (for LED pedestrian combo or countdown modules). 3rd Party lab must have "Nationally Recognized Testing Laboratory (NRTL)" status. Proof of certification must be documented. Proof of certification must be presented when requested by the Construction Manager.

For side-of-pole indications requiring use of incandescent bulbs, and when incandescent bulbs are defined in the plans, traffic signal bulbs shall be General Electric, Durotest, Phillips, or approved equal. Incandescent

bulbs shall be approved for traffic signal use and shall be 116 watt, 130 volt.

All signal head locations shall be approved by the Construction Manager.

All back plates shall be installed on all mast arm mounted and/or span wire mounted traffic signal heads, black in color, and of the louvered design to allow wind passage. Back plates shall not be mounted on side-of-pole mounted traffic signal heads.

Astro-brac or Sky-brac type mounting hardware shall be used to attach all traffic signal heads mounted on mast arms. Refer to Detail 900-11 of these Standards and Specifications.

Industry standard span wire mounting hardware shall be used to attach the signal heads to both the span wire cable and messenger cable on a span wire type installation.

Side of pole traffic signal heads shall use industry standard side of pole hardware on both the top and bottom traffic signal head sections for mounting.

All Band-it material, including buckles, shall be $\frac{3}{4}$ " stainless steel.

During construction, traffic signal heads that have been installed but are not ready for actual electrical connection shall be bagged with a dark opaque material.

Signal and pedestrian heads shall be paid for on a unit price basis and shall include all labor, equipment and materials necessary to install the signal head, complete-in-place.

9.21 TRAFFIC SIGNAL POLES, MAST ARMS AND LUMINAIRE DAVITS

Traffic poles, mast arms, luminaire davits, decorative bases, and ancillary materials shall meet the requirements of the standard details, which indicate the critical dimensions that must be met exactly or within stated tolerances. The intent is to provide traffic poles that match the overall appearance as illustrated and meet the performance requirements of the details and these specifications. Supplier submittals shall be required and shall demonstrate conformity with Detail 900-15 of these Standards and Specifications.

Traffic signal pole foundations shall adhere to foundation standards as referenced in Detail 900-03 of these Standards and Specifications, and

Chapter 9, "Traffic Signals", Section 7.0, "Foundations", of these Standards and Specifications.

Traffic poles, mast arms, luminaire davits, and decorative bases shall be wrapped for shipping from the factory in heavy duty paper or plastic to protect them from scratches and abrasions in transit.

Traffic poles, mast arms, luminaire davits, and decorative bases shall be galvanized as per ASTM A123 and A153, then top coat painted. Top coat paint shall be Federal Green, Valmont specification F-283CL, or approved equal. Prior to the installation of traffic poles, mast arms, davits, and/or decorative bases, the Contractor shall wipe clean the outer surfaces. Following the installation of the traffic poles, mast arms, and/or luminaire davits, the Contractor shall touch up nicks and abrasions in conformance with manufacturer's recommendations.

Two hand holes shall be provided on each pole; one at the base, one flush hand hole behind the signal mast arm connection. The flush covers shall be flush with the base metal giving them a hidden appearance. A "J-hook" wire support shall be provided in each pole shaft above the hand hole behind the mast arm connection. One grounding attachment shall be provided in each pole shaft near the hand hole cover at the base of the pole.

When decorative bases are installed as part of the project, decorative bases shall be installed in conformance with the standard details.

When decorative bases are not installed as part of the project, anchor bolt nut covers shall be provided. A locking device shall be provided to prevent lifting or creeping of the anchor bolt nut covers.

Mast arm connecting bolts shall be of sufficient strength to conform to current AASHTO specifications.

All mast arm and pole shaft end openings shall be provided with set screw caps.

All welding shall conform to AWS D1.1 Sections 1 through 8 and shall be performed by welders certified in accordance with AWS code. All butt welds shall be ground flush with base metal to provide a uniform smooth finish.

Buy American Provision, all steel materials permanently incorporated into the work shall be certified to have been produced in the United States. All manufacturing processes for these materials must occur in the United States and be new domestic steel. Certifications that steel has been

manufactured in the United States shall be provided to the City by the manufacturer.

All materials shall be of the ASTM type as called for in this specification. Mill certifications shall be supplied for proof of compliance to these Specifications.

Valmont brand traffic signal poles, mast arms, luminaire davits, and decorative bases have been pre-approved to meet City specifications. Other brands must be approved by the Construction Manager prior to ordering the poles, mast arms, luminaire davits, and/or decorative bases.

Specialty signal poles, of nostalgia design or other, and which do not meet these specifications, shall only be installed with approval from the Construction Manager.

Traffic signal poles, mast arms, luminaire davits, and decorative bases shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.22 SPAN WIRE POLE

Span wire poles and cables shall be designated to meet the structural requirements given in the latest edition of "Standard Specifications for Structural Support for Highway Signs, Luminaires and Traffic Signals", published by AASHTO, for a wind velocity of 90 MPH. The minimum pole weights and span wire cable rating given in the standard details shall be increased as necessary in accordance with the AASHTO requirements.

Span wire pole foundations shall adhere to foundation standards as referenced in Detail 900-05 of these Standards and Specifications, and Chapter 9, Section 7.0, "Foundations", of these Standards and Specifications.

Span wire poles shall be galvanized as per ASTM A123 and A153, then top coat painted. Top coat paint shall be Federal Green, Valmont specification F-283CL, or approved equal.

Span wire poles may be seamless, or may be fabricated as one piece without transverse joints or welds and with only one longitudinal seam which shall be either continuously welded and ground, or rolled flush.

Span wire cable shall be seven wire stranded, common galvanized, and utilities grade. The cable shall have a minimum wire diameter of 3/8 inch,

and shall be rated at 13,000 pounds minimum. Tether cable shall have a minimum diameter of 3/8 inch and shall be stranded, galvanized steel.

Span wire poles shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

Span wire cable shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install both the span wire cable and tether cable complete-in-place.

9.23 PEDESTAL POLE

Pedestal poles shall be designed to meet the structural requirement given in the latest edition of "Standard Specifications for Structural Support for Highway Signs, Luminaires and Traffic Signals", published by AASHTO, for a wind velocity of 90 MPH. Unless modified by a structural analysis, the pole shall be Schedule 40 galvanized steel. The pole base shall be frangible.

Pedestal pole foundations shall adhere to foundation standards as referenced in Detail 900-09 of these Standards and Specifications, and Chapter 9, Section 7.0, "Foundations", of these Standards and Specifications.

The pedestal pole shall be hot dipped galvanized per ASTM A123 and A153, equivalent to 2 oz. per square foot, inside and out, then top coat painted. Top coat paint shall be Federal Green, Valmont specification F-283CL, or approved equal.

Pedestrian poles shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.24 PEDESTRIAN PUSH BUTTON POLE

Pedestrian push button pole shall be as illustrated in the standard details, constructed of Schedule 40 galvanized steel. Pole base shall be frangible.

Pedestal push button pole foundations shall adhere to foundation standards as referenced in Detail 900-09 of these Standards and Specifications and Chapter 9, Section 7.0, "Foundations", of these Standards and Specifications.

The pedestal push button pole shall be hot dipped galvanized per ASTM A123 and A153, equivalent to 2 oz. per square foot, inside and out, then top coat painted. Top coat paint shall be Federal Green, Valmont specification F-283CL, or approved equal.

Pedestrian push button poles shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.25 ILLUMINATED STREET NAME SIGNS

9.25.01 FLOURESCENT

Illuminated street name signs shall be florescent type, NAIM Series, as manufactured by NuArt Lighting Products. Approved equal shall be permitted when approved by the Construction Manager. Supplier submittals shall be required and shall demonstrate conformity with Detail 900-01 of these Standards and Specifications.

Illuminated street name signs housings shall be constructed of extruded aluminum with a minimum wall thickness of .078". All ferrous hardware parts shall be galvanized and cadmium plated.

The reflectors shall have a minimum reflectance of 85%.

Background sheeting shall be 3M brand DG3 reflective sheeting, series 4090T translucent white. Green transparent overlay film shall be colored Pantone 3435C, or approved equal. Sign panels shall be protected by overlay clear film and shall be 3M brand series 1150 clear. The sign colors shall not fade when exposed to an accelerated test of ultraviolet light equivalent to eight (8) years of outdoor exposure.

The entire surface of the sign panel shall be evenly illuminated. The average of brightness reading for the letters shall be 150 feet – lamberts minimum. The light transmission factor of the sign panel shall provide a letter-to-background brightness ratio between 10:1 and 20:1.

The sign ballasts shall be the high power factor type, single lamp, 200 MA, 120 Volt/60 cycle. There shall be a separate ballast for each fluorescent lamp. Fuses shall be miniature slow-blowing type, with a separate fuse provided for each ballast. Fluorescent lamps shall meet ANSI Standard C78. One lamp holder for each lamp shall be the spring loaded type. The entire sign and its components shall operate over a temperature range of -30 degrees F. to +160 degrees F.

Terminal blocks shall be molded, phenolic, barrier type rated at 15 ampere, 1000 V and shall have waterproof marking strips. No wiring splices will be permitted within the sign without the permission of the Construction Manager or his designee.

Illuminated street name signs shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.25.02 LED/OTHER

LED or other type illuminated street name signs shall only be used where specified in the plans and specifications and may be considered by the Construction Manager on a per project basis. When specified in the project plans and/or specifications, LED or other type illuminated street name signs shall be of the manufacturer and model number as specified.

9.26 BLANK OUT REGULATORY/WARNING SIGNS

Blank out regulatory or warning sign housings shall be constructed of aluminum unless directed otherwise by the Construction Manager. All ferrous hardware parts shall be galvanized cadmium plated, or stainless steel. Supplier submittals shall be required and shall demonstrate conformity with Detail 900-02 of these Standards and Specifications.

Blank out regulatory or warning signs shall be of LED type.

The cabinet interior and circuit connections shall be readily accessible via hinged doors or removable panels. The lens panel shall be removable without the use of tools.

The sign color shall not fade when exposed to an accelerated test of ultraviolet light equivalent to five years of outdoor exposure.

The entire surface of the sign panel shall be evenly illuminated. All messages shall be clearly legible attracting attention under any lighting conditions for an advance distance of at least 500 feet. When illuminated, the sign shall be visible anywhere within the approximately a 60 degree cone centered about the optic axis.

The sign panel shall completely blank out when not energized.

Terminal blocks shall be molded, phenolic, barrier type rated at 15 ampere, 1000 V and shall have waterproof marking strips. No wiring

splices will be permitted within the sign without the permission of the Construction Manager.

The overall weight of the complete sign assembly including mounting hardware shall not exceed 90 lbs.

Blank out regulatory/warning signs shall be measured and paid for per unit count and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.27 SCHOOL FLASHING BEACON ASSEMBLY

School flasher beacon assemblies shall be Type 1 or Type 2 as defined in the project plans and shall be as shown in the standard Detail 900-04 of these Standards and Specifications.

Type 1 school flasher beacon assemblies shall incorporate a speed radar sign. The speed radar sign shall be model RU2 Fast 250 as supplied by RU2 Systems, Inc. or approved equivalent.

LED indications shall be furnished for all indications. For solar installations, LED indications shall be 12V type.

School flasher LED indications shall meet the requirements of the latest version of the ITE Standards. Verification of LED adherence to ITE standards shall be through a 3rd party "Nationally Recognized Testing Laboratory (NRTL)" to demonstrate compliance to Section 6.3 (Production Tests & Inspections) of the latest ITE VTCSH Full Ball specification dated June 27th 2005. 3rd Party lab must have "Nationally Recognized Testing Laboratory (NRTL)" status. Proof of certification must be documented. Proof of certification must be presented when requested by the Construction Manager.

Front mount school flashing beacon assembly signal heads shall flash alternately.

Each school flasher beacon assembly shall include a NEMA Type 4, natural aluminum enclosure for housing the associated time clock unit and electrical connections. When solar power is used in conjunction with the school flashing beacon assembly, the NEMA Type 4 enclosure shall be of sufficient size to house all associated solar power equipment, including the battery(s).

The NEMA Type 4 enclosure shall be lockable and provided with a treasury type lock Corbin number R357SGS, or exact equivalent.

A time clock, RTC model number AP21T, or approved equal shall be incorporated in the school flashing beacon assembly NEMA Type 4 enclosure.

Terminal blocks shall be molded, phenolic, barrier type rated at 15 ampere, 1000 V. No wiring splices will be permitted within the school flasher beacon assembly or NEMA Type 4 enclosure without the permission of the Construction Manager.

For 120VAC installations, a main circuit breaker shall be installed in the NEMA Type 4 enclosure between the service feed and school flashing beacon assembly electronics. Fuse(s) in place of the circuit breaker shall not be permitted. A main circuit breaker shall not be required for solar type installations.

For 120VAC installations, a 120VAC receptacle shall be installed within the NEMA Type 4 enclosure.

School flashing beacon assemblies shall be paid for on a unit price basis and shall include all labor, equipment, materials, and electrical service connections necessary to install a school flashing beacon assembly, complete-in-place, on a single pole.

9.28 WARNING OR REGULATORY SIGN FLASHING BEACON ASSEMBLY

A warning or regulatory sign flashing beacon assembly shall be as shown in the standard Detail 900-14 of these Standards and Specifications.

LED indications shall be furnished for all indications. For solar installations LED indications shall 12V type.

Warning or regulatory sign flashing beacon assembly LED indications shall meet the requirements of the latest version of the ITE Standards. Verification of LED adherence to ITE standards shall be through a 3rd party "Nationally Recognized Testing Laboratory (NRTL)" to demonstrate compliance to Section 6.3 (Production Tests & Inspections) of the latest ITE VTCSH Full Ball specification dated June 27th 2005. 3rd Party lab must have "Nationally Recognized Testing Laboratory (NRTL)" status. Proof of certification must be documented. Proof of certification must be presented when requested by the Construction Manager.

Front mount warning or regulatory sign flashing beacon assembly signal heads shall flash simultaneously.

All terminations shall be made on a terminal block located within the signal head. Terminal blocks shall be molded, phenolic, barrier type rated at 15 ampere, 1000 V. No wiring splices will be permitted within the warning or regulatory sign flashing beacon assembly without the permission of the Construction Manager.

Warning or regulatory sign flashing beacon assemblies shall be paid for on a unit price basis and shall include all labor, equipment, materials, and electrical service connections necessary to install a warning or regulatory sign flashing beacon assembly, complete-in-place, on a single pole.

9.29 SOLAR POWER SYSTEM

The solar power system shall be of sufficient size to adequately support the power requirements of the attached equipment year round.

The solar power system shall incorporate a solid-state solar controller including a high output solar regulator and low voltage disconnect.

The solar power system shall operate on input voltages ranging from 11.5 VDC to 25 VDC.

The solar regulator's minimum rating shall be 25A at 12 VDC, temperature compensation.

The solar panel position shall be field settable to the correct degree required at the location.

The solar system shall use automatic night dimming to conserve power.

The solar power system shall include all labor, equipment, and materials necessary to install a solar power system, complete-in-place, on a single pole.

9.30 UNINTERRUPTABLE POWER SUPPLY (UPS)

9.30.01 GENERAL

A UPS shall be incorporated in all new traffic signals and where otherwise specified in the plans and project specials. Approved manufacturers include Alpha, Clary, Econolite, Myers, PSI, and Signal Sense, and shall meet or exceed these specifications.

The UPS shall be installed per manufacturer's specifications.

Programming software and manuals shall be supplied with each UPS and shall become the property of the City at the completion of the project.

A UPS shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.30.02 CABINET

All UPS equipment, including the UPS, batteries, all related equipment, and cabling, shall be housed within a single cabinet other than the standard traffic signal cabinet. These cabinets, pony cabinets, shall be directly mountable on either exterior sidewall of the traffic signal cabinet.

Cabinets which only house a portion of the equipment shall not be permitted.

The pony cabinet's finish shall match with the controller cabinet, natural aluminum or powder coat painted Federal Green.

The pony cabinet shall be sized to attach to either exterior sidewall of the traffic signal NEMA "P" Cabinet as specified in these specifications.

All UPS components shall be rated for use in the pony cabinet provided.

9.30.03 OPERATIONAL SPECIFICATIONS

Power Input/Output

- Use 120VAC, 60 Hz, single phase source input.
- Provide for input surge suppression.
- Output a single phase pure AC sine-wave regulated at 120VAC ($\pm 3\%$), 60Hz.
- Be capable of operating in the voltage range of 85VAC to 135VAC without using the batteries.
- Be of double-conversion/true on-line, or line interactive design.
 - Double Conversion/True On-Line:
As a double conversion/true on-line design, the UPS unit shall be in an always on condition continuously monitoring the input and shall provide continuous frequency and voltage regulation at the output. Upon loss of utility power, the UPS shall transfer to battery

mode in 0ms. No transfer time shall be experienced when transitioning to full UPS operation.

- Line Interactive:
As a line interactive design, the UPS unit shall be in an always on condition continuously monitoring the input voltage; regulating the output voltage when utility power falls out of tolerances. Upon loss of utility power, the UPS shall transfer to full UPS operation in <5ms.
- Be installed in series with the utility power such that the UPS powers the entire traffic signal cabinet and all associated equipment.

Run Time

- Provide for full signal operation at an average of 700 Watts for a minimum of one hour, with additional minimum flash time of two hours.
- Provide for user definable full run time settings to define full run time prior to the UPS transitioning to flash operation.
- Provide for user definable battery level flash settings by which the user can change battery level flash settings.
- Remain in, or automatically transition to flash operation, when utility power fails and the UPS battery levels are below, or fall below, the user defined battery level flash settings.
- Restore the signal to full operation any time utility power is restored or power is supplied via the generator receptacle.
- Include a low battery cutout to prevent critical discharge of, and damage to, the UPS batteries.
- Provide a battery recharge of 95% within eight hours.

Indications, Alarms, Faults

- Provide a means by which the user can accurately check the battery charge level, and UPS load level.
- Provide indications which display the current condition of the UPS including the presence or absence of a critical UPS fault, and the presence or absence of utility power.
- Provide an automatic bypass by which the UPS unit is bypassed and runs off utility power if a critical internal UPS fault occurs.

- Provide a single dry contact relay output and alarm trigger with user definable trigger options to notify the owner of critical events and/or failures to include:
 - UPS critical fault
 - Loss of utility power input
 - Low battery condition

Switches, Ports, Receptacles, Controls

- Provide a bypass switch by which the user can manually bypass the UPS and power the signal via utility power. This feature is to be used in the case of UPS failure and/or the need for UPS maintenance or repair procedures.
- Include a generator receptacle accessible via the exterior of the traffic signal cabinet and UPS cabinet.
- Provide automatic sensing of generator power. The UPS shall be configured such that the UPS provides regulated 120VAC, 60 Hz, single phase output power to run the signal in full operation and recharges the UPS batteries while under generator power. The UPS shall be configured to run the signal in full operation regardless of the UPS's battery charge level.
- The UPS unit shall automatically sense when generator power is applied, and when generator power fails. When generator power is applied, the UPS unit shall be configured such that it automatically reverts to generator power.
- When generator power fails (generator power falls outside of acceptable signal tolerances), the UPS unit shall be configured such that it automatically reverts back to either utility power or UPS battery power respectively based upon the availability at the time.
- Provide all required software and cabling for local UPS management.
- Provide options and solutions for networked remote monitoring and management of the UPS through an Ethernet switch and/or other networking device.

Hardware, Software, Cabling

All UPS units shall include all components, hardware, cabling, installation manuals, and software required for complete installation, operation, programming, monitoring, and maintenance of the UPS system.

Warranty

All proposed UPS equipment shall be warranted for a period of two years by the manufacturer.

9.31 CLOSED-CIRCUIT TELEVISION (CCTV)

9.31.01 CCTV CAMERA

CCTV cameras shall be installed where indicated on the project plans or as otherwise directed by the Construction Manager. Mounting height shall be at the direction of the Construction Manager.

Each CCTV cameras shall be Panasonic model number WVCS954 and shall include a Panasonic POD9CW outdoor housing and Panasonic PAM3 pole mount adapter. Approved equals shall be acceptable as approved by the Construction Manager.

CCTV camera power supplies shall be Altronix model number T2428100C, or approved equal. The power supply input shall be rated for 115VAC 50/60 Hz, .95 Amps. The power supply output shall be rated for 24VAC @ 4 Amps or 28VAC @ 3.5 Amps. An inline fuse shall be provided and rated @ 3.5 Amps/250V.

Composite cable, as supplied by MSN Communications (303-347-8303), shall be installed, shall be of adequate length to reach between the associated communications equipment and CCTV camera, and shall include molded connectors that mate with those of the camera. Composite cable shall include coax cable, communications cable, power cable, and other cables as required for full camera operability.

CCTV camera control shall be established via RS-485 data communications. Multiplex-coaxial communications shall not be permitted.

Communications equipment for both video and data communications shall be defined in the project plans or project specials, and shall adhere to their independent specifications as defined in these Standards and Specifications.

The CCTV camera power supply, and associated communications equipment, shall be shelf mounted or rail mounted within the traffic signal cabinet. When specified in the project plans or project specials, or at the direction of the Construction Manager, a separate NEMA 3R or NEMA 4

enclosure shall be installed, shall be of adequate size, and shall house the CCTV camera power supply, communications equipment, and all cable connections.

CCTV cameras shall be measured by the units installed and shall include all labor, equipment, and materials including, but not limited to, the CCTV camera, power supply, composite cable, necessary to install the item complete-in-place.

9.31.02 ENCODER/DECODER

A video Encoder/Decoder shall be required whenever the CCTV camera video and/or data communications are being routed via an Ethernet Managed Switch.

Encoder/Decoder shall be Pelco Net300 series, or approved equal, and shall, at minimum, meet the specifications as defined.

Internet communications shall support RTP, RTCP, UDP, IP, HTTP, SNMP, IGMP, ICMP, and ARP.

Video coding shall support MPEG-4.

Encoder/Decoder shall provide for one BNC, PAL/NTSC, 75 Ohm, 1V Peak-To-Peak input/output, one RS-232/RS-422/RS-485, bidirectional, 9-pin, D-Sub data port, one dry contact alarm input, one dry contact alarm output, and one LAN 10/100 BaseT, auto sensing port.

Encoder/Decoder shall support PAL and NTSC formats with image sizing as defined. For PAL format, 704 x 576 pixels @ 4CIF, 704 x 288 pixels @ 2CIF, and 352 x 288 pixels @ CIF. For NTSC format, 704 x 480 pixels @ 4CIF, 704 x 240 pixels @ 2CIF, and 352 x 240 pixels @ CIF.

Encoder/Decoder shall be user programmable via Internet Explorer. The user shall be able to program, communication parameters, maximum bandwidth rates, frame skip rates, point-to-point,/unicast/multicast modes and associated parameters, and security settings.

Encoder/Decoder shall support variable video frame rates of up to 30 frames per second.

Encoder/Decoder shall be rated for operation at temperatures of 32 degrees F to 122 degrees F, with an 80% max relative humidity, non-condensing.

Unless otherwise specified, the Contractor shall be responsible for proper programming, setup, and testing of the Encoder/Decoder. At the City's discretion, the City may opt to have their Maintenance Contractor or other third party complete Encoder/Decoder, setup, and/or testing. When the City's Maintenance Contractor or other third party is enlisted for programming, setup, and/or testing of the Encoder/Decoder, associated costs for the Maintenance Contractor or third party labor shall be the responsibility of the City.

Encoder/Decoders shall be measured by the paired units installed (Encoder & Decoder) and shall include all labor, equipment, and materials necessary to install the item complete-in-place.

9.32 MISCELLANEOUS HARDWARE

All ferrous mounting hardware and weatherheads shall be galvanized, cadmium plated, or made of stainless steel to resist corrosion.

Payment for these items shall be incidental to the pay item to which the miscellaneous hardware item is attached.

9.33 MAINTENANCE AND EMERGENCY REPAIR DURING CONSTRUCTION

During the construction, reconstruction, fourteen-day test period, and until signal acceptance by the City, the Contractor shall maintain the system or systems on a 24 hour basis. The cost of any maintenance necessary except electrical energy, and maintenance due to damage by public traffic, shall not be paid for separately but shall be included in the cost of the work.

Acceptance by the City of the work performed by the Contractor shall only take place after all punch list items have been satisfactorily completed and inspected by the City.

The Contractor shall provide the Construction Manager with a 24 hour one call phone number for reporting of any and all signal malfunctions. Fees incurred for such service shall not be paid for separately but shall be included in the cost of the work.

All malfunctions of a controller and its accessory equipment shall be considered an emergency unless otherwise identified by the City. Equipment malfunctions and/or damage, which in the opinion of the Construction Manager or other City authorized person, constitutes a serious hazard or inconvenience to the public, shall be considered an

emergency. The Contractor shall undertake emergency repairs no later than one (1) hour after the City notifies the Contractor of the emergency.

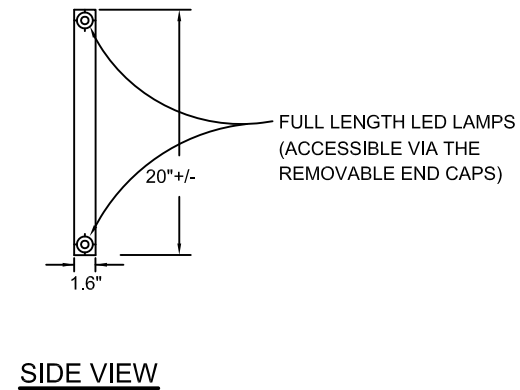
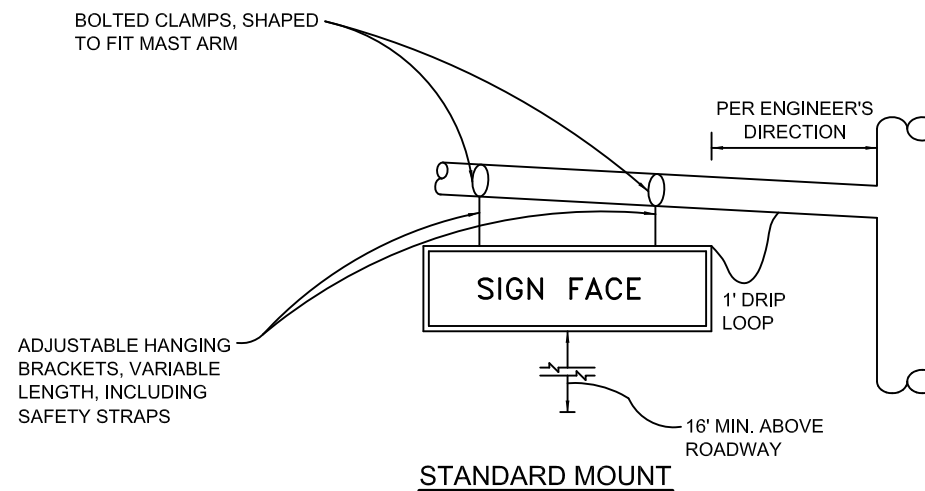
Malfunctions of a controller and its accessory equipment, which are identified by the Construction Manager or other City authorized person, as non-emergency repairs shall be considered non-emergency. The Contractor shall undertake non-emergency repairs no later than 24 hours after the City notifies the Contractor of the non-emergency.

If the Contractor fails to respond within the defined response time, the Construction Manager may elect to employ the services of the City's designated Traffic Signal Maintenance Contractor to perform the said maintenance work. In such cases, the Contractor shall reimburse the City for labor, equipment, and material charges associated with the utilization of the City's designated Traffic Signal Maintenance Contractor.

9.34 MOBILIZATION

This work shall consist of the mobilization of personnel, equipment and supplies at the project site in preparation for work on the project. This item shall also include costs incurred for labor and operations which must be performed prior to beginning the other items under the Contract.

Mobilization shall be paid for on a lump sum basis.

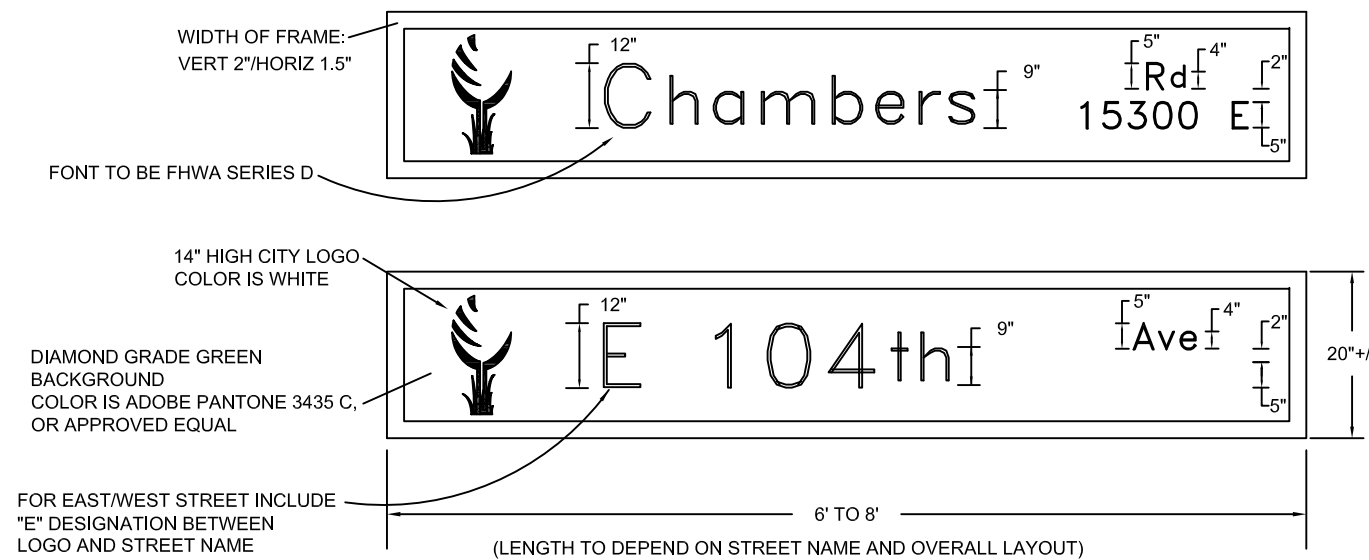


NOTES

1. FINAL SIGN LAYOUT AND LETTERING DETAILS PER PROJECT MANAGER'S DIRECTION.
2. SIGN TO BE DOUBLE SIDED WITH WHITE PRINT ON GREEN BACKGROUND FOR STREET NAME AND LOGO.

GENERAL NOTES

1. STREET NAME SIGN TO BE FREE-SWINGING OR LIMITED-SWINGING. SIGN FIXTURE AND PANELS SHALL WITHSTAND 90 MPH WIND LOADING, WITH STRUCTURAL REQUIREMENTS MEETING AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS," LATEST EDITION.
2. HOUSING TO BE CONSTRUCTED OF ALUMINUM.
3. NEOPRENE GASKETS SHALL BE INSTALLED BETWEEN THE SIGN PANEL FRAME AND FIXTURE HOUSING TO PREVENT WATER ENTRANCE. SCREENED WEEP HOLES SHALL BE PROVIDED ON HOUSING BOTTOM FOR DRAINAGE.




ILLUMINATED SIGN TYPICAL LAYOUT

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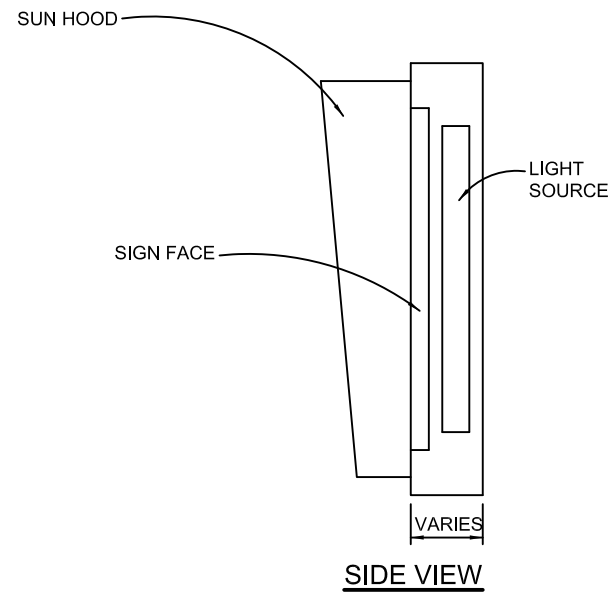
APPROVAL	
<i>Maria R. Fisher</i> CITY ENGINEER	05-27-16 DATE



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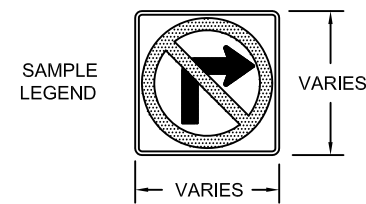
ILLUMINATED STREET NAME SIGN
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. 900-01
Sheet No. 1 of 1



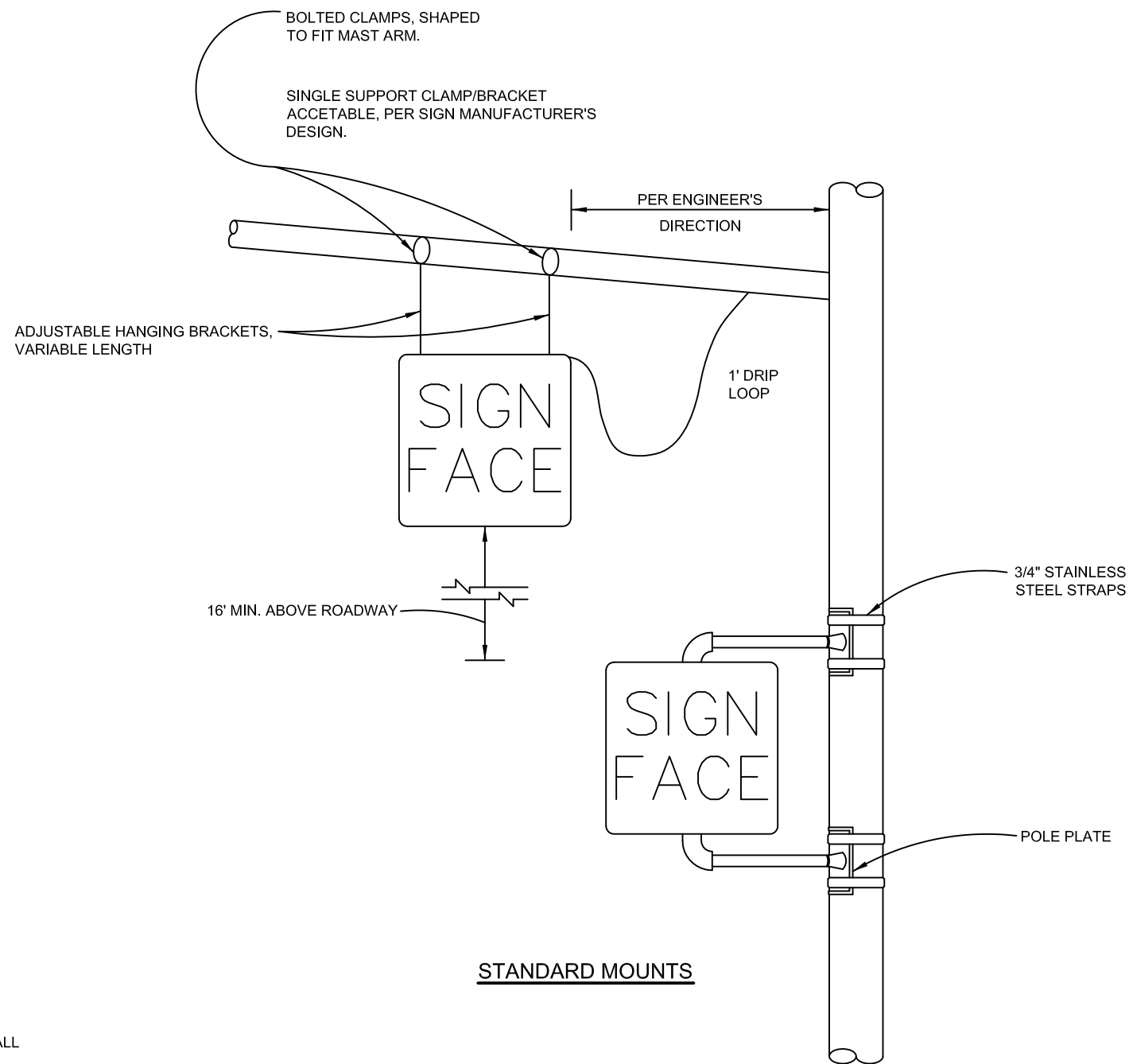
NOTES

1. SIGN MAY BE SINGLE-SIDED OR DOUBLE SIDED PER ENGINEER'S DIRECTION.
2. SIGN COLOR, LEGEND AND SIZE PER ENGINEER DIRECTION.



NOTES

1. LIGHT SOURCE SHALL BE LED. SIGN FACE SHALL COMPLETELY BLANK OUT WHEN NOT ENERGIZED.
2. CABINET INTERIOR AND CIRCUIT CONNECTIONS SHALL BE READILY ACCESSIBLE VIA HINGED DOORS OR REMOVABLE PANELS. THE LENS PANEL SHALL BE REMOVABLE WITHOUT THE USE OF TOOLS.




GENERAL NOTES

1. SIGN FIXTURE AND PANELS SHALL WITHSTAND 90 MPH WIND LOADING, WITH STRUCTURAL REQUIREMENTS MEETING AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS," LATEST EDITION.
2. HOUSING SHALL BE CONSTRUCTED OF ALUMINUM UNLESS OTHERWISE DIRECTED BY ENGINEER.
3. NEOPRENE GASKETS SHALL BE INSTALLED BETWEEN THE SIGN PANEL AND FIXTURE HOUSING TO PREVENT WATER ENTRANCE. SCREENED WEEP HOLES SHALL BE PROVIDED ON HOUSING BOTTOM FOR DRAINAGE.

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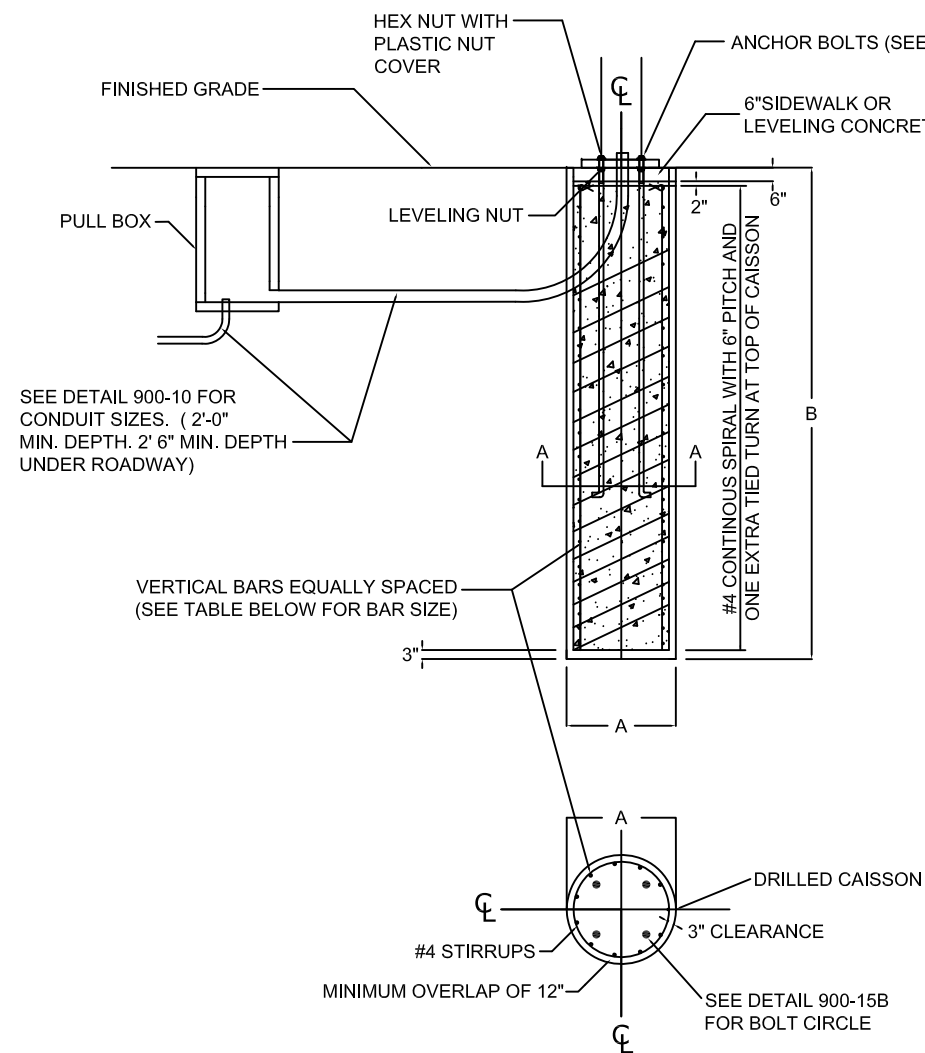


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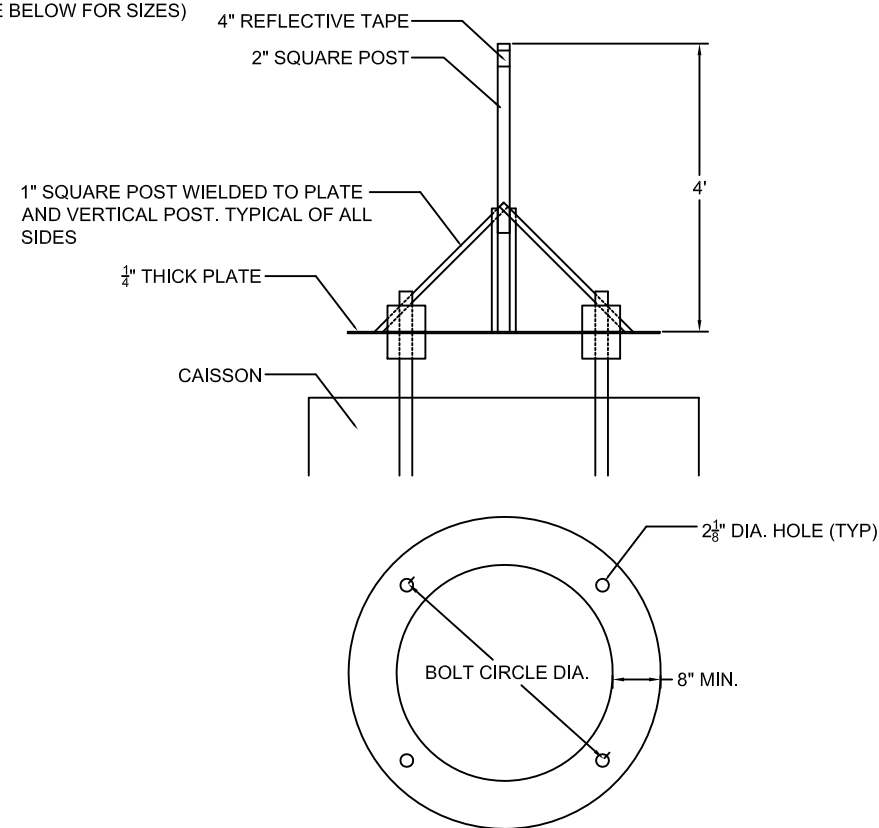
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REGULATORY WARNING SIGN
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. 900-02
Sheet No. 1 of 1



TRAFFIC SIGNAL POLE CAISSON FOR MAST ARM POLES



BOLT PROTECTION AT FUTURE SIGNAL POLE LOCATIONS

CAISSON DATA (FOR SINGLE AND DOUBLE ARM INSTALLATION)				
DIAMETER (IN.) (A)	DEPTH (FT.) (B)	MAST ARM LENGTH. (FT)	VERTICAL BARS	ANCHOR BOLTS (D)
36	10.0	UP THRU 35	11 - #9	4 - 1.75"
42	14.0	40 THRU 55	14 - #9	4 - 1.75"
48	18.0	60 THRU 75	18 - #9	4 - 2"

GENERAL NOTES

1. CONCRETE CLASS AS PER THE COLORADO DEPT. OF TRANSPORTATION. REINFORCED STEEL: PER AASHTO M31 SPECIFICATION, GRADE 60 FOR #9, #5 & #4 BARS.
2. SHAFT FOR CONCRETE FOUNDATION TO BE DRILLED BY MECHANICAL AUGER. CASING, IF USED IN PLACING CONCRETE, SHALL BE REMOVED UPON COMPLETING POUR.
3. FOUNDATION DESIGN REQUIRES THAT THE SHAFT BE FOUNDED IN COMPACT SAND, CLAY, OR SANDY CLAY. THE ALLOWABLE SAFE LATERAL BEARING CAPACITY OF SOIL (AROUND SHAFT) TO BE 1,300 LBS./SQ. FT. MINIMUM AT DEPTH OF 4.0 FT. BELOW TOP OF FOUNDATION. THE AVERAGE FRICTIONAL RESISTANCE OF THE SOIL (AROUND THE SHAFT) TO BE 460 LBS./SQ. FT. MINIMUM ALLOWABLE UNDER WIND LOADING (TORSION). IF THE SOIL INVESTIGATION (CONDUCTED PRIOR TO CONSTRUCTION) INDICATES THE ABOVE NOTED REQUIREMENTS CANNOT BE MET, OR IF "EXPANSIVE" SOIL IS AN EXISTING PROBLEM, THEN THE FOUNDATION DESIGN SHOWN WILL HAVE TO BE MODIFIED AND APPROVED BY THE ENGINEER.
4. SHOULD ROCK BE ENCOUNTERED, THE SHAFT SHOULD EXTEND 6 FT. MINIMUM INTO ROCK. THE ALLOWABLE SAFE LATERAL BEARING CAPACITY OF ROCK TO BE 4,300 LBS./SQ. FT. THE SOIL (INCLUDING ROCK) SURROUNDING THE SHAFT SHOULD BE INVESTIGATED TO ENSURE IT WILL RESIST THE TORSIONAL MOMENT OF 93,435 FT. LBS.
5. CONCRETE SHALL BE POURED IN LIFTS NOT EXCEEDING 3 FEET IN DEPTH. AT THE POURING OF EACH LIFT, CONCRETE SHALL BE MECHANICALLY VIBRATED TO REMOVE AIR POCKETS.
6. FOUNDATIONS SHOULD BE POURED 10 TO 20 DAYS IN ADVANCE OF POLE INSTALLATION. SEE PROJECT SPECIAL PROVISIONS FOR SPECIFIC DIRECTIONS.
7. WHEN AMBIENT TEMPERATURE IS BELOW 40 F. POURED FOUNDATIONS SHALL BE COVERED WITH BLANKETS AND/OR STRAW PER DIRECTIONS OF THE ENGINEER.

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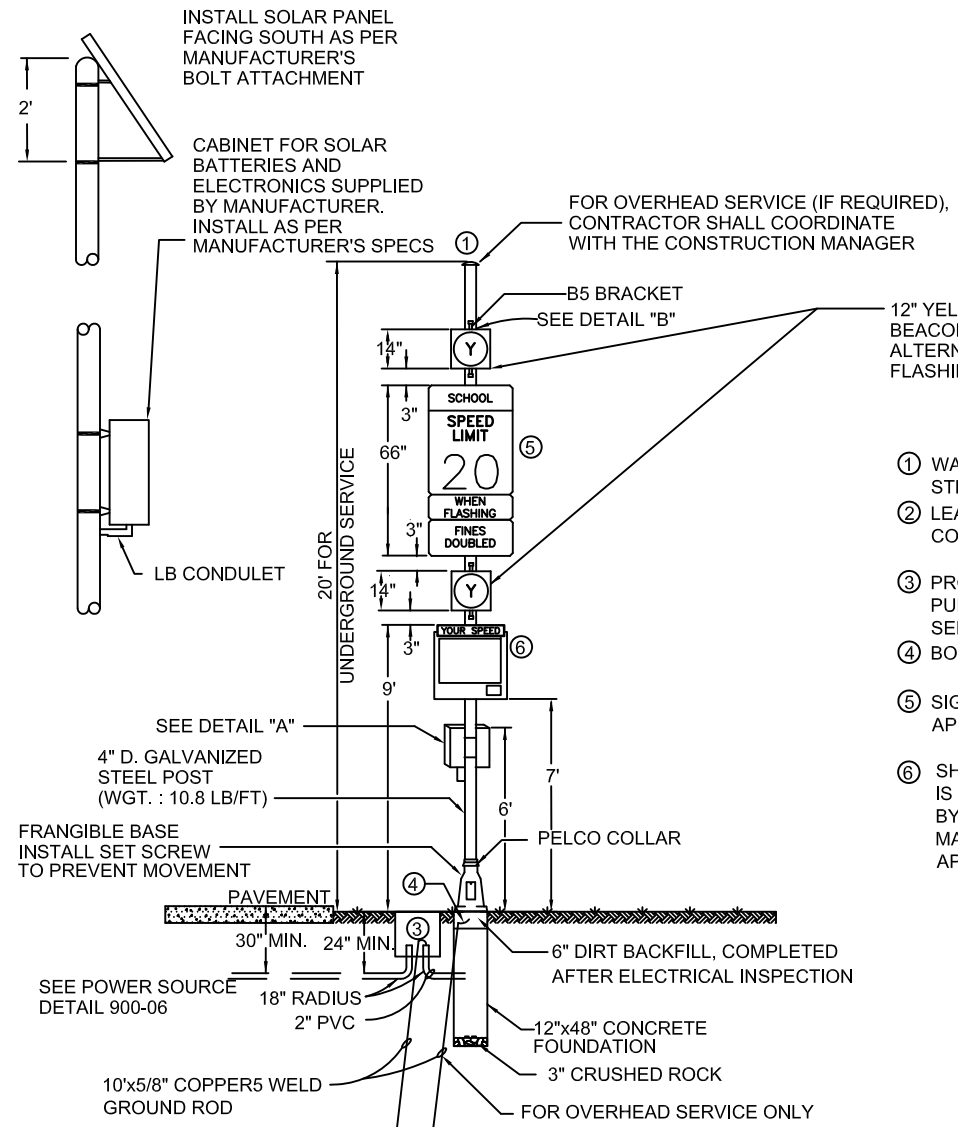
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	05-27-16
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MAST ARM POLE FOUNDATIONS
 ENGINEERING CONSTRUCTION STANDARDS

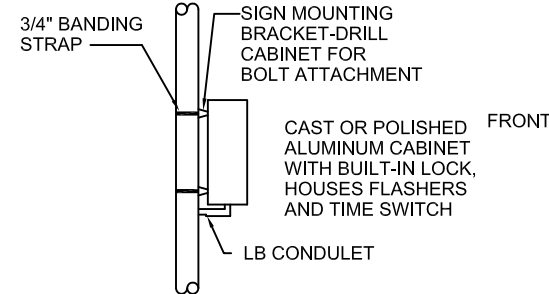
DETAIL NO. 900-03
Sheet No. 1 of 1

OPTIONAL SOLAR PANEL

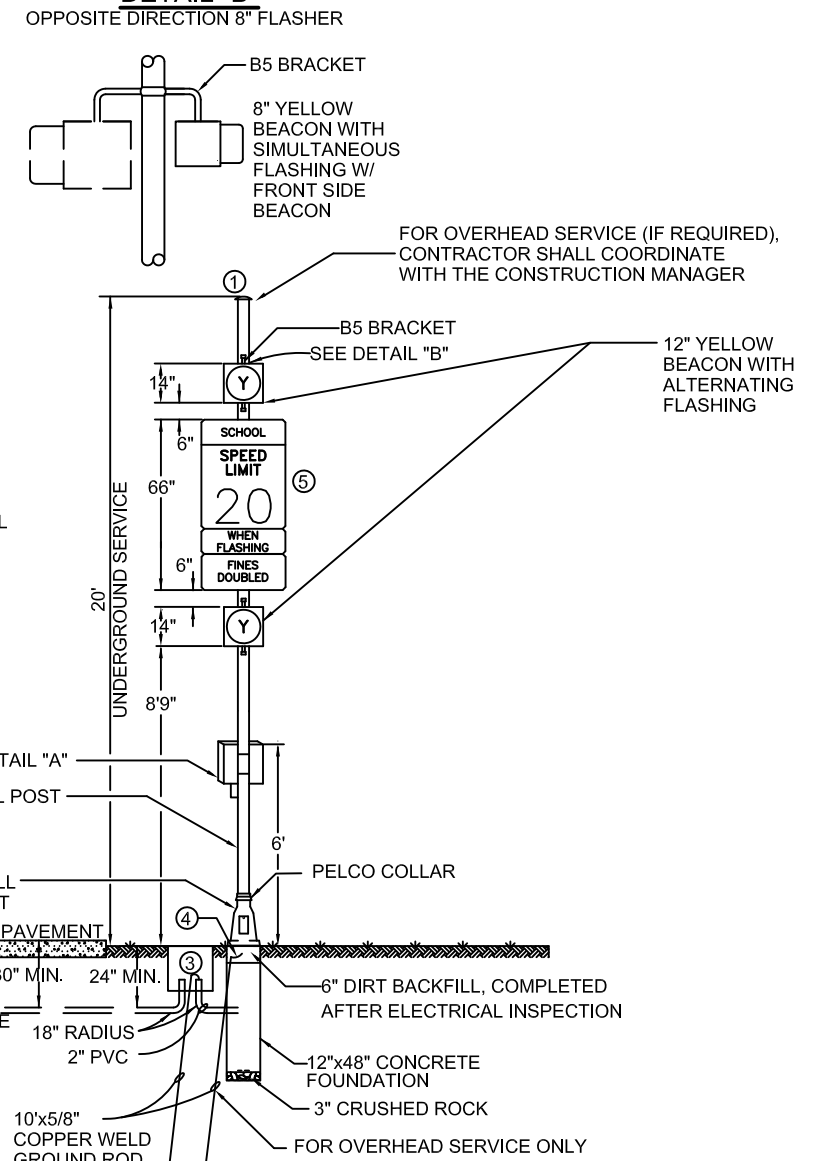


SCHOOL FLASHING BEACON ASSEMBLY
TYPE 1

DETAIL "A"



DETAIL "B"



SCHOOL FLASHING BEACON ASSEMBLY
TYPE 2

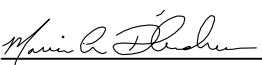
- NOTES**
- 1 WATERTIGHT GALVANIZED STEEL POLE CAP
 - 2 LEAVE 8' COILED WIRE FOR UTILITY COMPANY CONNECTION
 - 3 PROVIDE CONDUIT AND TYPE III PULL BOX FOR UNDERGROUND SERVICE ONLY
 - 4 BONDING STRAP IN BACKFILL
 - 5 SIGN ASSEMBLY LAYOUT TO BE APPROVED BY THE CITY
 - 6 SHOWN RADAR SPEED DISPLAY SIGN IS MODEL RU2 FAST 250 SUPPLIED BY RU2 SYSTEM, INC. 877-9829-5237. MAY BE SUBSTITUTED BY A CITY APPROVED ALTERNATIVE.


FLASHING BEACONS

ALL FLASHING BEACONS SHALL BE POLYCARBONATE WITH TUNNEL VISORS AND BLACK HOUSINGS

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	05-27-16
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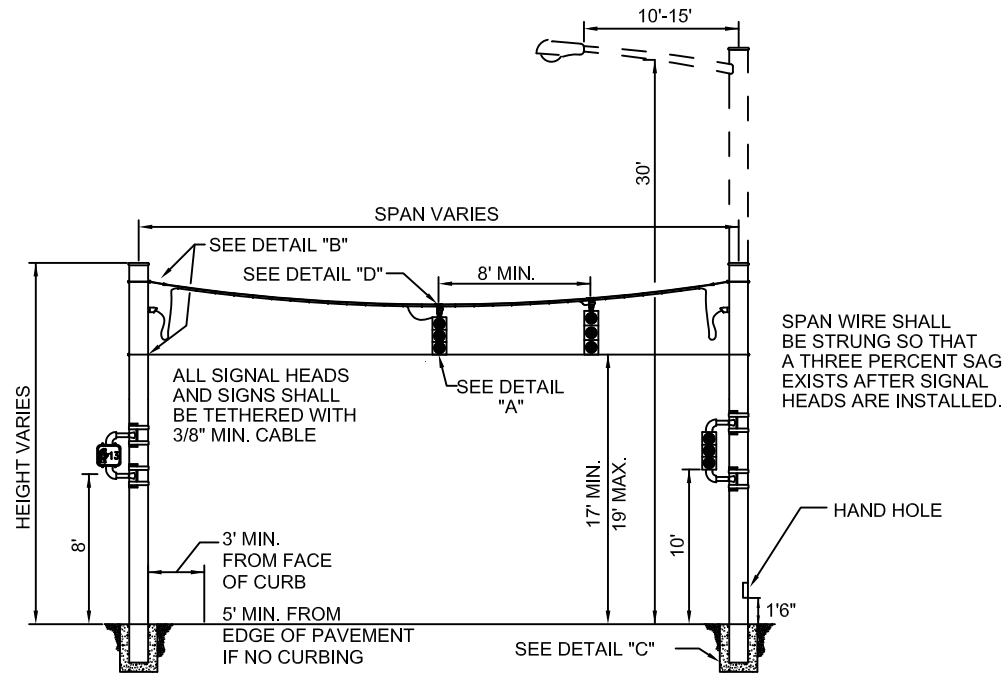
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SCHOOL FLASHING BEACON

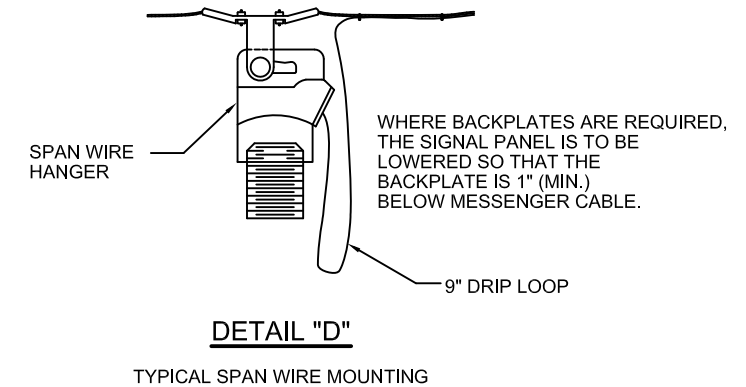
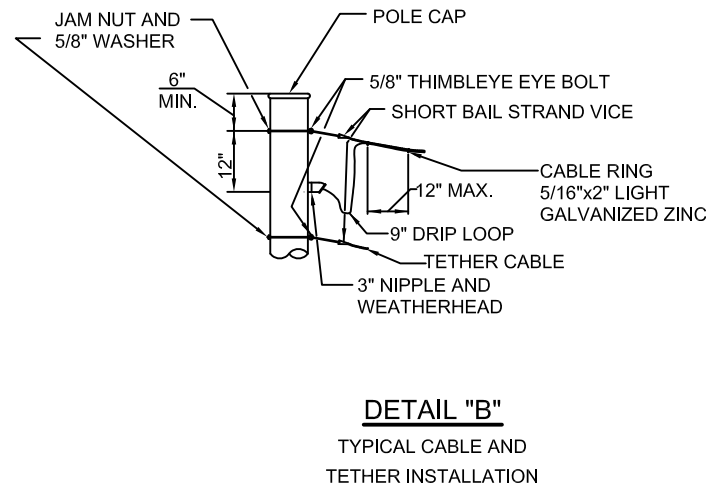
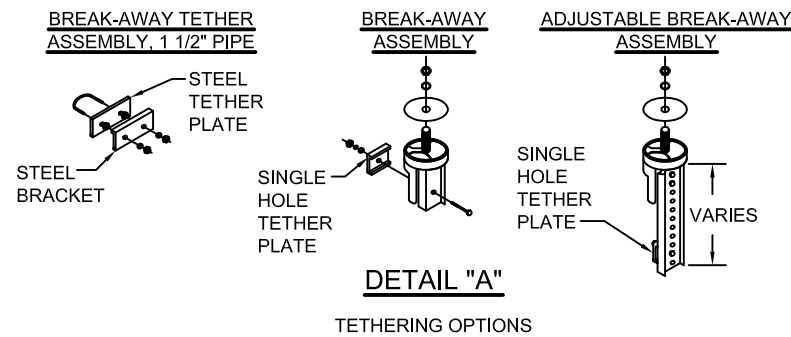
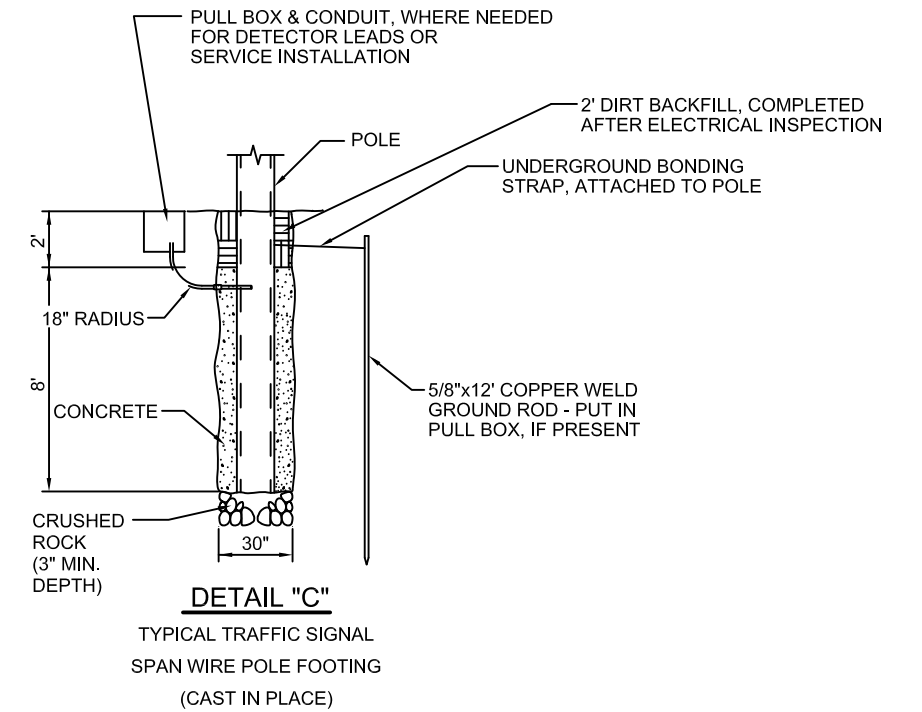
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. 900-04
Sheet No. 1 of 1



GENERAL NOTES


- SPAN WIRE POLES SHALL BE HOT DIPPED GALVANIZED PRIMER AND FINISHED WITH FEDERAL GREEN POWDER COATING. POLE SURFACE SHALL BE WIPED CLEAN AND FREE OF DEBRIS PRIOR TO FINISH APPLICATION. FINISH APPLICATION SHALL BE COMPLETED PRIOR TO INSTALLATION OF SIGNAL/PEDESTRIAN HEADS AND PEDESTRIAN PUSH BUTTONS. FOLLOWING INSTALLATION OF THESE ITEMS, CONTRACTOR SHALL TOUCH UP NICKS AND ABRASIONS AS NEEDED.
- DESIGN CRITERIA SHALL MEET LATEST AASHTO EDITION OF "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS," FOR A WIND VELOCITY OF 90 MPH.
- SPAN WIRE POLES SHALL BE FABRICATED OF GALVANIZED STEEL WITH A MIN. YIELD STRENGTH OF 35 KSI. AND A MIN. WEIGHT PER LINEAR FOOT AS FOLLOWS: 49.5 LB. FOR 12" DIA. POLES. POLES SHALL BE INSTALLED SO THAT THEY WILL BE PLUMB WHEN DEFLECTED BY THE INSTALLED LOAD. SPAN WIRE CABLE SHALL BE A MINIMUM OF 3/8 INCH DIAMETER, RATED AT A MINIMUM OF 13,000 POUNDS.
- SPAN WIRE SIGNAL HEADS SHALL HAVE ONE POWER FEED WIRE IN AND OUT PER HEAD. CONNECTIONS SHALL BE MADE ONLY ON THE SIGNAL HEAD TERMINALS, WITH NO EXTERNAL SPLICES.



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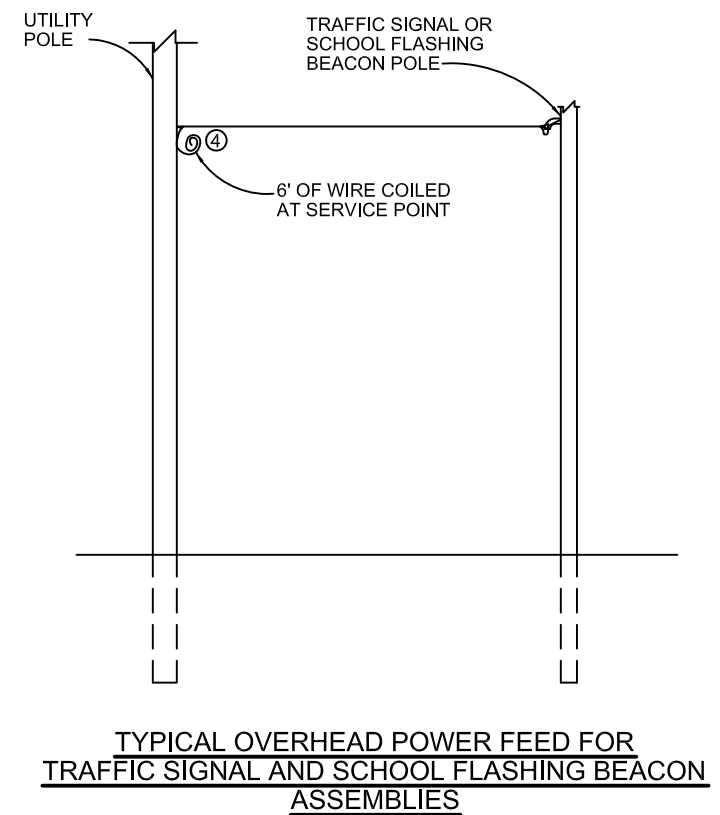
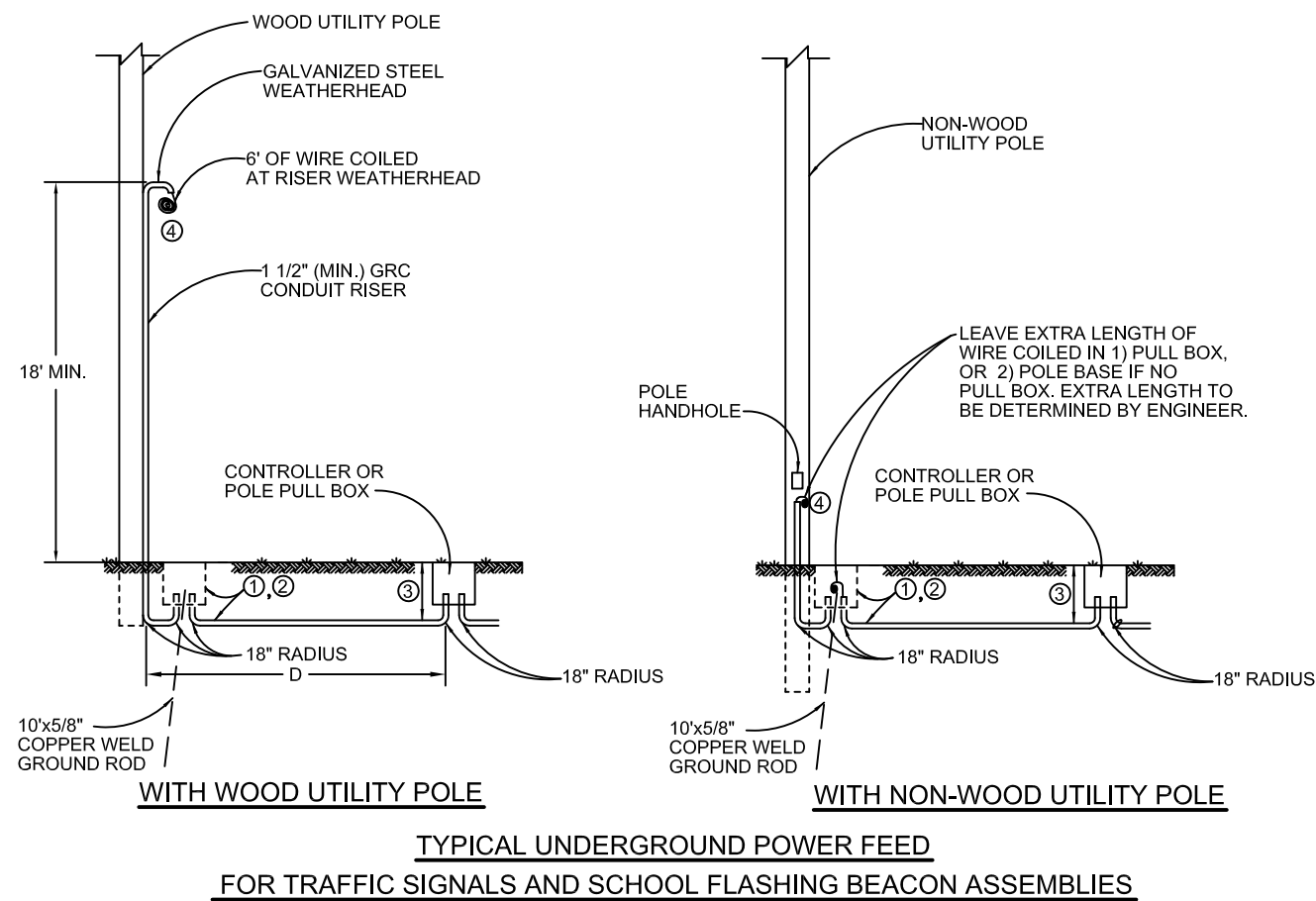
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SPAN WIRE POLE DETAIL	
ENGINEERING CONSTRUCTION STANDARDS	

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Sheet No. 1 of 1

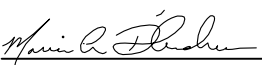
NOTES


- ① PROVIDE TYPE III PULL BOX/GROUND ROD AND 2" PVC CONDUIT ONLY IF D EXCEEDS 10'
- ② PROVIDE 2" GRC CONDUIT WITHOUT PULL BOX/GROUND ROD IF D IS LESS THAN 10'
- ③ MINIMUM CONDUIT DEPTHS: UNDERGROUND 24" UNDER PAVEMENT 30"
- ④ WHERE REQUIRED BY UTILITY COMPANY, CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING PERMIT AND INSPECTION FROM THE LOCAL MUNICIPALITY.



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	05-27-16
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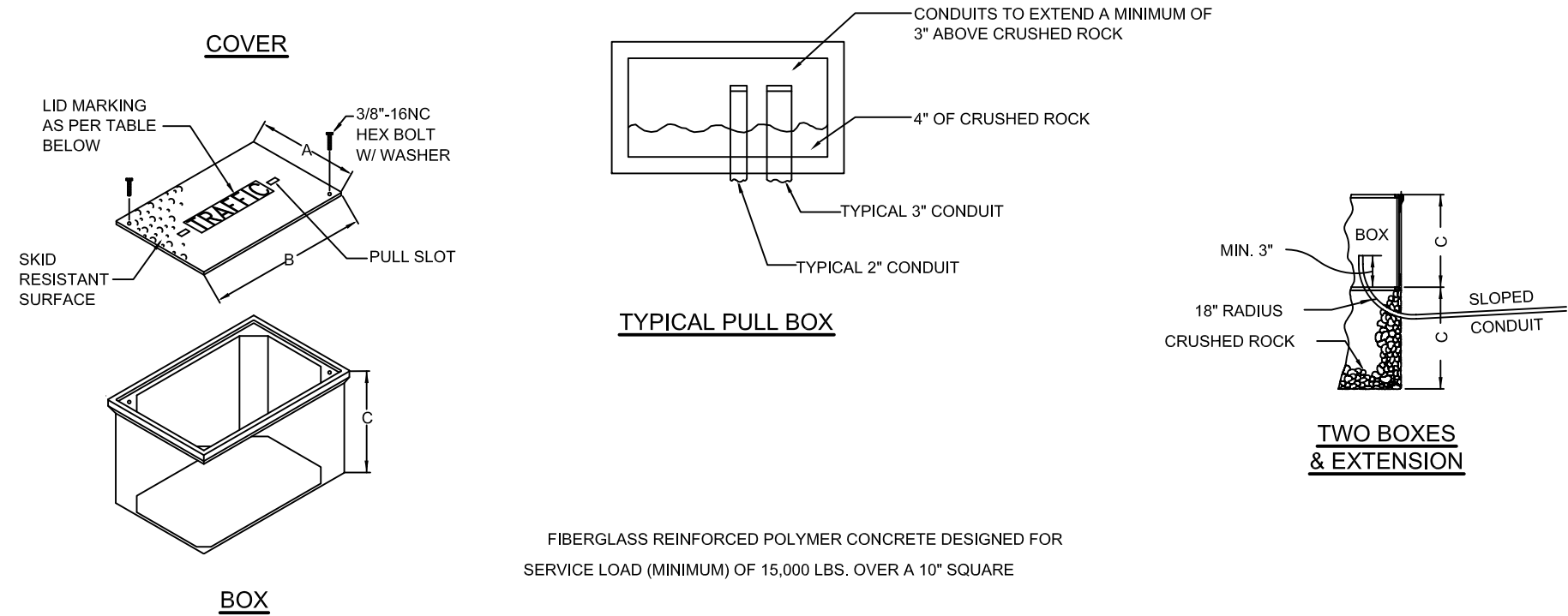


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POWER FEED FOR TRAFFIC SIGNALS	
ENGINEERING CONSTRUCTION STANDARDS	

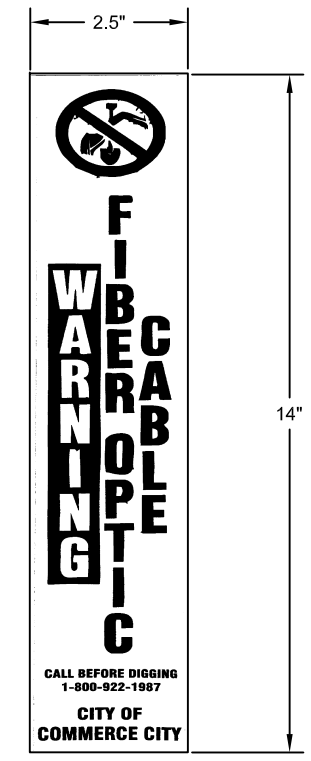
DETAIL NO. 900-06
Sheet No. 1 of 1



FIBERGLASS REINFORCED POLYMER CONCRETE DESIGNED FOR SERVICE LOAD (MINIMUM) OF 15,000 LBS. OVER A 10\"/>

PULLBOXES

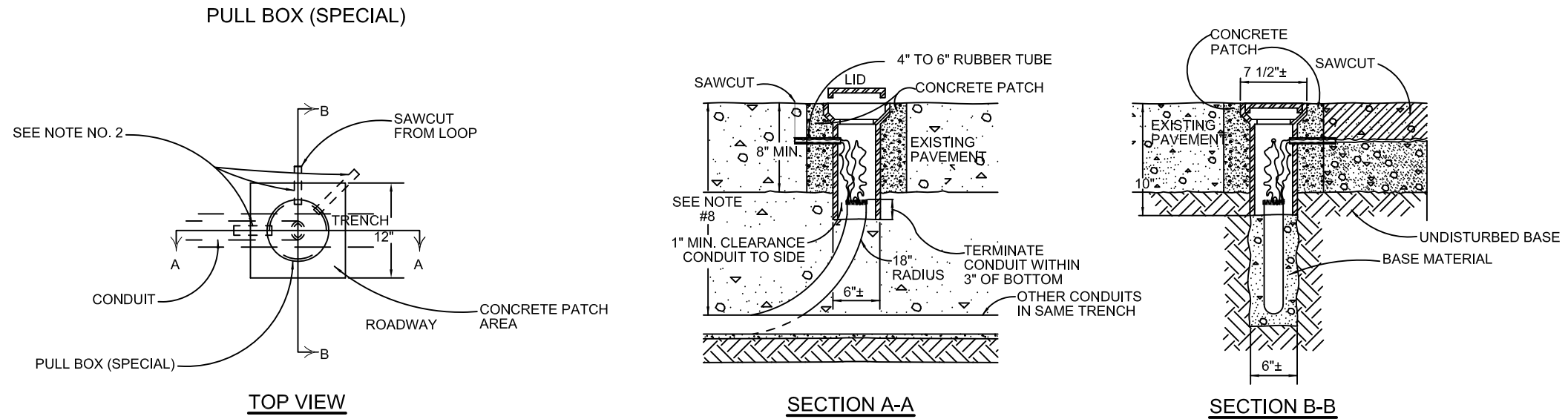
PULL BOX USAGE	SIZE (A X B X C)	PULL BOX LID MARKING
CABINET HOME RUN PULLBOX	24"x36"x18"	TRAFFIC
SIGNAL POLE PULL BOX	17"x30"x12"	TRAFFIC
DETECTOR PULL BOX (SIDE OF ROAD)	12"x12"x12"	TRAFFIC
DETECTOR WATER VALVE	WATER VALVE	TRAFFIC
COMMUNICATION VAULT (T/S CABINET)	30"x48"x18"	TRAFFIC COMM
COMMUNICATION VAULT (INTERMEDIATE LOCATIONS)	24"x36"x18"	TRAFFIC COMM
TELEPHONE DEMARCATION	13"x24"x12"	TRAFFIC COMM
ELECTRICAL DEMARCATION	13"x24"x12"	ELECTRIC



UTILITY DECAL

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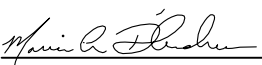



GENERAL NOTES

1. PULL BOX (SPECIAL) SHALL BE A WATER VALVE STEM TYPE PULL BOX MADE OF ALUMINUM WITH A CAST IRON LID. THE PULL BOX SHALL HAVE THE CAPABILITY OF ACCEPTING RISER RINGS FOR FUTURE OVERLAYS. THE LID SHALL HAVE THE WORD "TRAFFIC" PRINTED ON IT.
2. PULL BOXES SHALL HAVE 3/4" TO 1" DIAMETER HOLES DRILLED OR TORCHED 3" FROM TOP TO ACCEPT A 4" TO 6" RUBBER TUBE (3/4" GARDEN HOSE). THE NUMBER OF HOLES SHALL BE AS PER PLANS OR AS DIRECTED BY THE CITY ENGINEER.
3. CARE SHALL BE TAKEN DURING BACKFILL COMPACTION TO PREVENT COLLAPSE OF THE TUBES.
4. 2' MINIMUM SLACK OF BOTH FEED AND LOOP WIRES IS TO BE PROVIDED SO THAT ALL TESTING AND SPLICING CAN BE DONE OUTSIDE OF THE PULL BOX.
6. PULL BOX IS TO BE LOCATED IN AN AREA OF THE STREET NOT HEAVILY TRAVELED IF POSSIBLE AND CENTERED A MINIMUM OF 12" FROM THE CONCRETE GUTTER PAN.
7. ALL WORK LISTED ABOVE FOR INSTALLATION OF PULL BOXES SHALL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE PRICE OF THE CONDUIT.
8. CONDUIT UNDER ROADWAY SHALL BE LOCATED AT A DEPTH OF NOT LESS THAN 30 INCHES.
9. PULL BOX LID SHALL BE FLUSH TO 1/4" LOW OF FINAL GRADE.

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 CITY ENGINEER	05-27-16 DATE

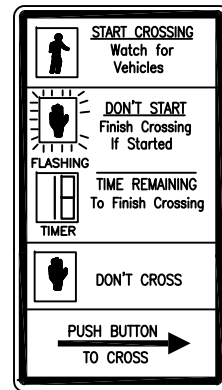


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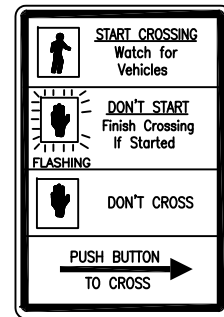
<p>PULL BOX (SPECIAL)</p> <p>ENGINEERING CONSTRUCTION STANDARDS</p>
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DETAIL NO. 900-08
Sheet No. 1 of 1

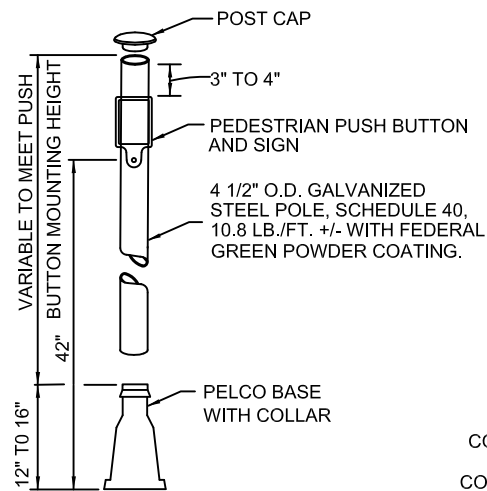
TYPICAL PEDESTRIAN PUSH-BUTTON SIGNS
SIGN SHALL BE LABEL (STICK-ON) TYPE



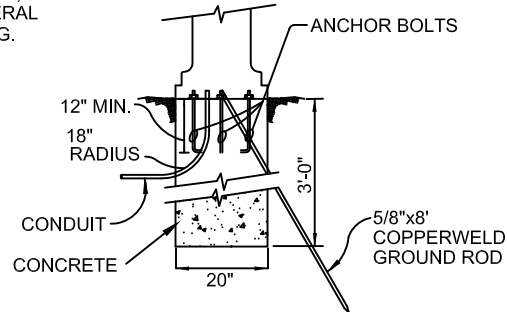
R10-3e
9"x15"
COUNTDOWN



R10-3b
9"x12"
NON-COUNTDOWN

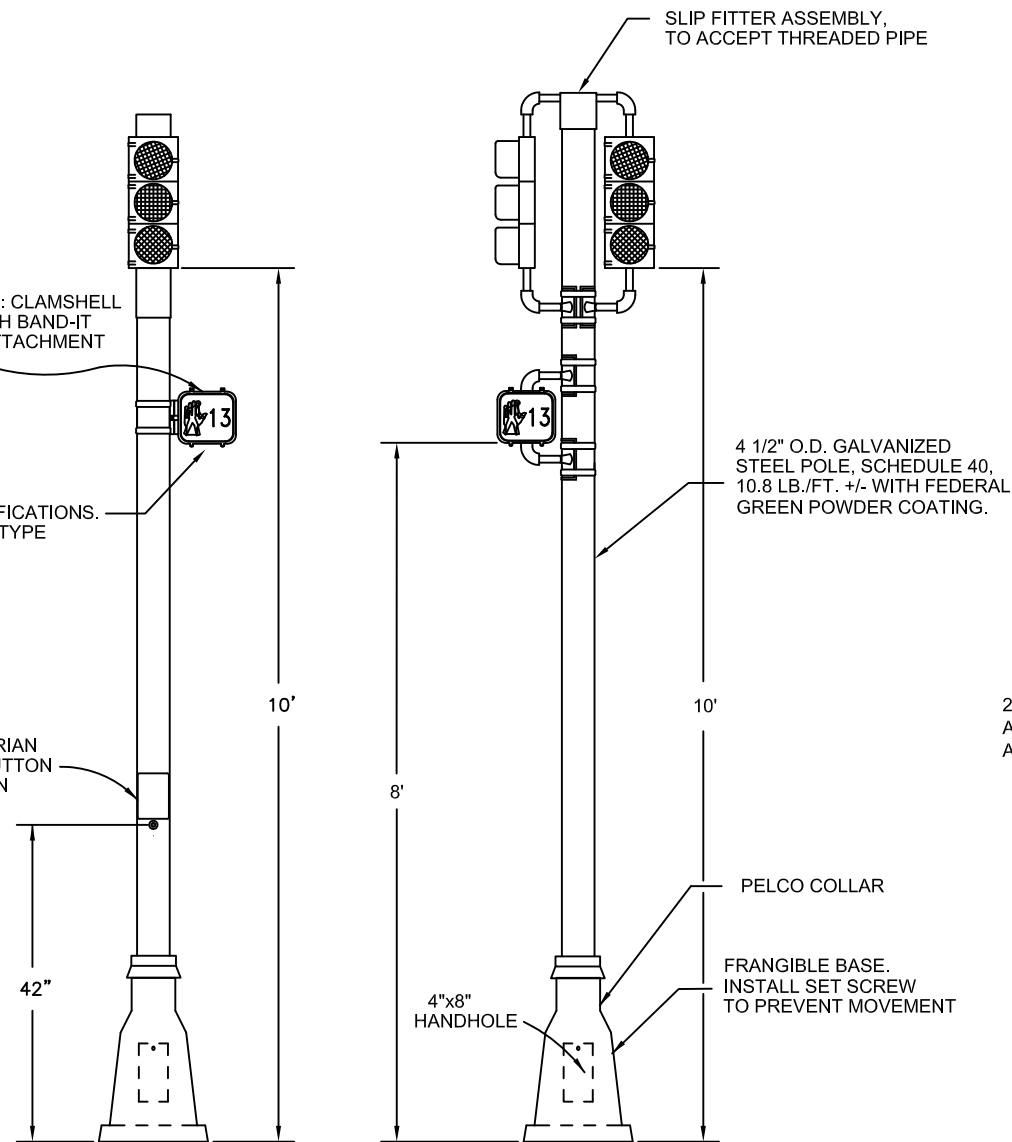


PEDESTRIAN PUSH BUTTON POLE



FOUNDATION DETAIL

ALTERNATE: CLAMHELL MOUNT WITH BAND-IT OR BOLT ATTACHMENT TO POLE
SEE PROJECT SPECIFICATIONS. COUNTDOWN TIMER TYPE MAY BE REQUIRED.



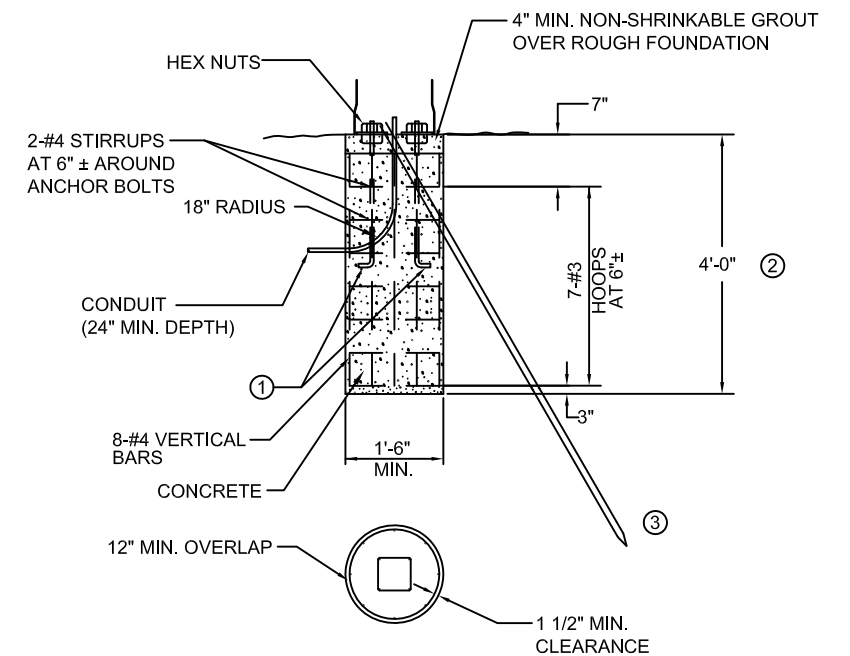
PEDESTAL POLE SHALL BE HOT DIPPED GALVANIZED PER ASTM A123, EQUIVALENT TO 2 OZ. PER SQUARE FOOT, INSIDE AND OUT

TYPICAL PEDESTAL POLE DETAIL

1/4" SPLIT PIN SHALL BE INSTALLED IN THE UPPER PORTION OF THE ALUMINUM BASE AND SHALL COMPLETELY PENETRATE BASE AND POLE TO SECURE POLE TO PREVENT MOVEMENT OR TWISTING. PELCO COLLAR TO BE INSTALLED.

FOOTING NOTES

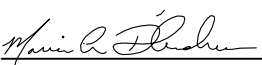
- ① ANCHOR BOLTS (FURNISHED WITH POLE) PER MANUFACTURER'S TEMPLATE.
- ② CAISSON DESIGNS REQUIRE THAT THE CAISSON BE FOUNDED IN COMPACT SAND, CLAY OR SANDY CLAY. IF, BY VISUAL INSPECTION OF THE HOLE, OTHER MATERIAL IS PRESENT, THE CAISSON DESIGN SHALL BE MODIFIED AND APPROVED BY THE CONSTRUCTION MANAGER.
- ③ 5/8"x8' COPPERWELD GROUND ROD THROUGH FOUNDATION, INTO GROUND.
- ④ HAND HOLE SHALL BE PROVIDED.




TYPICAL PEDESTAL POLE FOUNDATION (CAST IN PLACE)

S:\Transport\100049520 - Commerce City Engineering Standards\Design\Drawings\Reference_Files\CCC DWGs\900-09 (Pedestrian Pole).dwg

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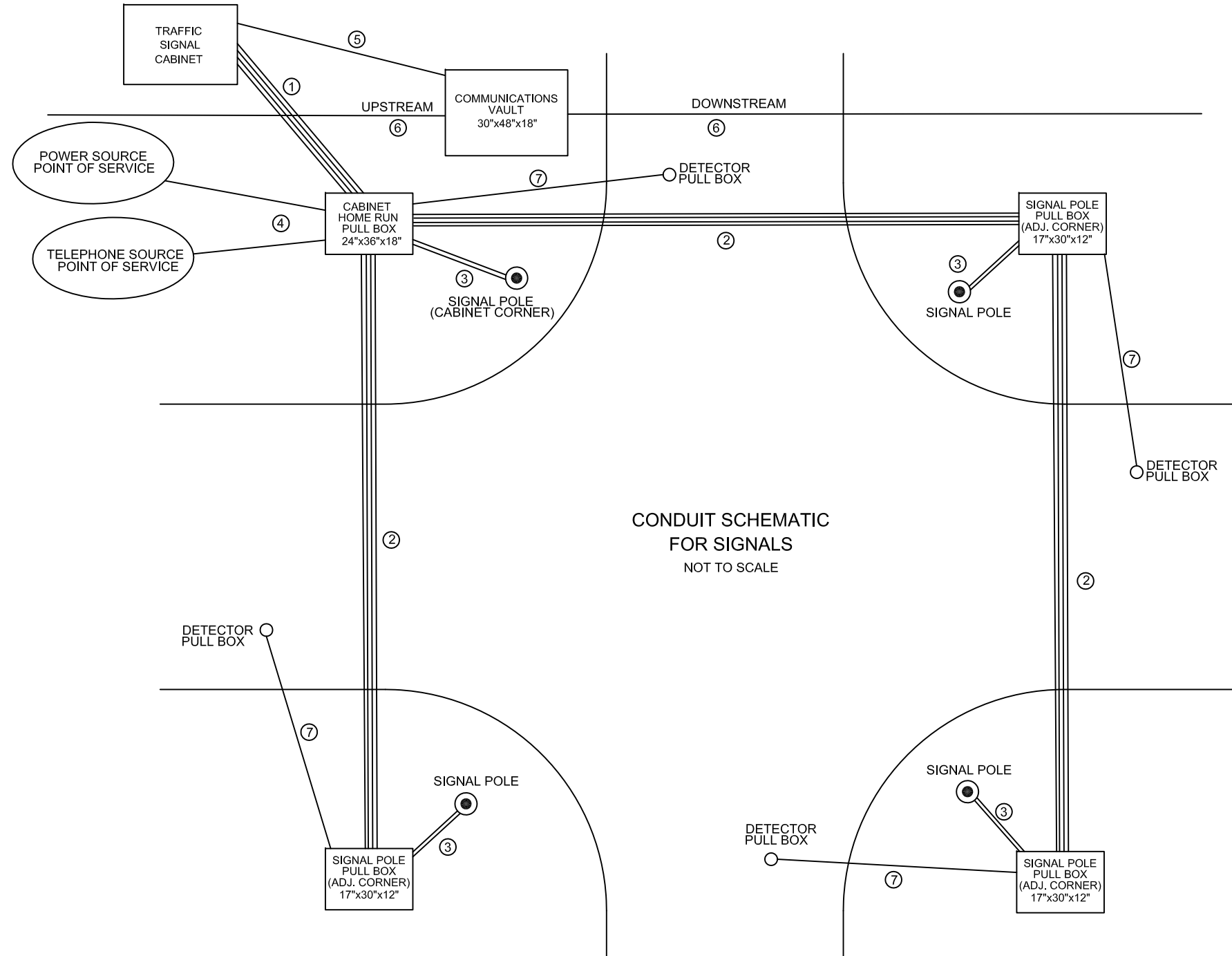
APPROVAL	
 CITY ENGINEER	05-27-16 DATE



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Department of Public Works
8602 Rosemary St.
Commerce City, CO 80022
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PEDESTRIAN POLE
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. 900-09
Sheet No. 1 of 1



CONDUIT SCHEMATIC
FOR SIGNALS
NOT TO SCALE

RECOMMENDED CONDUIT/CABLE RELATIONSHIPS


- ① "CABINET HOME RUN PULL BOX" TO "TRAFFIC SIGNAL CABINET"
1 OF 1 - 2" CONDUIT: POWER FROM POINT-OF-SERVICE
1 OF 3 - 3" CONDUITS: LOW VOLTAGE & VIDEO
2 OF 3 - 3" CONDUITS: FIELD WIRING (120 VAC)
3 OF 3 - 3" CONDUITS: SPARE
- ② "CABINET HOME RUN PULL BOX" TO "SIGNAL POLE PULL BOX (ADJ. CORNER)"
"SIGNAL POLE PULL BOX (ADJ. CORNER)" TO "SIGNAL POLE PULL BOX (ADJ. CORNER)"
1 OF 1 - 2" CONDUIT: LUMINAIRE POWER
1 OF 3 - 3" CONDUITS: LOW VOLTAGE & VIDEO
2 OF 3 - 3" CONDUITS: FIELD WIRING (120 VAC)
3 OF 3 - 3" CONDUITS: SPARE
- ③ "CABINET HOME RUN PULL BOX" TO "SIGNAL POLE (CABINET CORNER)"
"SIGNAL POLE PULL BOX (ADJ. CORNER)" TO "SIGNAL POLE"
1 OF 1 - 2" CONDUIT: LUMINAIRE POWER
1 OF 1 - 3" CONDUITS: FIELD WIRING
- ④ "CABINET HOME RUN PULL BOX" TO "POINTS OF SERVICE"
1 OF 2 - 2" CONDUITS: POWER FROM POINT OF SERVICE
2 OF 2 - 2" CONDUITS: TELEPHONE FROM POINT OF SERVICE (IF REQUIRED)
- ⑤ "COMMUNICATIONS VAULT" TO "TRAFFIC SIGNAL CABINET":
1 OF 1 - 2" CONDUIT: INTERCONNECT
- ⑥ "COMMUNICATIONS VAULT" UPSTREAM/DOWNSTREAM:
1 OF 1 - 3" CONDUIT: INTERCONNECT
- ⑦ "CABINET HOME RUN PULL BOX" TO "DETECTOR PULL BOX"
"SIGNAL POLE PULL BOX (ADJ. CORNER)" TO "DETECTOR PULL BOX"
1 OF 1 - 2" CONDUIT: INDUCTANCE DETECTOR WIRING

NOTE: ⑦ IS SHOWN AS A REFERENCE ONLY. INSTALL ONLY IF REQUIRED IN THE CONSTRUCTION PLANS AND SPECIFICATIONS.

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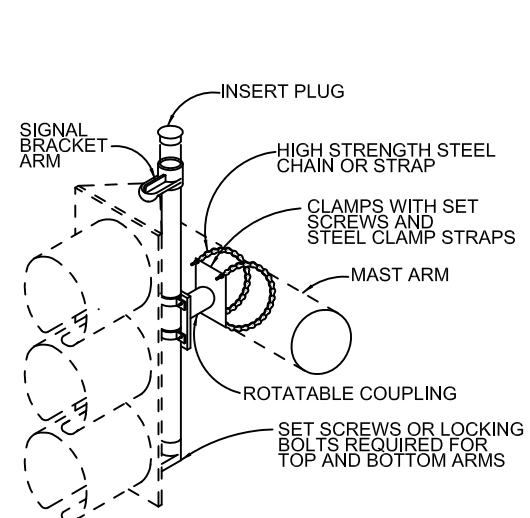
APPROVAL	
<i>Maria R. Fisher</i>	05-27-16
CITY ENGINEER	DATE



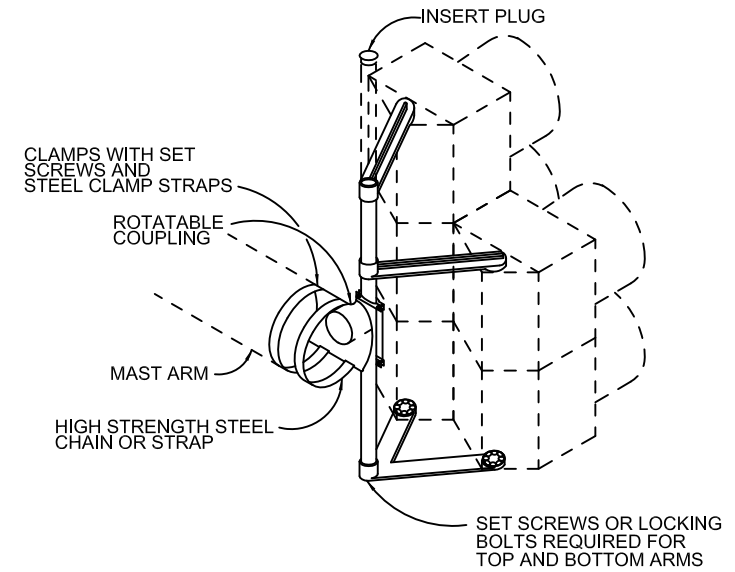
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<h1>CONDUIT SCHEMATIC</h1>
ENGINEERING CONSTRUCTION STANDARDS

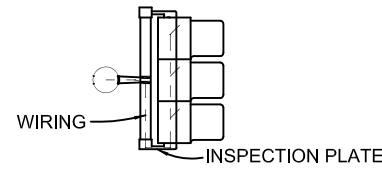
DETAIL NO. 900-10
Sheet No. 1 of 1



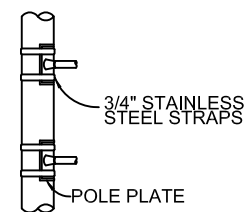
DETAIL OF MAST ARM MOUNTING FOR IN-LINE SIGNAL HEAD (3-SECTION OR 5-SECTION)



DETAIL OF MAST ARM MOUNTING FOR SIDE-BY-SIDE SIGNAL HEAD (5-SECTION)



WIRING DIAGRAM



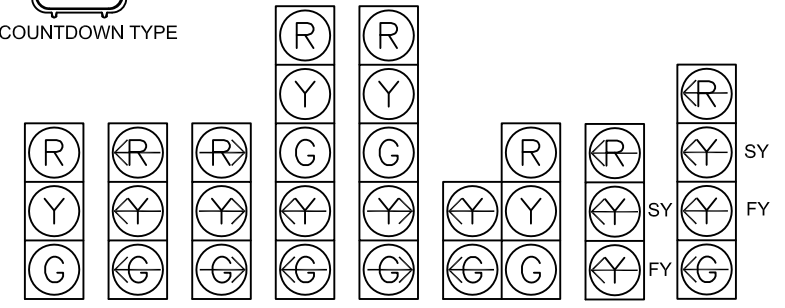
TYPICAL SIDE OF POLE SIGNAL MOUNTING

MOUNTING NOTES

1. PIPE COUPLINGS FOR SIGNAL BRACKETS SHALL BE EITHER 1-1/2 OR 2 INCH DEPENDING UPON THE SIGNAL HEAD TO BE INSTALLED. SIGNAL BRACKETS SHALL BE FURNISHED BY THE MANUFACTURER OF THE SIGNAL HEADS.
2. UNLESS OTHERWISE SPECIFIED, ALL TRAFFIC SIGNALS MOUNTED ABOVE THE ROADWAY SHALL HAVE A HEIGHT OF 17' TO 19' ABOVE THE PAVEMENT GRADE AT THE ROADWAY CENTER. ALL SIDE-OF-POLE MOUNTED TRAFFIC SIGNALS SHALL HAVE A HEIGHT OF 10' ABOVE GROUND LINE AND PEDESTRIAN SIGNALS SHALL HAVE A HEIGHT OF 8' ABOVE GROUND LINE AS MEASURED TO THE BOTTOM OF THE SIGNAL HEAD HOUSING OR BRACKET.
3. MAST ARM MOUNTED SIGNAL HEADS SHALL USE ASTRO-BRAC'S OR SKY-BRAC. ALL SIGNAL HEADS SHALL BE MOUNTED IN SUCH A MANNER AS TO BE EASILY REMOVED FROM THEIR SUPPORTING STRUCTURE.
4. GASKET SEALING COMPOUND SHALL BE USED IN ADDITION TO ANY LEAD WASHERS REQUIRED FOR CREATING A WATER-TIGHT CONNECTION BETWEEN THE SIGNAL HEAD AND MOUNTING BRACKET.
5. SIGNAL HEADS SHALL BE SECURELY AFFIXED BY USE OF A SERRATED COUPLING OR OTHER ACCESSORIES RECOMMENDED BY THE SIGNAL MANUFACTURER.
6. WIRING FROM INSIDE MAST ARM THROUGH A 1" FIELD DRILLED HOLE IN ARM SHALL BE BROUGHT THROUGH THE MOUNTING SUPPORT TUBE AND LOWER ARM (AS SHOWN). FIELD DRILLED HOLES SHALL HAVE RUBBER GROMMETS INSTALLED.

NOTES

ALL VEHICLE SIGNAL HEADS SHALL BE POLYCARBONATE WITH 12" SECTIONS AND TUNNEL VISORS.
 ALL VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE LED TYPE AND BLACK IN COLOR, WITH THE EXCEPTION OF THE SIDE OF POLE SIGNALS. SIDE OF POLE SIGNALS SHALL HAVE RED BULBS. PEDESTRIAN HEADS SHALL BE COUNTDOWN TYPE.



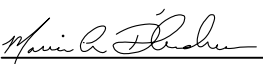
PEDESTRIAN AND VEHICLE SIGNAL HEADS


GENERAL WIRING NOTES

1. TRAFFIC SIGNAL CONDUIT SHALL NOT CARRY WIRING OF OTHER UTILITIES.
2. EXCEPT FOR LOOP DETECTOR LEADS, ALL SPLICES SHALL BE IN HAND HOLES AT POLE BASES AND NOT IN PULL BOXES.
3. PEDESTRIAN AND VEHICLE SIGNAL HEADS SHALL BE INDIVIDUALLY WIRED FROM THE POLE BASE TO THE SIGNAL HEAD.
4. CONTRACTOR SHALL PROVIDE 2 WIRING DIAGRAMS OF THE SIGNAL INSTALLATION TO THE CITY.
5. UNLESS ALLOWED BY THE ENGINEER, WIRE SHALL NOT OCCUPY MORE THAN 40% OF THE INSIDE AREA OF CONDUIT.

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SIGNAL HEAD MOUNTING	
ENGINEERING CONSTRUCTION STANDARDS	

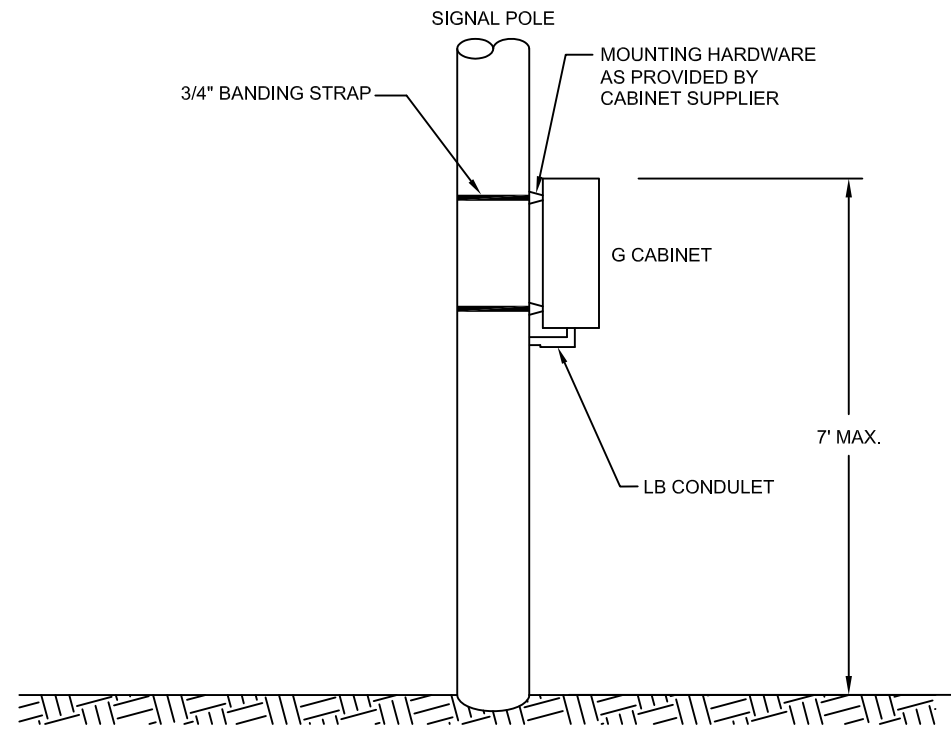
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Sheet No. 1 of 1

NOTES

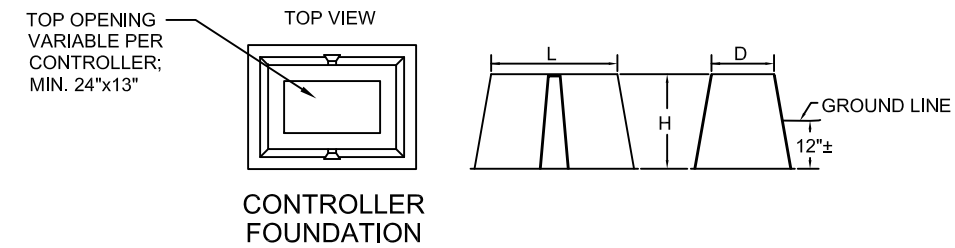
AN UNINTERRUPTABLE POWER SUPPLY (UPS) SHALL BE INSTALLED WITH THE CONTROLLER EQUIPMENT. SEE SPECIFICATIONS.

CABINET FOUNDATION

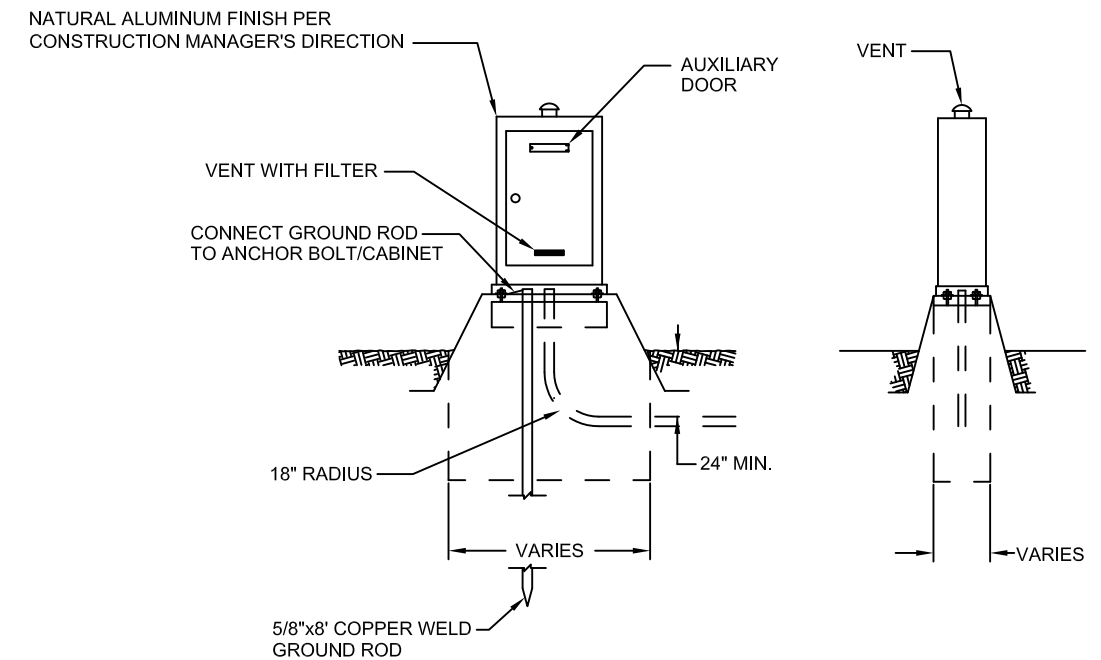
	<u>L</u>	<u>D</u>	<u>H</u>
P CABINET	44"	26"	24"



TYPICAL SIDE-OF-POLE MOUNTED CONTROLLER CABINET



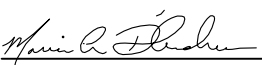
CONTROLLER FOUNDATION




TYPICAL BASE MOUNTED CONTROLLER CABINET INSTALLATION AND FIBERGLASS FOUNDATION

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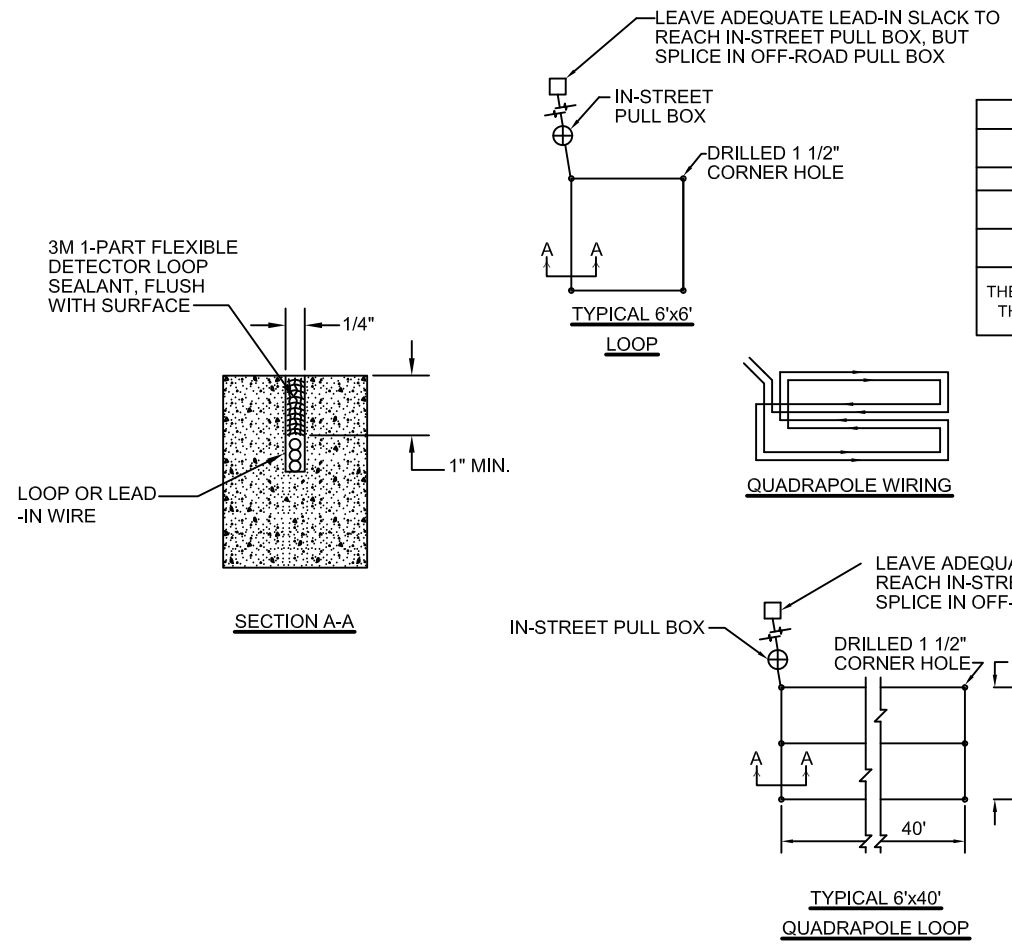
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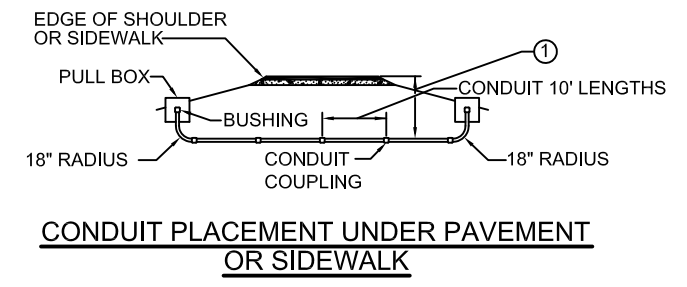
CONTROLLER CABINET
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. 900-12
Sheet No. 1 of 1



LOOP TURNS	
SIZE OF LOOP	NUMBER OF TURNS
6' X 6'	4
6' X 8' TO 6' X 20'	3
6' X 22' TO 6' X 40'+	2

THE NUMBER OF TURNS MAY BE ADJUSTED BY THE ENGINEER IN THE FIELD. WIRING CONNECTIONS TO BE FIELD DETERMINED.



- NOTES**
- ① MINIMUM CONDUIT DEPTH: UNDER PAVEMENT 30" UNDER SIDEWALK 24"
- ALL PVC CONDUIT SHALL BE SCHEDULE 80

LOOP SAW CUT AND INSTALLATION


NOTES

1. IMMEDIATELY BEFORE LAYING THE LOOP CABLE, THOROUGHLY CLEAN AND DRY SAW CUT WITH HIGH PRESSURE COMPRESSED AIR.
2. LOOP WIRE IN ADJACENT LOOPS SHALL BE LAID UNIFORMLY IN EITHER A CLOCKWISE OR COUNTER-CLOCKWISE DIRECTION AND THE LOOP TAGGED TO INDICATE THE DIRECTION.
3. USE A BLUNT, NON-METALLIC INSTRUMENT TO PUSH WIRE INTO SLOT.
4. LOOP WIRE SHALL BE CONTINUOUS (NO SPLICES) FROM THE PULL BOX. SPLICES IN PULL BOX SHALL BE WATERPROOFED WITH 3M SPLICE KIT.
5. CONTINUITY TEST FOR EACH LOOP SHALL BE CONDUCTED 1) BEFORE ANY LOOP SEALER IS INSTALLED AND 2) AFTER LOOP SEALER IS INSTALLED AND LEAD-IN CABLE IS SPLICED AND TRAINED TO THE CONTROLLER. "RESISTANCE-TO-GROUND" AND "INDUCTANCE" SHALL BE MEASURED AND RECORDED FOR EACH TEST.

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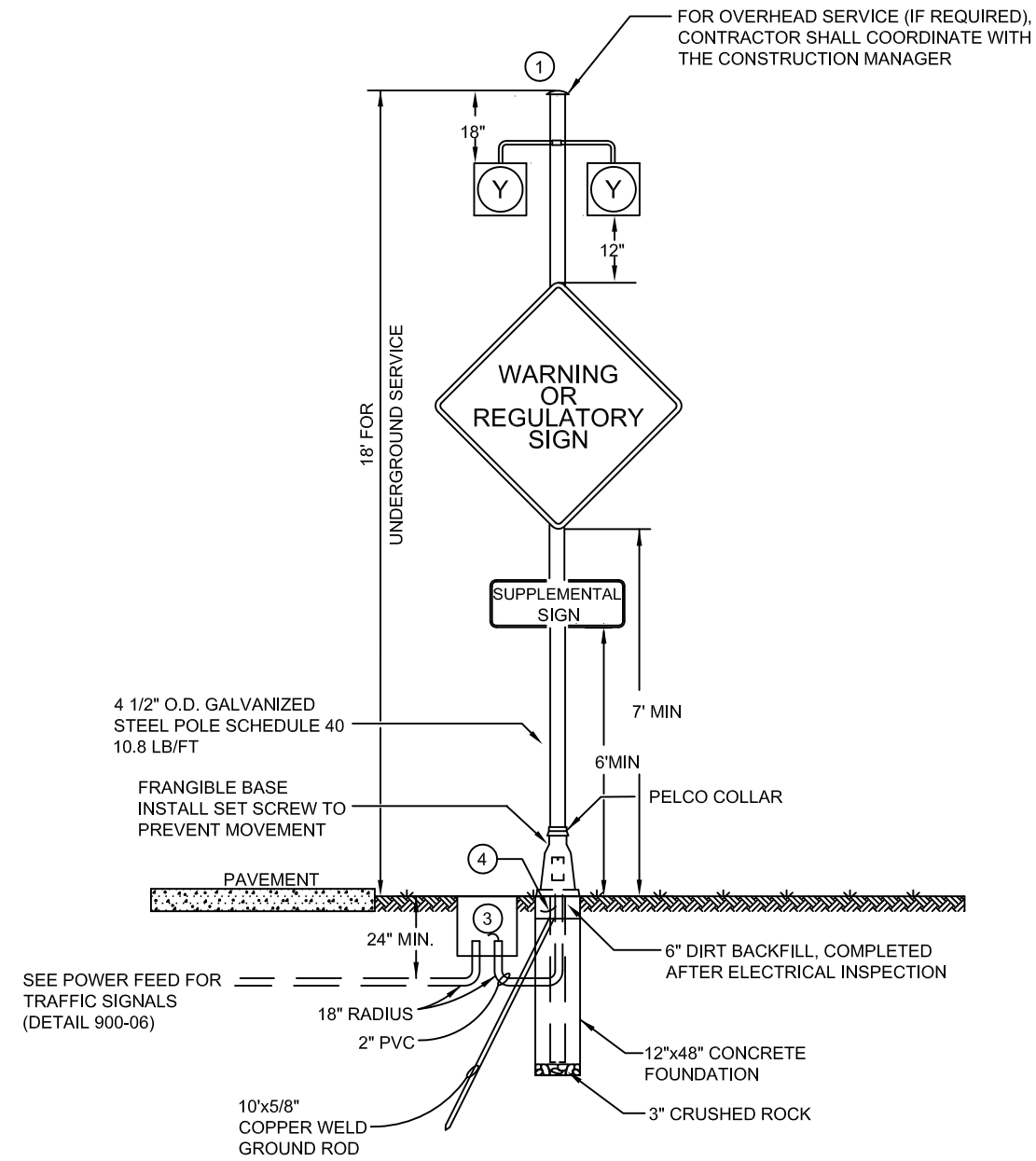
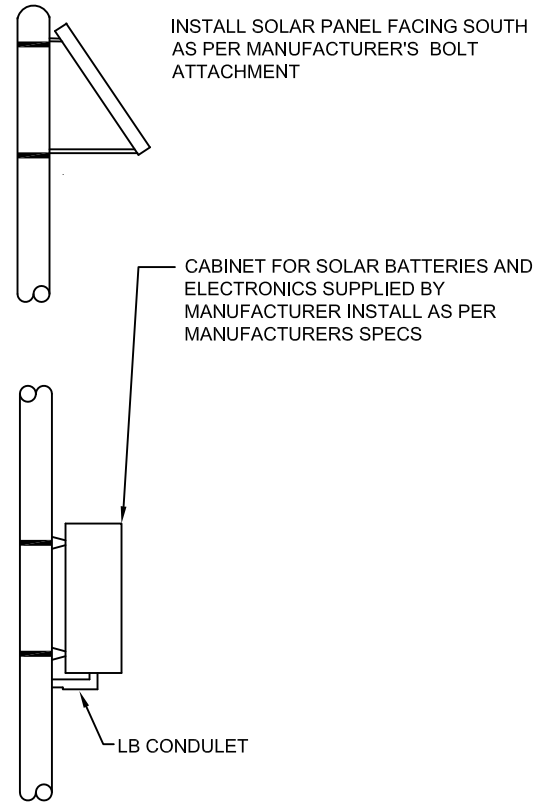
CONDUIT DETAILS	
ENGINEERING CONSTRUCTION STANDARDS	

DETAIL NO. 900-13
Sheet No. 1 of 1

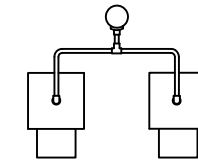
FLASHING BEACONS

ALL FLASHING BEACONS SHALL BE 12" POLYCARBONATE WITH TUNNEL VISORS AND BLACK HOUSINGS

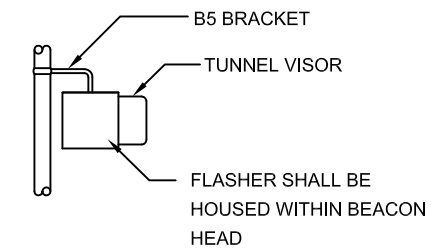
OPTIONAL SOLAR



BEACON TOP VIEW



BEACON SIDE VIEW




NOTES

- ① WATERTIGHT GALVANIZED STEEL POLE CAP
- ② LEAVE MINIMUM OF 8' COILED WIRE FOR UTILITY COMPANY CONNECTION AT UTILITY DEMARCATION POINT
- ③ PROVIDE CONDUIT AND PULL BOX FOR UNDERGROUND SERVICE ONLY
- ④ BONDING STRAP IN BACKFILL

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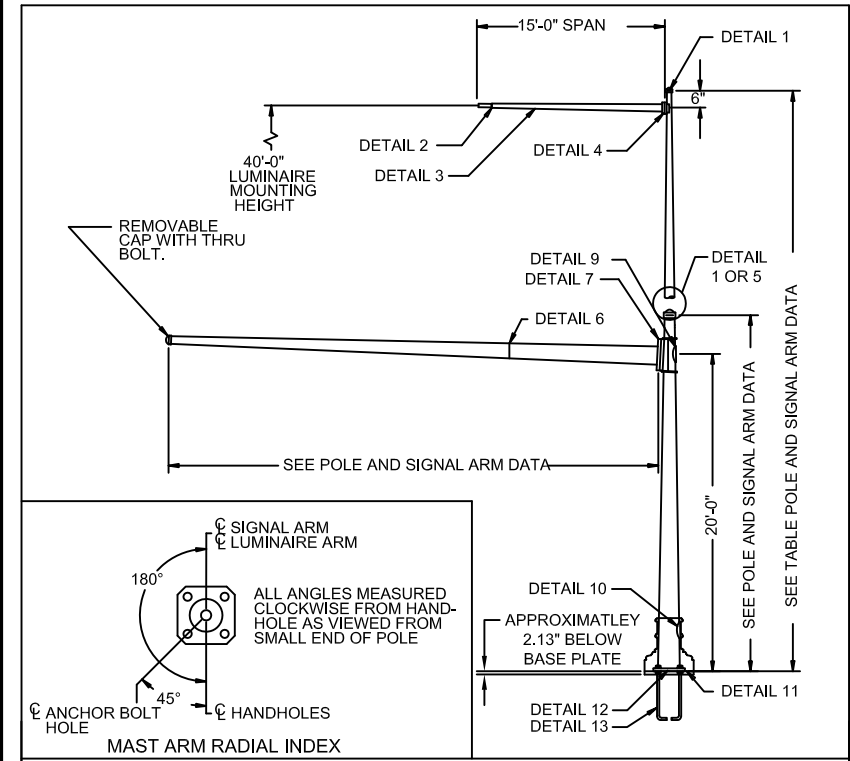


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<h1>FLASHING BEACON</h1>
ENGINEERING CONSTRUCTION STANDARDS

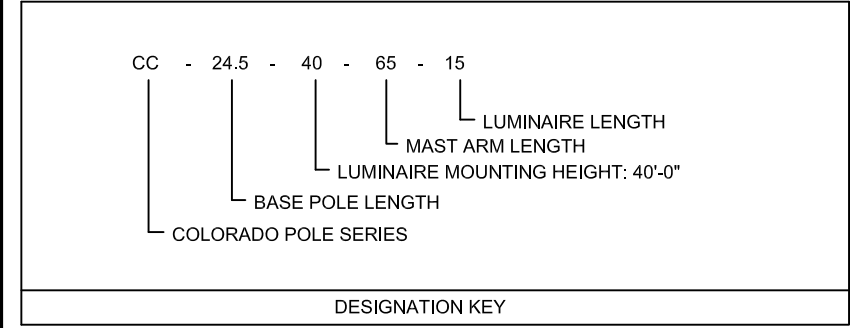
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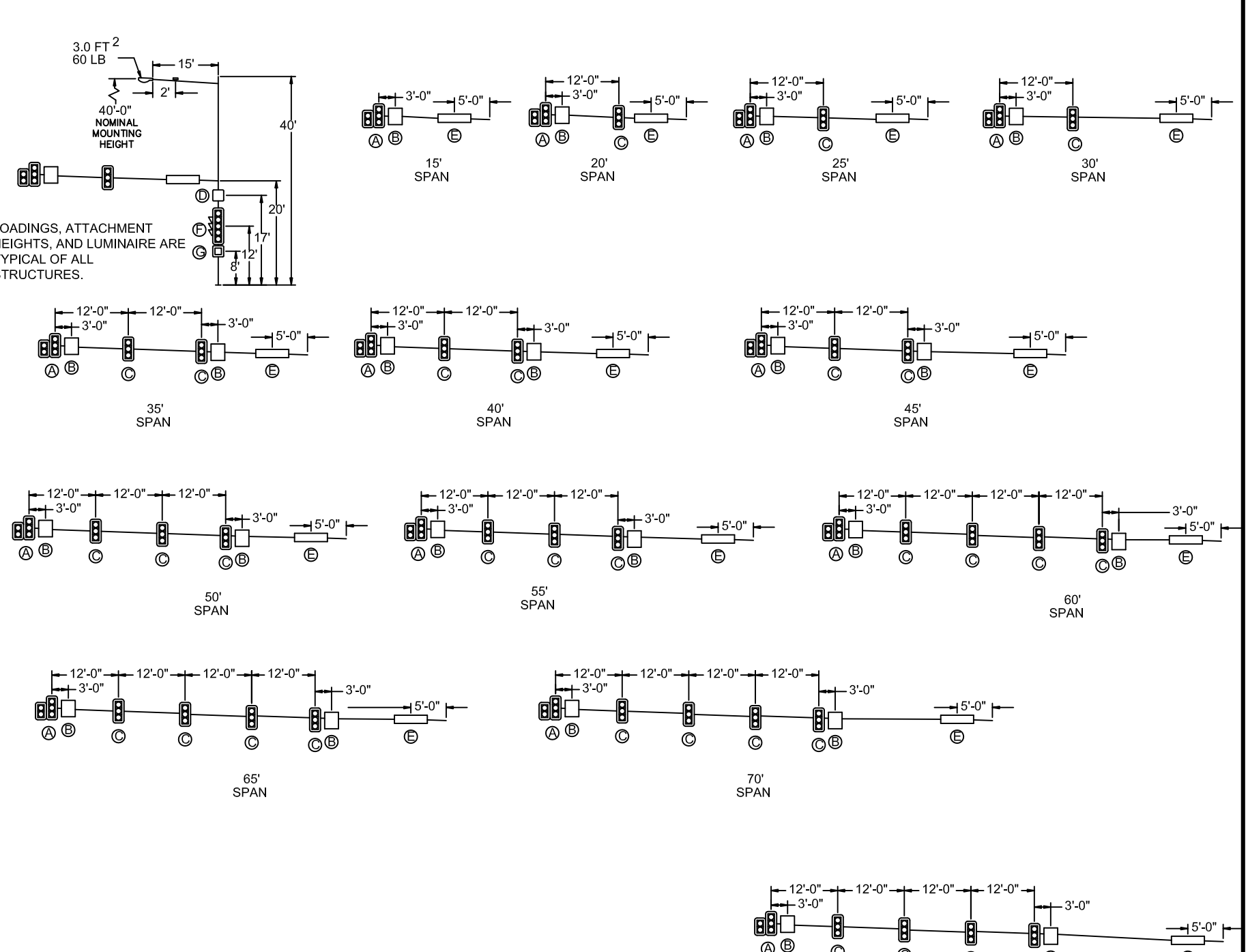
COMMERCE CITY, COLORADO POLE SERIES

MATERIAL DATA					
COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)	COMPONENT	ASTM DESIGNATION	MIN. YIELD (KSI)
POLE SHAFT (OTHER)	A595 GR. A	55	LUM. ARM ATTACHMENTS	A36	36
POLE SHAFT .250,.188	A572 GR. 65	65	MAST ARM ATTACHMENTS	A36	36
ARM SHAFT .219,.250,.281	A572 GR. 65	65	MAST ARM CONN. BOLT	A325	-
ARM SHAFT (OTHER)	A595 GR. A	55	LUM. CONNECTION BOLT	A307	-
ANCHOR BOLTS	F1554	55	GALVANIZING HARDWARE	A153	-
POLE BASE	A36	36	GALVANIZING STRUCTURES	A123	-

FINISH: PAINT OVER GALVANIZED
 BASE COAT: HOT DIP GALVANIZE TO ASTM 123
 FINISH COAT: TGIC OR URETHANE POLYESTER POWDER
 VALMONT SPEC.: F-283CL
 COLOR: FEDERAL GREEN



REV	DRAWN BY-DATE	CHECK BY-DATE	DESCRIPTION
B	MRL1 12/15/06	MRL1 12/15/06	REVISED DECORATIVE BASE COVERS
A	MRL1 04/15/06	MRL1 04/15/06	ADDED DECORATIVE BASES
	MRL1 11/22/05	MRL1 11/23/05	



DEVICE	DESCRIPTION	PROJ. AREA (FT ²)	WEIGHT (LBS)
(A)	12"-5 SEC. SIGNAL WITH BACKPLATE	13.72	71
(B)	30" X 36" REGULATORY SIGN	7.50	25
(C)	12"-3 SEC. SIGNAL WITH BACKPLATE	8.67	38
(D)	24" X 30" REGULATORY SIGN	5.00	15
(E)	20" X 96" INT. ILLUM. STREET SIGN	13.33	125
(F)	DUAL SIGNALS	13.61	142
(G)	DOUBLE 16" PED SIGNALS	8.00	80

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 CITY ENGINEER

05-27-16
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900-15A

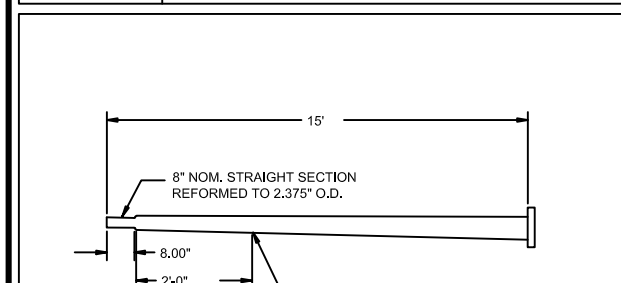
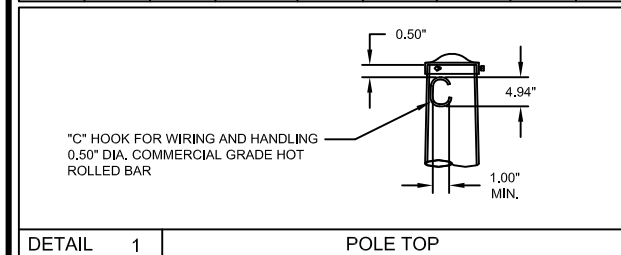
ENGINEERING CONSTRUCTION STANDARDS

Sheet No. 1 of 1

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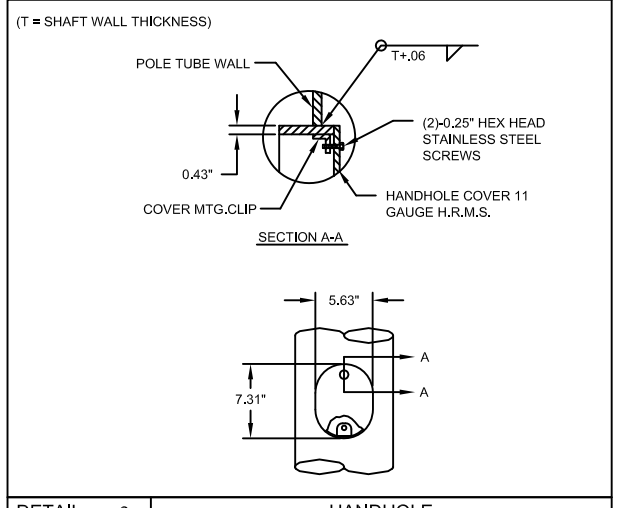
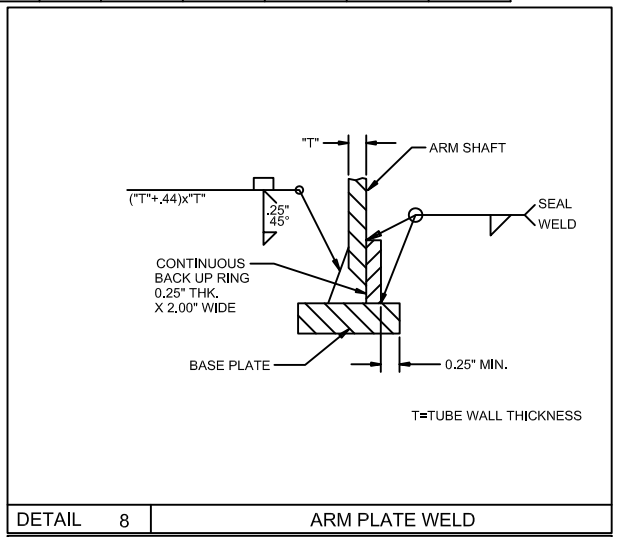
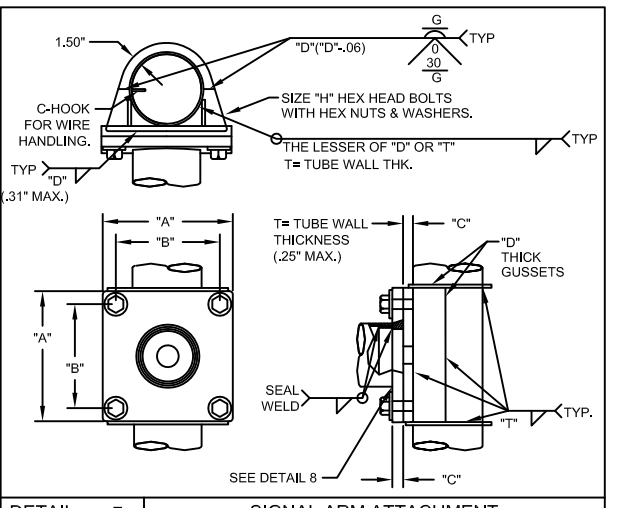
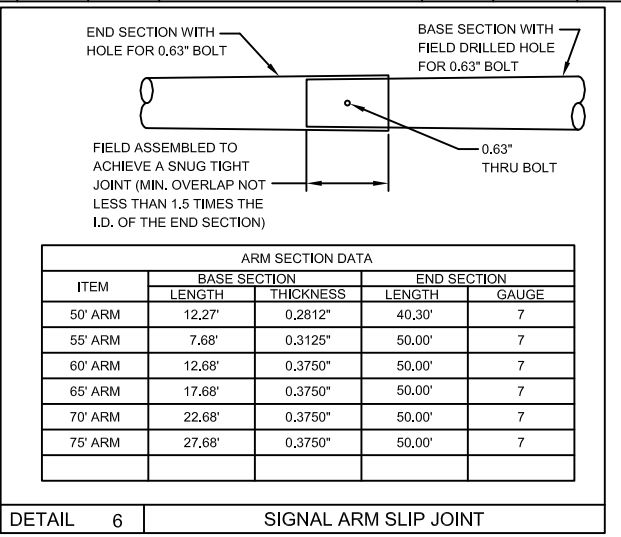
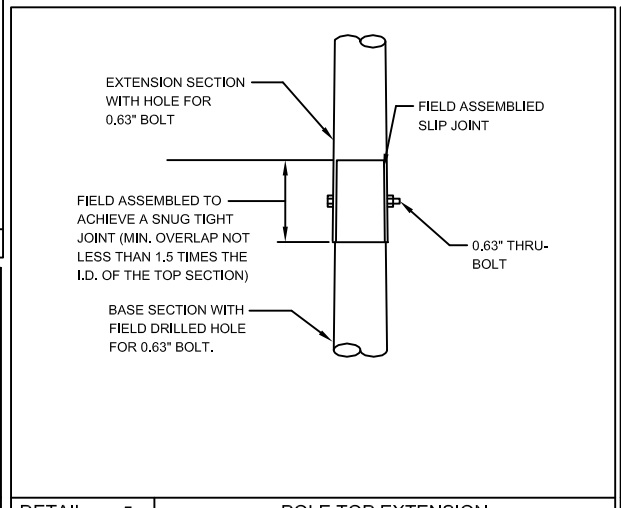
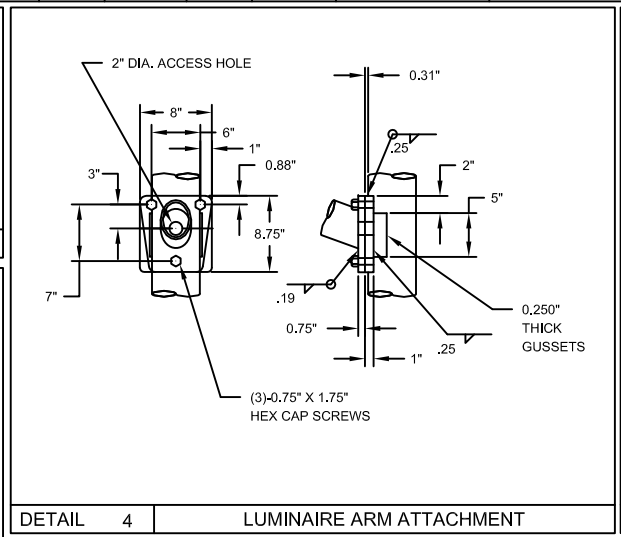
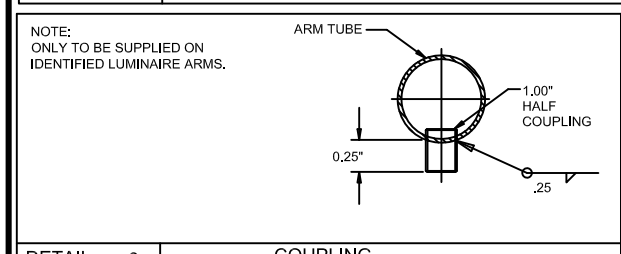
POLE AND SIGNAL ARM DATA

ARM SPAN (FT)	POLE TUBE				POLE BASE				ANCHOR BOLT				SIGNAL ARM DATA				POLE TOP EXTENSION									
	BASE DIA. (IN)	TOP DIA. (IN)	LENGTH (FT)	GAUGE OR THK. (IN)	SQUARE "S" (IN)	BOLT CIRCLE "M" (IN)	THK. "M" (IN)	HOLE "Z" (IN)	DIA. "K" (IN)	LENGTH "J" (IN)	HOOK "H" (IN)	THREAD LENGTH "U" (IN)	PLATE SHAPE "A" X "A"	BOLT PATTERN "B" X "B"	POLE PLATE THICK "C" (IN)	GUSSET THICK "D" (IN)	CONNECTION BOLT "F"	QTY. OF BOLTS	FIXED END DIA. (IN)	FREE END DIA. (IN)	GAUGE OR THICK (IN)	SPAN (FT)	BASE DIA. (IN)	TOP DIA. (IN)	WALL THICK (IN)	LENGTH (FT)
15.00																			7.00	4.90	7	15.00				
20.00																			8.00	5.20	7	20.00				
25.00	14.50	11.07	24.50	0.250	23.00	23.00	2.00	2.00	1.75	84.00	6.00	8.00	19.25 X 19.25	16.00 X 16.00	1.50	0.375	1.25"-7UNC X 3.25" LONG	4	10.00	6.50	7	25.00	11.78	9.47	0.1793	18.04
30.00																			10.50	6.30	7	30.00				
35.00																			11.00	6.10	3	35.00				
40.00																			12.50	6.90	3	40.00				
45.00	16.00	12.57	24.50	0.250	23.00	23.00	2.00	2.00	1.75	84.00	6.00	8.00	22.25 X 22.25	18.50 X 18.50	1.75	0.438	1.50"-7UNC X 3.75" LONG	4	13.00	6.70	3	45.00	13.33	10.77	0.1875	18.23
50.00																			13.00	6.36	DET.6	50.00				
55.00																			13.34	6.00	DET.6	55.00				
60.00																			14.04	6.00	DET.6	60.00				
65.00																			14.74	6.00	DET.6	65.00				
70.00	19.00	15.50	25.00	0.250	25.00	25.00	2.00	2.25	2.00	84.00	6.00	10.00	26.75 X 26.75	23.00 X 23.00	2.25	0.500	1.50"-7UNC X 4.50" LONG	4	15.44	6.00	DET.6	70.00	16.31	13.77	0.1875	18.11
75.00																			16.14	6.00	DET.6	75.00				



ARM RISE AFTER LOADING IS BETWEEN -0° DEG. +2° DEG FROM THE HORIZONTAL.

ARM SPAN (FT)	FIXED END DIA. (IN)	FREE END DIA. (IN)	GA.
15	4.50	2.38	11



TITLE CITY OF COMMERCE CITY, COLORADO TRAFFIC STRUCTURES

VALMONT INDUSTRIES, INC. RESERVES THE RIGHT TO INSTALL VARIOUS, ENGINEER APPROVED, MATERIAL HANGING ACCOMMODATIONS TO FACILITATE THE MANUFACTURING PROCESS.

valmont
Valley, NE 68064
(402) 359-2201

PAGE NUMBER: 2 OF 3
DRAWING NUMBER: DB00748
REV: B

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COMPUTER FILE INFORMATION

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Drawing Name: \$FILE\$\$	
Scale: \$SCALESHORT\$	Units: ENGLISH

APPROVAL

Maria R. Fisher
CITY ENGINEER

05-27-16
DATE

CITY OF COMMERCE CITY

Department of Public Works
8602 Rosemary St.
Commerce City, CO 80022
Ph: 303-289-8150

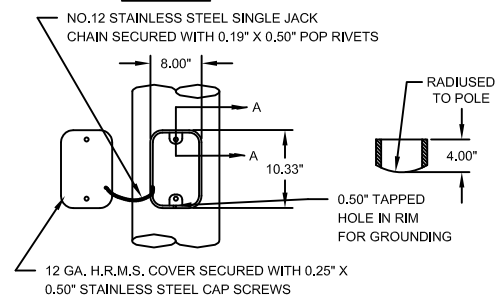
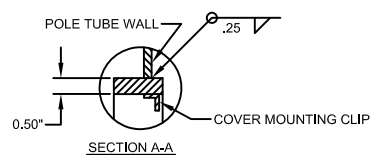
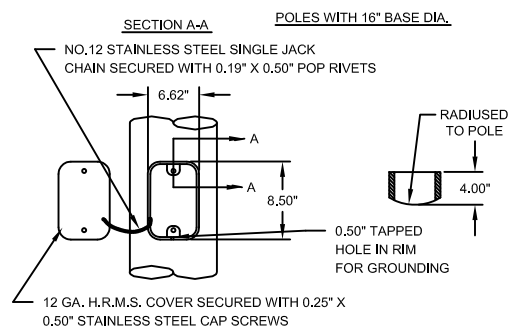
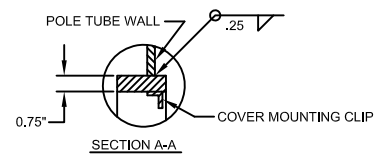
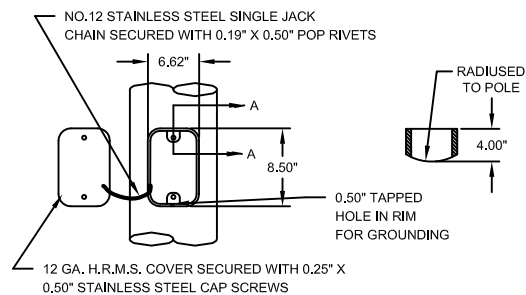
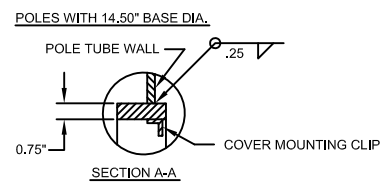
MASTARM POLES

ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. 900-15B

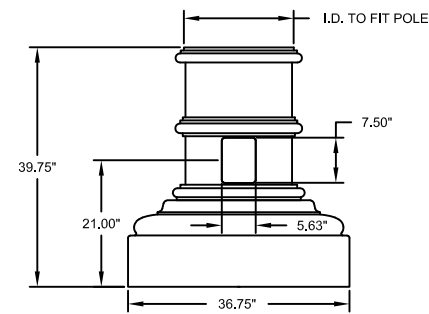
Sheet No. 1 of 1

NOTE: HAND HOLES ON THE 14.50" AND 19.00" BASE POLES WILL BE SEMI-FLUSH, HAND HOLES ON 16" BASE POLES WILL BE FLUSH.

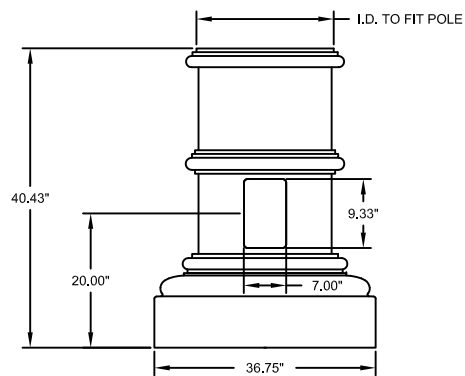


DETAIL 10 LOWER HANDHOLE

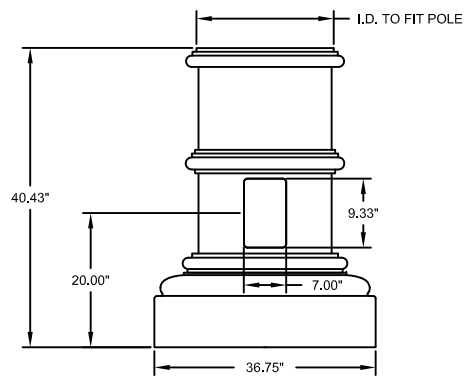
NOTE: ALL DIMENSIONS NOMINAL.



POLES WITH 14.50" O.D. BASE



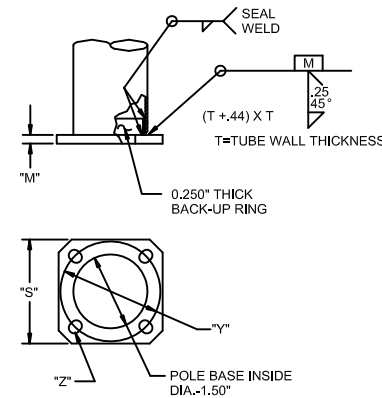
POLES WITH 16.00" O.D. BASE



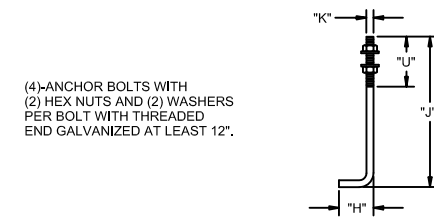
POLES WITH 19.00" O.D. BASE

DETAIL 11 DECORATIVE BASE COVERS

NOTE: THE HAND HOLES IN THE TRAFFIC POLES WILL BE MOUNTED TO CORRESPOND TO THE HAND HOLE OPENINGS IN THE DECORATIVE BASES.



DETAIL 12 POLE BASE



DETAIL 13 ANCHOR BOLT

THESE TRAFFIC SIGNAL SUPPORT STRUCTURES ARE DESIGNED IN ACCORDANCE WITH LOADING AND ALLOWABLE STRESS REQUIREMENTS OF 2001 AASHTO "STANDARDS SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", FOURTH EDITION, WIND LOADS ARE BASED ON A BASIC WIND SPEED OF 100 MPH WITH A RECURRENCE INTERVAL OF 50 YEARS, AND A FATIGUE CATEGORY OF II. FATIGUE LOADS ARE BASED ON THE REQUIREMENTS OF SECTION 11.7 AND THE FOLLOWING DESIGN LOADS:

VORTEX SHEDDING: NOT APPLICABLE FOR STRUCTURES WITH A TAPER OF AT LEAST 0.14 IN/FT, PER AASHTO.

NATURAL WIND GUSTS: THE YEARLY MEAN WIND SPEED FOR NATURAL WIND GUSTS WILL BE ASSUMED TO BE 11.2 MPH.

GALLOPING: STRUCTURES ARE NOT DESIGNED TO RESIST PERIODIC GALLOPING FORCES.

TRUCK-INDUCED GUST: STRUCTURES ARE DESIGNED TO INCLUDE TRUCK-INDUCED GUSTS. (THE SPECIFIED AVERAGE TRUCK SPEED IS 65 MPH)

AASHTO 2001 SPECIFICATIONS

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MASTARM POLES
ENGINEERING CONSTRUCTION STANDARDS

DETAIL NO. 900-15C
Sheet No. 1 of 1